Proposed Mitigated Negative Declaration

and

Initial Study

Upper Sulphur Creek Restoration Project

Lead Agency:

CITY OF LAGUNA NIGUEL

Prepared by:

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November 2004

MITIGATED NEGATIVE DECLARATION

CITY OF LAGUNA NIGUEL
UPPER SULPHUR CREEK ECOSYSTEM RESTORATION PROJECT

INTRODUCTION

The City of Laguna Niguel proposes environmental restoration of an existing open space corridor along Upper Sulphur Creek. Restoration activities would occur along Upper Sulphur Creek, adjacent to Crown Valley Parkway in the City of Laguna Niguel from approximately Glen Rock Drive in the north downstream to approximately 800 feet southwest of La Plata Drive. The project would be crossed by La Plata Drive, La Paz Road, Nueva Vista Drive, and Moulton Parkway.

As required by the California Environmental Quality Act (CEQA), an Initial Study has been prepared for the proposed project. In response to the conclusions of the project's Initial Study, this Mitigated Negative Declaration has been prepared. This document is the finalized Mitigated Negative Declaration (MND) for the proposed project. An Initial Study (IS) and a draft of the MND was prepared for the project and circulated for public review beginning September 29, 2004 and ending October 28, 2004 for a 30-day public review period. The document was submitted to the Governor's Office of Planning and Research, State Clearinghouse (SCH), which established a 30-day public review period from September 30, 2004 to October 29, 2004. The proposed project's SCH number is 2004101015.

Seven comment letters were received during the public review period. Written responses to these comments are provided in Appendix A, Response to Comments. Comment letters are included in Appendix B. Appendix C presents modifications to the text of the Initial Study that were made in response to comments and minor changes made to the project description. Also new to this MND is the Mitigation Monitoring Plan (MMP), Appendix D. The MMP lists all mitigation proposed in the Initial Study (IS) and details how the City of Laguna Niguel intends to implement each mitigation measure. The MND also includes Appendices E (Air Quality Calculations) and F (Conceptual Plan), which were included in the circulated MND and IS. For ease of review, a line down the side of the affected text marks any changes to the text of the MND and IS.

PROJECT DESCRIPTION

The project would restore up to 27.7 acres of open space along approximately 1.52 miles of Upper Sulphur Creek adjacent to Crown Valley Parkway. The project area extends from the Glen Rock Drive and Crown Valley Parkway intersection through Rancho Niguel Master Association property (the "Upper Reach"), southwest under Moulton Parkway. The project continues through Rancho Niguel Master Association property to approximately 260 feet northeast of Nueva Vista Drive, where the project crosses into Crown Royale Homeowners Association (HOA) property (the "Middle Reach"). The project continues southwest adjacent to Crown Valley Parkway through Crown Royale HOA property to La Paz Road. Crossing under La Paz Road, where the project ~~would~~ enters Niguel Ridge HOA property (the "Lower Reach") and continue southwest to approximately 800 feet southwest of La Plata Drive. Project activities would include the removal of up to 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches to create a wider soft-bottom channel. Floodplain terraces adjacent to the channel would be created to be inundated by water during winter storms of various intensities.

Portions of the existing irrigated ornamental landscaping and all invasive weedy vegetation would be removed and replaced with a mosaic of vegetation communities native to the local environment. Invasive and ornamental elimination and concrete removal activities would differ for each of the three reaches within the project area:

- Upper Reach – All non-native species, such as pampas grass and tamarisk, would be removed from the mixed native/ornamental landscape. Ornamental shrubs and trees would be removed only if they are inside the stream channel. Streetscape landscaping would remain unchanged.
- Middle Reach – Turfgrass would be stripped~~. Eucalyptus would be removed~~ from within the restoration project limits and replaced with native understory plants, willows, oaks and sycamore trees. The perimeter along the roadways would remain undisturbed as an ornamental scenic buffer and use zone. The existing concrete v-ditch would be demolished and the site would be graded to create a wider soft-bottom channel. Terraced zones would also be graded at differing floodplain levels adjacent to the streambanks. Rock or other suitable materials would be placed, as needed, in the narrower portions of the stream channel to control erosion.
- Lower Reach – Existing ornamental shrubs, weeds, and eucalyptus would be selectively removed and the concrete v-ditch in the upper portion of the reach would be demolished. Where possible, the active channel would be graded and planted within the 5-year flood elevation on the west bank. Ungrouted rock would be placed in the streambed as necessary to control erosion.

Replacement plant species would be selected and arranged in plant communities in accordance with their adaptation to the specific hydrological regimes, microclimates, soil conditions, and distances above the stream flowline elevation. Plants would be installed from containers or seed purchased from local specialty growers or from cuttings taken at the site. The channel bed would have constant open, flowing water derived from urban runoff that would support marshy vegetation. The lower channel banks would support native willows, and the lower terraces would support riparian woodland plants such as sycamores and cottonwoods. Upper terrace areas would be planted with coast live oaks (*Quercus agrifolia*) and associated native species and cultivars.

Excavation would be largely minimal in the Upper Reach, but would occur with the removal of the v-ditch and grading of the active channel in the Middle and Lower Reaches. Material excavated during the project (approximately 12,000 cubic yards) would be used as fill at a permitted construction site or would be disposed of at the Olinda Alpha Sanitary Landfill in Brea, approximately 32 miles from the proposed project site. ~~on site in two areas: one in the Upper Reach and one in the Middle Reach. Fill material in the Upper Reach would help stabilize an upland sage scrub area (see Figures 13a and 16a in Appendix B, Upper Sulphur Creek Conceptual Restoration Plan). Fill in the Middle Reach would be used in leveling the ground in a new proposed park area near the intersection of La Paz Road and Crown Valley Parkway (see Figures 19, 21, and 23 in Appendix B, Upper Sulphur Creek Conceptual Restoration Plan). Alternatively, excavated dirt could be used as fill at a permitted location at Crown Valley Community Park.~~

The proposed project maintains the access currently provided to the project area by existing paved paths and unpaved trails. Interpretive signage would be added at key locations along the trails and at an existing concrete-paved trailside plaza located in the Upper Reach.

Following planting, the restored area would be regularly maintained by the City to remove invasive weeds, pick up trash, remove flow obstacles, and repair erosion. Supplemental irrigation may be required following completion of the project if weather conditions are particularly dry. Other project activities that would be performed following the planting of the new native vegetation include:

- Quarterly monitoring for at least two years by qualified field biologists to track the establishment of the vegetation communities and colonization by native fauna and migratory birds; and
- Water flow and quality parameters, including phosphorus, nitrogen, and bacteria, will also be monitored at key locations along the project for up to one year.

AVAILABILITY OF DOCUMENTS

In accordance with CEQA, a 30-day public review period for the Proposed Upper Sulphur Creek Ecosystem Restoration Project Mitigated Negative Declaration and Initial Study commenced on September 29, 2004 and concluded on October 29, 2004. On ~~November 16~~December 7, 2004 the Laguna Niguel City Council will conduct a certification hearing for the Upper Sulphur Creek Ecosystem Restoration Project Mitigated Negative Declaration and Initial Study. Copies of the Initial Study and other documents utilized in conducting the environmental assessment for the proposed project are on file and available for review at the following address:

City of Laguna Niguel
27791 La Paz Road
Laguna Niguel, CA 92677

ENVIRONMENTAL DETERMINATION

An Initial Study was prepared to identify the potential effects on the environment from the establishment of the proposed addition and to evaluate the significance of these effects. Based on the Initial Study, the restoration project would have less than significant effects or no impacts related to the following issues:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Hazards and Hazardous Materials
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Utilities and Services Systems

However, the environmental assessment presented in the Initial Study identifies nine environmental impacts associated with four issues that could be potentially significant unless mitigation measures are applied that can effectively reduce or avoid the impacts. The four issues are:

- Cultural Resources
- Geology and Soils
- Hydrology and Water Quality
- Noise

Measures have been formulated to effectively mitigate all of the potentially significant environmental impacts identified in the Initial Study. Implementation of these mitigation measures can avoid the impacts or reduce them to a less than significant level. The mitigation measures are presented below.

MITIGATION MEASURES

Implementation of the following mitigation measures would avoid potentially significant impacts identified in the Initial Study or reduce them to a less than significant level.

Cultural Resources

CR-1 In the event of the discovery of cultural resources (e.g., archaeological, paleontological, or human remains) during project-related activities, all work shall immediately stop within 100 feet of the discovery. A qualified cultural resource specialist would be notified immediately and would implement measures as necessary to avoid or minimize harm to the discovery, pending the results of an evaluation. Ground disturbance in the vicinity of the discovery would not resume until a qualified archaeologist has evaluated and treated the discovery. Evaluation and curation procedures shall meet the standards mandated by the California Office of Historic Preservation.

Geology and Soils

GS-1 A comprehensive Erosion Control Plan shall be prepared for project construction. The Plan shall identify measures to be implemented to minimize the erosion effects of grading and excavation. Erosion control methods to be described in the Plan and implemented shall include, but not be limited to, the following:

- Avoiding soil disturbance during periods of heavy precipitation or high winds;
- Keeping disturbed areas to the minimum necessary for construction;
- Reducing surface water flows across graded or exposed areas;
- Using straw bales, soil mats, or silt fences to stabilize disturbed areas;
- Using culvert, ditches, water bars and sediment traps to control runoff and sedimentation; and
- Bioengineering techniques for erosion control.

Hydrology and Water Quality

WQ-1 A storm water pollution prevention plan (SWPPP) shall be developed and implemented by the contractor to prevent or reduce the effects of earth moving, handling of toxic materials, and other disturbances in and adjacent to the channel that may cause accelerated erosion, scouring and water contamination. The SWPPP shall show BMPs that will be required to control discharges from the construction site as well as from waste handling and disposal areas. The SWPPP will be prepared in accordance with the Orange County Stormwater Program Construction Runoff Guidance Manual 2003. The SWPPP shall include methods of on-site storage and disposal of construction materials and construction waste, and methods to minimize or eliminate the exposure of stormwater to construction materials, equipment, vehicles, waste storage areas, or service areas. The comprehensive erosion control plan required under GS-1 shall be included as part of the SWPPP.

Noise

N-1 The City of Laguna Niguel shall ensure through either an agreement with the construction contractor or through regular monitoring of construction activity that the construction contractor does all the following:

- Properly maintains and tunes engines on all construction equipment;
- Maintains properly functioning mufflers on all internal combustion and vehicle engines used in construction to reduce noise; and
- Observes working hours restrictions in accordance with the City Noise Ordinance.

TABLE OF CONTENTS

PAGE

ENVIRONMENTAL CHECKLIST

1. Project Title 1
2. Lead Agency/Project Sponsor Name and Address 1
3. Contact Person and Phone Number 1
4. Project Location 1
5. General Plan Designation 1
6. Zoning 1
7. Surrounding Land Uses and Setting 1
8. Project Site Location 2
9. Required Permits and Approvals 8

Environmental Factors Potentially Affected 9

Environmental Determination 9

Evaluation of Environmental Impacts 10

ENVIRONMENTAL ANALYSIS AND DISCUSSION OF IMPACTS

I. Aesthetics 10
II. Agricultural Resources 11
III. Air Quality 12
IV. Biological Resources 18
V. Cultural Resources 23
VI. Geology and Soils 25
VII. Hazards and Hazardous Materials 28
VIII. Hydrology and Water Quality 31
IX. Land Use and Planning 35
X. Mineral Resources 36
XI. Noise 38
XII. Population and Housing 41
XIII. Public Services 42
XIV. Recreation 45
XV. Transportation and Traffic 46
XVI. Utilities and Service Systems 49
XVII Mandatory Findings of Significance 52
XVIII References 53
XIX. List of Preparers and Reviewers 55

APPENDICES

A. Air Quality Calculations
B. Conceptual Restoration Plan

CEQA Environmental Checklist Form

1. PROJECT TITLE

Upper Sulphur Creek Ecosystem Restoration Project (proposed project).

2. LEAD AGENCY/PROJECT SPONSOR NAME AND ADDRESS

City of Laguna Niguel
27791 La Paz Road
Laguna Niguel, CA 92677
(949) 362-4300

3. CONTACT PERSON AND PHONE NUMBER

Nancy Palmer
Senior Watershed Manager
City of Laguna Niguel Public Works Department
(949) 362-4384
npalmer@ci.laguna-niguel.ca.us

4. PROJECT LOCATION

Proposed project activity would occur along Upper Sulphur Creek, adjacent to Crown Valley Parkway in the City of Laguna Niguel. Restoration activities would occur over a 1.52-mile length of Sulphur Creek from approximately Glen Rock Drive in the north, flowing in a southwesterly direction downstream to approximately 1,000 feet southwest of La Plata Drive. The project would be crossed by La Plata Drive, La Paz Road, Nueva Vista Drive, and Moulton Parkway. Figure 1 illustrates the proposed project area.

5. GENERAL PLAN DESIGNATION

The proposed project area is shown within the City of Laguna Niguel's General Plan. With the exception of one small portion near Nueva Vista Drive designated as "Public/Institutional," the entire project area is designated as "Open Space."

6. ZONING

According to the City of Laguna Niguel Official Zoning Code Map, the proposed project would primarily occur on lands zoned as "OS: Open Space District," although a small portion of the project near Nueva Vista Drive would occur on land zoned as "PI: Public/Institutional District."

7. SURROUNDING LAND USES AND SETTING

The proposed project area is located within the Aliso Creek Watershed in the City of Laguna Niguel in southern Orange County, California. Areas surrounding the project have been intensively developed with urban uses, particularly single-family Mediterranean-style residences on both sides of Sulphur Creek and the parallel Crown Valley Parkway. Residences sit along the canyon ridgelines approximately 30 to 200 feet above the stream. The proposed restoration of Upper Sulphur Creek is located alongside Crown Valley Parkway immediately to the southeast of the project; and on common-area properties owned by the the Niguel Ridge, Crown Royale, and Rancho Niguel residential communities to the northwest. A continuous public sidewalk along most of the project west of Crown Valley Parkway provides access. An unpaved regional hiking/equestrian trail extends along the upstream portion of the project area. Other

single-family residential communities line the southeast side of Crown Valley Parkway. Other nearby uses include two elementary schools, one middle school, four parks, multi-family residential communities, and commercial areas.

8. PROJECT SITE LOCATION

The proposed project consists of the restoration of approximately 28 acres along the 1.52-mile long Upper Sulphur Creek corridor in the City of Laguna Niguel. The project would be divided into three sub-areas:

- The Upper Reach – Owned by the Rancho Niguel Master Homeowners Association, this reach currently contains approximately 16 acres of riparian woodland and native scrub vegetation, intermixed with ornamental plants and invasive weeds;
- The Middle Reach – Owned by the Crown Royale Homeowners Association, this reach currently consists of approximately 5.5 acres of ornamental landscaping along the concrete v-ditch which contains Sulphur Creek; and
- The Lower Reach – The project area in this reach is owned by the Niguel Ridge Homeowners Association. In the upstream portion of this reach, Sulphur Creek continues to flow in a concrete v-ditch surrounded by ornamental plants. The downstream portion of the Lower Reach, however, consists of marsh and woodland areas, heavily infested with invasive plants.

Figure 2 depicts the three reaches within the project area. Restoration activities would occur in all three reaches, consisting of the elimination of invasive and ornamental species and their replacement with native species in all reaches, the removal of concrete v-ditches in the Middle and Lower Reaches, and the addition of interpretive signage. Although project restoration activities would occur on private lands owned by the Rancho Niguel Master, Crown Royale, and Niguel Ridge Homeowners Associations, maintenance easements for the project would be negotiated so that maintenance responsibility for the creek channel and adjacent restored areas would be taken over by the City. Crown Valley Parkway is a designated Landscape Scenic Corridor.

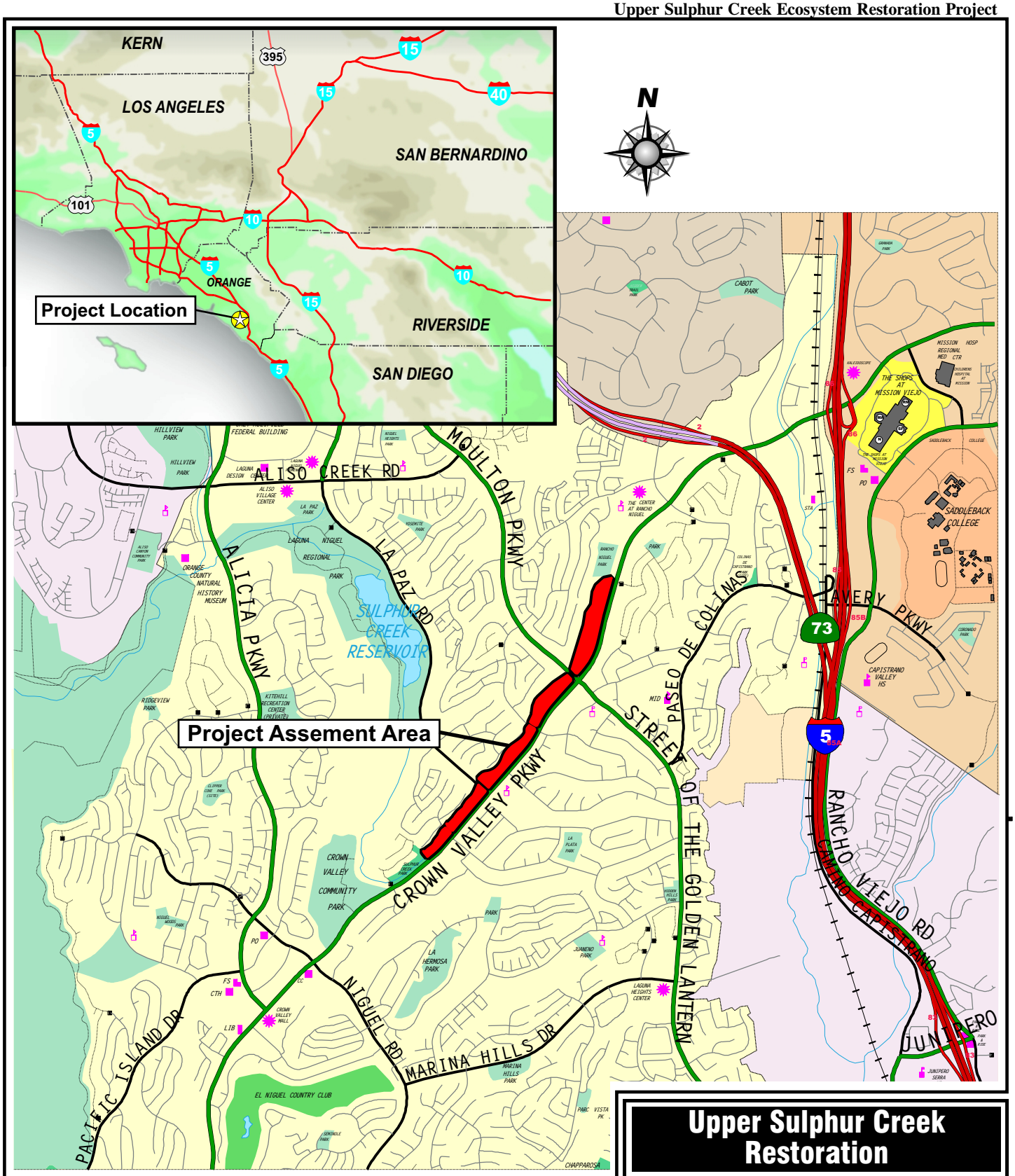
8.1 General Project Setting

The proposed restoration project lies along a portion of Upper Sulphur Creek, which serves a drainage area of approximately three square miles within Laguna Niguel, located in the coastal hills of southern Orange County. Sulphur Creek drains into Aliso Creek approximately three miles upstream of Aliso Creek's mouth at the Pacific Ocean. The portion of Upper Sulphur Creek included in the project is fed by storm drains in the neighborhoods on both sides of Crown Valley Parkway. Project restoration activities would occur over 28 acres along a 1.52-mile corridor between Rancho Niguel Park and Sulphur Creek Park.

8.2 Project Objectives

Proposed project objectives include the following:

- Re-establishing self-sustaining native wildlife habitat;
- Re-connecting habitat in Upper Sulphur Creek with existing downstream habitat;
- Expanding habitat opportunities for migratory songbirds of federal interest;
- Eliminating invasive weeds proliferating downstream in Sulphur Creek;
- Conserving irrigation water by eliminating regular ornamental landscape irrigation;
- Improving Aliso watershed water quality by reducing fertilizer and pesticide applied to the surrounding landscape and by the development of natural biofiltration and depositional processes;
- Attenuating flow rates by increasing channel roughness and storage as well as permeability;
- Educating the public about wetland processes, plant communities, and water cycles; and
- Providing a peaceful nature refuge while maintaining passive recreational functions.



Map: Thomas Bros. Los Angeles/Orange Co.,2004.

Upper Sulphur Creek Restoration

Figure 1

Project Location

Aspen Environmental Group

RBF

Aerial from the City of Laguna Niguel, June 2003.

Aspen Environmental Group	Project Area	Upper Sulphur Creek Restoration Figure 2

8.3 Project Background

Historically, the project area was characterized by rolling hills covered largely with coastal sage scrub and native grassland, which, after European settlement, was used for cattle ranching on land grants initially associated with Mission San Juan Capistrano. Over 30 years ago, the Creek was channelized in conjunction with rapid urbanization that converted the entire headwaters area to suburban street gutters and underground piping systems. The original cross-sectional width of the Creek floodplain is now largely occupied by Crown Valley Parkway, and Upper Sulphur Creek is constrained to a narrow strip parallel to the roadway.

In 2002, the Aliso Creek Watershed Management Plan listed the restoration of Upper Sulphur Creek as a high-priority recommended action. Other restoration activities on Sulphur Creek, including habitat mitigation in Sulphur Creek Park immediately downstream of the project area, a U.S. Army Corps of Engineers ecological restoration project on an intermediate reach of Sulphur Creek, and additional habitat mitigation sites in Crown Valley Community Park, have already been or are in the process of being implemented. Biological surveys in Upper Sulphur Creek were performed in 2003 to determine the status of potential endangered species and initiate permit negotiations with resource agencies.

8.4 Existing On-Site Uses

The 3,600-foot long Upper Reach is 16 acres of open space dominated by riparian woodland and native scrub vegetation, heavily intermixed with ornamentals and infested with invasive weeds such as pampas grass (*Cortaderia selloana*) and tamarisk (*Tamarix gallica*). The project area in the Upper Reach averages approximately 200 feet in width. In the 1,700-foot long Middle Reach, the creek currently runs in a concrete-lined v-ditch, landscaped with approximately 5.5 acres of irrigated turfgrass and eucalyptus trees. The creek continues in the 2,700-foot long Lower Reach in a concrete v-ditch for another 1,900 feet before returning to soft-bottom channel. The Lower Reach is surrounded by 6 acres of irrigated landscaping dominated by flowering ornamental shrubs. The project would restore a corridor up to 100 feet in width in the Lower Reach.

The Upper Reach of the project currently provides a limited wildlife habitat area that is disconnected from habitat downstream of the rest of the project area. Restoring a native plant palette would re-establish vegetation communities and wildlife habitat that historically existed along the entire length of the project area.

In the case of both the Middle and Lower Reaches, the channelized creek bed has relatively steep banks. Low-level stream flows are confined to the narrow concrete or earthen ditch, but rise to higher levels during storms, providing water to higher levels along the stream banks.

A regional multi-use trail runs above the west bank of the Upper and Middle Reaches of the creek. A paved sidewalk follows the east bank of the creek through all the reaches.

8.5 Project Components

The project would restore up to 27.7 acres of open space along approximately 1.52 miles of Upper Sulphur Creek adjacent to Crown Valley Parkway. The project area extends from the Glen Rock Drive and Crown Valley Parkway intersection through Rancho Niguel Master Association property, southwest under Moulton Parkway. The project continues through Rancho Niguel Master Association property to approximately 260 feet northeast of Nueva Vista Drive, where the project crosses into Crown Royale Homeowners Association (HOA) property. The project continues southwest adjacent to Crown Valley Parkway through Crown Royale HOA property to La Paz Road. Crossing under La Paz Road, the project would enter Niguel Ridge HOA property and continue southwest to approximately 800 feet southwest of La Plata Drive. Project activities would include the removal of up to 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches to create a wider soft-bottom channel. Floodplain terraces adjacent to

the channel would be created to be inundated by water during winter storms of various intensities. Portions of the existing irrigated ornamental landscaping and all invasive weedy vegetation would be removed and replaced with a mosaic of vegetation communities native to the local environment. Invasive and ornamental elimination and concrete removal activities would differ for each of the three reaches within the project area:

- Upper Reach – All non-native species, such as pampas grass and tamarisk, would be removed from the mixed native/ornamental landscape. Ornamental shrubs and trees would be removed only if they are inside the stream channel. Minimal excavation would occur in this reach. Streetscape landscaping would remain unchanged.
- Middle Reach – Turfgrass would be stripped and replaced with a low water variety of turfgrass. Eucalyptus would be removed from within the restoration project limits and replaced with oaks and sycamore trees. The perimeter along the roadways would remain undisturbed as an ornamental scenic buffer and use zone. The existing concrete v-ditch would be demolished and the site would be graded to create a wider soft-bottom channel. Terraced zones would also be graded at differing floodplain levels adjacent to the streambanks. Ungrouted rock would be placed as needed in the narrower portions of the stream channel to control erosion.
- Lower Reach – Existing ornamental shrubs, weeds, and eucalyptus would be selectively removed and the concrete v-ditch in the upper portion of the reach would be demolished. Where possible, the active channel would be graded and planted within the 5-year flood elevation on the west bank. Ungrouted rock would be placed in the streambed as necessary to control erosion.

Replacement plant species would be selected and arranged in plant communities in accordance with their adaptation to the specific hydrological regimes, microclimates, soil conditions, and distances above the stream flowline elevation. Plants would be installed from containers or seed purchased from local specialty growers or from cuttings taken at the site. The channel bed would have constant open, flowing water derived from urban runoff that would support marshy vegetation. The lower channel banks would support native willows, and the lower terraces would support riparian woodland plants such as sycamores and cottonwoods. Upper terrace areas would be planted with coast live oaks (*Quercus agrifolia*) and associated native species and cultivars.

Excavation would be largely minimal in the Upper Reach, but would occur with the removal of the v-ditch and grading of the active channel in the Middle and Lower Reaches. Material excavated during the project would be used as fill on-site in two areas: one in the Upper Reach and one in the Middle Reach. Fill material in the Upper Reach would help stabilize an upland sage scrub area (see Figures 13a and 16a in Appendix B. Upper Sulphur Creek Conceptual Restoration Plan). Fill in the Middle Reach would be used in leveling the ground in a new proposed park area near the intersection of La Paz Road and Crown Valley Parkway.

The proposed project maintains the access provided to the project area by existing paved paths and unpaved trails. Interpretive signage would be added at key locations along the trails and at an existing concrete-paved trailside plaza located in the Upper Reach.

Following planting, the project area would be regularly maintained by the City to remove invasive weeds, pick up trash, remove flow obstacles, and repair erosion. Supplemental irrigation may be required during the first two years following completion of the project if weather conditions are particularly dry. Other project activities that would be performed following the establishment of the new native vegetation include:

- Quarterly monitoring for at least two years by qualified field biologists to track the establishment of the vegetation communities and colonization by native fauna and migratory birds; and
- Water flow and quality parameters, including phosphorus, nitrogen, and bacteria, will also be monitored for up to one year at key locations along the project.

8.6 Project Construction Schedule

Project construction would begin in approximately early May 2005 and would conclude in November 2005. Biological and water quality monitoring activities would continue for at least another one to two years following completion of project construction activities.

Table 1 provides a summary of existing and proposed site uses and construction characteristics.

Table 1. Summary of Project and Site Characteristics

	Upper Reach	Middle Reach	Lower Reach	Total
Reach Length	3,573 feet	2,240 feet	2,038 feet	8,051 feet
Average Reach Width	200 feet	150 feet	100 feet	--
Project Area Acreage	21 acres	8.5 acres	7.5 acres	37.0 acres
Concrete Demolition	--	1,700 linear feet	1,900 linear feet	3,600 linear feet
Remove Invasive Weeds	2.9 – 5.6 acres*	--	0.5 acre	3.4 – 6.1 acres*
Remove Irrigated Turfgrass	--	1.3-2.5 acres*	--	1.3-2.5 acres*
Remove Irrigated Ornamentals	0 – 2.7 acres	--	3.3 - 3.9 acres*	3.3 – 6.6 acres*
Excavate soft-bottom channels and terraces	--	1,700 linear feet	1,900 linear feet	3,600 linear feet
Enhance existing waters and coastal freshwater marsh (Corps Jurisdictional)	6.9 acres	--	0.5 acre	7.4 acres
Enhance existing southern willow riparian woodland (CDFG Jurisdictional)	8 acres	--	0.6 acre	8.6 acres
Enhance existing coastal sage/grass mosaic	0.8 acre	--	--	0.8 acre
Establish new coastal freshwater marsh	--	0.5 acre	0.5 acre	1 acre
Establish new southern willow riparian woodland	0.9 acre	2.2 acres	1.3 acres	4.4 acres
Establish new coastal sage/grass mosaic	4 – 6.7 acres*	0 – 0.6 acre*	0.5 acre	4.5 – 7.8 acres*
Establish new oak and sycamore woodland (park)	--	1.5 acres	--	1.5 acres
Existing (pre-project) wetland and waters habitat: 7.7 acres				
Post-project wetland and waters habitat: 9.3 acres				
Existing southern willow riparian habitat: 9.4 acres				
Post-project willow riparian habitat: 15.7 acres				
Project Construction Schedule				
May 2005 – September 2005	Concrete demolition, invasive and ornamental removal, grading			
October 2005 – November 2005	Planting activities			
Construction Equipment				
1 Backhoe				
1 Grader				
1 Haul Truck				
2 Jackhammers				

* Note: Ranges indicate the potential minimum and maximum acreages of activity based on the planting plans described in Appendix B: Upper Sulphur Creek Ecosystem Restoration Project Conceptual Plan.

9. Required Permits and Approvals

The proposed project would require the permits and approvals listed in Table 2 below.

Table 2. Required Permits and Approvals

Agency/ Department	Permit/Approval	Description
Local		
Orange County Flood Control District	Encroachment Permit	An encroachment permit is required for construction in floodplain easements under the jurisdiction of the Orange County Flood Control District.
State of California		
San Diego Regional Water Quality Control Board (Region 9)	Section 401 WQC	Section 401 of the Clean Water Act grants each state the right to ensure that the State's interests are protected on any federally permitted activity occurring in or adjacent to waters of the State. If a proposed project requires a USACE Section 404 permit (see below), falls under other federal jurisdictions, and has the potential to impact waters of the State, the applicable Regional Water Quality Control Board (in this case San Diego Regional Water Quality Control Board) would regulate the project and associated activities through a Water Quality Certification (WQC) (Section 401), which verifies that the project activities will comply with State water quality standards.
California Department of Fish and Game	Section 1602 Streambed Alteration Agreement	Section 1602 of the California Fish and Game Code requires that a Streambed Alteration Agreement be submitted to the California Department of Fish and Game for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." The proposed project would alter the streambed of Sulphur Creek.
Federal		
United States Army Corps of Engineers	Section 404 Permit	A request of verification that the project falls under Nationwide Permit (NWP) 27, Wetland and Riparian Restoration and Creation Activities, must be submitted to the Army Corps of Engineers. The Army Corps of Engineers will determine whether or not project activity meets the terms and conditions of NWP 27 under Section 404. This verification is needed because the proposed project would discharge dredged or fill material into waters of the United States (Sulphur Creek).

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by the project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards and Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

ENVIRONMENTAL DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An EIR is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the project, nothing further is required.

Signature *Date*

Ken Montgomery, Director of Public Works
City of Laguna Niguel
27791 La Paz Road
Laguna Niguel, California 92677

EVALUATION OF ENVIRONMENTAL IMPACTS:

I. Aesthetics

Setting

Proposed project activity would occur along Upper Sulphur Creek, adjacent to Crown Valley Parkway in the City of Laguna Niguel (see Figure 1). Areas surrounding the proposed project area are developed with residential communities containing Mediterranean-style homes that sit along canyon ridgelines approximately 30 to 200 feet above the creek corridor. A continuous public sidewalk along the east side of the creek provides access for the entire project area while an unpaved regional hiking/equestrian trail extends along the upstream portion of the project area.

Views of the proposed project reaches occur mainly from the residential communities described above as well as from nearby open space used for recreation. The proposed project corridor is dedicated open space that contains a small creek and associated vegetation. The project corridor incorporates natural characteristics into the surrounding development and is considered a local scenic resource.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

AESTHETICS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a. Would the project have a substantial adverse effect on a scenic vista?

LESS THAN SIGNIFICANT IMPACT. The proposed project would visually enhance the project area due to the restoration of native vegetation and return of the stream bottom to a more natural appearance. Short-term visual impacts would result during construction activities due to the use of large construction equipment in an area with moderate visual quality and due to the time required for vegetation to mature. Although restoration activities would temporarily degrade the visual quality of the project area, the long-term result of restoration would ultimately produce a visual setting that would be more visually pleasing than existing conditions. Therefore, the proposed project would have a short-term adverse, but less than significant impact, and would have a long-term beneficial impact on the scenic vistas in the project area.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

LESS THAN SIGNIFICANT IMPACT. The proposed project would traverse alongside Crown Valley Parkway, designated by Orange County as a Landscape Scenic Corridor, but the proposed project is not located along a State scenic highway (Caltrans, 2004). Scenic resources may be temporarily damaged with the removal of some non-native or ornamental trees and vegetation, but the proposed project would result in a long-term beneficial impact to the project area and surrounding areas that have views of the project area. Because impacts would be temporary and would not occur within the viewshed of a State scenic highway, impacts would be less than significant.

c. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

LESS THAN SIGNIFICANT IMPACT. The proposed project would incorporate natural character into the project area, thereby improving its visual setting and that of its surroundings. Native plants with a "neater" appearance will be concentrated next to public accessways and existing streetscapes will remain unchanged. During construction, equipment usage and restoration activities could temporarily disrupt or degrade the visual character of the project area and its surroundings. However, due to the short duration of the construction activities, impacts would be considered adverse, but less than significant.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

NO IMPACT. The proposed project would not create new light or glare sources in the project area. No nighttime construction is planned, and the proposed project would not include operational lighting. No impact would occur.

II. Agricultural Resources

SETTING

The California Department of Conservation (DOC) established the Farmland Mapping and Monitoring Program (FMMP) in 1982 to assess the location, quantity, and quality of agricultural lands and conversion of these lands to other uses. Every even numbered year, FMMP issues a Farmland Conversion Report. FMMP data are used in elements of some county and city general plans, in environmental documents as a way of assessing project impacts on Prime Farmland and in regional studies on agricultural land conversion, and in assessing impacts of proposed projects.

The U.S. Department of Agriculture, Soils Conservation Service, classifies notable agricultural lands as follows:

- Prime Farmland: Land that has the best combination of physical and chemical properties for the production of crops
- Farmland of Statewide Importance: Similar to Prime Farmland, but with minor shortcomings (e.g., steeper slopes, inability to hold water)
- Unique Farmland: Land of lesser quality soils, but recently used for the production of specific high economic value crops.

Collectively, these valuable agricultural lands are referred to as Farmland.

The proposed project area is located in suburban Orange County, California, and includes no lands designated by the DOC for agricultural uses, Farmland, or other lands subject to a Williamson Act contract (DOC, 2004a and 2004b). In addition, the City of Laguna Niguel has no lands designated for agricultural uses (City of Laguna Niguel, 2002a, 2002b, and 2004a).

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

AGRICULTURAL RESOURCES - In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agricultural farmland. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c. Involve other changes in the existing environment, which, due to their location or nature, could individually or cumulatively result in loss of Farmland, to non-agricultural use?	☐	☐	☐	☒

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

NO IMPACT. The proposed project area includes no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (DOC, 2004b). Therefore, the proposed project would have no impacts on lands designated as Farmland.

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

NO IMPACT. The proposed project area includes no lands zoned for agricultural use or subject to a Williamson Act contract (DOC, 2004a). The nearest lands subject to a Williamson Act contract are several miles away from the project area (DOC, 2004a), and the City of Laguna Niguel contains no lands zoned for agricultural use (City of Laguna Niguel, 2002b). Therefore, the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. No impacts would occur.

c. Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

NO IMPACT. As described above, the proposed project would not be located on existing farmland, land zoned for farming, or land near agricultural operations. The proposed project is located within an urbanized area. Therefore, the proposed project would not have the potential to affect Farmland or result in its conversion to non-agricultural use. Additionally, as noted in Section XII, Population and Housing, the project is not growth-inducing and would not be expected to induce or exacerbate off-site agricultural conversion. Therefore, no impacts to the conversion of Farmland are expected from the proposed project.

III. Air Quality

Setting

Ambient Air Quality Standards. Regulation of air pollution is achieved through a combination of ambient air quality standards and emission limits for individual sources and categories of sources of air pollutants. The Federal Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards are established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. These pollutants are called “criteria” air pollutants because the intent of the standards is to meet specific public health and welfare criteria. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants (referred to as State Ambient Air

Quality Standards or State standards). The applicable federal and State ambient air quality standards (AAQS) and a brief discussion of the related heath effects and principal sources for each pollutant are presented in Table 3.

Table 3. Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone (O_3)	8 Hour	0.08 ppm (157 µg/m3)	—	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	1 Hour	0.12 ppm (235 µg/m^3)	0.09 ppm (180 µg/m^3)		
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m3)	9.0 ppm (10 mg/m3)	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	1 Hour	35 ppm (40 mg/m3)	20 ppm (23 mg/m3)		
Nitrogen Dioxide (NO_2)	Annual Avg.	0.053 ppm (100 µg/m^3)	—	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	1 Hour	—	0.25 ppm (470 µg/m^3)		
Sulfur Dioxide (SO_2)	Annual Avg.	0.03 ppm (80 µg/m^3)	—	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)		
	3 Hour	0.5 ppm (1300 µg/m^3)	—		
	1 Hour	—	0.25 ppm (655 µg/m^3)		
Respirable Particulate Matter (PM_{10})*	Annual Arithmetic Mean	50 µg/m^3	20 µg/m^3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 Hour	150 µg/m^3	50 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)*	Annual Arithmetic Mean	15 µg/m^3	12 µg/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	24 Hour	65 µg/m^3	—		
Lead	Calendar Quarter	1.5 µg/m^3	—	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	30 Day Average	—	1.5 µg/m^3		

* On June 20, 2002, the Air Resources Board approved the recommendation to revise the PM_{10} annual average standard to 20 µg/m^3 (arithmetic mean) and to establish an annual average standard for $PM_{2.5}$ of 12 µg/m^3 (arithmetic mean). On June 5, 2003, the Office of Administrative Law approved the amendments to the regulations for PM. Information regarding these revisions can be found at www.arb.ca.gov/research/aaqs/std-rs/std-rs.htm.

Attainment Status. As required by the Federal Clean Air Act, U.S. EPA classifies air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act also requires designation of areas as "attainment" or "nonattainment" for the State standards, rather than the national standards. Thus, areas in California have two sets of attainment/nonattainment designations: one set with respect to the national standards and one set with respect to the State standards. The project site is located within the South Coast Air Basin (SCAB), which includes the non-Antelope Valley portion of Los Angeles County, Orange County, Riverside County, and the non-desert portion of San Bernardino County. The current attainment status for the SCAB is provided in Table 4.

Table 4. Attainment Status for the South Coast Air Basin

Pollutants	Federal Classification	State Classification
Ozone (1-hour)	Extreme Non-Attainment	Extreme Non-Attainment
Ozone (8-hour)	Severe Non-Attainment	N/A
PM_{10}	Serious Non-Attainment	Non-Attainment
$PM_{2.5}$	Non-Attainment [a] (proposed)	Non-Attainment [b] (proposed)
CO	Serious Non-Attainment	Non-Attainment [c]
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Source: CARB, 2002 and 2004; USEPA, 2004.

Note(s): CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than 10 micrograms in diameter; N/A = Not Applicable.

a. Proposed federal $PM_{2.5}$ attainment status recommended by the California Air Resources Board on February 11, 2004. The USEPA plans to finalize $PM_{2.5}$ designations by December 15, 2004. Report available at: http://www.arb.ca.gov/desig/pm25desig/pm25desig.htm.

b. Proposed State $PM_{2.5}$ attainment status from 2003 Staff Report Attachment B - Proposed Amendments to the Area Designations available at: http://www.arb.ca.gov/desig/desig03/desig03.htm.

c. Los Angeles County portion of SCAB only.

Existing Air Quality Conditions. Existing levels of ambient air quality and historical trends in the project area are best documented by measurements recorded at the SCAQMD air monitoring stations closest to the project site. For this project, data collected at the Mission Viejo Via Pera Monitoring Station were selected to represent ambient air quality conditions in the vicinity of Sulphur Creek. The Mission Viejo monitoring station is located approximately five miles northeast of the project site. Monitored air pollutants at the Mission Viejo monitoring station include carbon monoxide (CO), particulate matter (PM_{10}), and ozone (O_3). Air quality trends recorded at the Mission Viejo air monitoring station from 2001 to 2003 are presented below in Table 5.

Table 5. Ambient Air Quality Monitoring Data from the Project Area

Pollutant Standards	2001	2002	2003
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	2.36	1.88	1.64
No. Days Standard Exceeded			
NAAQS (8-hour) $\geq$ 9.5 ppm	0	0	0
CAAQS (8-hour) $\geq$ 9.0 ppm	0	0	0
Particulate Matter (PM_{10})			
Maximum 24-hour concentration ($\mu g/m^3$)	60	80	64
Ave. arithmetic mean concentration ($\mu g/m^3$)	53.75	65.25	51.25
No. Samples Exceeding Standards			
NAAQS (24-hour) > 150 ($\mu g/m^3$)	0	0	0
CAAQS (24-hour) $\geq$ 50 ($\mu g/m^3$)	3	5	2
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.125	0.136	0.153
No. Days Standard Exceeded			
NAAQS (1-hour) > 0.12 ppm	1	2	4
CAAQS (1-hour) > 0.09 ppm	10	9	16

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
Source: CARB, 2004.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c. 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)?	☐	☐	☒	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

NO IMPACT. The Federal Clean Air Act requires jurisdictions of non-attainment areas to prepare air quality plans that demonstrate strategies for achieving attainment. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIPs). The California Clean Air Act also requires plans for non-attainment areas with respect to the State standards. Within the project study area, the SCAQMD and the Southern California Association of Governments (SCAG) have responsibility for preparing an Air Quality Management Plan (AQMP), which addresses the Federal and State Clean Air Act requirements. The AQMP details goals, policies, and programs for improving air quality and establishes thresholds for daily emissions. Environmental review of individual projects within the region must demonstrate that daily construction and operational emission thresholds, as established by the SCAQMD, would not be exceeded, nor would the number or severity of existing air quality violations be increased.

Implementation of the proposed project would not affect local or regional population or employment and would therefore be consistent with SCAG's Growth Management Plan. The proposed project would be inconsistent with air quality plans if it would result in population and/or employment growth that exceeds the growth estimates included in the applicable air quality plan (SCAQMD, 1993). The proposed project would not require any additional City employees for operations. Because there would be no employment growth generated by the proposed project, the proposed project would not conflict with or obstruct implementation of SCAQMD's AQMP.

The SCAQMD Rules and Regulations constitute a significant part of the attainment plan. Applicable rules and regulations for the proposed project may include: Rule 401 Visible Emissions; Rule 402 Nuisance; Rule 403 Fugitive Dust; and Rule 1110.2 Emission from Gaseous- and Liquid-Fueled Engines. The proposed project would be constructed and operated in compliance with all SCAQMD rules and regulations; therefore, the proposed project would not conflict with or obstruct implementation of SCAQMD's AQMP.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

LESS THAN SIGNIFICANT IMPACT. The proposed project site is located within the SCAB. Air quality conditions in SCAB are regulated by SCAQMD. The SCAB region has been in non-attainment for

several air pollutants, including carbon monoxide (in Los Angeles County), PM_{10}, and ozone for some time, and SCAQMD is working toward improving air quality within the region.

Project-related air emissions would have a significant effect if they resulted in concentrations that create either a violation of an ambient air quality standard or significantly contribute to an existing air quality violation. Should ambient air quality already exceed existing standards, the SCAQMD has established specific significance threshold criteria to account for the continued degradation of local air quality. Table 6 presents the allowable contaminant generation rates at which construction and operational emissions are considered to have a significant effect on air quality throughout the SCAB.

Table 6. Significance Thresholds

Air Pollutant	Construction Phase (lbs/day)	Operational Phase (lbs/day)
Reactive Organic Gases (ROGs)	75	55
Carbon Monoxide (CO)	550	550
Nitrogen Oxides (NOx)	100	55
Sulfur Oxides (SOx)	150	150
Particulates (PM_{10})	150	150

Note: The SCAQMD no longer requires construction activities to be evaluated by quarterly significance thresholds (SCAQMD, 2001). Source: SCAQMD, CEQA Air Quality Handbook, 1993.

Short-Term Construction Impacts. The proposed project would result in short-term air quality impacts during the construction phase of the project. Pollutant emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather. It is anticipated that construction activities (concrete demolition, invasive and ornamental removal, grading and dirt removal) would occur over a 5½-month period, while planting activities would occur over a 1½-month period. However, the SCAQMD requests that maximum daily emissions be estimated for comparison to the SCAQMD's daily emission significance thresholds for short-term construction projects.

Construction/restoration activities associated with the removal of concrete v-ditches in the Middle and Lower Reaches and the grading of the creek bottom would generate the most emissions during construction activities. These activities would require the use of the following heavy-duty diesel construction equipment: one backhoe; one grader; and one haul truck. For a worst-case scenario, it is assumed that concrete removal and creek bottom grading would occur simultaneously and would generate the maximum daily construction emissions. Refer to Table 7 for the estimated total maximum (worst-case) daily construction emissions that would be associated with the project. Complete emissions calculations and assumptions for the proposed project are presented in Appendix A.

Table 7. Maximum Daily Construction Emissions (lb/day)

Emission Source	ROC	CO	NOx	Sox	PM_{10}
Mobile Equipment	23.08	64.87	25.68	2.16	1.20
Worker Commute Trips	2.18	15.28	1.40	0.03	0.07
Fugitive Dust (Material Handling)	---	---	---	---	11.0
Total Construction Emissions	25.26	80.15	27.08	2.19	12.27
SCAQMD Significance Thresholds	75	550	100	150	150
Exceed Threshold?	NO	NO	NO	NO	NO

As presented in Table 7, the estimated daily construction emissions would not exceed the significance thresholds for any of the criteria pollutants. Even so, construction activities would be required to comply with all applicable SCAQMD regulations including Rule 403, which contains measures for controlling dust generated during construction activities. Because project construction emissions are well below SCAQMD standards, potential air quality impacts from construction activity would be less than significant and no mitigation measures are required.

Operational Impacts. Long-term air quality impacts are those associated with the change in permanent usage of the project site. The proposed project would not involve extensive long-term operational activities. The addition of interpretive facilities at all three reaches would generate negligible emissions in the form of occasional vehicle exhaust associated with periodic and minor ongoing maintenance activities. Therefore, long-term air quality emissions associated with the proposed project would be less than significant.

c. Would the project 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)?

LESS THAN SIGNIFICANT IMPACT. The CEQA Guidelines require that a project be evaluated with respect to its contribution to the cumulative baseline. This contribution with respect to air emissions would include both construction and operational emissions.

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for air quality impacts must be area-wide by nature.

As noted earlier, the SCAB is out of attainment for CO (in the Los Angeles area), ozone, and PM_{10} particulate matter. Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the SCAB. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously.

Although no significant impacts to air quality are projected to result from the proposed project, control measures such as those associated with SCAQMD Rule 403 to control fugitive dust would reduce project air emissions, would be consistent with the assumptions of the Air Quality Management Plan, and could be applied to all similar cumulative projects, reducing simultaneous impacts.

The proposed project would not result in a net increase in operational emissions. Because project impacts would not be individually significant and would be consistent with the assumptions of the Air Quality Management Plan, the project would not be cumulatively considerable. Therefore, a cumulatively considerable net increase of any criteria pollutant would not occur and no mitigation measures are required.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?

LESS THAN SIGNIFICANT IMPACT. Certain residents, such as the very young, the elderly, and those suffering from certain illnesses or disabilities, are particularly sensitive to air pollution and are considered "sensitive receptors." Examples of land uses where significant numbers of sensitive receptors are often found are schools, day care centers, parks, recreational areas, medical facilities, and rest homes and convalescent care facilities. Land use conflicts can arise when sensitive receptors are located next to major sources of air pollutant emissions. However, the proposed project would not result in substantial levels of construction or operational air emissions. Therefore, potential impacts associated with the proposed project are considered to be less than significant.

e. Would the project create objectionable odors affecting a substantial number of people?

NO IMPACT. The proposed project includes the replacement of invasive species with native species in all reaches, the removal of concrete v-ditches in the Middle and Lower Reaches, grading of the creek bottom, and the addition of interpretive signage. No new operations would occur at the project site that would create objectionable odors affecting a substantial number of people. No impacts would occur.

IV. Biological Resources

SETTING

The proposed project would be located along an open space corridor between the Niguel Ridge, Crown Royale, and Rancho Niguel residential communities and Crown Valley Parkway in Laguna Niguel, California. Existing biological resources along this corridor are dominated by ornamental and non-native species and communities, although patches of native communities exist in the Upper Reach and downstream below the Lower Reach. The plant communities within the project area were mapped in the field using a 1"=300' (300 scale) orthorectified aerial photograph flown in 2003 (Robert Lung & Associates, July 2003). Plant communities were mapped according to the descriptions found in the Orange County Habitat Classification System (OCHCS) (Gray and Bramlet, 1992). See Appendix B for acreages and locations of each community. Appendix B, Upper Sulphur Creek Ecosystem Restoration Project Conceptual Plan, also includes the Plant Species Compendium, listing all of the plant species observed within the study area. A search of the California Natural Diversity Database identified endangered, threatened, or sensitive plant and wildlife species expected or reported to be in the vicinity of the project area. Biological surveys further identified existing plant and wildlife species on the site.

Native habitats in the project area include California sagebrush-California buckwheat scrub, coyote bush scrub, alkali meadow, coastal freshwater marsh, southern willow scrub, and southern cottonwood-willow riparian forest.

The project site supports approximately 0.70 acre of California sagebrush-California buckwheat scrub, a type of Venturan-Diegan transitional coastal sage scrub that occurs in the Lower Reach, on the west side of Sulphur Creek. This community is dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), and coyote bush (*Baccharis pilularis*). Herbaceous understory species consist primarily of non-native grasses. This community is considered sensitive by the CDFG.

The project site supports approximately 0.08 acre of coyote bush scrub that is found in a narrow strip between the ornamental plantings bordering Crown Valley Parkway and Upper Sulphur Creek. Coyote bush (*Baccharis pilularis*) is the only dominant shrub in this community. The shrub understory is dominated by non-native annual grasses including ripgut (*Bromus diandrus*).

The project site supports approximately 0.55 acre of alkali meadow. This community occurs on both sides of Upper Sulphur Creek, including areas that appear to have been planted with ornamentals in the past. Many of these areas appear to have developed as a result of saline or alkaline groundwater influx, or may be more related to soil pH and salinity in drier areas. In general, the alkali meadow habitat is dominated by saltgrass (*Distichilis spicata*) with non-native bird's-foot trefoil (*Lotus corniculatus*) and alkali heath (*Frankenia salina*). Subdominants include non-native bristly ox-tongue (*Picris ecioides*), Spanish sunflower (*Pulicaria paludosa*), curly dock (*Rumex crispus*), and alkali mallow (*Malvella leprosa*). Dryer areas on the border of the alkali meadow have been invaded by soft chess (*Bromus hordaceus*) and artichoke thistle (*Cynara cardunculus*). Wetter areas closer to the stream support alkali bulrush (*Scirpus maritimus*), seaside heliotrope (*Heliotropium curassivicum*), California sea lavender (*Limonium californicum*), salt marsh fleabane (*Pluchea odorata*), and celery (*Apium graveolens*). In coastal southern California, alkali meadow is often considered to be a sensitive wetland type.

The project site supports approximately 2.57 acres of coastal freshwater marsh found in the permanently wetted portions of Upper Sulphur Creek. This habitat is dominated by a near-monoculture of southern cattail (*Typha domingensis*), with very small amounts of alkali bulrush along the stream edges. Occasional Mexican fan palms (*Washingtonia robusta*) and individual pampas grass plants are often found within or

adjacent to the freshwater marsh. Because of its status as wetland habitat, coastal freshwater marsh is considered a sensitive vegetation community.

The project site supports approximately 0.40 acre of southern willow scrub. Willows identified within the site include arroyo willow (*S. lasiolepis*), black willow (*S. goodingii*), sandbar willow (*S. exigua* syn. *S. hindsiana*), and red willow (*S. laevigata*). The understory is sparse, but does include mule fat as well as a number of non-native hydrophytes including Spanish sunflower and pampas grass. Southern willow scrub is considered a sensitive vegetation community.

The project site supports approximately 3.45 acres of southern cottonwood-willow riparian forest. This community is dominated by Fremont cottonwood (many or most appear to be planted) along with several native willow species, similar to the southern willow scrub community. Understory shrubs include mule fat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), coyote bush, pampas grass, myoporum (*Myoporum laetum*), and Spanish sunflower. Many of the cottonwood trees on site exhibit leaf, twig, and branch dieback. The reasons for this decline are not known; however, alkaline and/or saline soils have been suspected to cause similar symptoms in cottonwoods planted at the San Joaquin Marsh in the 1980s. In contrast, most of the willows appear to be healthy. Southern cottonwood-willow riparian forest is considered a sensitive vegetation community.

Non-native habitats in the project area include ruderal habitats, flood control areas, developed areas, and ornamental plantings. Approximately 1.33 acres of disturbed ruderal vegetation occur on-site, dominated by broadleaf weeds including sweet alyssum (*Lobularia maritima*), garland chrysanthemum (*Chrysanthemum coronarium*), prickly lettuce (*Lactuca serriola*), bristly ox-tongue, bird-foot trefoil, and tumbleweed (*Salsola tragus*). Approximately 2.86 acres of pampas grass occur on site and are characterized by large stands of pampas grass, often extending fairly close to the water, but also extending a considerable distance upslope. Associated species include non-native grasses and broadleaf weeds, as well as occasional coyote bush individuals. Approximately 1.24 acres of flood control channel and associated hard structures occur on site. Upper Sulphur Creek flows through a 7-foot wide concrete v-ditch through the Middle Reach. When present, associated riprap, gunnite, or energy dissipation structures are also included within this classification. These areas do not generally support vegetation. Developed areas within the Upper Sulphur Creek project area are roads, right of ways, trails, and rip rap, together totaling approximately 2.84 acres. Approximately 21 acres of parks and ornamental plantings dominate the site. In some areas, such as the irrigated turf and bedding annuals adjacent to Crown Valley Parkway, these areas are subject to ongoing maintenance. Other areas planted in the past are not currently being maintained or irrigated, and have declined. Portions of these unmaintained areas have been colonized by invasive exotic species as well as coyote bush, coast and *menziesii* goldenbush (*Isocoma menziesii*) and other native species. Dominant species vary throughout these ornamental landscapes, but include turf grasses, planted Fremont cottonwood (*Populus fremontii*), pampas grass, island ceanothus (*Ceanothus arboreus*), tree wattles (*Acacia* spp.), groundcover acacia (*Acacia redolens*), myoporum, gums (*Eucalyptus* spp.), Aleppo pine (*Pinus halepensis*), Brazilian pepper tree (*Schinus terebinthifolius*), oleander (*Nerium oleander*), and prostrate myoporum (*Myoporum parvifolium* 'Prostratum').

A wide variety of wildlife species have been observed in the project area. The Upper Sulphur Creek Species Compendium in Appendix B, provides a complete list of the species observed. Over 50 species of birds were observed in the area, including such common species as American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), western scrub jay (*Aphelocoma coerulescens*), and California towhee (*Pipilo crissalis*). Mammals identified during area surveys include raccoon (*Procyon lotor*), California ground squirrel (*Spermophilus beecheyii*), and desert cottontail (*Sylvilagus audubonii*). Additionally, a number of reptile species were also identified in the project area, including western fence lizard (*Sceloporus occidentalis*), and common side-blotched lizard (*Uta stansuriana*).

Special Status Species. Special status species include flora, fauna, and vegetation communities that are listed as threatened or endangered, candidate species, or species of special concern under the California or federal Endangered Species Act, species that are listed as fully protected by the California Department of Fish and Game (CDFG), and plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered in California and beyond.

Sensitive wildlife species include those species listed as endangered or threatened under FESA or CESA, candidates for listing by USFWS or CDFG, and species of special concern to USFWS or CDFG. A number of sensitive wildlife species were reported in the CNDDB and are known to occur within the region (see Appendix B). Focused surveys for least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax trailli extimus*) were conducted (see Appendix B, Attachment E). No breeding or nesting activities were identified at the time of the survey; however, migratory willow flycatchers were observed during the focused surveys.

All wildlife species observed during the field survey by sight, call, tracks, nests, scat (fecal droppings), remains, or other sign were recorded. Binoculars and regional field guides were utilized for the identification of wildlife, as necessary. All wildlife species observed on site, as well as diagnostic signs, were recorded in field notes. In addition to species actually detected, expected use of the project area by other wildlife was derived from the analysis of habitats within the project area combined with known habitat preferences of regionally-occurring wildlife species. Wildlife taxonomy follows Stebbins (2003) for amphibians and reptiles, the American Ornithologists' Union (1998) for birds, and Jameson and Peters (1988) for mammals. A list of all wildlife species detected on site is included in the attached compendium.

Sensitive species observed on the site include Costa's hummingbird (*Calypte costae*) [Federal Special Concern Species (FSC)-nesting], migrant willow flycatcher (*Empidonax traillii*) [State Endangered (SE)-nesting), California thrasher (*Toxostoma redivivum*) (FSC), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) (CSC). Sensitive species with federal or State sensitive status that have at least a low potential to occur include western spadefoot (*Spea hammondii*), southwestern pond turtle (*Emys* [=*Clemmys*] *marmorata pallida*), coast horned lizard (*Phyrnosoma coronatum*), orange-throated whiptail (*Cnemidophorus hyperythrus*), silvery legless lizard (A*nniella pulchra pulchra*), two-striped garter snake (*Thamnophis hammondii*), northern red rattlesnake (*Crotalus ruber ruber*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), merlin (*Falco columbarius*), Pacific slope flycatcher (*Empidonax difficilis*), southwestern willow flycatcher (*E. t. extimus*), loggerhead shrike (*Lanius ludovicanus*), least Bell's vireo (*Vireo bellii pusillus*), yellow-breasted chat (*Icteria virens*), lark sparrow (*Chondestes grammacus*), tri-colored blackbird (*Agelaius tricolor*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and San Diego desert woodrat (*Neotoma lepida intermedia*).

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

BIOLOGICAL RESOURCES - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. 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 California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d. 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 wildlife nursery sites?	☐	☐	☐	☒
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a. Would the project 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 California Department of Fish and Game or U.S. Fish and Wildlife Service?

LESS THAN SIGNIFICANT IMPACT. Focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted by PCR Services Corporation in 2003. In addition, field surveys were conducted by Aspen Environmental Group in 2004 to map vegetation communities, delineate wetlands and riparian habitat, and assess the project area for sensitive species. Although migratory willow flycatchers and a number of other sensitive species have been observed on site, because of the limited habitat on site, and the presence of a biological monitor during project activities, it is not anticipated that project activities would adversely affect sensitive species.

The proposed project would enhance approximately 6.97 acres of existing riparian habitat by removing non-native invasive species and creating approximately 2.5 acres of riparian habitat including coastal freshwater marsh habitat. In addition, the proposed project would create approximately 5 acres of upland sage scrub buffer habitat. The proposed project has been designed to support sensitive species following restoration activities. The proposed project is not expected to result in adverse effects to sensitive species. The project is anticipated to provide habitat that would benefit local sensitive species. Any impacts would be less than significant.

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

NO IMPACT. The proposed project would be beneficial to riparian habitat by removing non-native invasive species from riparian habitat existing in the Upper and Lower Reaches of Upper Sulphur Creek.

No riparian habitat currently exists within the Middle Reach or portions of the Lower Reach. Native species would be avoided to the greatest extent practicable when removing non-native species. In addition, where bare areas exist following non-native species removal, native cottonwood-southern willow scrub or other site-appropriate species would be planted. These activities are expected to improve riparian habitat. No adverse impact would occur.

c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?

NO IMPACT. The proposed project would be beneficial to wetlands by removing non-native invasive species within coastal freshwater marsh, cottonwood-southern willow scrub riparian, and adjacent upland buffer areas. In addition, the proposed project would remove lined flood control channels from the creek in order to create additional marsh, riparian, and buffer habitat areas. Invasive species, cement, and other debris removed from the existing floodplain and habitat areas would be hauled from the project area and disposed of at an appropriate location. Restoration activities within the jurisdictional areas would be temporary in nature and would not include the discharge of dredged or fill material into waters or wetlands. No adverse impacts to wetlands would occur as a result of the proposed activities.

d. Would the project 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 wildlife nursery sites?

NO IMPACT. Due to the isolated nature of Upper Sulphur Creek and the lack of habitat in the project area, with the exception of in the Upper Reach, fish or wildlife movement does not substantially occur within the project area. Fish or wildlife movement along the project area would require passing through a series of flood control structures and culverts under Moulton Parkway, Nueva Vista Drive, La Paz Road, and La Plata Drive. In addition, the Upper Sulphur Creek is surrounded on all sides by urbanization, which would limit movement via land barriers, light, and noise. Construction activities would not interfere with any fish or wildlife movement or disrupt wildlife corridors or nursery sites.

The project would restore existing riparian habitat and create additional habitat in the Middle and Lower Reaches, allowing for increased local wildlife movement by urban edge-adapted species. Because the proposed project is contiguous with restoration efforts further downstream, this project would contribute to the connection of larger wildlife corridors between Aliso and Wood Canyons Regional Parks. No adverse impacts would occur.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

NO IMPACT. The proposed project would not conflict with any local policies or ordinance protecting biological resources, including native or heritage trees. The City of Laguna Niguel has not adopted any such ordinances or policies. No conflicts with local biological resource policies or ordinances would occur.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

NO IMPACT. The proposed project would not conflict with a proposed or adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP) due to the fact that the City of Laguna Niguel has not adopted any habitat conservation plans. No conflicts would occur.

V. Cultural Resources

SETTING

This section describes the ethnographic, archaeological, and paleontological settings found in the project area, followed by an assessment of the potential impacts to these resources.

Ethnographic Resources. A Native American group known as the Shoshonean Culture historically inhabited the project area. This group is believed to have entered the Southern California area around 500 B.C. The two Shoshonean tribes that lived in Orange County are the Juaneno, associated with the Mission San Juan Capistrano, and the Gabrieleno, associated with the San Gabriel Archangel Mission.

Archaeologic Resources. A records search conducted for the City of Laguna Niguel General Plan EIR found 30 archaeological sites within or adjacent to the City boundary. Archaeological sites contain significant resources that identify ancient human activity. In the project area, these sites are generally located along streams and creeks, including Aliso Creek, Arroyo Salada, and Salt Creek. The nearest known archaeological site to the project site is approximately 2.5 miles to the northwest (City of Laguna Niguel, 1992).

Paleontological Resources. Paleontological sites show evidence of pre-human activity. There are two main time periods and rock units within the City of Laguna Niguel. The latest, Rancholabrean (late Pleistocene, 11,000 to 100,000 years old) contains typical "ice-age" vertebrate fossils and is discontinuous in its collections. The other unit is the Hemphillian (late Miocene 6 to 9 million years old) Capistrano Formation. There was extensive intrusion of ocean waters during the Hemphillian along the California coastal areas, represented by thick marine deposits. Fossils collected from these deposits in Laguna Niguel and surrounding areas during the past 25 years have added tremendously to the fossil record. The nearest known paleontologic site to the project site is approximately 2.0 miles to the northwest (City of Laguna Niguel, 1992).

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

CULTURAL RESOURCES - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?	☐	☐	☐	☒
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

a. Would the project cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?

NO IMPACT. Section 15064.5(a)(3) of the CEQA Guidelines generally defines historical resource as any object, building, structure, site, area, place, record, or manuscript determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Project activities would include the removal of 3,600

linear feet of concrete v-ditch, irrigated ornamental landscaping, and invasive weedy vegetation. Grading and re-contouring would occur following the removal of concrete ditches and the ornamental and weedy vegetation would be replaced by native vegetation. The items that would be removed are not considered to be of historical significance as defined in §15064.5. No impacts to historical resources would occur.

b. Would the project cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The closest known archaeological site to Sulphur Creek is approximately 2.5 miles to the northwest (City of Laguna Niguel, 1992). A survey of the project area confirmed the absence of surface artifacts and impacts that could occur as a result of sub-surface disturbance would be limited to the areas proposed for concrete ditch removal and grading. Due to the disturbed nature of the fill material on which project grading would occur, it is unlikely that project construction would impact unique archaeological resources. However, should archaeological resources be encountered during project-related activities, potentially significant impacts could occur. Implementation of Mitigation Measure CR-1 would ensure that impacts would be reduced to a less than significant level.

CR-1 In the event of the discovery of cultural resources (e.g., archaeological, paleontological, or human remains) during project-related activities, all work shall immediately stop within 100 feet of the discovery. A qualified cultural resource specialist would be notified immediately and would implement measures as necessary to avoid or minimize harm to the discovery, pending the results of an evaluation. Ground disturbance in the vicinity of the discovery would not resume until a qualified archaeologist has evaluated and treated the discovery. Evaluation and curation procedures shall meet the standards mandated by the California Office of Historic Preservation.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The nearest known paleontologic site to the project site is approximately 2.0 miles to the northwest (City of Laguna Niguel, 1992). Due to the disturbed nature of the fill material where construction would occur, it is unlikely that a unique paleontological resource, site, or unique geologic feature would directly or indirectly be destroyed. However, should paleontological resources be discovered during project related activities, impacts could be potentially significant. Implementation of Mitigation Measure CR-1 would reduce impacts to paleontological resources to a less than significant level.

d. Would the project disturb any human remains, including those interred outside of formal cemeteries?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Due to the disturbed nature of the areas on which concrete removal and excavation would occur, no Native American human remains are anticipated to be encountered during construction of the proposed project. However, the discovery of human remains during project related activities would be considered a potentially significant impact. Implementation of Mitigation Measure CR-1 would reduce impacts due to the disturbance of human remains to a less than significant level.

VI. Geology and Soils

SETTING

The City of Laguna Niguel is located in a highly active seismic region. Although there are no active or potentially active faults within the City boundary, there are two active faults located within Orange County that could affect the project site. Active faults near the site include the Newport-Inglewood Fault, approximately 13 miles to the northwest, and the Whittier Fault, approximately 17 miles to the northeast.

Elevations of the project site range from 335 feet above mean sea level (msl) in the northern portion of the site to approximately 240 feet above msl in the sourthern portion of the site. Based on the USDA Orange County Soil Survey (USDA, 1978), there are three main types of soils in the Sulphur Creek area: Botella clay loam, Calleguas clay loam, and Sorrento loam. Further detail regarding the soils occurring on the project site is discussed in Appendix B.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

GEOLOGY AND SOILS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning 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 Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) creating substantial risks to life or property?	☐	☐	☒	☐
e. 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?	☐	☐	☐	☒

a. Would the project expose people or structures to potential adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning 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 Publication 42.

LESS THAN SIGNIFICANT IMPACT. Fault rupture caused by seismic activity can break the ground surface overlying the fault. This can cause horizontal or vertical surface displacements from less than 1 inch to many feet, depending on the fault and earthquake magnitude. Under the Alquist-Priolo Act, the California State Geologist identifies areas in the State that are at risk from surface fault rupture. The main purpose of the Act is to prevent construction of buildings used for human occupancy where traces of active faults are evident on the Earth's surface. These zones are known as Alquist-Priolo Earthquake Fault Zones. Impacts resulting from fault rupture generally occur within the immediate vicinity overlying the fault. The zones vary in width, but average about ¼-mile wide.

According to the California Department of Conservation, Division of Mines and Geology California Seismic Hazard Zones Map (San Juan Capistrano Quadrangle), the project site is not located within the boundaries of any State designated Alquist-Priolo Special Studies Zone (DOC, 2000). The nearest Alquist-Priolo Special Study Zone is associated with the Newport-Inglewood Fault, which is located approximately 13 miles northwest of the proposed project site. Therefore, the hazard of fault rupture is considered to be low at the project site. Potential impacts associated with fault rupture are less than significant.

ii) Strong seismic ground shaking?

LESS THAN SIGNIFICANT IMPACT. Southern California is a seismically active region and prone to earthquakes that can result in hazardous conditions to people within the region. Earthquakes and ground motion can affect a widespread area. No active faults are located within 10 miles from the project site. Potential impacts associated with strong seismic ground shaking are anticipated to be less than significant.

iii) Seismic-related ground failure, including liquefaction?

LESS THAN SIGNIFICANT IMPACT. The potential for liquefaction depends on the magnitude of ground shaking, groundwater conditions, the relative density of the soils, and the age of site-specific geologic units. Seismic-induced liquefaction occurs when a saturated, granular deposit of low relative density is subject to extreme shaking and loses strength or stiffness due to increased pore water pressure. The consequences of liquefaction are typically characterized by settlement, uplift on structures, and increases in lateral pressure on buried structures. If building foundations are not designed properly, the effects of severe liquefaction could produce structural failure, leading to injury or loss of life.

The City of Laguna Niguel is located in an area that has varying potential for liquefaction. According to the Department of Conservation, Division of Mines and Geology Seismic Hazard Zones Official Map for the San Juan Capistrano Quadrangle, the proposed project is not within a liquefaction zone (DOC, 2004C). Furthermore, no habitable structures are included as part of the proposed project. Therefore, potential impacts are less than significant.

iv) Landslides?

NO IMPACT. The project site ranges in elevation from 335 feet above mean sea level (msl) in the northern portion of the site to approximately 240 feet above msl in the southern portion of the site. Change in elevation over the 1.52-mile route of the proposed project would be approximately 95 feet. According to the Department of Conservation, Division of Mines and Geology Seismic Hazard Zones

Official Map for the San Juan Capostrano Quadrangle, the proposed project site is not located in an area susceptible to landslides or mudslides (DOC, 2004C). Therefore, no impacts are expected.

b. Would the project result in substantial erosion or the loss of topsoil?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Short-term erosion impacts could occur during concrete ditch demolition and surface grading. Unearthed and exposed soil could potentially accelerate erosion. Fugitive dust could result during windy conditions and from construction vehicles traversing the site. In the event of heavy precipitation, exposed soils could be washed off the project site into public right-of-ways and/or storm drainage systems. However, site preparation and construction/restoration activities would be conducted in compliance with required Best Management Practices and State codes and requirements for erosion control and grading. Furthermore, ungrouted rock would be placed in the streambed as necessary to control long-term erosion. To ensure that erosion related impacts during construction would be kept to less than significant levels, implementation of Mitigation Measure GS-1 is recommended.

GS-1 A comprehensive Erosion Control Plan shall be prepared for project construction. The Plan shall identify measures to be implemented to minimize the erosion effects of grading and excavation. Erosion control methods to be described in the Plan and implemented shall include, but not be limited to, the following:

- Avoiding soil disturbance during periods of heavy precipitation or high winds;
- Keeping disturbed areas to the minimum necessary for construction;
- Reducing surface water flows across graded or exposed areas;
- Using straw bales, soil mats, or silt fences to stabilize disturbed areas;
- Using culvert, ditches, water bars and sediment traps to control runoff and sedimentation; and
- Bioengineering techniques for erosion control.

c. Is the project located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

LESS THAN SIGNIFICANT IMPACT. As described in subsections (a) and (b) above, the project site would not be subject to significant impacts associated with unstable soil, landslide, liquefaction, or erosion. In addition, the proposed project would not result in lateral spreading, subsidence, or collapse. No habitable structures are included as part of the proposed project. Impacts would be less than significant.

d. Is the project located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) creating substantial risks to life or property?

LESS THAN SIGNIFICANT IMPACT. Based on the USDA Orange County Soil Survey (USDA, 1978), there are three main types of soils in the Sulphur Creek area: Botella clay loam, Calleguas clay loam, and Sorrento loam. Alluvial processes formed these soils. A typical profile of the near surface layer is grayish brown loam, approximately 12 inches thick, with underlying material that is grayish brown, light brownish gray, or pale brown silty clay loam to a depth of approximately 62 inches. These soils have a potential for expansion due to the small amount of clay. However, the proposed interpretative signs would be constructed according to the 1997 Uniform Building Code and would comply with all State and local construction and building requirements to adequately address any concerns associated with expansive soils. These interpretive facilities would not be habitable structures, and no residential or commercial structures are proposed as part of the project. Impacts would be less than significant.

e. Would the project 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?

NO IMPACT. The proposed project would not be served by septic tanks or other alternative wastewater disposal systems. No impacts would occur.

VII. Hazards and Hazardous Materials

SETTING

Existing and past land use activities are used as potential indicators of hazardous material storage and use. For example, many industrial sites, historic and current, are known or suspected to have soil or groundwater contamination by hazardous substances. Properties devoted to the oil and gasoline industry, including oil fields and processing facilities, are commonly known or suspected to have environmental contamination from petroleum hydrocarbons, heavy metals, and chlorinated solvents. Other examples of hazardous material sources include leaking underground tanks in commercial and industrial areas, surface runoff and groundwater migration from contaminated sites, and pesticides and herbicides in the soil of past agricultural lands. In addition to contaminants found in soils, groundwater is subject to contamination associated with underground storage tanks and other sources.

The primary issues of concern related to contamination are: (a) worker health and safety and (b) public exposure to hazardous materials during on-site construction and off-site waste handling. Potential impacts on air quality and traffic during waste transport must also be considered. Where encountered, contaminated soil may qualify as hazardous waste and thus require handling and disposal according to local, State, and federal regulations.

A search of federal, State, and local databases for the site and surrounding area was conducted in April 2004, by the US Army Corps of Engineers for the Sulphur Creek area (Army Corps of Engineers, 2004). One leaking underground storage tank (LUST) case is listed in close proximity to the proposed project. Laguna Niguel Regional Park, located at 28241 La Paz Road, is designated San Diego Regional Water Quality Control Board (RWQCB) LUST Case No. 9UT1168. The substance leaked at this storage tank was unleaded gasoline, and the impacted area was designated as soil only. This release occurred downstream from Sulphur Creek and the proposed project area. The contaminated soil has been excavated and disposed of to an approved site and the RWQCB closed the case in October 1990 (Army Corps of Engineers, 2004). No evidence of contaminated soils has been found in the project area.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

HAZARDS AND HAZARDOUS MATERIALS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. Create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☐	☒	☐

HAZARDS AND HAZARDOUS MATERIALS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d. 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 it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. For a project 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, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g. Impair implementation of or physically interferes with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h. Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

LESS THAN SIGNIFICANT IMPACT. The proposed project would not use, store, transport, generate, or dispose of large quantities of hazardous substances. During construction, the transport, storage, use, and disposal of any hazardous materials would be subject to federal, State, and local health and safety requirements. As such, no significant hazards associated with hazardous materials would be expected.

Hazardous or flammable substances that may be used during the construction phase of the project would include vehicle fuels and oils for the operation of heavy equipment for activities such as concrete demolition and surface grading. Construction vehicles on site may require routine or emergency maintenance that could result in the release of oil, diesel fuel, transmission fluid, and/or other materials. Because the proposed project is considered a waterway, a release of hazardous materials could potentially affect the environment and/or downstream waterways. However, the hazardous materials would not be used in large quantities or stored in a manner that would pose a significant hazard to the public. In addition, the use of hazardous materials during construction would be short-term. Therefore, the impacts resulting from project implementation would be less than significant.

b. Would the project 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?

LESS THAN SIGNIFICANT IMPACT. The project would not generate hazardous materials or substances that pose a hazard to the public. As discussed above, the transport, storage, use, and disposal of any hazardous materials during project construction would be subject to federal, State, and local health and safety requirements. Therefore, no significant hazardous materials impacts are expected.

Demolition, grading, construction of interpretive signs, and placement of erosion control material could require the use of hazardous materials in small quantities for fueling/lubrication of on and off-site construction equipment. However, the use of hazardous materials would be short-term and would be subject to current regulations. The risk of upset in the form of a release or spill of hazardous substances would be minimal and would not be anticipated. Project excavation and grading is not anticipated to expose the public or environment to contaminated soils. Therefore, potential impacts are considered to be less than significant.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

LESS THAN SIGNIFICANT IMPACT. Based on the results of a database search conducted by the US Army Corps of Engineers for Sulphur Creek, the project site has never been used for hazardous waste disposal and has not been subject to hazardous waste removal or remedial action (Army Corps of Engineers, 2004). It is not anticipated that project activities would expose any contaminated soils. In addition, petroleum pipelines or other pipelines containing hazardous materials do not transect the site. During construction of the project, project personnel would follow all institutional controls governing the storage, transportation, use, handling, and disposal of hazardous materials. Although Crown Valley Elementary School is approximately 75 feet from the project area on the opposite side of Crown Valley Parkway, because the amounts of hazardous materials used during project construction would be limited and their use would occur for only a short period, impacts could be adverse, but would be less than significant.

d. Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

NO IMPACT. As described above, a search of federal, State, and local databases for the site and surrounding area was conducted in April 2004 by the US Army Corps of Engineers for the Sulphur Creek area (Army Corps of Engineers, 2004). One LUST case was identified in close proximity to the proposed project. However, the RWQCB closed the case in October 1990 after the site was properly remediated. No other hazardous materials sites were identified in the vicinity of the project site. Therefore, the proposed site is not included on a list of hazardous materials sites, and would therefore not create a significant hazard to the public or the environment.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

NO IMPACT. The nearest airport to the project site is John Wayne Airport (SNA) in Orange County, approximately 15 miles to the north (AirNav, 2004). Other airports are located approximately 40 to 60 miles to the northwest in Long Beach and Los Angeles, 61 miles to the north in Ontario, and 75 miles to the south in San Diego. No impacts would occur.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

NO IMPACT. The proposed project site is located approximately 7 miles north of the US Marine El Toro Air Station (AirNav, 2004). Project activities would not result in any impacts to existing El Toro facilities or flight paths. No impacts would occur.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

LESS THAN SIGNIFICANT IMPACT. The proposed project would not impair implementation of or interfere with an emergency response or evacuation plan. Emergency access to or via adjacent streets would not be adversely impacted during construction because the only project equipment and materials staging area is planned to be located on the proposed project site (i.e., not in a public road right-of-way). Therefore, the proposed project would not interfere with an emergency response plan or emergency evacuation plan. Impacts would be less than significant.

h. Would the project 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?

LESS THAN SIGNIFICANT IMPACT. The topography, vegetation, and development patterns in Laguna Niguel make the City highly susceptible to fire hazards. The project site is located in a valley with slopes cradling the east and west, with residential development to the west and Valley Parkway to the east. During construction, overgrown weedy vegetation along the slopes that could act as fuel for a fire would be removed and construction activities would comply with all applicable fire code requirements. Therefore, the project would not result in a significantly increased fire hazard for the project's surrounding uses. Impacts would be less than significant.

VIII. Hydrology and Water Quality

SETTING

Flooding. Flood hazard is defined as the potential for flooding to occur during a storm event, particularly during 50-year or 100-year storm events. Impacts may occur when development of a project encroaches a flood plain area. According to the City of Laguna Niguel, the Lower Reach of the proposed project site is within a 100-year floodplain (City of Laguna Niguel, 1992).

Drainage. The proposed project site is located within the Aliso watershed, in the City of Laguna Niguel. Sulphur Creek, which serves a drainage area of approximately nine square miles mostly within Laguna Niguel and Laguna Hills, drains into Aliso Creek approximately three miles upstream of its mouth at the Pacific Ocean. The portion of Upper Sulphur Creek included in the project is fed by storm drains in the neighborhoods on both sides of Crown Valley Parkway.

Surface Water Quality. The urbanized areas of the project area contribute non-point pollution in the form of stormwater and nuisance water runoff that includes non-permitted discharges, such as oily runoff from parking lots and roads. The project site does not contain any point sources of pollution. Water quality in the creeks and drainages in the project area varies depending on the magnitude of regional non-point sources, local point sources, and the nature of the flows that deliver these pollutants.

The Aliso watershed (which includes Sulphur Creek as a tributary) is listed by the State Water Resources Control Board (SWRCB) as impaired by bacteria, phosphates, and nitrates.

Regulatory Framework. The Orange County Resource Management and Development Department (RDMD) is the predominant agency involved in surface water sample collection and analysis in the Aliso Creek watershed, which includes Sulphur Creek. The RDMD's Environmental Resources Division has been routinely involved in monitoring water quality of tributaries to water bodies identified as waters of the State by the San Diego and Santa Ana RWQCBs from 1973 to present.

In 1948, Congress enacted the Water Pollution Control Act, which has since been amended significantly and is now commonly referred to as the Clean Water Act (CWA). The CWA delineates a national

permitting system for point discharges known as the National Pollutant Discharge Elimination System (NPDES). NPDES is the basic regulatory and enforcement tool available under the CWA. The project site currently does not have or require an operational NPDES permit to limit specific discharge point sources. Non-point sources are regulated under the municipal NPDES permit that covers City storm drains. The project would also be required to comply with the statewide General NPDES Permit for stormwater discharges associated with construction activity.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

HYDROLOGY AND WATER QUALITY - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b. 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 (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on or off site?	☐	☐	☒	☐
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?	☐	☐	☒	☐
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☒	☐	☐
f. Otherwise substantially degrade water quality?	☐	☒	☐	☐
g. Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year floodplain structures, which would impede or redirect flood flows?	☐	☐	☐	☒
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j. Inundate by seiche, tsunami, or mudflow?	☐	☐	☒	☐

a. Would the project violate any water quality standards or waste discharge requirements?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. During project construction, activities such as grading and excavation could increase the sediment load in stormwater runoff due to the erosion of exposed soil. Construction-related water contamination and soil erosion

impacts can be minimized or avoided by the use of best management practices (BMPs) during construction. Construction BMPs may include: containment and handling restrictions on toxic materials used during construction, watering loose soil to reduce wind erosion until final soil placement and compaction is achieved, suspension of excavation and grading during periods of rain or high winds, and the use of temporary drains and swales, silt fencing, hay bale barriers, and sand bag barriers to avoid surface erosion during rainfall events. Temporary soil stabilization can be the single most important factor in reducing erosion at construction sites. Soil stabilization BMPs include: covering with mulch, soil stabilizers, and fiber rolls or blankets.

Under Section 402 of the Clean Water Act, the project would be required to comply with the statewide General NPDES Permit for stormwater discharges associated with construction activity. Compliance with this permit is demonstrated by preparing a Stormwater Pollution Prevention Plan (SWPPP) for all construction activity as would be required under Mitigation Measure WQ-1. Implementation of Mitigation Measure WQ-1 would reduce the impact of violations of water quality standards or waste discharge requirements to a less than significant level.

WQ-1 A storm water pollution prevention plan (SWPPP) shall be developed and implemented by the contractor to prevent or reduce the effects of earth moving, handling of toxic materials, and other disturbances in and adjacent to the channel that may cause accelerated erosion, scouring and water contamination. The SWPPP shall show BMPs that will be required to control discharges from the construction site as well as from waste handling and disposal areas. The SWPPP shall include methods of on-site storage and disposal of construction materials and construction waste, and methods to minimize or eliminate the exposure of stormwater to construction materials, equipment, vehicles, waste storage areas, or service areas. The comprehensive erosion control plan required under GS-1 shall be included as part of the SWPPP.

The proposed project would improve Aliso watershed water quality by reducing fertilizer and pesticide applied to the surrounding landscape and by the development of natural biofiltration and depositional processes, thus improving the water quality of the area. Long-term project impacts to water quality standards and waste discharge requirements are considered to be beneficial.

b. Would the project 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 (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

LESS THAN SIGNIFICANT IMPACT. Potable water consumption that would be associated with the proposed project would be negligible compared to the region's total water consumption. Therefore the project would not create a substantial demand upon groundwater sources and would not substantially change the amount of groundwater pumped from local wells. Thus, the proposed project would not deplete groundwater supplies.

The proposed project would include the removal of 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches of the proposed project, thus reducing the amount of impervious surface. This reduction in the amount of impervious surfaces on the creek bottom may result in a slight increase in groundwater recharge. As such, the project would not result in a net deficit of groundwater recharge. Impacts would be less than significant.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on or off site?

LESS THAN SIGNIFICANT IMPACT. Under existing conditions, stormwater runoff at the project site flows through Upper Sulphur Creek, which serves a drainage area of approximately three square miles within Laguna Niguel. As indicated in Table 1 of the Project Description, the proposed project would include the removal of 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches of the project and the addition of 6.2 acres of wetland habitat over pre-project conditions. Runoff through Sulphur Creek could decrease slightly relative to existing conditions due to the decrease in impervious surface area; however, this potential decrease in runoff would result in less than significant impacts. Furthermore, existing drainage patterns would not change because the project would not alter the existing course of Sulphur Creek. Impacts associated with alterations to existing drainage patterns at the site would be considered less than significant.

d. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?

LESS THAN SIGNIFICANT IMPACT. As discussed in Sections VIII (b) and (c) above, the amount of non-permeable surfaces would decrease at the project site and the existing drainage pattern through Sulphur Creek is not expected to change as a result of the proposed project. Consequently, the proposed project would not have an adverse effect on absorption rates, drainage patterns, or the rate and amount of surface runoff.

The existing storm drain infrastructure in the vicinity would be able to adequately accommodate the minor change to site runoff associated with the proposed project. Furthermore, as described above in Section VIII (c) above, the proposed project would not alter the course of any waterways. Therefore, the proposed project is not expected to result in an increased amount of surface runoff that would result in alteration of drainage patterns or flooding. Impacts would be less than significant.

e. Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems to provide substantial additional sources of polluted runoff?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The proposed project is not expected to create or contribute to runoff water in excess of the capacity of the existing stormwater drainage system serving the project site. As discussed in Sections VIII (a) through (d) above, restoration activities at Sulphur Creek would result in a decrease to the amount of non-permeable surfaces at the site. Therefore, the existing stormwater drainage system would continue to adequately accommodate the stormwater flows through Sulphur Creek. As discussed in Section VIII (a), project construction would require RWQCB approval for general construction runoff and/or construction dewatering discharges under the NPDES. Implementation of Mitigation Measures WQ-1 would ensure the submittal of a SWPPP for all construction activity to comply with this permit. Upon completion, the proposed project would not contribute additional sources of non-point pollution runoff. Therefore, impacts associated with an increase in additional sources of polluted runoff are considered to be less than significant with the incorporation of Mitigation Measure WQ-1.

f. Would the project otherwise substantially degrade water quality?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. As discussed in Section VIII (a), project construction would require RWQCB approval for general construction runoff and/or construction dewatering discharges under the NPDES. Degradation of water quality due to runoff and construction discharge would be considered a potentially significant impact. Implementation of Mitigation Measure WQ-1 ensures the submittal of a SWPPP for all construction activity to comply with

this permit and would reduce impacts to a less than significant level. Upon completion, the proposed project would not contribute additional sources of non-point pollution runoff. Therefore, impacts associated with an increase in additional sources of polluted runoff are considered to be less than significant with mitigation incorporated.

g. Would the project place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

NO IMPACT. While the Lower Reach of the proposed project site is within a 100-year floodplain, the proposed project does not involve the construction of housing. Therefore, there is no potential for impacts associated with placing housing within a flood hazard zone. No impacts would occur.

h. Would the project place within a 100-year floodplain structures, which would impede or redirect flood flows?

NO IMPACT. The only structures included as part of the proposed project are interpretive signs. These structures would not have any impacts on impeding or redirecting flood flows.

i. Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

LESS THAN SIGNFICANT IMPACT. The proposed project does not modify existing accessways or propose that any staff members be permanently located on site. In addition, no dams or reservoirs are located upstream of the site within the Sulphur watershed. Therefore, flood risk and dam failure impacts to the project site are considered less than significant.

j. Would the project cause inundation by seiche, tsunami, or mudflow?

LESS THAN SIGNIFICANT IMPACT. A seiche is a surface wave created when an earthquake or other disturbance shakes a body of water. Seiches are of concern where water storage facilities are located immediately adjacent to developed sites. There are no bodies of water capable of subjecting the site to a seiche within the project area. The Pacific Ocean is approximately 3.5 miles southwest of the proposed project site. Because no habitable structures are proposed, there is no potential for the project to increase risks by a tsunami. The topography of the site is not considered a hillside area, therefore, it is not considered a mudflow hazard location (City of Laguna Niguel, 1992). Because no residential housing is proposed, the impact of these risks to persons is considered less than significant.

IX. Land Use and Planning

SETTING

The proposed project would be located within the City of Laguna Niguel, Orange County, in southern California (see Figure 1). Therefore, it is subject to the City of Laguna Niguel General Plan and Zoning Code. The proposed project corridor is designated Open Space with the exception of a small portion of the project corridor near Nueva Vista Drive that is designated Public/Institutional (City of Laguna Niguel, 2002a and 2002b).

The portion of Laguna Niguel affected by the proposed project is part of the Laguna Niguel Planned Community, which existed prior to the incorporation of the City of Laguna Niguel in 1989 (Orange County, 1983).

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

LAND USE AND PLANNING – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an 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?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural communities conservation plan?	☐	☐	☐	☒

a. Would the project physically divide an established community?

NO IMPACT. With the exception of off-site hauling of debris and materials, proposed project activities would occur within the existing creek channel and surrounding open space. The proposed project site is situated between an existing community and Crown Valley Parkway. Because Crown Valley Parkway is a high-volume arterial, the surrounding communities are oriented away from the proposed project site. Therefore, the proposed project would not further divide any established community. No impacts would occur.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an 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?

NO IMPACT. The proposed project would be subject to the City of Laguna Niguel General Plan and Zoning Code, which designates the project area as Open Space and Public/Institutional (City of Laguna Niguel, 2002a and 2002b). As the proposed project would maintain the existing corridor's function as an open space corridor with flood conveyance capacity, the proposed project would be consistent with the plans and policies of the City of Laguna Niguel. Additionally, the project would contribute to the achievement of land use goals for preservation and enhancement of the natural setting of the City. No policy inconsistency impacts would occur.

c. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

NO IMPACT. The proposed project would not be within or adjacent to land under the jurisdiction of any habitat conservation plan or natural community conservation plan. Therefore, the project would not conflict with any applicable habitat conservation plans or natural community conservation plans. No impacts would occur.

X. Mineral Resources

SETTING

The California State Legislature enacted the Surface Mining and Reclamation Act (SMARA) in 1975 to limit new development in areas containing significant mineral deposits. SMARA calls for the State Geologist to classify the lands within California based on mineral resource availability. Although California has a wide range of mineral commodities, it was recognized that regionally produced construction materials, like sand, gravel, and crushed stone, are used in every urban area of the State and require special classification data. The California Division of Mines and Geology (CDMG) has classified urbanizing lands according to the presence or absence of significant sand, gravel, or stone deposits that

are suitable as sources of aggregate. These areas, called Mineral Resource Zones (MRZ), are described below:

- SZ: Scientific Resource area containing unique or rare occurrences of rocks, minerals, or fossils that are of outstanding scientific significance.
- MRZ-1: Mineral Resource Zone where adequate information indicates that no significant mineral deposits are present or likely to be present.
- MRZ-2: Mineral Resource Zone where adequate information indicates that significant mineral deposits are present, or there is a high likelihood for their presence and development should be controlled.
- MRZ-3: Mineral Resource Zone where the significance of mineral deposits cannot be determined from the available data.
- MRZ-4: Mineral Resource Zone where there is insufficient data to assign any other MRZ designation.

The classification system is intended to ensure that through appropriate lead agency policies and procedures, mineral deposits of statewide or regional significance are considered in agency decisions. The MRZ-2 classification would automatically warrant protective mitigation. Municipalities develop and adopt mineral resource management policies to incorporate into their planning policies, based on the mineral classification data provided. Most of the comprehensive mineral resource mapping in California has been completed for urban areas where there is a high probability that converted land uses would be incompatible with mining.

According to the City of Laguna Niguel General Plan, the proposed project area is not delineated as a locally important mineral resource recovery site. There are no known mineral resources (i.e., oil, gas, or non-petroleum resources) at the project site (CGS, 2004).

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

MINERAL RESOURCES - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?

NO IMPACT. Development on or impacts to lands classified as MRZ-2 would constitute a significant impact to mineral resources, while impacts to the other classifications (SZ, MRZ-1, MRZ-3, or MRZ-4) would not. The proposed project is not located in or adjacent to a known mineral resource zone classified as MRZ-2. Therefore, the project would not result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the State. No impacts would occur.

b. Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

NO IMPACT. The proposed project site is not delineated by the City of Laguna Niguel General Plan as a locally important mineral resource recovery site (City of Laguna Niguel, 1992). Therefore, the proposed project would not result in the loss of availability of a locally important mineral resource recovery site. No impacts would occur.

XI. Noise

SETTING

Noise Standards and Thresholds of Significance. Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation and the pressure level, or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting" written as dBA. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or the day/night average noise level (Ldn).

The proposed project is located within the City of Laguna Niguel and is subject to the noise policies and standards of the City's General Plan and noise ordinances. The City of Laguna Niguel has established policies and regulations concerning the generation and control of noise that could adversely affect their citizens and noise sensitive land uses. Exterior noise is required to be kept below 55 dBA from 7:00 a.m. to 10:00 p.m. and below 50 dBA from 10:00 p.m. to 7:00 a.m. (City of Laguna Niguel, 2004b). However, noise sources associated with construction, repair, remodeling or grading of property are exempted from the noise provisions provided such activities do not take place between 8:00 p.m. and 7:00 a.m., Monday through Saturday, or at any time on Sunday or a federal holiday (City of Laguna Niguel, 2004b).

Noise Sources and Levels. Transportation sources, such as automobiles, trucks, trains, and aircraft, are usually the principal sources of noise in an urban environment. Along major transportation corridors and highways noise levels can reach 80 Ldn, while away from busy streets and in isolated natural environments, noise levels can be below 40 Ldn. Industrial and commercial equipment and operations contribute to the ambient noise environment in their vicinities.

The primary noise source in the project area is the Crown Valley Parkway, which runs adjacent to most of the project area. Although John Wayne International Airport is only approximately 15 miles east of the proposed project, it is not in the direct flight path of the airplanes approaching or departing the airport and is not within the airport's designated 65 Ldn contour (AirNav, 2004). Areas outside the 65 Ldn are considered to be compatible with residential land use; the airport noise is audible from the project area, but is not considered significantly adverse.

Secondary sound also results from natural sources (e.g. water, wind, and birds), residential sources (e.g., dogs, people, landscape maintenance, etc.), and traffic on the residential roads in the subject area. Noise measurement contours for areas adjacent to the Crown Valley Parkway are presented within the City of Laguna Niguel General Plan. CNEL ambient noise levels in the Sulphur Creek Project area are estimated to be moderately high, ranging between 65.8 dBA and 69.6 dBA (City of Laguna Niguel, 1992).

Sensitive Receptors. Noise-sensitive receptors are facilities or areas (residential areas, hospitals, schools, offices, etc.) where excessive noise may cause annoyance or loss of business. Sensitive receptors in the vicinity of the proposed project are primarily limited to homes in residential communities. Single-family residential uses exist on both sides of the Sulphur Creek, within 30 to 200 feet. In addition, the Crown

Valley Elementary School is approximately 75 feet from the project site on the opposite side of Crown Valley Parkway.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

NOISE - Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e. For a project 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, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a. Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

Construction Impacts. Construction noise would be created from on-site and off-site sources. On-site noise during construction would occur primarily from heavy-duty diesel and gasoline-powered construction equipment. Off-site noise would be generated from trucks removing concrete debris, vegetative debris, or dirt and delivering materials and equipment to the job-site, as well as from vehicles used by workers commuting to and from the job site.

On-site Sources. Short-term adverse noise levels would result for up to 5.5 months from the construction of the proposed project, particularly with regard to the demolition of the concrete v-ditch and the grading of the creek bottom. On-site sources would include the operation of heavy construction equipment, such as a backhoe, grader, and jackhammers. Table 8 provides the typical noise ranges for these pieces of construction equipment.

Table 8. Noise Emission Characteristics of Construction Equipment

Equipment	Typical Noise Level 50 ft from Source (dBA)
Backhoe	80
Grader	85
Jack Hammer	88
Truck leaving construction site	88

Note: These values are based on a range of equipment and operating conditions.
Source: FTA, 1995.

The closest sensitive receptors (i.e., residences and Crown Valley Elementary School) are approximately 30 to 75 feet from the project site, although the closest sensitive receptors to the project area where the concrete v-ditch would be removed are approximately 100 to 200 feet from the site. During construction, it is anticipated that the residences and elementary school would be exposed to noise generated by various

pieces of construction equipment operating within the construction zones. Based on the information presented above, temporary noise levels at 50 feet would average up to 85 dBA. At 75 and 100 feet, it is anticipated that noise levels would average up to 82 and 79 dBA, respectively. The City has committed to require that all construction equipment and vehicles be tuned and utilize high-grade mufflers. In addition, the construction contractor would conform to City standards for construction noise, including restrictions limiting construction activities between the hours of 7:00 a.m. and 9:00 p.m. on weekdays and Saturdays; no construction activity would occur during national holidays or on Sundays. Implementation of the mitigation measures presented below would reduce potentially significant short-term impacts associated with onsite construction sources to less than significant levels.

Off-site Sources. Noise levels from off-site construction related traffic (delivery trucks, automobiles, and haul trucks) would be adverse (up to approximately 88 dBA at 50 feet). Application of best management practices that would be implemented by the City to minimize noise levels in residential neighborhoods and to limit travel to certain hours of the day would reduce the impact of construction related noise. Implementation of the mitigation measures presented below would reduce potentially significant short-term impacts associated with onsite construction sources to less than significant levels.

Construction noise levels from the equipment described in Table 8 would be potentially significant. However, implementation of the following recommended mitigation measures would reduce these impacts to less than significant levels.

N-1 The City of Laguna Niguel shall ensure through either an agreement with the construction contractor or through regular monitoring of construction activity that the construction contractor does all the following:

- Properly maintains and tunes engines on all construction equipment;
- Maintains properly functioning mufflers on all internal combustion and vehicle engines used in construction to reduce noise; and
- Observes working hours restrictions in accordance with the City Noise Ordinance.

Operational Impacts. Long-term noise impacts are those that would result from the change in permanent usage of the project site. The proposed project would not involve extensive long-term operational activities. The addition of interpretive signage and landscape maintenance activity at all three reaches would result in negligible noise sources in the form of occasional vehicle trips associated with periodic and minor ongoing maintenance activities. Noise impacts are likely to be less where replacement of turfgrass eliminates the need for regular mowing. Therefore, long-term operational noise impacts associated with the proposed project would be less than significant.

b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

LESS THAN SIGNIFICANT IMPACT. The proposed project would not be expected to result in excessive exposure of persons to or generation of groundborne vibration or noise levels. No sources of groundborne noise are proposed as part of the project. Construction equipment such as a backhoe and jackhammers would generate a limited amount of vibration during construction activities. However, groundborne vibration or noise would attenuate rapidly from the source and would not likely be perceptible by nearby receptors. Thus, impacts from groundborne vibration or noise would be less than significant.

c. Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

NO IMPACT. Because the project would help return the creek corridor to a more natural state, the project would not result in a substantial permanent increase in ambient noise levels in the vicinity of the

site above levels existing without the project (see Section XI (a)). The operations associated with the proposed project would be the same as those that currently exist at the site and would not generate substantial noise impacts.

d. Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. During concrete demolition and creek bottom grading, the construction of the proposed project could potentially generate adverse temporary noise impacts. However, the City of Laguna Niguel would comply with local noise ordinances and would implement Mitigation Measure N-1 to reduce any potential construction noise impacts (see Section XI [a]). Therefore, potential noise impacts would be mitigated to less than significant levels.

e. For a project 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, would the project expose people residing or working in the project area to excessive noise levels?

NO IMPACT. The nearest airport to the Project site is John Wayne Airport (SNA) in Orange County, approximately 15 miles to the north. Other airports are located approximately 40 to 60 miles to the northwest in Long Beach and Los Angeles, 61 miles to the north in Ontario, and 75 miles to the south in San Diego. No impacts would occur.

f. For a project within the vicinity of a private air strip, would the project expose people residing or working in the project area to excessive noise levels?

NO IMPACT. The proposed Project site is located approximately 7 miles north of the US Marine El Toro air station. No impacts would occur.

XII. Population and Housing

SETTING

The proposed project is located adjacent to a residential area within the City of Laguna Niguel in Orange County, California. The project corridor contains no housing and is currently used for open space and passive recreational purposes. It also serves as a visual resource for the adjacent residential areas.

Table 9 presents U.S. Census Year 2000 population, housing, and employment data for the project area and the City of Laguna Niguel.

Table 9. Population and Housing (2000)

	Total Population	Unemployment Rate	Total Housing Units	Vacancy Rate
Project Area[1]	8,043	4%	2,703	2%
City of Laguna Niguel	61,891	3%	23,885	3%

Source: U.S. Census. 2004. Census 2000 – Data Sets. Available: http://factfinder.census.gov.
[1] The project area includes portions of the following Census tracts: 423.19, 423.36.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

POPULATION AND HOUSING - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and business) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

NO IMPACT. The proposed project would not directly or indirectly induce population growth. The proposed project would not include the development of any new homes or businesses, and would not extend existing infrastructure or create new jobs. Local contractors would construct the project, so it is not anticipated that contractors would need to relocate to the area. City staff and contractors would perform the long-term maintenance required of the project. Therefore, no population growth impacts would occur.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

NO IMPACT. The proposed project site contains no housing and would not displace any residences. As noted in Section VIII, Hydrology, restoration of the proposed project site would not affect downstream flood control efforts such that housing would be affected. No impacts resulting from displacement of housing would occur.

c. Would the project displace substantial numbers of people necessitating the construction of replacement housing elsewhere?

NO IMPACT. As noted above and in the project description, the proposed project is existing open space and contains no housing. Therefore, the proposed project would not displace housing or businesses, or otherwise displace people, necessitating the construction of replacement housing elsewhere. No impacts would occur.

XIII. Public Services

SETTING

Fire. Within the City of Laguna Niguel, the Orange County Fire Authority (OCFA) provides fire prevention and suppression services and emergency medical services. The OCFA operates three fire stations within the City of Laguna Niguel, all of which could respond to a fire or emergency within the Upper Sulphur Creek project area (OCFA, 2004). The names and locations of the three fire stations are as follows:

- Station 5 at 23600 Pacific Island Drive;
- Station 49 at 31461 Street of the Golden Lantern; and
- Station 39 at 24241 Avila Drive.

The topography, vegetation, and development patterns in Laguna Niguel make the City highly susceptible to fire hazards. The City is characterized by rolling hills and valleys, and residential development located on/within ridgelines and valleys. Vegetation in the City includes highly combustible types such as chaparral and ruderal vegetation. The fire hazard is at its peak during the summer months when plant material dies and becomes a source of fuel.

Police. Police services in the project area and the City of Laguna Niguel are contracted with the Orange County Sheriff's Department (OCSD). The OCSD assigns 36 community services officers, deputies, investigators, and sergeants to the City of Laguna Niguel (OCSD, 2004). Statistical analysis indicates that Laguna Niguel has a low rate of Part 1 Crimes (i.e., homicide, rape, robbery, assault, burglary, general theft, and auto theft). Laguna Niguel's current crime rate is 1.48 crimes per 100 residents (OCSD, 2004).

Schools. The Capistrano Unified School District (CUSD) serves the City of Laguna Niguel. Crown Valley Elementary School is approximately 75 feet from the project site on the opposite side of Crown Valley Parkway. Other schools serving the project area are Marian Bergeson Elementary School located at 25302 Rancho Niguel Road and Niguel Hills Middle School located at 29070 Paseo Escuela in the City of Laguna Niguel and Dana Hills High School located at 33333 Street of the Golden Lantern in the City of Dana Point (CUSD, 2004).

Parks. Recreational facilities surrounding the project site include Crown Valley Community Park abutting the project site on the south, Niguel Botanical Preserve to the west of Crown Valley Community Park, Laguna Niguel Regional Park, and an unpaved footpath and regional Class I Bikeway that travels along the west side of the floodplain and upstream portion of Sulphur Creek.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 any of the public services:

i) Fire protection?

LESS THAN SIGNIFICANT IMPACT. Fire protection to the project site is provided by the OCFA. The current estimated OCFA emergency response time to the project area is 5 to 7 minutes (City of Laguna Niguel, 1992). The proposed improvements associated with the project would comply with all applicable provisions of the City's Fire and Building Codes. No changes would occur to existing waterlines or connections in the area that provide fire flows. Because the proposed project would not include the construction of residential housing, habitable structures, or generate the need for additional employees (refer to Section XII, Population and Housing), it would not place additional demands on the existing OCFA service ratios. Furthermore, project construction and staging activities would be confined to the site and would not interfere with OCFA access to surrounding properties. Emergency access to the site would also be maintained during construction. As such, the proposed project would not create adverse impacts associated with fire protection services, and would not result in the need for new or expanded fire facilities. Impacts to current fire protection service levels would be less than significant.

ii) Police Protection?

LESS THAN SIGNIFICANT IMPACT. The OCSD would provide police protection for the proposed project. The current estimated OCSD emergency response time to the project area is 4 to 6 minutes to the project area (City of Laguna Niguel, 1992). Because the proposed project would not include the construction of residential housing or generate the need for additional employees (refer to Section XII, Population and Housing), the proposed project would not reduce the officer to population ratio, or substantially affect the provision of public police services of the OCSD. Construction and staging of the proposed project would be confined to the site and, therefore, would not interfere with OCSD access to surrounding properties or affect police response times. As such, the proposed project would not result in adverse impacts associated with the provision of police protection services, and would not result in the need for new or expanded police facilities. Impacts would be less than significant.

iii) Schools?

NO IMPACT. The demand for new or expanded school facilities is generally associated with an increase in housing or population. As described above and in Section XII, Population and Housing, the proposed project would neither induce population growth through the need for new employees nor would it result in new housing. Thus, the proposed project would not induce new population that would require the need for new or expanded school facilities. Therefore, no impact on school facilities within the project vicinity would occur.

iv) Parks?

NO IMPACT. The demand for new or expanded parks is generally associated with an increase in housing or population. As described above and in Section XII Population and Housing, the proposed project would neither induce population growth through the need for new employees nor result in new housing. Thus, the proposed project would not induce new population that would require the need or for new or expanded park facilities. Furthermore, the proposed project maintains the access provided to the project area by existing paved paths and unpaved trails. Therefore, no impact on parks within the project vicinity would occur.

v) Other Public Facilities?

NO IMPACT. Because the project would not result in an increase in housing or population, the proposed project would neither induce population growth through the need for new employees nor would it result in new housing. Thus, the proposed project would not induce new population that would require the need for new or expanded public utilities and infrastructure, including water lines, gas lines, storm drain lines, sewer lines, power/data lines and roadways. Some alteration to existing landscape irrigation systems and metering would occur as maintenance responsibility is transferred from the Homeowner Associations to the City. Project implementation would not require new or altered public utilities or infrastructure services above existing conditions. No impacts would occur.

XIV. Recreation

SETTING

Recreational facilities surrounding the project site include Crown Valley Community Park abutting the project site on the south, Niguel Botanical Preserve to the west of Crown Valley Community Park, Laguna Niguel Regional Park, and an unpaved footpath and regional Class I Bikeway that travels along the west side of the floodplain and upstream portion of Sulphur Creek.

Crown Valley Community Park serves as the center of the City of Laguna Niguel's Parks and Recreation Department and includes the Crown Valley Community Center, a portion of which is leased by the South Coast YMCA. Recreational facilities at the park include a swimming pool, a gymnasium, two soccer fields (one with lights), one baseball field with lights, 14 picnic tables in two group areas, a bikeway, a playground, 280 parking spaces, and small recreational buildings. Additionally, the City of Laguna Niguel is proposing to build the Orange Coast Watershed Center adjacent to the community center on the west bank of Sulphur Creek to serve as an environmental education and event facility.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

RECREATION	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

NO IMPACT. Physical impacts to recreational facilities are usually associated with population in-migration and growth in an area, which increase the use of the existing facilities, leading to the need for expanded or new facilities. Given that the proposed project does not introduce any new residential development, the proposed project is not anticipated to increase the regional population (see Section XII, Population and Housing, for analysis of the proposed project's impacts on area population). Therefore, usage of neighborhood and regional parks or other recreational facilities would not increase as a result of the proposed project. As a result, the proposed project would not cause substantial physical deterioration of regional recreational facilities. Furthermore, the proposed project maintains the access provided to the

project area by existing paved paths and unpaved trails. No impacts to recreation would occur except for temporary impacts during construction. A sign and a flagman will be present to control public safety risk at the interface of the trails and the construction traffic.

b. Would the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

NO IMPACT. The proposed project would result in visual enhancement to recreational facilities serving the area, and restoration activities would integrate existing recreational facilities in the project area. Because the project would result in an improvement to recreational facilities without increasing the population of the area, the project would not require the construction or expansion of existing recreational facilities. No impacts from construction of recreational facilities would occur.

XV. Transportation and Traffic

SETTING

Regional Transportation Routes. The study area is located within the boundaries of the City of Laguna Niguel. Regional transportation routes serving the City of Laguna Niguel include:

- Interstate 5. Interstate 5 (I-5) is the major north-south route for regional travel between San Diego and Los Angeles, and is located directly east of the City. It consists of four travel lanes in each direction with full interchanges at Crown Valley Parkway and Avery Parkway (City of Laguna Niguel, 1992).
- State Route 73. State Route 73 (SR-73) is a west-east regional route from Interstate 405 in Costa Mesa terminating at its intersection with I-5 in south Orange County. It consists of three travel lanes in each direction and crosses through the northern boundary of Laguna Niguel with interchanges at Greenfield Drive, Moulton Parkway, and La Paz Road (City of Laguna Niguel, 1992).

Secondary Road System. All of the roads in the immediate vicinity of the study area are maintained by the City of Laguna Niguel and provide local access to the Crown Valley Parkway and surrounding residential neighborhoods. Traffic count data for 2003 is available for Crown Valley Parkway, which had a traffic count of 36,300 vehicles per day (vpd) and a level-of-service (LOS) at the intersection of Crown Valley Parkway and the Crown Valley Community Park of level C or better (City of Laguna Niguel, 1992).

Regulatory Context. The California Vehicle Code Division 15 Sections 35100-35558 establish the height, weight, length, and width restrictions for vehicles and their loads. Specifically, Section 35550 states: "The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds" (CVC, 2003). Vehicles or loads that exceed these limitations are considered oversize and require a special permit to operate on the State highway system. California Vehicle Code, Section 35780 designates the California Department of Transportation (Caltrans) and local authorities, with respect to roadways under their jurisdictions, the authority to issue a special permit to operate or move a vehicle or combination of vehicles or special mobile equipment of a size or weight of vehicle or load that exceeds the maximum specified limits (CVC, 2003).

The City of Laguna Niguel Public Works Department is responsible for transportation issues within the City boundaries. The City Traffic Engineer reviews all requests for traffic control devices from citizens and developers and prepares a report with recommendations to the City Traffic Commission. The Traffic Commission's recommendations are then forwarded to the City Council for final approval. Public Works contracts with private firms to provide street and traffic signal maintenance.

New projects within the City must comply with the Congestion Management Program (CMP) for Orange County pursuant to the 1989 State Legislature Transportation and Passenger Rail Bond Funding Package. The CMP involves monitoring traffic conditions on the designated transportation network, performance measures, analysis of the impact of land use decisions on the transportation network, and mitigation to reduce impacts of the network.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

TRANSPORTATION/TRAFFIC - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause an increase in traffic that is substantial in relation to the existing 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)?	☐	☐	☒	☐
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c. 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?	☐	☐	☐	☒
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
e. Result in inadequate emergency access?	☐	☐	☒	☐
f. Result in inadequate parking capacity?	☐	☐	☐	☒
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

a. Would the project cause an increase in traffic that is substantial in relation to the existing 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)?

LESS THAN SIGNIFICANT IMPACT.

Construction Impacts. During construction of the proposed project, construction workers would drive to and from the site each workday. Demolition of the existing concrete v-ditch, grading of the creek bottom, and removal of exotic and invasive plant species would generate solid waste in the form of concrete, soil, and vegetative material. Construction of the interpretive signs would also result in construction debris. The demolition waste and construction material would need to be hauled to and from the construction site by truck. However, it is estimated that an average of approximately five haul trips would occur in a single workday.

Should construction activity, including hauling of demolition materials, result in oversized loads, the construction contractor would be required to obtain oversized load permits from the applicable agencies (i.e., Caltrans and/or the Public Works Department). Furthermore, as part of the City of Laguna Niguel Public Works Department's consideration of the oversized load permit, it would review the proposed haul routes for transportation issues within the City boundaries, and would require appropriate permit

stipulations to avoid potential construction traffic impacts, especially to sensitive receptors in the surrounding residential neighborhoods. Therefore, the construction activities would result in a less than significant construction traffic impact.

Operation Impacts. Upon completion of the project, access to these facilities would be limited to periodic inspection and maintenance, and would not result in a significant increase in traffic volume. Therefore, project operations would have no significant impact on the streets in the project vicinity.

b. Would the project cause, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways to be exceeded?

LESS THAN SIGNIFICANT IMPACT. The Orange County Congestion Management Program (CMP) indicates that a project may have a significant impact and that a traffic study would be required if the project would contribute 50 or more peak hour vehicle trips to a designated CMP intersection and/or if the project would add 150 or more peak hour trips in either direction to a designated CMP freeway monitoring location.

The 5.5-month construction phase of the project would not result in daily trips that would exceed CMP thresholds during the peak traffic hour. It is estimated that project construction would generate an average of approximately five haul trips in a single workday. In addition, the CMP addresses ongoing traffic conditions, not temporary conditions, such as those caused by short-term construction projects, such as the proposed project. Long-term operations at the proposed project site would not cause a noticeable increase in traffic. Therefore, a detailed CMP analysis is not required, as the project would not have a significant impact on the CMP roadway network. Additionally, the project would not exceed a level of service standard established by the congestion management agency and is exempt from the requirements of the CMP program. Any impacts would be less than significant.

c. Would the project 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?

NO IMPACT. The proposed project would not have any components that would affect air traffic patterns or safety. No impacts would occur.

d. Would the project substantially increase hazards because of a design feature or incompatible uses?

LESS THAN SIGNIFICANT IMPACT. The increased levels of traffic and the increased number of vehicular turning movements at the intersections in the project area during project construction would result in a slight increase to the number of traffic conflicts and a corresponding increase in the probability of an accident occurring. The impact would not be significant, however, because there are no inherently dangerous design features in the area. Furthermore, the City of Laguna Niguel Public Works Department would require appropriate oversized permit stipulations to avoid any potential construction traffic impacts associated with the project. Closure of lane number 3 along Crown Valley Parkway may temporarily be required for equipment movement, but this work would be performed under permits and traffic controls defined by the City of Laguna Niguel. Therefore, impacts related to hazards due to design features are considered less than significant.

e. Would the project result in inadequate emergency access?

NO IMPACT. The proposed project would not substantially alter the current emergency access features at or adjacent to the project site. Although lane number 3 along Crown Valley Parkway may temporarily be required for the logistics of equipment movement, this work would be done under permits and traffic controls defined by the City of Laguna Niguel and is not anticipated to substantially alter access along the project area. The proposed project also includes hardscape elements to maintain the access provided to the

project area by existing paved paths and unpaved trails. Therefore, long-term site access would be improved. Any impacts would be less than significant.

f. Would the project result in inadequate parking capacity?

NO IMPACT. During construction, all worker vehicles would be parked either at the project site or in the Crown Valley Parkway bike lane through special temporary permit arrangements through the City. Project equipment and materials would be staged either at the site or overnight at an alternative site such as Crown Valley Community Park. Therefore, construction activities would not result in inadequate parking capacity to the project area. Upon completion, the proposed project would not generate an additional demand for parking. Parking capacity in the project area would not be impacted; no impacts would occur.

g. Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

NO IMPACT. The proposed project would be located entirely within the creek corridor alongside Crown Valley Parkway, and therefore, would not have any components that would affect policies, plans, or programs supporting alternative transportation. The restoration plans include the existing bike paths and walkways paved with asphalt or concrete as well as the equestrian/hiking trails surfaced with decomposed granite. Interpretive signage would be added at key locations along the trails and at an existing concrete-paved trailside plaza located in the Upper Reach. No impacts would occur.

XVI. Utilities and Service Systems

SETTING

Water Supply. The Moulton Niguel Water District (MNWD) provides water service to City residents as well as to Aliso Viejo and Laguna Hills. Laguna Niguel is divided into Improvement Districts Nos. 1 and 7 of the MNWD. The water system in the City consists of primary, secondary, and tertiary feeder lines, utilizing reservoirs and pump stations to store water to accommodate peak water demands and ensure adequate fire flows.

Wastewater Infrastructure. South Orange County Wastewater Authority operates the sewer system in the metropolitan Laguna Niguel area; however, the Moulton Niguel Water District provides sewer service to the city. The wastewater treatment in the district currently operates below the maximum treatment capacity and is expected to continue to accommodate future wastewater capacity.

Solid Waste Facilities. Solag Disposal/CR&R, Inc. provides residential and commercial refuse collection for City residents and businesses and residential collection of recyclable materials. Waste is transported to the Prima Deshecha Landfill located in San Juan Capistrano. The landfill occupies 1,500 acres and has an estimated remaining life of over ten years.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

UTILITIES AND SERVICE SYSTEMS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒

UTILITIES AND SERVICE SYSTEMS - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e. Result in a determination by the wastewater treatment provider, which serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

NO IMPACT. During construction, the amount of wastewater generated by construction workers would be considered a short-term minimal impact and would not result in a permanent increase to the treatment plant that receives the wastewater. Portable toilets would be located at the project during construction for temporary use by workers. Upon completion of the proposed Upper Sulphur Creek restoration activities, the project would not result in any new wastewater generation. Thus, existing wastewater generation from the project site would remain the same and not result in any additional wastewater. Therefore, the proposed project would be within the requirements of the MNWD and would result in no impacts to wastewater treatment providers.

b. Would the project require, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. As stated above in Section XVI (a), the existing wastewater treatment facilities serving the area would be adequate to provide the short-term limited wastewater services required of the proposed project.

The project may require water during site grading for dust suppression purposes. Due to the short-term nature of this construction phase, the water used would not be significant and would not significantly impact the local water supply. Upon completion, the proposed project would use minimal water for periodic landscaping and maintenance purposes. Therefore, water consumption associated with the project is not expected to require or result in the construction of new water treatment facilities or the expansion of existing facilities. No impacts are anticipated.

c. Would the project require, or result in the construction of, new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

LESS THAN SIGNIFICANT IMPACT. An objective of the proposed project is to attenuate flow rates by increasing channel roughness and storage as well as permeability. The project would reduce stormwater flows through Sulphur Creek by developing a channel bed that would have constant open flowing water derived from urban runoff that would support marshy vegetation. No change or expansion of catch basins, as part of the City's storm drain system, would be required by the proposed project. Therefore, because existing site drainage patterns would not be substantially altered, any impacts to stormwater drainage facilities would be less than significant.

d. Would the project have sufficient water supplies available to serve the proposed project from existing entitlements and resources, or would new or expanded entitlements be needed?

NO IMPACT. As stated above in Section XVI (a) and (b), the existing water and wastewater treatment facilities serving the Sulphur Creek project area are anticipated to be adequate to provide wastewater, reclaimed water, domestic potable water service, and fire flows for the site. No impacts are anticipated.

e. Would the project result in a determination by the wastewater treatment provider that serves or may serve the proposed project that it has adequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments?

NO IMPACT. As stated above in XVI (a), the existing wastewater treatment facilities serving the Sulphur Creek project area are anticipated to continue to provide wastewater services for the site. The project would not require the construction of new wastewater treatment facilities or the expansion of existing facilities. Therefore, no impacts to wastewater treatment providers are anticipated.

f. Would the project be served by a landfill with sufficient permitted capacity to accommodate the proposed project's solid waste disposal needs?

LESS THAN SIGNIFICANT IMPACT. The proposed project would generate demolition and construction debris during project construction. Debris from this project would include vegetative waste, and concrete debris from the removal of 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches of Sulphur Creek. Table 10 lists four unclassified landfills likely to be used for disposal of demolition and construction debris.

Table 10. Existing Unclassified Landfills Available to the Project Site

Name	Location	Permitted Daily Disposal (Tons)	Average Daily Disposal (Tons)	Remaining Capacity (Million Tons)	Permit Expiration Date
Azusa Land and Reclamation (Unclassified)	Azusa	6,500	500	48.93	Project Completion
Nu-Way Live Oak (Unclassified)	Irwindale	6,000	1,834	N/A	Project Completion
Peck Road Gravel Pit (Unclassified)	Monrovia	1,210	990	2.38	Project Completion
Reliance Pit No. 2 (Unclassified)	Irwindale	6,000	2,233	N/A	Project Completion

Sources: California Integrated Waste Board, 2004 and the California Waste Facilities, Sites, & Operations Database, http://www.ciwmb.ca.gov/SWIS.

The total permitted daily disposal at the four identified landfills is 19,710 tons and the actual daily disposal is 5,557 tons, which yields a remaining total permitted capacity of 14,153 tons per day. While the project would increase solid waste generation as a result of demolition activities, it is assumed that the total combined remaining daily permitted capacity of the identified unclassified landfills could adequately accommodate the construction debris associated with the proposed project. Therefore, waste generated by

demolition and construction activities would not exceed the available capacity at the four landfills serving the project area. Construction impacts related to solid waste capacity would be short-term and less than significant. Excess dirt generated during excavation will either be disposed of on site or taken to a permitted location at Crown Valley Community Park.

Upon completion of the proposed project, no permanent increase in solid waste generation would occur. The project would not require any additional staff to oversee facility operations. Therefore, solid waste associated with operation of the project would not introduce any increase in solid waste generation to the Prima Deshecha Landfill facility serving the project area. No impacts would occur.

g. Would the project comply with federal, State, and local statutes and regulations related to solid waste?

NO IMPACT. The proposed project would result in a slight short-term and temporary increase in solid waste generation during project construction, but would not, directly or indirectly, affect standard solid waste operations of the facility, which inherently is in compliance with applicable regulations. As stated above in Section XVI (f), existing unclassified solid waste facilities serving the project area are anticipated to continue to provide solid waste services in compliance with existing federal, state, and local statutes and regulations related to solid waste. Upon completion of the proposed project, no permanent increase in solid waste generation would occur. The project would not require any additional staff to oversee facility operations. Therefore, solid waste associated with operation of the project would not introduce any increase in solid waste generation to the Prima Deshecha Landfill facility serving the project area. No impacts would occur. No impacts related to applicable solid waste regulations would occur.

XVII. Mandatory Findings of Significance

MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c. Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The preceding analysis does not reveal any significant unmitigable impacts to the environment. Based on these findings, the proposed project is not expected to degrade the quality of the environment. Because the proposed project itself is a habitat restoration activity, the proposed project is not expected to have the potential to substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal. As discussed above in Section V, with the implementation of Mitigation Measure CR-1, the project does not pose a potentially significant impact under amended National Historic Preservation Act of 1966 to any structures of historic significance. No impacts would occur.

b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, effects of other current projects, and the effects of probable future projects.)

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Although the project includes potentially significant impacts associated with cultural resources, geology and soils, hydrology and water quality, and noise, these impacts can be mitigated to less than significant levels. Other less than significant impacts have also been identified in the document. Each of these impacts is individually limited and would not cumulatively contribute to a considerable impact. As an ecosystem restoration, the project would improve environmental conditions along the project area and ultimately reduce cumulative environmental impacts with future projects. Impacts would be less than significant with the implementation of Mitigation Measures CR-1, GS-1, WQ-1, and N-1.

c. Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. While the project may result in potentially significant impacts associated with cultural resources, geology and soils, hydrology and water quality, and noise, with the proposed mitigation they would not result in direct or indirect substantial adverse effects on human beings. Implementation of Mitigation Measures CR-1, GS-1, WQ-1, and N-1 would reduce impacts to less than significant levels. Other impacts associated with the project would also be less than significant. No human beings would be substantially adversely affected by the project. With mitigation incorporated, all impacts would be less than significant.

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XIX. List of Preparers and Reviewers

Name	Project Role
Lead Agency/Reviewers	
Nancy Palmer	City of Laguna Niguel Public Works Department
Jeff Gibson	City of Laguna Niguel Planning Department
CEQA Consultant: RBF/Aspen Environmental Group	
Anna Lantin	RBF – Project Manager
Shawna Hilgert	RBF – Hydrology and Water Quality
Negar Vahidi	Aspen Environmental Group – CEQA Project Manager
Jacob Hawkins	Aspen Environmental Group – CEQA Deputy Project Manager, Project Description, Biological Resources
Michelle Mattson	Aspen Environmental Group – Conceptual Plan Project Manager. Biological Resources, Geology and Soils, Hydrology and Water Quality, Project Description
Phil Lowe	Aspen Environmental Group – Hydrology and Water Quality
Kathleen Robertson	Aspen Environmental Group – Aesthetics, Agricultural Resources, Land Use and Planning, Mineral Resources, Population and Housing
Scott DeBauche	Aspen Environmental Group - Air Quality, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Public Services, Recreation, Transportation and Traffic, Utilities and Service Systems, Mandatory Findings of Significance
Matt Fagundes	Aspen Environmental Group - Air Quality, Noise
Judy Spicer	Document Production Coordinator
Debra Matsumoto	Editor
Kati Simpson	Graphics
Craig Hattori	Graphics

APPENDICES

A. RESPONSE TO COMMENTS

B. COMMENT LETTERS

C. MODIFICATIONS TO THE INITIAL STUDY

D. MITIGATION MONITORING PLAN

E. AIR QUALITY CALCULATIONS

F. UPPER SULPHUR CREEK CONCEPTUAL RESTORATION PLAN

APPENDIX A.

RESPONSE TO COMMENTS

APPENDIX A. RESPONSE TO COMMENTS

INTRODUCTION

The City of Laguna Niguel released for public review a Mitigated Negative Declaration (MND) and Initial Study (IS) for the proposed Upper Sulphur Creek Ecosystem Restoration Project on September 29, 2004. The MND and IS were circulated for public comment until October 29, 2004. A total of seven sets of comments were received in the form of letters, faxes, and emails. This section presents responses to comments received on the MND and IS. See Appendix B for copies of all comments.

RESPONSES TO MND AND IS COMMENTS

Table A lists all comments received on the MND and IS and shows the comment set identification number for each letter, fax, or email. To find the response to a particular comment, note its comment set number from Table A, then find the response to the that particular comment set below. See Appendix B for copies of the comment letters on the MND and IS.

Table A. Commentors and Comment Set Numbers

Commenter	Comment Set
California State Coastal Conservancy	1
Crown Royale Homeowners Association	2
Michael L. Erholz	3
Micki Harris	4
Diane Hegyi	5
Judith Hoel	6
Patrick Wiesen	7

COMMENT SET 1: CALIFORNIA STATE COASTAL CONSERVANCY

Mitigation Measure WQ-1 has been revised to provide more definition by including the requirement that the SWPPP be written in accordance with the Orange County Stormwater Program Construction Runoff Guidance Manual 2003.

Revised Mitigation Measure WQ-1:

> A storm water pollution prevention plan (SWPPP) shall be developed and implemented by the contractor to prevent or reduce the effects of earth moving, handling of toxic materials, and other disturbances in and adjacent to the channel that may cause accelerated erosion, scouring and water contamination. The SWPPP shall show BMPs that will be required to control discharges from the construction site as well as from waste handling and disposal areas. <u>The SWPPP will be prepared in accordance with the Orange County Stormwater Program Construction Runoff Guidance Manual 2003.</u> The SWPPP shall include methods of on-site storage and disposal of construction materials and construction waste, and methods to minimize or eliminate the exposure of stormwater to construction materials, equipment, vehicles, waste storage areas, or service areas. The comprehensive erosion control plan required under GS-1 shall be included as part of the SWPPP.

COMMENT SET 2: CROWN ROYALE HOMEOWNERS ASSOCIATION

The City of Laguna Niguel recognizes the unanimous endorsement of the Crown Royale Homeowners Association Board of Directors for the Alternative #3 planting plan for the Middle Reach described in the Conceptual Plan (Appendix F of this document), which retains the least amount of turfgrass area of the alternatives present. The Crown Royale Homeowners Association will be informed of the December 7, 2004 Laguna Niguel City Council certification hearing for the Upper Sulphur Creek Ecosystem Restoration Project Mitigated Negative Declaration and Initial Study.

COMMENT SET 3: MICHAEL L. ERHOLZ

It is expected that restoration will improve the overall scenic quality of the area and it is not anticipated that the proposed project would significantly reduce the aesthetic value of the trail that runs adjacent to Sulphur Creek in the Middle Reach. The City of Laguna Niguel, however, recognizes that there is a preference among some members of the community for the Alternative #2 planting plan for the Middle Reach in the Conceptual Plan. Alternative #2 would have the greatest amount of grassy area in the Middle Reach among the different Conceptual Plan alternatives. These preferences will be taken into consideration by the Laguna Niguel City Council in its deliberations on the Upper Sulphur Creek Ecosystem Restoration Project.

COMMENT SET 4: MICKI HARRIS

Under the proposed project, the City of Laguna Niguel will be taking over maintenance of areas of the stream corridor that would be included in the proposed project area. It is believed that the City's maintenance of the area may provide leverage for ensuring that repairs by other agencies with utilities in the corridor are accomplished properly in a timely manner.

The City recognizes that there is a preference among some members of the community for the Alternative #2 planting plan for the Middle Reach, which retains the most grass; and/or for the Alternative #1 planting plan for the Middle Reach, which balances Alternatives #2 and #3 while keeping lawn area intact near Crown Valley Parkway on both sides of the public sidewalk. These preferences will be taken into consideration by the Laguna Niguel City Council in its deliberations on the Upper Sulphur Creek Ecosystem Restoration Project.

COMMENT SET 5: DIANE HEGYI

See Response to Comment Set 3.

COMMENT SET 6: JUDITH HOEL

See Response to Comment Set 3.

COMMENT SET 7: PATRICK WIESEN

See Response to Comment Set 3.

APPENDIX B.

COMMENT LETTERS

APPENDIX C.

MODIFICATIONS TO THE INITIAL STUDY

APPENDIX C. MODIFCATIONS TO THE INITIAL STUDY

INTRODUCTION

This appendix presents changes to the IS that resulted from comments made on the document and minor changes made to the project description which do not alter the impacts identified in the IS. The text that has been removed from the IS has been indicated by a strikeout. New text to be added is indicated with underlines. Changes to mitigation measures are shown in this section and are also reflected in Appendix D.

Page 2, Section 8 of the IS (Revised per changes to the Project Description)

The first paragraph of Section 8 of the IS has been revised as follows:

The proposed project consists of the restoration of ~~approximately~~ up to 28 acres along the 1.52-mile long Upper Sulphur Creek corridor in the City of Laguna Niguel. The project would be divided into three sub-areas:

Page 2, Section 8.1 of the IS (Revised per changes to the Project Description)

The first paragraph of Section 8.1 of the IS has been revised as follows:

The proposed restoration project lies along a portion of Upper Sulphur Creek, which serves a drainage area of approximately ~~three~~ two square miles within Laguna Niguel, located in the coastal hills of southern Orange County. Sulphur Creek drains into Aliso Creek approximately three miles upstream of Aliso Creek's mouth at the Pacific Ocean. The portion of Upper Sulphur Creek included in the project is fed by storm drains in the neighborhoods on both sides of Crown Valley Parkway. Project restoration activities would occur ~~over~~ up to 28 acres along a 1.52-mile corridor between Rancho Niguel Park and Sulphur Creek Park.

Page 2, Section 8.2 of the IS (Revised per changes to the Project Description)

The fifth, sixth, seventh, eighth, and ninth bullets in Section 8.2 of the IS have been revised as follows:

- Improving Aliso watershed water quality by reducing fertilizer and pesticide applied to the surrounding landscape and by natural cleansing of runoff through wetland nutrient uptake, ~~the development of natural~~ biofiltration, ~~and~~ depositional processes, increased infiltration, and reduction of temperature;
- Attenuating flow is achieved by reducing discharge rates by increasing channel roughness and storage as well as permeability;
- Educating the public about wetland processes, plant communities, and water cycles; ~~and~~
- Providing a peaceful nature refuge while maintaining passive recreational functions;~~.~~
- Water conservation by use of native vegetation minimizing the need for permanent irrigation; and
- Improvements to eliminate standing water to minimize the potential for vector-related issues.

Page 5, Section 8.5 of the IS (Revised per changes to the Project Description)

The first paragraph of Section 8.5 of the IS has been revised as follows:

The project would restore up to 27.7 acres of open space along approximately 1.52 miles of Upper Sulphur Creek adjacent to Crown Valley Parkway. The project area extends from the Glen Rock Drive and Crown Valley Parkway intersection through Rancho Niguel Master Association property, southwest under Moulton Parkway. The project continues through Rancho Niguel Master Association property to approximately 260 feet northeast of Nueva Vista Drive, where the project crosses into Crown Royale Homeowners Association (HOA) property. The project continues southwest adjacent to Crown Valley Parkway through Crown Royale HOA property to La Paz Road. Crossing under La Paz Road, the project would enter Niguel Ridge HOA property and continue southwest to approximately 800 feet southwest of La Plata Drive. Project activities would include the removal of up to ~~3,600~~ 2,000 linear feet of concrete v-ditch in the Middle and Lower Reaches to create a wider soft-bottom channel. Floodplain terraces adjacent to the channel would be created to be inundated by water during winter storms of various intensities. Portions of the existing irrigated ornamental landscaping and all invasive weedy vegetation would be removed and replaced with a mosaic of vegetation communities native to the local environment. Invasive and ornamental elimination and concrete removal activities would differ for each of the three reaches within the project area:

Page 6, Section 8.5 of the IS (Revised per changes to the Project Description)

The sixth paragraph of Section 8.5 of the IS has been revised as follows:

Excavation would be largely minimal in the Upper Reach, but would occur with the removal of the v-ditch and grading of the active channel in the Middle and Lower Reaches. Material excavated during the project (approximately 12,000 cubic yards) would be used as fill at a permitted construction site or would be disposed of at the Olinda Alpha Sanitary Landfill in Brea, approximately 32 miles from the proposed project site. ~~on site in two areas: one in the Upper Reach and one in the Middle Reach. Fill material in the Upper Reach would help stabilize an upland sage scrub area (see Figures 13a and 16a in Appendix B, Upper Sulphur Creek Conceptual Restoration Plan). Fill in the Middle Reach would be used in leveling the ground in a new proposed park area near the intersection of La Paz Road and Crown Valley Parkway (see Figures 19, 21, and 23 in Appendix B, Upper Sulphur Creek Conceptual Restoration Plan). Alternatively, excavated dirt could be used as fill at a permitted location at Crown Valley Community Park.~~

Page 7, Section 8.6 of the IS (Revised per changes to the Project Description)

Rows 4 and 12 of Table 1 in Section 8.6 of the IS have been revised as follows:

Concrete Demolition	--	~~1,700~~1,300 linear feet	~~1,900~~ 700 linear feet	~~3,600~~ 2,000 linear feet
Establish new coastal freshwater marsh	--	~~0.5~~ 0.75 acre	~~0.5~~ 0.23 acre	1 acre

Page 7, Section 8.6 of the IS (Revised per changes to the Project Description)

The list of Construction Equipment at the bottom of Table 1 in Section 8.6 of the IS has been revised as follows:

Construction Equipment
1 Backhoe
1 Grader
~~1~~ 2-3 Haul Trucks
2 Jackhammers
1 Loader

Page 16, Section III. Air Quality of the IS (Revised per changes to the Project Description)

The second paragraph under Section III. Air Quality, Environmental Impacts and Mitigation Measures, Short-Term Construction Impacts of the IS has been revised as follows:

Construction/restoration activities associated with the removal of concrete v-ditches in the Middle and Lower Reaches and the grading of the creek bottom would generate the most emissions during construction activities. These activities would require the use of the following heavy-duty diesel construction equipment: one backhoe; one grader; one loader, and ~~one~~ two or three haul trucks. For a worst-case scenario, it is assumed that concrete removal and creek bottom grading would occur simultaneously and would generate the maximum daily construction emissions. Refer to Table 7 for the estimated total maximum (worst-case) daily construction emissions that would be associated with the project. Complete emissions calculations and assumptions for the proposed project are presented in Appendix A.

Page 16, Section III. Air Quality of the IS (Revised per changes to the Project Description)

Table 7 under Section III. Air Quality, Environmental Impacts and Mitigation Measures, Short-Term Construction Impacts of the IS has been revised as follows:

Table 7. Maximum Daily Construction Emissions (lb/day)

Emission Source	ROC	CO	NOx	Sox	PM_{10}
Mobile Equipment	~~23.08~~ 26.24	~~64.87~~ 80.16	~~25.68~~ 47.86	~~2.16~~ 3.26	~~1.20~~ 2.23
Worker Commute Trips	2.18	15.28	1.40	0.03	0.07
Fugitive Dust (Material Handling)	---	---	---	---	11.0
Total Construction Emissions	~~25.26~~ 28.42	~~80.15~~ 95.44	~~27.08~~ 49.26	~~2.19~~ 3.29	~~12.27~~ 13.30
SCAQMD Significance Thresholds	75	550	100	150	150
Exceed Threshold?	NO	NO	NO	NO	NO

Page 29, Section VII. Hazardous Materials of the IS (Revised per changes to the Project Description)

The second paragraph under Section VII. Hazardous Materials, Environmental Impacts and Mitigation Measures, Impact Question a. of the IS has been revised as follows:

Hazardous or flammable substances that may be used during the construction phase of the project would include vehicle fuels and oils for the operation of heavy equipment for activities such as concrete demolition and surface grading. Construction vehicles on site may require routine or emergency maintenance that could result in the release of oil, diesel fuel, transmission fluid, and/or other materials. Because the proposed project is considered a waterway, a release of hazardous materials could potentially affect the environment and/or downstream waterways. However, the hazardous materials would not be used in large quantities or stored in a manner that would pose a significant

hazard to the public. Project excavation, grading, and transport of fill material is not anticipated to expose the public to contaminated soils. In addition, the use of hazardous materials during construction would be short-term. Therefore, the impacts resulting from project implementation would be less than significant.

Page 30, Section VII. Hazardous Materials of the IS (Revised per changes to the Project Description)

The second paragraph under Section VII. Hazardous Materials, Environmental Impacts and Mitigation Measures, Impact Question b. of the IS has been revised as follows:

Demolition, grading, construction of interpretive signs, and placement of erosion control material could require the use of hazardous materials in small quantities for fueling/lubrication of on and off-site construction equipment. However, the use of hazardous materials would be short-term and would be subject to current regulations. The risk of upset in the form of a release or spill of hazardous substances would be minimal and would not be anticipated. Project excavation ~~and~~ , grading, and transport of fill materials is not anticipated to expose the public or environment to contaminated soils. Therefore, potential impacts are considered to be less than significant.

Page 33, Section VIII. Hydrology and Water Quality of the IS (Revised per Comment Set 1)

Mitigation Measure WQ-1 under Section VIII. Hydrology and Water Quality, Environmental Impacts and Mitigation Measures, Impact Question a. of the IS has been revised as follows:

WQ-1 A storm water pollution prevention plan (SWPPP) shall be developed and implemented by the contractor to prevent or reduce the effects of earth moving, handling of toxic materials, and other disturbances in and adjacent to the channel that may cause accelerated erosion, scouring and water contamination. The SWPPP shall show BMPs that will be required to control discharges from the construction site as well as from waste handling and disposal areas. The SWPPP will be prepared in accordance with the Orange County Stormwater Program Construction Runoff Guidance Manual 2003. The SWPPP shall include methods of on-site storage and disposal of construction materials and construction waste, and methods to minimize or eliminate the exposure of stormwater to construction materials, equipment, vehicles, waste storage areas, or service areas. The comprehensive erosion control plan required under GS-1 shall be included as part of the SWPPP.

Page 39, Section XI. Noise of the IS (Revised per changes to the Project Description)

The second paragraph under Section XI. Noise, Environmental Impacts and Mitigation Measures, Impact Question a. of the IS has been revised as follows:

On-site Sources. Short-term adverse noise levels would result for up to 5.5 months from the construction of the proposed project, particularly with regard to the demolition of the concrete v-ditch and the grading of the creek bottom. On-site sources would include the operation of heavy construction equipment, such as a backhoe, loader, grader, and jackhammers. Table 8 provides the typical noise ranges for these pieces of construction equipment.

Page 39, Section XI. Noise of the IS (Revised per changes to the Project Description)

Table 8 under Section XI. Noise, Environmental Impacts and Mitigation Measures, Impact Question a. of the IS has been revised as follows:

Table 8. Noise Emission Characteristics of Construction Equipment

Equipment	Typical Noise Level 50 ft from Source (dBA)
Backhoe	80
Loader	85
Grader	85
Jack Hammer	88
Truck leaving construction site	88

Page 48, Section XV. Transportation and Traffic of the IS (Revised per changes to the Project Description)

The second paragraph under Section XV. Transportation and Traffic, Environmental Impacts and Mitigation Measures, Impact Question b. of the IS has been revised as follows:

The 5.5-month construction phase of the project would not result in daily trips that would exceed CMP thresholds during the peak traffic hour. It is estimated that project construction would generate an average of approximately ~~five~~ 17 haul trips in a single workday. In addition, the CMP addresses ongoing traffic conditions, not temporary conditions, such as those caused by short-term construction projects, such as the proposed project. Long-term operations at the proposed project site would not cause a noticeable increase in traffic. Therefore, a detailed CMP analysis is not required, as the project would not have a significant impact on the CMP roadway network. Additionally, the project would not exceed a level of service standard established by the congestion management agency and is exempt from the requirements of the CMP program. Any impacts would be less than significant.

Page 49, Section XVI. Utilities of the IS (Revised per changes to the Project Description)

The third paragraph under Section XV. Transportation and Traffic, Setting of the IS has been revised as follows:

Solid Waste Facilities. Solag Disposal/CR&R, Inc. provides residential and commercial refuse collection for City residents and businesses and residential collection of recyclable materials. Waste is transported to the Prima Deshecha Landfill located in San Juan Capistrano. The landfill occupies 1,500 acres and has an estimated remaining life of over ten years. The proposed project could dispose of approximately 12,000 cy of fill material at the Olinda Alpha Sanitary Landfill in Brea. The Olinda Landfill occupies 565 acres and has an estimated remaining life of nine years.

Page 51, Section XVI. Utilities of the IS (Revised per changes to the Project Description)

The first paragraph under Section XV. Transportation and Traffic, Environmental Impacts and Mitigation Measures, Impact Question f. of the IS has been revised as follows:

LESS THAN SIGNIFICANT IMPACT. The proposed project would generate demolition and construction debris during project construction. Debris from this project would include vegetative waste, and concrete debris from the removal of 3,600 linear feet of concrete v-ditch in the Middle and Lower Reaches of Sulphur Creek. Table 10 lists four unclassified landfills likely to be used for disposal of demolition and construction debris. The proposed project would also generate approximately 12,000 cy of soil fill material which would either be hauled a permitted construction site for use as fill or would be disposed of at the Olinda Alpha Sanitary Landfill. Table 10 also lists disposal and capacity information for the Olinda Alpha Sanitary Landfill.

Page 51, Section XVI. Utilities of the IS (Revised per changes to the Project Description)

Table 10 under Section XV. Transportation and Traffic, Environmental Impacts and Mitigation Measures, Impact Question f. of the IS has been revised as follows:

Table 10. Existing Unclassified Landfills Available to the Project Site

Name	Location	Permitted Daily Disposal (Tons)	Average Daily Disposal (Tons)	Remaining Capacity (Million Tons)	Permit Expiration Date
Azusa Land and Reclamation (Unclassified)	Azusa	6,500	500	48.93	Project Completion
Nu-Way Live Oak (Unclassified)	Irwindale	6,000	1,834	N/A	Project Completion
Peck Road Gravel Pit (Unclassified)	Monrovia	1,210	990	2.38	Project Completion
Reliance Pit No. 2 (Unclassified)	Irwindale	6,000	2,233	N/A	Project Completion
Olinda Alpha Sanitary Landfill (Solid Waste Landfill)	Brea	8,000	7,000	74.90	Project Completion

Page 51, Section XVI. Utilities of the IS (Revised per changes to the Project Description)

The second paragraph under Section XV. Transportation and Traffic, Environmental Impacts and Mitigation Measures, Impact Question f. of the IS has been revised as follows:

The total permitted daily disposal at the four identified landfills is 19,710 tons and the actual daily disposal is 5,557 tons, which yields a remaining total permitted capacity of 14,153 tons per day. While the project would increase solid waste generation as a result of demolition activities, it is assumed that the total combined remaining daily permitted capacity of the identified unclassified landfills could adequately accommodate the construction debris associated with the proposed project. Therefore, waste generated by demolition and construction activities would not exceed the available capacity at the four landfills serving the project area and disposal of the fill material at the Olinda Alpha Sanitary Landfill would not exceed its available capacity. Construction impacts related to solid waste capacity would be short-term and less than significant. ~~Excess dirt generated during excavation will either be disposed of on site or taken to a permitted location at Crown Valley Community Park.~~

Page 52, Section XVI. Utilities of the IS (Revised per changes to the Project Description)

The first paragraph under Section XV. Transportation and Traffic, Environmental Impacts and Mitigation Measures, Impact Question g. of the IS has been revised as follows:

NO IMPACT. The proposed project would result in a slight short-term and temporary increase in solid waste generation during project construction, but would not, directly or indirectly, affect standard solid waste operations of the facility, which inherently is in compliance with applicable regulations. As stated above in Section XVI (f), existing unclassified solid waste facilities serving the project area and the Olinda Alpha Sanitary Landfill are anticipated to continue to provide solid waste services in compliance with existing federal, state, and local statutes and regulations related to solid waste. Upon completion of the proposed project, no permanent increase in solid waste generation would occur. The project would not require any additional staff to oversee facility operations. Therefore, solid waste associated with operation of the project would not introduce any increase in solid waste generation to the Prima Deshecha Landfill facility serving the project area. No impacts would occur. No impacts related to applicable solid waste regulations would occur.

APPENDIX D.

MITIGATION MONITORING PLAN

CITY OF LAGUNA NIGUEL
MITIGATION MONITORING PROGRAM FOR
MITIGATED NEGATIVE DECLARATION

November 3, 2004

PROJECT NAME: Upper Sulphur Creek Ecosystem Restoration Project

DESCRIPTION: The City of Laguna (City) proposes to restore up to 28 acres of open space along approximately 1.52 miles of Upper Sulphur Creek in the City of Laguna Niguel. The Upper Sulphur Creek Ecosystem Restoration Project (proposed project) would be divided into three sub-areas: Upper, Middle and Lower Reach. Project activities would include the removal and replacement of portions of the existing irrigated ornamental landscaping and all invasive weedy vegetation with a mosaic of vegetation communities native to the local environment. Up to 2,000 linear feet of concrete v-ditch in the Middle and Lower Reaches would be removed to create a wider soft-bottom channel. Floodplain terraces adjacent to the channel would be created to be inundated by water during winter storms of various intensities. Invasive and ornamental elimination and concrete removal activities would differ for each of the three reaches (upper, middle, and lower reach) within the project area. The proposed project site is located on private lands owned by the Rancho Niguel Master (Upper Reach), Crown Royale (Middle Reach), and Niguel Ridge Homeowners Associations (Lower Reach). Maintenance easements for the project would be negotiated so that maintenance responsibility for the creek channel and adjacent restored areas would be taken over by the City. Restoration activities are anticipated to commence in July 2004.

LOCATION: Proposed project activity would occur along Upper Sulphur Creek, adjacent to Crown Valley Parkway in the City of Laguna Niguel. Restoration activities would occur over a 1.52-mile length of Sulphur Creek from approximately Glen Rock Drive in the north, flowing in a southwesterly direction downstream to approximately 1,000 feet southwest of La Plata Drive. The project would be crossed by La Plata Drive, La Paz Road, Nueva Vista Drive, and Moulton Parkway.

The following Mitigation Measures have been incorporated into the project design or are to be implemented in accordance with the project conditions of approval, thereby reducing all identified environmental impacts to a less than significant level:

MITIGATION MEASURE	STAFF MONITOR	TIMING OF COMPLIANCE	DATE OF COMPLIANCE
CR-1 In the event of the discovery of cultural resources (e.g., archaeological, paleontological, or human remains) during project-related activities, all work shall immediately stop within 100 feet of the discovery. A qualified cultural resource specialist would be notified immediately and would implement measures as necessary to avoid or minimize harm to the discovery, pending the results of an evaluation. Ground disturbance in the vicinity of the discovery would not resume until a qualified archaeologist has evaluated and treated the discovery. Evaluation and curation procedures shall meet the standards mandated by the California Office of Historic Preservation.	Grading Inspector	Throughout construction	
GS-1 A comprehensive Erosion Control Plan shall be prepared for project construction. The Plan shall identify measures to be implemented to minimize the erosion effects of grading and excavation. Erosion control methods to be described in the Plan and implemented shall include, but not be limited to, the following: • Avoiding soil disturbance during periods of heavy precipitation or high winds; • Keeping disturbed areas to the minimum necessary for construction; • Reducing surface water flows across graded or exposed areas; • Using straw bales, soil mats, or silt fences to stabilize disturbed areas; • Using culvert, ditches, water bars and sediment traps to control runoff and sedimentation; and • Bioengineering techniques for erosion control.	Grading Inspector	Throughout construction	
WQ-1 A storm water pollution prevention plan (SWPPP) shall be developed and implemented by the contractor to prevent or reduce the effects of earth moving, handling of toxic materials, and other disturbances in and adjacent to the channel that may cause accelerated erosion, scouring and water contamination. The SWPPP shall show BMPs that will be required to control discharges from the construction site as well as from waste handling and disposal areas. The SWPPP will be prepared in accordance with the Orange County Stormwater Program Construction Runoff Guidance Manual 2003. The SWPPP shall include methods of on-site storage and disposal of construction materials and construction waste, and methods to minimize or eliminate the exposure of stormwater to construction materials, equipment, vehicles, waste storage areas, or service areas. The comprehensive erosion control plan required under GS-1 shall be included as part of the SWPPP.	Grading Inspector	Throughout construction	
N-1 The City of Laguna Niguel shall ensure through either an agreement with the construction contractor or through regular monitoring of construction activity that the construction contractor does all the following: • Properly maintains and tunes engines on all construction equipment; • Maintains properly functioning mufflers on all internal combustion and vehicle engines used in construction to reduce noise; and • Observes working hours restrictions in accordance with the City Noise Ordinance.	Public Works Department/Project Manager	Throughout construction	

APPENDIX E.

AIR QUALITY CALCULATIONS

UPPER SULPHUR CREEK ECOSYSTEM PROJECT

TABLE 1: DAILY FUGITIVE DUST EMISSION ESTIMATES

Emission Factor (tons/acre-month)	**Period**	(days)	**Areas** (acres/day)
0.11	1		1
Totals			
Tons/day	Pounds/day		
0.0055	11.00		

Note: It is assumed that each month consist of 20 workdays.

Source: Midwest Research Institute, 1996.

UPPER SULPHUR CREEK ECOSYSTEM PROJECT

TABLE 2: DAILY MOBILE SOURCE EMISSION ESTIMATES FOR CONSTRUCTION EQUIPMENT

Parameter	Units	Backhoe	Grader	Loader	Parameter	Units	Haul Truck	
Number of Equipment Units		1	1	1	Miles per trip		57	
Operational Hours	hr/day	8	8	8	Trips per day		17	
Average Rated Horse Power	hp	79	156.6	79	Conversion Factor	(lb/g)	0.002205	
Typical Load Factor	%	46.50%	57.50%	46.50%				
Emission Factor	lb/hp-hr				Emission Factor	(g/mile)		
CO		0.015	0.08	0.015	CO		6.42	
ROCs		0.003	0.03	0.003	ROCs		1.34	
NOx		0.022	0.021	0.022	NOx		9.27	
SOx		0.002	0.002	0.002	SOx		0.30	
PM10		0.001	0.001	0.001	PM10		0.43	
Total Daily Emissions	(lb/day)							**Totals**
CO		4.408	57.629	4.408			13.717	80.162
ROCs		0.882	21.611	0.882			2.863	26.237
NOx		6.465	15.128	6.465			19.807	47.865
SOx		0.588	1.441	0.588			0.641	3.257
PM10		0.294	0.720	0.294			0.919	2.227

Refer to Table 3 for emissions associated with commuting workers.

The miles per trip for haul trucks is an average that accounts for 5 of the trips with 40 mile round trips and 12 of the trips with 64 mile roundtrips.

Sources:

Tables A9-8-B and -C, A9-5-K-6 and A9-5-L *SCAQMD CEQA Air Quality Handbook*

Appendix J of AP-42, USEPA AP-42

UPPER SULPHUR CREEK ECOSYSTEM PROJECT

TABLE 3: EMISSION ASSOCIATED WITH COMMUTING CONSTRUCTION WORKERS

Vehicle Type	Vehicle Trips per Day	Round trip Miles	ROC		NOx		SOx		CO		PM10	
			Emission Factor (g/mile)	Total Emissions (lbs)	Emission Factor (g/mile)	Total Emissions (lbs)	Emission Factor (g/mile)	Total Emissions (lbs)	Emission Factor (g/mile)	Total Emissions (lbs)	Emission Factor (g/mile)	Total Emissions (lbs)
Workers Commuting (LDGV)	5.0	30	2.77	0.92	1.82	0.60	0.05	0.02	18.43	6.09	0.11	0.04
Workers Commuting (LDGT)	5.0	30	3.84	1.27	2.42	0.80	0.05	0.02	27.83	9.19	0.11	0.04
Total Emissions (lbs/day)				2.18		1.40		0.03		15.28		0.07

Notes: Emission factors for ROC, NOx, and CO obtained from Appendix J of AP-42 (USEPA, 1998)
Emission factors for ROC, NOx, and CO assumes 35 mph at 75 F
Emission factors for PM10 and SOx obtained from Appendix 9 of CEQA Handbook (SCAQMD, 1993)

Workers commuting are divided into half Light Duty Gasoline Vehicles (LDGV) and half Light Duty Gasoline Trucks (LDGT). It is assumed that a total of up to 10 workers would commute to the work site each day.

UPPER SULPHER CREEK ECOSYSTEM PROJECT

TABLE 4: EMISSIONS SUMMARY

CONSTRUCTION EMISSIONS

Air Pollutant	Mobile Equip	Worker Trips	Fugitive Dust	Total Daily (lb/day)
Carbon Monoxide (CO)	80.16	15.28	---	95.44
Reactive Organic Compounds (ROCs)	26.24	2.18	---	28.42
Nitrogen Oxides (NOx)	47.86	1.40	---	49.26
Sulfur Oxides (SOx)	3.26	0.03	---	3.29
Particulates (PM10)	2.23	0.07	11.00	13.30

APPENDIX F.

UPPER SULPHUR CREEK CONCEPTUAL RESTORATION PLAN

EXECUTIVE SUMMARY

RBF Consulting (RBF) and Aspen Environmental Group (Aspen) (the Team), under contract to the City of Laguna Niguel, prepared the Upper Sulphur Creek Conceptual Restoration Plan (the Plan). The Assessment Area consists of approximately 8,051 lineal feet of Upper Sulphur Creek (the Creek) flowing along side Crown Valley Parkway. The Assessment Area extends from the Glenn Rock Drive approximately 800 feet southwest of La Plata Drive in Laguna Niguel, California (the Assessment Area), between Rancho Niguel Park and Sulphur Creek Park. In order to prepare the Plan, the Team reviewed existing literature and hydrologic data, mapped vegetation communities, determined the potential of the Assessment Area to support sensitive flora, fauna, and wildlife movement, and completed a Hydrogeomorphic Method (HGM) functional assessment to establish a baseline. From this information, the Team developed a reasonable set of actions to restore native habitat within the existing constraints that will increase functional value to wildlife and improve water quality, as well as increase aesthetics, and provide recreation and educational benefits to the community. The Plan will be used to facilitate the preparation of the Mitigated Negative Declaration, a requirement of the California Environmental Quality Act (CEQA). In addition, the Plan will be used to obtain required State and Federal regulatory permits for impacts that would occur when the restoration project is implemented.

Through historical aerial review, it was determined that the Assessment Area and the watershed have undergone anthropogenic modifications over the past 70 years. Initially, impacts included agricultural and ranching activities within the watershed as early as 1938. Except to the extent that native vegetation may have been impacted, these activities had little to no effect on the Assessment Area until the 1960s. During this period Crown Valley Parkway was constructed, realigning and straightening many sections of Sulphur Creek. From this point forward, residential developments and new roads such as La Paz Road continued to confine and channelize the drainage through the 1980s. It appears in the 1985 and 1986 photographs that almost the entire Assessment Area was graded, channelized, or partially concrete-lined to accommodate the Rancho Niguel and the Crown Royale neighborhoods. These actions removed stream sinuosity and filled the floodplain, confining the stream to a soft-bottomed trapezoidal-shaped channel or a concrete-lined v-ditch. In addition, the hydrologic regime was converted from an ephemeral or intermittent system to a perennial system due to urban and storm runoff. Subsequently, the Creek has supported a range of healthy and disturbed vegetation communities including southern willow scrub, coastal freshwater marsh, and alkali meadow within the Creek, and sagebrush-buckwheat scrub, ruderal, and ornamental habitats in the adjacent uplands. In addition, many of the native habitats within the Creek are being invaded by invasive species such as pampas grass (*Cortaderia selloana*) and salt cedar (*Tamarix ramosissima*).

In addition, the ability of the Creek to provide wildlife habitat for foraging, breeding, and movement has been substantially degraded. Subsequently very few sensitive wildlife species were observed within the Assessment Area or in the literature review or are expected to occur. Sensitive species observed on the site include Costa's hummingbird (*Calypte costae*), migrant willow flycatcher (*Empidonax traillii*), California thrasher (*Toxostoma redivivum*), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). Sensitive species with State or Federal sensitive statuses that have at least a low potential to occur within the Assessment Area include, but are not limited to, the following: western spadefoot (*Spea hammondii*), southwestern pond turtle (*Emys* [=*Clemmys*] *marmorata pallida*), coast horned lizard (*Phyrnosoma coronatum*), orange-throated whiptail (*Cnemidophorus hyperythrus*), silvery legless lizard (A*nniella pulchra pulchra*), two-striped garter snake (*Thamnophis hammondii*), northern red rattlesnake (*Crotalus ruber ruber*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), merlin (*Falco*

columbarius), Pacific slope flycatcher (*Empidonax difficilis*), southwestern willow flycatcher (*E. t. extimus*), least Bell's vireo (*Vireo bellii pusillus*), and coastal California gnatcatcher (*Polioptila californica californica*). The Assessment Area does not currently support regional wildlife movement due to the presence of urban development surrounding the upper Sulphur Creek corridor. Due to this constraint, the Assessment Area mostly provides opportunities for local wildlife movement, primarily utilized by urban edge-adapted species.

The Creek has been perennialized and is relatively intact in several reaches, but is channelized in others. Nonetheless, the Creek supports jurisdictional "Waters of the U.S.," "Waters of the State," and wetlands. There are three key agencies that regulate activities within these type of features: (1) the U.S. Army Corps of Engineers (ACOE) Regulatory Program regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA), (2) the California Department of Fish and Game (CDFG) regulates activities within wetlands under the Fish and Game Code Section 1600-1607, and (3) the Regional Water Quality Control Board under Section 401 of the Federal CWA and the California Porter Cologne Act. Any restoration or development proposal that involves impacting the Creek would require permits from these agencies. The Creek was delineated as supporting 6.69 acres of ACOE "Waters of the U.S." and wetlands, as well as 13.98 acres of CDFG "Waters of the State" and associated riparian habitat.

After compiling the existing conditions data, the baseline of the Assessment Area was determined using a functional assessment method based on the framework of the ACOE HGM for wetland functional assessment (Smith *et al.*, 1995) and *A Guidebook for Application of Hydrogeomorphic Assessments to Riverine Wetlands* (Brinson *et al.*, 1995). The HGM approach measures field indicators of both the biotic and abiotic condition of waters and wetlands. These indicators are used to estimate the capacity of the system to perform a suite of hydrologic, biogeochemical, and biologic functions relative to a range of conditions observed for similar aquatic resources in a specific region. In southern Orange County, California, two draft HGM guidebooks have been formulated to rapidly assess streams: (1) within the Santa Margarita Watershed (*Draft National Guidebook to Hydrogeomorphic Functional Assessment of Riverine Waters and Wetlands in the Santa Margarita Watershed* [Lee *et al.*, 1997]); and (2) within the Aliso Creek watershed (*Hydrogeomorphic Assessment of Aliso Creek Watershed Stream: Developing a Foundation for Holistic Permitting and Management* [MacNeil, 2001]). The latter of the two was, in part, a calibration of the former for the specific requirements of the Aliso Creek watershed, including Upper Sulphur Creek and its tributaries. Therefore, baseline data collected in 1998 within Upper Sulphur Creek as part of developing the Guidebook were utilized in this assessment to determine if any changes had occurred over the last 6 years and to estimate the baseline functions currently being performed.

In order to develop conceptual restoration actions, the Assessment Area was divided into three reaches based on existing baseline conditions (described above), land ownership, and restoration opportunities. Each reach has an independent functional baseline, proposed restoration actions, and an estimate of the expected increase in functional capacity after the implementation of the restoration actions. The HGM baseline determined that the Creek within the Assessment Area is currently degraded to an average of approximately 23 percent of its theoretical capacity to perform the hydrologic, biogeochemical, and biologic functions identified by the Aliso Creek Watershed Guidebook (McNeil, 1997). The lowest scoring reach is performing at 0 percent of the theoretical maximum because it is confined to a concrete v-ditch and does not support native habitat or water quality functions. The highest functioning reach is estimated at 39 percent due to the wide soft channel bottom and buffer areas on both sides of the Creek. The reduction in function throughout the Assessment Area is the result of modifications that have increased the base flow within the Creek, reduced the width of the floodplain, shortened intervals

between flood events, and introduced exotic and invasive species. These modifications are variables that lower the functional integrity of a riparian system.

The results of the HGM Baseline analysis provided the information required to develop a conceptual restoration plan. The plan proposes to remove invasive exotic vegetation in the Creek and adjacent uplands, remove concrete lining and establish the proper stream channel configuration where possible. To balance erosion and sedimentation in the Creek, a low-flow channel should be sized for a 2-year rain event (Riley, 1998), which also defines the ACOE OHWM. Adjacent to the low-flow channel, a floodplain expected to be engaged in a 3 to 5 year storm would be established by exposing the native soil buried by fill material. This floodplain will be expanded, where possible, to support 25-year flood event without changing the 100-year flood channel capacity. This is expected to decrease runoff, improve water quality, and increase wildlife habitat. The Team also made significant efforts to integrate educational, recreational, and aesthetic opportunities into the Plan such that the community and stakeholders also benefit. For example, a native-cultivar buffer and educational signage have been proposed.

The HGM baseline was used to estimate future HGM scores and functional gain for each reach following implementation of the proposed restoration plan. Functional scores were not estimated for the future without restoration; however, the stream is expected to continue to degrade such that it would provide less of its currently observed functions due primarily to invasive species proliferation. Overall the conceptual restoration plan would more than double the functional capacity of the Creek. The Plan will provide increased habitat and wildlife function, increase biogeochemical functions including improving water quality, and to a small extent increase the flood capacity of the Creek.

1. INTRODUCTION

1.1 OVERVIEW

Widespread degradation of the ecological integrity of southern California's watersheds has resulted from the project-by-project approach that has long characterized decisions affecting growth. This has prompted a shift towards watershed, stream, and reach-scale planning efforts that integrate the need for habitat preservation and restoration, wildlife diversity, and water quality management. However, projects such as restoring Upper Sulphur Creek face extensive limitations associated with existing infrastructure and close proximity to urban centers. Effective planning requires the participation and integration of local jurisdictions, State and Federal resource agencies, landowners, and citizens to adequately address the interests of all parties and optimize restoration opportunities. Therefore, this document is a conceptual plan, and, as such, it may change following review by the groups listed above or through more detailed hydrologic and sediment transport analysis.

The City of Laguna Niguel (the City) received Proposition 13 grant funding through the State Water Resources Control Board Nonpoint Source Pollution Control Program and matching funds through the California Coastal Conservancy's Wetland Recovery Project in 2002 for preliminary restoration concepts presented at that time. The City, in cooperation with the three property owners, contracted RBF Consulting (RBF) and Aspen Environmental Group (Aspen) (the Team) to further develop the restoration concepts and prepare the Conceptual Restoration Plan (the Plan) for 8,051 lineal feet of the Creek. The study encompassed private property extending from the Glenn Rock Drive and Crown Valley Parkway intersection (Rancho Niguel Master Association), through the Crown Royale Homeowners Association (HOA) property, ending approximately 800 lineal feet southwest of La Plata Drive (Niguel Ridge HOA) (Assessment Area) in Laguna Niguel, California. (Figure 1, *Project Location*; note: all Figures are at the end of this report). The primary goals of the study were to:

- Evaluate Existing Conditions and Determine a Functional Baseline,
- Determine Conceptual Habitat Restoration Opportunities and Functional Gain,
- Maintain and Potentially Enhance Existing Water Quality, and
- Identify Educational, Aesthetic, and Recreation Opportunities.

1.2 APPROACH

The first goal of this project was to evaluate the existing conditions and determine the functional baseline condition of the Assessment Area. To evaluate the existing conditions, a field assessment was conducted to map the vegetation communities and to delineate the "Waters of the U.S.," "Waters of the State," and wetlands. In addition, existing literature was reviewed and the California Natural Diversity Data Base (CNDDB) from the Laguna Beach and San Juan Capistrano U.S. Geological Survey (USGS) quadrangle maps were searched to determine the potential for the site to support sensitive flora and fauna. The importance of such efforts in a stream restoration project is two fold: (1) the potential of restoration to increase habitat value for specific sensitive species provides one basis for regulatory agencies to justify temporary impacts associated with restoration activities; and (2) the ability of the stream to support sensitive species is an indication of the integrity or ecosystem health.

The history of the Assessment Area was compiled through the review of soils, geology and hydrology maps, as well as historic aerial photographs dating as early as 1938. The history of a site provides optimal understanding of existing site conditions and a frame of reference in which restoration can be

compared. The soils, geology, and hydrology of a stream and its floodplain provide environmental constraints to the proposed restoration, for example, plants require specific soil chemistry (alkaline or well drained, etc.). Grading a floodplain adjacent to a slope mapped with geologic landslides could potentially destabilize upland areas and cause future erosion. And most importantly, the existing hydrology and hydraulic conditions drive the depth, width, and sinuosity of a stream. However, the formal design of stream cross-sections (width/depth ratio and stream sinuosity) will come after detailed hydraulic and sediment analysis and during the development of grading and landscape plans, but cross-sections have been developed based on a preliminary evaluation of hydrology and sediment, as well as the history, soils and geology. Therefore, the cross-section will not likely change significantly. In addition, the conceptual restoration actions accounted for existing structures such as culverts and drop structures that would be cost-prohibitive to relocate or modify.

The stream baseline assessment was based on the U.S. Army Corps of Engineers (ACOE) Hydrogeomorphic (HGM) approach, which calibrates functions identified for a wetland type within a specific geographic area, termed the *reference domain*. The approach is then to calibrate the functions against local reference wetlands that represent the range of conditions present from most degraded to most pristine. Information is collected on geomorphology, hydrology, edaphic characteristics, flora, and fauna and calibrated typically using multivariate statistical techniques, such as detrended correspondence analysis or principal components analysis. The result is a metric used to measure function, termed the Functional Capacity Index (FCI). The FCI estimates the capacity of a wetland to perform a specific function relative to other wetlands. In order to test the functions, and identify a FCI score for each, a set of variables reflective of the functional capacity and overall integrity of the stream are chosen to be directly measured in the field or calculated in the laboratory. Variables are defined as environmental factors that are necessary for the functions to occur, whereas each function is defined by a series of variables. Each variable is defined and scaled along a range of 0.0 to 1.0, the *variable score*. A specific combination of variables for each function is identified and weighted to produce simple mathematical formulas, termed algorithms. Finally, the variable scores and the algorithms are used to reach the appropriate FCI score, which roughly translates into the percentage at which the Assessment Area is performing a particular stream function.

Dr. Spencer MacNeil (2001) completed an HGM Guidebook for the Aliso Creek watershed that collected the data throughout the watershed for a suite of variables and established a scale for each variable and associated FCI scores. This allowed us to evaluate the baseline condition of the Assessment Area to the other streams in the region without defining and sampling additional reference wetlands. The FCI scores were used to predict the increase in hydrologic, biogeochemical, and biologic functions for the proposed restoration. Baseline FCI scores and field data collected within the Assessment Area by Dr. MacNeil in 1998 was updated for this planning effort in 2004. The FCI scores for both the existing baseline habitat and the proposed habitat following restoration were converted to Functional Capacity Units (FCU) based on acreage. The predicted change in function provides a tool to evaluate success of the proposed restoration actions and can be used to identify specific failures within the system to be rectified. In addition, if a low FCI gain is predicted because of a small Assessment Area or short stream length, but its restoration positively interacts with higher quality habitat areas (i.e., Aliso and Wood Canyons Regional Park) or is expected to have a significant effect on one function (i.e., water quality improvement), the restoration actions can still be justified.

2. ENVIRONMENTAL SETTING

The following section summarizes the location and environmental setting of the Upper Sulphur Creek Assessment Area. A review of literature and a site evaluation allowed the consolidation of the site history and hydrology and a review of aerial photographs, soils, geology, flora, and fauna that currently defines the Assessment Area.

2.1 HISTORIC AERIAL REVIEW

A review of historic aerials was conducted as one of the initial steps in preparing the conceptual restoration plan for Upper Sulphur Creek. This assessment was undertaken in order to identify stream conditions prior to anthropogenic modifications. Restoration is defined as "returning a wetland to its original or previous wetland state, whereas wetland creation involves conversion of uplands or shallow, open-water systems to vegetated wetlands" (Mitsch and Gosselink, 2000). Ideally, restoration would not be constrained by continued human presence within close proximity to the Assessment Area. However, Upper Sulphur Creek is currently within, and will continue to be in close proximity to, residential and commercial development and park facilities. The Assessment Area will need to be designed to accommodate current conditions (e.g., confinement by Crown Valley Parkway, increased hydrology due to urban runoff/nuisance flow, seed bank of invasive plant species, flood control concerns, and limited funding for restoration work.). Therefore, the activities proposed by the project will take the form of a combination of restoration and creation, in order to work within the constraints posed by the existing conditions.

The historical photograph review indicated the approximate timing for the removal of hilltops, placing of fill material within the historic floodplain, channel confinement, perennialization, and reduced stream sinuosity (curvature). The following is a short description of the aerials reviewed and an interpretation of the impacts that have occurred. The photographs obtained were taken intermittently between 1938 and 2004 and were purchased through Rupp Aerial Photography in Phoenix, Arizona.

- An aerial photograph taken on 6/14/1938 (Figure 2, Historic Aerial Photograph 1938) clearly shows the study site is relatively untouched by humans outside of potential cattle grazing. In addition, the dark coloration within Sulphur Creek indicates either wetland hydrology or recently saturated soils. Vegetation in the stream channel is difficult to discern given the age of the aerial photograph, but ponding appears to occur intermittently throughout the Assessment Area. Vegetation in the surrounding upland areas appears to consist of grasses and scrub communities. South of the Assessment Area, a horse stable or other farm building has been constructed where the Crown Valley Park baseball fields currently exist. Additionally, agricultural activities appear on the eastern ridgelines. Natural disturbances in the watershed include erosional gully formations throughout the tributaries of Sulphur Creek. This may be the result of stripping scrub vegetation from the adjacent uplands to improve grazing, causing increased runoff velocity and quantity. However, this may also be a natural occurrence since the soils and geology of the area are highly erosive.
- The next aerial photograph reviewed was that of 12/12/1952 (Figure 3, Historic Aerial Photograph 1952), approximately 14 years newer than the previous. Two additional impacts occurred since 1938: a dirt road was developed to the east of the Assessment Area (expanded later to become Crown Valley Parkway) and several stock-ponds were created by damming large tributaries to the east. Gully formation and incision had increased throughout the upstream tributaries as well, but do not appear to be caused by clearing of native vegetation for farming.
- Prior to 9/20/1965, approximately 13 years after the previous aerial photograph, Sulphur Creek and its tributaries had been extremely altered by urban developments and infrastructure (Figure 4, Historic Aerial Photograph 1965). Crown Valley Parkway had been constructed which confined the Upper Sulphur Creek

and significantly reduced its sinuosity (curvature). In addition, two housing developments on eastern hillsides were under construction. As part of the construction of Crown Valley Parkway and the housing, large stream diversions had been cut throughout the length of the Assessment Area, essentially straightening the stream.

- Between the previous photograph of 1965 and an aerial photograph dated 5/19/1971 (Figure 5, Historic Aerial Photograph 1971), modifications to the landscape include widening Crown Valley Parkway, constructing La Paz Road (in progress). La Paz Road subsequently undergrounded several hundred linear feet of Sulphur Creek within the Assessment Area. Additionally, previously graded housing pads to the west had, for the most part, been built. Most significantly, hydrologic indicators within Sulphur Creek are far more pronounced in this aerial in comparison to the previous. This indicates that the housing development located to the east of Crown Valley Parkway may be contributing flows to the creek or that it has been an exceptional rain year.
- An aerial photograph from 12/12/1985 (Figure 6, Historic Aerial Photograph 1985) shows the western hilltops have almost entirely been graded for the construction of Crown Royale and Rancho Niguel neighborhoods. As part of this grading, Sulphur Creek was filled and channelized into its current configuration, filling upstream from Glen Rock, and placing Sulphur Creek in the concrete-lined v-ditch through Crown Royale. Grading for Niguel Ridge had not been initiated.
- The most recent aerial photograph reviewed of 2001 (Figure 7, Aerial Photograph 2004) shows the current conditions that differ from previous aerials only in the development of Niguel Ridge and the completion of the remaining neighborhoods. In addition, urban developments appear to have increased the runoff within the watershed, contributing to the development of a perennial hydrologic regime of Sulphur Creek and the establishment of riparian habitats.

Over the course of approximately 40 years (1965 aerial to the 2004 aerial), Upper Sulphur Creek has undergone an overall reduction of sinuosity, transformed from an ephemeral or intermittent drainage to a perennial system. Vegetation reestablished in the Upper and Lower Reaches of the Assessment Area; however, most of this habitat has been invaded by invasive species, and other areas are experiencing minor erosion where flood control structures exist. Such impacts are apparent in the results of this functional assessment—see Section 4, HGM Baseline Conditions and Section 5, Conceptual Restoration Plan, respectively.

2.2 GEOLOGY AND SOILS

The landscape setting of the Upper Sulphur Creek Assessment Area was investigated by consulting the Orange County and Western Part of Riverside County Soil Survey (USDA, 1974); the U.S. Geologic Topographic Map for the San Juan Capistrano 7.5 minute quadrangle (USGS, 1968, photo revised, 1981); the U.S. Geologic Survey Santa Ana Quadrangle 30'x 60' Geologic Map (USGS, 1968; photo revised, 1975); and the California Department of Mines and Geology maps for Southern Half of Cañada Gobernadora Quadrangle Orange County, California (Morton, 1974). This analysis is helpful in understanding the soil and geologic conditions that govern many of the riverine wetland functions.

Geology

Laguna Niguel is part of the Peninsular Ranges Province, which lies within a seismically active belt that rings the Pacific Ocean (Morton, 1974). Faults historically known to undermine the geology in the vicinity include the San Andreas, San Jacinto, Elsinor-Whittier, and the Newport-Inglewood faults. To a lesser extent, the Cristianitos fault, transecting the northeastern corner of the San Juan Capistrano quadrangle, approximately 3 miles northeast of the Assessment Area, consisted of unknown capabilities when Morton completed his study. The younger deposits mapped on site are considered a high risk for damage by seismic activity (Quaternary-aged; Cenozoic, Pleistocene, and Holocene).

Upper Sulphur Creek and its historic floodplain are located directly over mapped young axial channel deposits (Qac) (Holocene and latest Pleistocene). These deposits are described as fluvial, deposited by stream action, along canyon floors. The sediment consists of unconsolidated sand, silt, and clay-bearing alluvium. In the surrounding uplands are multiple young landslide deposits (Qyls?) (Holocene and latest Pleistocene). This formation is highly fragmented to largely coherent landslide deposits ranging in unconsolidated to consolidated material. Most mapped landslides are described as consisting of scarp area as well as slide deposits. Many landslides are thought to have reactivated, at least in part, during late Holocene. The Capistrano formation is the second largest geologic mapping unit in the vicinity. The formation consists of siltstone facies (Tcs) (late Miocene to early Pliocene age), sandstone and calcareous mudstone beds, and sparse diatomaceous and tuffaceous beds. The Capistrano formation is marine in origin and is white to pale gray in color. The Capistrano terrain is moderately steep and rounded with poor exposures but commonly with sharply incised canyon bottoms. Natural cover is mainly grasses with light brush. Most importantly, this formation is inherently weak and unstable, indicative of massive failures under heavy moisture conditions. The formation maintains very low permeability and high porosity due to its highly expansive clay content. Interestingly the formation is described as having high sulfate content. Finally, the largest geologic mapping unit surrounding the Assessment Area is that of the Niguel Formation (Tn) (Pliocene). This unit is interbedded sandstone and conglomeratic sandstone of marine origin. The sandstone is brownish-gray and consists of unsorted clasts 2.5 to 25cm in diameter and contains blocks of siltstone (Figure 8, Sulphur Creek Geology Map).

Soils

Five soil formations are mapped by the USDA Soil Survey: the Alo clay (Aridic Haploxererts), Botella clay loam (Pachic Argixerolls), Calleguas clay loam (Typic Xerorthents), Cropley clay (Aridic Haploxererts), and Sorrento loam (Calcic Haploxerolls) (see Figure 9, Sulphur Creek Soils Map). Sulphur Creek is mapped in the **Sorrento series**, consisting of well-drained soils on alluvial fans and floodplains ranging between 2 and 9 percent slopes. The soils were formed in alluvium derived from sedimentary rocks. A typical profile of the surface layer is grayish brown loam, 12 inches thick, with underlying material that is grayish brown, light brownish gray, and pale brown silty clay loam to a depth of 62 inches. The soil is described as being neutral in the upper 6 inches and becoming moderately alkaline and calcareous below. The soil is moderately permeable, runoff is slow to medium, and erosion hazard is slight. Water holding capacity is 10 to 13 inches. The soil pits excavated during the assessment verified the grey clay soil described in the soil series description. The natural vegetation was determined to be annual grasses and sycamore trees. The description of alluvial soils, along with drier vegetation types within the channel, coupled with the historical aerial review lead us to believe that Sulphur Creek was an ephemeral to intermittent stream corridor versus the existing perennial flow.

Located on the juxtaposed slopes and floodplain are the **Botella clay loam**, 9 to 15 percent slopes, and the **Calleguas clay loam**, 50 to 75 percent slopes. Botella soil series is a gently to moderately sloping soil generally occurring on alluvial fans in narrow foothill valleys. The Botella series consists of well drained soils on alluvial fans, formed in sedimentary alluvium. The typical profile is such that the surface layer is grayish brown, slightly acid clay loam that is 8 inches thick. The subsoil is gray neutral to mildly alkaline silty clay loam that is 27 inches thick. The substratum is gray and grayish brown, mildly alkaline or moderately alkaline, to a depth of 66 inches or more. The soil is moderately to slowly permeable with an estimated water holding capacity of 9.5 to 11.5 inches. In bare soil conditions, erosion hazard is moderate, as runoff is medium. The vegetation consisted of annual grasses and forbs and some oak trees and brush. In addition, as with the previous soil description, the vegetation description describes a drier floodplain than what is currently observed. One mapped area of **Cropley clay** occurs at the upper most location of the Assessment Area where Sulphur Creek was filled

and placed below ground in a pipe. This soil unit is described as consisting of well-drained soils on fans and valley fill that was formed in fine textured alluvium from sedimentary rocks and occurs on slopes 2 to 9 percent slopes. A typical cross section is very dark gray clay to 29 inches thick and is moderately alkaline.

Primarily on the lower slopes on the western bank of the Sulphur Creek Assessment Area are small inclusions of **Calleguas clay loam**. The soil is generally found on steep slopes with south-facing aspects. Almost 75 percent of the original surface has been lost due to cultivating, overgrazing, or has been burned as evidenced by sheet, rill, and gully erosion. Geologic erosion is active and soil slipping is common. Runoff is rapid on bare soil and erosion hazard is high. The soil profile is typically pale brown clay loam and shaly clay loam that is 15 inches thick. The underlying material is soft, fractured shale with lime coatings. The soil is moderately alkaline and calcareous throughout.

Located on the surrounding hillsides is the **Alo clay** mapping unit, 15 to 30 percent slopes. The soil is described as a moderately steep soil generally occurring on broad ridgetops in the foothills. This soil consists of well-drained soils formed in material weathered from calcareous sandstone and shale. The horizon ranges from very dark grayish brown to brown in 10YR hue. Soft lime masses occur below 15 inches. The underlying material is light yellowish brown, lime-coated weathered shale. The soil chemistry is slightly acid to moderately alkaline. Texture is heavy clay loam or clay with a profile structure ranging from granular in the upper few inches to prismatic or angular blocky. On bare soil, runoff is rapid and erosion hazard is high with a water holding capacity of 3.5 to 36 inches. Soil pits that were excavated within the floodprone area of the eastern bank verified this soil series description. Several soil pits located near the upstream end of the Assessment Area exhibited soil profiles consistent with the Alo clay mapping unit, having had noted blocky structures of intermingling yellowish brown matrices and white concretions (lime and calcium deposits). This would be consistent with the historic aerials showing fill material from the ridgelines being placed in the creek during channelization.

In conclusion, the geology and soils mapped for the Assessment Area indicate the system had undergone manipulations in hydrologic and biologic function since the 1960s. First, the stream is mapped in fluvium, deposited by stream action, which is typical of low gradient systems in southern California. However, those systems consist of wide floodplains such that water velocity is reduced and fine sediments like clay and sands are deposited. Also, the description includes vegetation such as grasses, sycamore trees, and oak trees. All of which are indicators of an ephemeral or intermittent hydrologic regime. This determination is supported by the historical aerial review because riparian vegetation is sparse, at most, within the Creek until sometime between 1965 and 1971. Most importantly, soil pits excavated within the floodplain were, in several instances, consistent with soil descriptions in the uplands (Alo clay). This supports the previous assumption that fill material had been placed in the channel and floodplain sometime between 1971 and 1985. As a result, the Creek was confined to a narrow channel throughout the Assessment Area. Finally, soil alkalinity was mentioned throughout the soil series descriptions. This supports the observation of plant species within the existing floodprone area, which are adapted to high soil salt content such as salt grass (*Distichilis spicata*) and alkali heath (*Frankenia salina*).

2.3 HYDROLOGY

Climate and Precipitation

The Sulphur Creek watershed enjoys a Mediterranean climate with cool, dry summers and mild, wet winters. Since rainfall occurs almost exclusively in the winter, streams are typically dry in the summer months. Rainfall records from nearby Laguna Beach indicate that the watershed receives approximately

12.7 inches of rainfall per year on average. Table 1 shows monthly rainfall distribution. Only 6 percent of the yearly total rain falls during the months of May to September. The total for these months averages only 0.72 inches. July rainfall averages 0.02 inch.

Table 1 Precipitation for Laguna Niguel

Month	Average Precipitation, in Inches
July	0.02
August	0.08
September	0.27
October	0.43
November	1.29
December	1.95
January	2.5
February	2.75
March	2.1
April	0.96
May	0.24
June	0.11
Total	12.7

Watershed Description

Sulphur Creek within the study area flows in a southwesterly direction adjacent to Crown Valley Parkway for a distance of approximately 1.53 miles, turning nearly 180 degrees to the northeast at the downstream end of the study area. Watershed area is 1.73 square miles. The entire watershed is urbanized with residential and some commercial development. The Sulphur Creek channel is mainly open and unlined, but has been modified substantially by urban encroachment and introduction of non-native vegetation.

Flow Rates

Peak flow rates for the study area were based on the Federal Emergency Management Agency discharges FEMA (1997). The 100-year discharge is 1,000 cubic feet per second (cfs) at the upstream end of the project, and 1,600 cfs at the downstream end of the project. Discharges for other return periods are summarized in Table 2.

Table 2 Peak Discharge Rates (cfs)

Flood Return Period, in Years	Upstream Limit of Project	Downstream Limit of Project
2	330	530
5	500	800
25	760	1220
100	1000	1600

cfs = Cubic feet per second.

Seasonal low flows consisting of non-stormwater flows (including landscape irrigation runoff, other nuisance flows, and natural seepage) are expected to range between 0.05 to 0.5 cfs, based on outflow records for Sulphur Creek Reservoir.

Channel Hydraulics

Channel hydraulic conditions were estimated using the U.S. Army Corps of Engineers HEC-RAS program. The results are presented in Table 3. Average flow depths range from 3.3 feet for a 2-year flood to 8.1 feet for a 100-year flood. Average flow velocities are very similar for all return periods and range from 6.7 to 7.2 feet per second. Flow velocities of 6.7 feet per second (fps), as are expected for the 2-year flood, are generally considered erosive for the soils present at the site.

Table 3 Existing Hydraulic Conditions

Flow Return Period in Years	Average Flow Depth in Feet	Average Flow Velocity in Feet Per Second	Average Flow Topwidth
2	3.3	6.7	52
5	4.2	7.0	60
25	6.1	7.2	79
100	8.1	7.2	98

3. BIOLOGICAL RESOURCES

3.1 VEGETATION COMMUNITIES

The plant communities within the Assessment Area were mapped in the field using a 1"=100' (100 scale) orthorectified aerial photograph flown in 2004 (Robert Lung & Associates, July 2003). Plant communities were mapped according to the descriptions found in the Orange County Habitat Classification System (OCHCS) (Gray and Bramlet, 1992) and listed below in numerical order according to the OCHCS habitat classification code. See Table 4 for acreages of each community and Figure 10a–10e, *Vegetation Map – Existing Conditions*, for the location of each community. Appendix B, Attachment B, *Sulphur Creek Species Compendium*, lists all of the plant species observed within the study area.

Table 4 Vegetation Communities within the Upper Sulphur Creek Assessment Area

Plant Community	OCHCS Code	Study Area Reach	Acres
California Sagebrush-California Buckwheat Scrub	2.3.1	U	0.70
Coyote Bush Scrub	2.3.9	U	0.08
Alkali Meadow	5.2	U	0.55
Coastal Freshwater Marsh	6.4	U, L	2.57
Southern Willow Scrub	7.2	L	0.40
Southern Cottonwood-Willow Riparian Forest	7.8	U	3.45
Ruderal-Disturbed	4.6d	U	1.33
Ruderal-Pampas Grass	4.6p	U	2.86
Parks and Ornamental Plantings	15.5	U, M, L	21.0
Flood Control Channels	13.4	M, L	1.24
Development/sidewalks	15.1	U, M, L	2.84
Total			37.02

U Upper Reach (Rancho Niguel Master Association), M Middle Reach (Crowne Royale HOA),
L Lower Reach (Niguel Ridge HOA)
Source: Aspen Environmental Group, 2004

Native Habitats

California Sagebrush-California Buckwheat Scrub (OCHCS 2.3.1)

The project site supports approximately 0.70 acre of California sagebrush/California buckwheat scrub in the Upper Reach. This community, a type of Venturan-Diegan transitional coastal sage scrub, occurs in the southwestern portion of the site (Reach 3), on the west side of Sulphur Creek. This community is dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), and coyote bush (*Baccharis pilularis*). Herbaceous understory species consist primarily of nonnative grasses. This community is considered sensitive by the California Department of Fish and Game (CDFG).

Coyote Bush Scrub (OCHCS 2.3.9)

The project site supports approximately 0.08 acre of coyote bush scrub in the Upper Reach. This vegetation community is found in a narrow strip between the ornamental plantings bordering Crown Valley Parkway and Sulphur Creek. Coyote bush is the only dominant shrub in this community. The shrub understory is dominated by nonnative annual grasses including ripgut (*Bromus diandrus*).

Alkali Meadow (OCHCS 5.2)

The project site supports approximately 0.55 acre of alkali meadow. This community occurs on both sides of Sulphur Creek, including areas that appear to have been planted with ornamentals in the past. Many of these areas appear to have developed as a result of saline or alkaline groundwater influx, or may be more related to soil pH and salinity in drier areas. In general, the alkali meadow habitat is dominated by saltgrass (*Distichilis spicata*) with nonnative bird's-foot trefoil (*Lotus corniculatus*) and alkali heath (*Frankenia salina*). Subdominants include nonnative bristly ox-tongue (*Picris ecioides*), Spanish sunflower (*Pulicaria paludosa*), curly dock (*Rumex crispus*), and alkali mallow (*Malvella leprosa*). Dryer areas on the border of the alkali meadow have been invaded by soft chess (*Bromus hordaceus*) and artichoke thistle (*Cynara cardunculus*). Wetter areas closer to the stream support alkali bulrush (*Scirpus maritimus*), seaside heliotrope (*Heliotropium curassivicum*), California sea lavender (*Limonium californicum*), salt marsh fleabane (*Pluchea odorata*), and celery (*Apium graveolens*). In coastal southern California, alkali meadow is often considered to be a sensitive wetland type.

Coastal Freshwater Marsh (OCHCS 6.4)

The project site supports approximately 2.57 acres of coastal freshwater marsh. This vegetation community is found in the permanently wetted portions of Sulphur Creek. This habitat is dominated by a near-monoculture of southern cattail (*Typha domingensis*), with very small amounts of alkali bulrush along the stream edges. Occasional Mexican fan palms (*Washingtonia robusta*) and individual pampas grass (*Cortaderia selloana*) plants are often found within or adjacent to the freshwater marsh. Because of its status as wetland habitat, coastal freshwater marsh is considered a sensitive vegetation community.

Southern Willow Scrub (OCHCS 7.2)

The project site supports approximately 0.40 acre of southern willow scrub. Willows identified within the site include arroyo willow (*S. lasiolepis*), black willow (*S. goodingii*), sandbar willow (*S. exigua* syn. *S. hindsiana*), and red willow (*S. laevigata*). The understory is sparse, but does include mule fat as well as a number of non-native hydrophytes including Spanish sunflower and pampas grass. Southern willow scrub is considered a sensitive vegetation community.

Southern Cottonwood-Willow Riparian Forest (OCHCS 7.8)

The project site supports approximately 3.45 acres of southern cottonwood-willow riparian forest. This community is dominated by Fremont cottonwood (many or most appear to be planted) along with several native willow species, similar to the southern willow scrub community. Understory shrubs include mule fat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), coyote bush (*Baccharis pilularis*), pampas grass, myoporum, and Spanish sunflower. Many of the cottonwood trees on site exhibit leaf, twig, and branch dieback. The reasons for this decline are not known; however, alkaline and/or saline soils have been suspected to cause similar symptoms in cottonwoods planted at the San Joaquin Marsh in the 1980s. In contrast, most of the willows appear to be healthy. Southern cottonwood-willow riparian forest is considered a sensitive vegetation community.

Non-Native Habitats

Flood Control Channels (OCHCS 13.4)

Approximately 1.24 acres of flood control channel and associated hard structures occur on site. Sulphur Creek flows through a low-flow 8-foot wide concrete v-ditch through the middle reach. When present,

associated riprap, fouted riprap, or energy dissipation structures are also included within this classification. These areas do not generally support vegetation.

Developed (OCHCS 15.1) areas within the Upper Sulphur Creek Assessment Area are roads, right of ways, trails, and sidewalks, together totaling approximately 2.84 acres.

Parks and Ornamental Plantings (OCHCS 15.5)

Approximately 21 acres of parks and ornamental plantings occur extensively throughout the site. In some areas, such as the irrigated turf and bedding annuals adjacent to Crown Valley Parkway, these areas are subject to ongoing maintenance. Other areas planted in the past are not currently being maintained or irrigated, and have declined. Portions of these unmaintained areas have been colonized by invasive exotic species as well as coyote bush coast goldenbush (*Isocoma menziesii*) and other native species. Dominant species vary throughout these ornamental landscapes, but include turf grasses, planted Fremont cottonwood (*Populus fremontii*), pampas grass, island ceanothus (*Ceanothus arboreus*), tree wattles (*Acacia* spp.), groundcover acacia (*Acacia redolens*), myoprum (*Myoporum laetum*), gums (*Eucalyptus* spp.), Aleppo pine (*Pinus halepensis*), Brazilian pepper tree (*Schinus terebinthifolius*), oleander (*Nerium oleander*), and prostrate myoporum (*Myoporum parvifolium 'Prostratum'*).

3.2 SENSITIVE PLANT SPECIES

Sensitive plants include those listed, or candidates for listing, by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG), species considered sensitive by the California Native Plant Society (CNPS), and species of local interest. Several sensitive plant species were reported in the CNDDB from the Laguna Beach, San Juan Capistrano, and Dana Point USGS quads. A discussion of each of these sensitive plant species is presented in Attachment A. No sensitive plant species were observed within the Assessment Area during the site assessment; however, July is outside of most of the known flowering periods. Federal or State listed plant species are not expected to occur within the Assessment Area; however, several other special-status plant species have at least a low potential to occur. These include Coulter's saltbush (*Atriplex coulteri*), intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), southern tarplant (*Centromadia parryi* ssp. *australis*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), mud nama (*Nama stenocarpum*), and rayless ragwort (*Senecio aphanactis*).

3.3 SENSITIVE WILDLIFE SPECIES

Sensitive wildlife species include those species listed as endangered or threatened under FESA or CESA, candidates for listing by USFWS or CDFG, and species of special concern to USFWS or CDFG. A number of sensitive wildlife species were reported in the CNDDB and are known to occur within the region (see Attachment A, *Sensitive Plant and Wildlife Species*). Focused surveys for least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax trailli extimus*) were conducted (see Attachment E, PCR Services, 2003a and 2003b). No breeding or nesting activities were identified at the time of the survey.

All wildlife species observed during the field survey by sight, call, tracks, nests, scat (fecal droppings), remains, or other sign were recorded. Binoculars and regional field guides were utilized for the identification of wildlife, as necessary. All wildlife species observed on-site, as well as diagnostic signs, were recorded in field notes. In addition to species actually detected, expected use of the Assessment Area by other wildlife was derived from the analysis of habitats within the Assessment Area combined

with known habitat preferences of regionally occurring wildlife species. Wildlife taxonomy follows Stebbins (2003) for amphibians and reptiles, the American Ornithologists' Union (1998) for birds, and Jameson and Peters (1988) for mammals. A list of all wildlife species detected on site is included in the attached compendium (see Attachment B).

Sensitive species observed on the site include Costa's hummingbird (*Calypte costae*) (Federal Special Concern Species [FSC]-nesting), migrant willow flycatcher (*Empidonax traillii*) (State Endangered [SE]-nesting), California thrasher (*Toxostoma redivivum*) (FSC), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) (CSC). Sensitive species with Federal or State sensitive status that have at least a low potential to occur include western spadefoot (*Spea hammondii*), southwestern pond turtle (*Emys* [=*Clemmys*] *marmorata pallida*), coast horned lizard (*Phyrnosoma coronatum*), orange-throated whiptail (*Cnemidophorus hyperythrus*), silvery legless lizard (A*nniella pulchra pulchra*), two-striped garter snake (*Thamnophis hammondii*), northern red rattlesnake (*Crotalus ruber ruber*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), merlin (*Falco columbarius*), Pacific slope flycatcher (*Empidonax difficilis*), southwestern willow flycatcher (*E. t. extimus*), loggerhead shrike (*Lanius ludovicanus*), yellow-breasted chat (*Icteria virens*), lark sparrow (*Chondestes grammacus*), tri-colored blackbird (*Agelaius tricolor*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and San Diego desert woodrat (*Neotoma lepida intermedia*).

3.4 WILDLIFE MOVEMENT ANALYSIS

Overview

Wildlife corridors link together areas of suitable habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and genetic material (MacArthur and Wilson, 1967; Soulé, 1987; Harris and Gallagher, 1989; Bennet, 1990). Other studies show that the absence of top predators (e.g. coyotes and mountain lions) upsets the ecological balance causing an increase in mesopredators (e.g. skunk, raccoon, and fox) and a corresponding decrease in bird abundance and diversity (Crooks and Soulé, 1999).

Corridors effectively act as links between different populations of a species. A group of smaller populations (termed "demes") linked together via a system of corridors is termed a "metapopulation." The long-term health of each deme within the metapopulation is dependent upon its size and the frequency of interchange of individuals (immigration vs. emigration). The smaller the deme, the more important immigration becomes, because prolonged inbreeding with the same individuals can reduce genetic variability. Immigrant individuals that move into the deme from adjoining demes mate with individuals and supply that deme with new genes and gene combinations that increases overall genetic diversity. An increase in a population's genetic variability is generally associated with an increase in a population's health.

Corridors mitigate the effects of habitat fragmentation by: (1) allowing animals to move between remaining habitat patches, which allows depleted populations to be replenished and promotes genetic diversity; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (such as fires or disease) will result in population or local species

extinction; and (3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs (Noss, 1983; Fahrig and Merriam, 1985; Simberloff and Cox, 1987).

Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, individuals extending range distributions); (2) seasonal migration; and, (3) movements related to home range activities (foraging for food or water; defending territories; searching for mates, breeding areas, or cover). A number of terms have been used in various wildlife movement studies, such as "travel route," "wildlife corridor," and "wildlife crossing" to refer to areas in which wildlife move from one area to another. To clarify the meaning of these terms and facilitate the discussion on wildlife movement in this study, these terms are defined as follows:

- **Travel Route:** A landscape feature (such as a ridgeline, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources (e.g., water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another; it contains adequate food, water, and/or cover while moving between habitat areas; and provides a relatively direct link between target habitat areas.
- **Wildlife Corridor:** A piece of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor. Larger, landscape-level corridors (often referred to as "habitat or landscape linkages") can provide both transitory and resident habitat for a variety of species.
- **Wildlife Crossing:** A small, narrow area, relatively short in length and generally constricted in nature, that allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings typically are manmade and include culverts, underpasses, drainage pipes, and tunnels to provide access across or under roads, highways, pipelines, or other physical obstacles.

It is important to note that, within a large open space area in which there are few or no man-made or naturally occurring physical constraints to wildlife movement, wildlife corridors as defined above may not yet exist. Given an open space area that is both large enough to maintain viable populations of species and provide a variety of travel routes (canyons, ridgelines, trails, riverbeds, and others), wildlife will use these "local" routes while searching for food, water, shelter, and mates, and will not need to cross into other large open space areas. Based on their size, location, vegetative composition, and availability of food, some of these movement areas (e.g., large drainages and canyons) are used for longer lengths of time and serve as source areas for food, water, and cover, particularly for small- and medium-sized mammals. This is especially true if the travel route is within a larger open space area. However, once open space areas become constrained and/or fragmented as a result of urban development or construction of physical obstacles such as roads and highways, remaining landscape features or travel routes that connect the larger open space areas can "become" corridors as long as they provide adequate space, cover, food, and water, and do not contain obstacles or distractions (man-made noise, lighting) that would generally hinder wildlife movement.

Wildlife Movement within the Assessment Area

As previously described, wildlife movement activities usually fall into one of three movement categories: dispersal, seasonal migration, and movements related to home range activities. Although the nature of each of these types of movement is species specific, large open spaces will generally support a diverse wildlife community representing all types of movement. Each type of movement may also be

represented at a variety of scales from non-migratory movement of amphibians, reptiles, and some birds, on a "local" level to many square mile home ranges of large mammals moving at a "regional" level. The presence of urban development surrounding the Upper Sulphur Creek corridor presents a severe constraint to regional wildlife movement. Due to this constraint, the Assessment Area mostly provides opportunities for local wildlife movement, primarily utilized by urban edge-adapted species.

3.5 DELINEATION OF WATERS AND WETLANDS

Overview

This section presents the findings of a delineation of jurisdictional waters of the U.S., State, and wetland resources within the Assessment Area. A delineation identifies areas that meet the jurisdictional requirements under Section 401 and 404 of the Clean Water Act (CWA) (regulated by the ACOE and Regional Water Quality Control Board (RWQCB), respectively), and Section 1600 of the State Fish and Game Code (regulated by CDFG) at a watershed scale (Lichvar et al., 2000).

Methods

Prior to visiting the Assessment Area potential and/or historic drainage features were located based on a review of the following: historic and current aerial photographs (Section 2.1), a detailed topographic map (Robert J. Lung & Associates, July 2003), USGS topographic maps (San Juan Capistrano, California), the county soil survey, and the USGS geologic maps (Section 2.2). Following the historic analysis, the entire Assessment Area was field-evaluated and all areas that were potentially subject to the jurisdiction of the ACOE, RWQCB and/or the CDFG were delineated. ACOE jurisdictional wetlands were delineated using a routine determination according to the methods outlined in the ACOE Wetland Delineation Manual (1987) based on vegetation composition, hydrologic, and edaphic features. Non-wetland "waters of the U.S." were delineated based on the limits of the OHWM as determined by erosion, the deposition of vegetation or debris, and changes in vegetation. The CDFG jurisdiction was defined to the bank of the stream/channels or to the limit of the adjacent riparian vegetation.

In areas where wetlands were suspected, data on vegetation, hydrology, and soils were collected as described below.

Vegetation

Plant species in each strata were ranked according to their dominance. Species that contributed to a cumulative total of 50 percent of the total dominant coverage plus any species that comprised at least 20 percent of the total dominant coverage were recorded on the wetland data sheets. The wetland indicator status was assigned to each species using the Region 0 List of Plant Species that Occur in Wetlands, as shown in Table 5 on the following page (Reed, 1988). If greater than 50 percent of the dominant species from all strata were Obligate, Facultative-wetland, or Facultative species, the criteria for wetland vegetation was considered to be met.

Hydrology

The presence of wetland hydrology was evaluated by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil pits. In addition, indicators of wetland or riverine hydrology were recorded, including watermarks, drift lines, rack, debris, and sediment deposits. The lateral extent of the hydrology indicators was used as a guide for locating soil pits for evaluation of hydric soils.

Table 5 Wetland Indicator Status

Category		Probability
Obligate Wetland	(OBL)	Almost always occur in wetlands (estimated probability of >99%)
Facultative	(FACW)	Usually occur in wetlands (estimated probability of 67 to 99%)
Facultative	(FAC)	Equally likely to occur in wetlands/non-wetlands (estimated probability of 34 to 66%)
Facultative	(FACU)	Usually occur in non-wetlands (estimated probability 67 to 99%)
Obligate Upland	(UPL)	Almost always occur in non-wetlands (estimated probability >99%)
Non-Indicator	(NI)	No indicator status has been assigned

Source: Reed, 1988

Soils

If the criteria for wetland vegetation and hydrology were met then an excavation of the soils was conducted to determine if the soils were hydric. Soil pits were dug to a depth of 18 inches. In areas of recent deposition of sand or other overburden material, the soil pit was dug to a depth of 18 inches below the depth of the overburden material. At each soil pit the soil texture and color were recorded by comparison with standard plates within a Munsell soil color chart. Any indicators of hydric soils, such as redoximorphic features, buried organic matter, organic streaking, reduced soil conditions, gleyed or low-chroma soils, or sulfidic odor were also recorded. The limits of wetland hydrology indicators were used as a guide for locating soil pits.

Results

The Creek is a perennial stream and supports a combination of cottonwood-willow riparian, southern willow scrub, coastal freshwater marsh, ornamental, and ruderal vegetation communities (Figure 10a-10e, *Vegetation Communities-Existing Conditions*). The existing cross-section of each reach is included in Section 5.3, Proposed Restoration. The following is a brief description of each reach followed by a summary in Table 6, and Figure 11a-11e, *Jurisdictional Waters and Wetlands-Existing Conditions*. Also see Attachment C, *Routine Wetland Data Sheets* for information on each soil pit excavated.

The Upper Reach begins at the northern boundary of the Assessment Area within the Rancho Niguel Master Association property. This reach is located parallel to Crown Valley Parkway and begins across the street from the intersection of Glenn Rock Drive and Crown Valley Parkway. Within this reach the Creek flows in a southwest direction approximately 2,173 linear feet through a large culvert under Moulton Parkway, which is 160 linear feet. Downstream of Moulton Parkway, this reach includes an additional 1,240 linear feet of the Creek ending near the intersection of Nueva Vista Road where Crown Royale HOA begins. The Creek is relatively intact throughout the Upper Reach although it is has been historically cleared by ranching and later filled and channelized to accommodate the development of Crown Valley Parkway and the Rancho Niguel Master Association. In addition, the increase in hydrology due to channelization and urbanization has converted the Creek from historically ephemeral or intermitted flows to perennial flows.

In the first portion of this reach, the Creek bed and banks are stable and gently sloping, supporting some braiding in the active channel and dense coastal freshwater marsh species including southern cattail (*Typha domingensis*) and alkali bulrush (*Scirpus americanus*). The entire reach supports cottonwood-willow riparian habitat and fairly extensive areas of alkali meadow on the eastern bank. Wetland soils were observed within the OHWM on sediment bars adjacent of the emergent wetlands (Attachment C, Routine Wetland Data Sheets, Soil Pit #1). In addition, within the alkali meadow, but outside of the OHWM, jurisdictional wetlands were also identified (Attachment C, *Routine Wetland*

Data Sheets, Soil Pit #2 and #3). Vegetation in these fringe wetlands included western marsh rosemary (*Limonium californicum*), seaside heliotrope (*Heliotropium curassivium*), wild celery (*Rorippa nasturtium-aquaticum*), pampas grass (*Cortaderia selloana*), alkali heath (*Frankenia salina),* salt grass (*Disticillis spicata*), and rabbit's foot grass (*Polypogon monspeliensis*). The western bank, extending into the uplands, in addition to near the waters edges on the eastern slope, have been invaded by pampas grass and to a lesser extent, tamarisk. In the second portion of the Upper Reach, from Moulton Parkway to The Marin Colony condominium complex, the Creek narrows and only supports wetlands within the OHWM (Attachment C, *Routine Wetland Data Sheets*, Soil Pit #4). There is, however, alkali meadow in the floodplain, but is dryer than described previously due likely to the steep slopes and narrow channel.

The Middle Reach begins to the southeast of The Marin Colony condominium complex approximately 140 linear feet upstream (north) of Nueva Vista Road. At this location the Creek has been channelized into a concrete v-ditch surrounded by grouted and ungrouted riprap and ornamental and non-native trees including eucalyptus (*Eucalyptus* sp.) and salt cedar (*Tamarix ramosissima)*. The majority of the Middle Reach, approximately 1,840 linear feet, is located between Nueva Vista Road and La Paz Parkway. Similar to upstream, this portion of the reach is contained in a concrete v-ditch with grouted riprap at the northwest end, the southeast end, and at one culvert outfall near the center of the reach. The eastern bank of the Creek is vegetated with turf grass and sparse eucalyptus trees and the western bank is either bare ground or covered by wood chips and sparse eucalyptus trees. Mild erosion is occurring at several locations along the eastern bank where annual flows exceed the capacity of the low-flow v-ditch. This reach does not currently support wetlands or riparian habitat; therefore, ACOE and CDFG jurisdiction was determined to be equal in width as determined by the erosion on either bank.

The Lower Reach begins at La Paz Parkway and extends 1,158 linear feet to La Plata Drive, 60 linear feet culverted under La Paz Parkway, and an additional 820 linear feet downstream (southwest) to the City's property. The entire lower reach is within the boundaries of the Niguel Ridge HOA. The upper portion of this reach is narrow, trapezoidal in shape, and contained in a concrete v-ditch with several grouted riprap structures located at the upstream or downstream end. In addition, there is one large grade control structure near the downstream end of this area, approximately 140 feet north of La Plata Drive. Localized erosion is extensive along the banks on both sides of the channel, especially at the downstream grade control structure. Both banks are vegetated with low growing ornamental shrubs and clumps of eucalyptus trees. Downstream of La Plata drive the Creek narrows, but is not within a concrete v-ditch and supports freshwater marsh habitat within the OHWM and isolated clumps of southern willow scrub habitat along the both banks. Wetlands persist within the OHWM (Attachment C, *Routine Wetland Data Sheets*, Soil Pit #5 and #6). The banks are primarily vegetated with ornamental shrubs and invasive species such as pampas grass and salt cedar.

Table 6 Acreage of Waters and Wetlands within the Upper Sulphur Creek Assessment Area

REACH			ACOE		CDFG
ID	Name	Length (ft)	WoUS OHWM (ac)	Wetlands (ac)	Bank to Bank or Riparian Canopy (ac)
Upper	Rancho Niguel Master Assoc.	3,573	5.76	6.90	8.00
Middle	Crown Royale HOA	2,440	0.44	0.00	0.44
Lower	Niguel Ridge HOA	2038	0.58	0.84	0.93
Total Acreage within Assessment Area *		8,051	6.78**	7.74	9.37

* Agency jurisdictions often overlap (i.e., the totals for ACOE and CDFG are not additive)

** The waters of the U.S. acreage is a subset of ACOE wetlands. Wetlands were contained throughout the waters, as well as outside (on the fringe) of the OHWM due to seepage.

Source: Aspen Environmental Group, 2004.

4. HGM BASELINE CONDITIONS

4.1 HGM CLASSIFICATION

California contains a diversity of wetland types that vary widely in topographic setting, hydrology, chemistry, substrate, vegetation physiognomy, and persistence (Ferren et al., 1996). Factors that influence the formation and differentiation of wetlands can include elevation, exposure, bedrock, soil, rates of erosion or sedimentation, temperature, rainfall, accumulation of salts, distance from the ocean, tidal regimes, energy of water flow, and artificial disturbances. The ability to understand, classify, study, and communicate information about a diverse group of wetlands requires a classification system to help organize their physical and biological attributes of the wetlands.

The HGM classification is based on geomorphic setting, water sources, and hydrodynamics. Geomorphic setting refers to the landform and topographic position of the wetland. Water source refers to the route taken by water between the time it precipitates out of the atmosphere and when it reaches the wetland (e.g., did the water enter the wetland via direct precipitation, through ground water discharge, or overbank flow from a channel). Hydrodynamics refers to the pattern and fluctuation of water flow in the wetland (i.e., is the flow unidirectional or bi-directional and does it flow vertically from ground water or horizontally over land?). At the coarsest level, wetlands have been grouped into seven HGM classes (see Table 7). Each of these seven classes can have extreme variability throughout the country. Therefore, when evaluating a specific HGM class, that class is further subdivided based on the regional specificity of wetlands. For example, "riverine" wetlands in southern California may be further divided by stream order, gradient, or nature of flow (perennial, intermittent, or ephemeral).

Table 7 Hydrogeomorphic Classes of Wetlands Showing Associated Dominant Water Sources, Hydrodynamics, and Examples of Subclasses

Hydrogeomorphic Class	Dominant Water Source	Dominant Hydrodynamics	Examples of Subclasses	
			Eastern USA	Western USA and Alaska
Riverine	Overbank flow from channel	Unidirectional, horizontal	Bottomland hardwood forests	Riparian forested wetlands
Depressional	Return flow from ground water and interflow	Vertical	Prairie pothole marshes	California vernal pools
Slope	Return flow from ground water	Unidirectional, horizontal	Fens	Avalanche chutes
Mineral soil flats	Precipitation	Vertical	Wet pine flatwoods	Large playas
Organic soil flats	Precipitation	Vertical	Peat bogs; portions of Everglades	Peat bogs
Estuarine fringe	Overbank flow from estuary	Bidirectional, horizontal	Chesapeake Bay marshes	San Francisco Bay marshes
Lacustrine fringe	Overbank flow from lake	Bidirectional, horizontal	Great Lakes marshes	Flathead Lake marshes

Source: Smith et al., 1995.

4.2 FUNCTIONS TYPICALLY ASSOCIATED WITH RIVERINE SYSTEMS

4.2.1 Overview

"Riverine" refers to an HGM class of wetland that has a floodplain or riparian geomorphic setting (Brinson, 1993a). Riverine wetlands occur in floodplains and riparian corridors in association with

stream channels. Dominant water sources are overbank flow from the channel or subsurface hydraulic connections between the stream channels, wetlands, and seeps. Additional water sources may be interflow and return flow from adjacent uplands, occasional overland flow from adjacent uplands, tributary inflow, and direct precipitation (Brinson, 1995).

All waters and wetlands perform a combination of hydrologic, biogeochemical, and biologic functions. The manner and degree to which a specific wetland performs each function varies based on the subclass and location of the wetland. Fifteen functions typically performed by riverine systems have been identified in the national riverine guidebook titled, *A Guidebook for the Application of Hydrogeomorphic Functional Assessment to Riverine Wetlands* (Brinson *et al.,* 1995). The national guidebook was used in the determination of functions specific to the southern California arid environment in the *Guidebook to Hydrogeomorphic Functional Assessment of Riverine Waters and Wetlands in the Santa Margarita Watershed* (Lee et al., 1997), which established fourteen applicable functions for the region. One additional function was identified by Spencer MacNeil in his dissertation, *Hydrogeomorphic Assessment of Aliso Creek Watershed Streams: Developing a Foundation for Holistic Permitting and Management* (2001). The functions discussed in the Santa Margarita HGM guidebook were modified, as necessary, by MacNeil to reflect conditions influenced by the climate, geology, and topology of the Aliso Creek Watershed. Data were collected at 10 locations throughout the Assessment Area by MacNeil to determine the existing conditions of the Creek as it related to the watershed in 2000. Because essentially no anthropogenic modifications were made to the Assessment Area within the past four years, these same data locations where analyzed for natural stream changes and used to project expected future conditions with restoration efforts (Section 5, *Conceptual Restoration Plan*). The functions consist of three hydrologic, four biogeochemical, and five habitat functions, listed in Table 8.

Table 8 Riverine Waters and Wetland Functions

HYDROLOGIC FUNCTIONS
Maintenance of Characteristic Channel Dynamics
Dynamic Water Storage and Energy Dissipation Dynamic Subsurface Water Storage
BIOGEOCHEMICAL FUNCTIONS
Nutrient Cycling
Detention of Imported Elements and Compounds Detention of Particulates Organic Carbon Export
BIOLOGIC FUNCTIONS
Maintenance of Characteristic Plant Community Maintenance of Characteristic Detrital Biomass
Maintenance Spatial Structure of Habitat Maintenance Habitat Interspersion and Connectivity Maintenance Characteristic Invertebrate Diversity

Source: MacNeil, 2001.

4.2.2 HGM Methodology

Because wetland functions are based on complex ecological processes that occur at varying spatial and temporal scales, they are difficult to measure directly. Consequently, functional assessments typically rely on measures of physical and biological properties as surrogates for direct measure of ecological function. These properties are commonly referred to as variables or indicators, which should be easily measurable in the field and be reflective of occurrence of one or more wetland function(s). Ideally, these variables should be correlated with level of performance of function(s) such that quantification of

the variable provides a reasonable estimate of the capacity of the wetland to perform the function(s) being investigated. Values for each variable are used to identify a FCI score that ranges from 0 to 1.0. The index is determined by the *reference domain,* which typically includes all the wetlands of the specific HGM subclass within the region or watershed. A score of 0 represents a condition that in the variable is absent and is not recoverable under natural conditions without appreciable cost and human intervention. Conversely, a score of 1.0 represents the best attainable condition in the defined reference domain.

The HGM variable definitions and FCI scoring, as well as the algorithms in which the FCI scores are used to calculate each riverine function are provided in Attachment D. The following is a summary of the factors that define each riverine function used in the baseline analysis for the Assessment Area.

4.2.3 Definitions of Riverine Functions

Hydrologic Functions

Maintenance of Characteristic Channel Dynamics

The function, Maintenance of Characteristic Channel Dynamics, refers to the physical processes and structural attributes that maintain characteristic stream stability. These include flow characteristics, in-channel coarse woody debris and potential coarse woody debris inputs, channel dimensions, and other physical features such as bank vegetation and slope. A high functioning stream will dissipate energy by allocating it across the roughness of the floodprone area, which encourages minor accretion (sediment accumulation) and discourages erosion and channel incision. Maintenance of Characteristic Channel Dynamics is also essential to the development and maintenance of the other riverine wetland functions, such as biogeochemical and plant community and habitat functions. Downstream effects of this function include contributions to stream stability, water quality, and the structure and function of aquatic habitat (Lee et al., 1997).

Dynamic Surface Water Storage and Energy Dissipation

Dynamic Surface Water Storage and Energy Dissipation is defined as: (1) the capacity of a wetland to detain moving water from overbank flow for a short duration when flow is out of the channel; and (2) the ability of the channel to maintain stability over time by dissipating energy as water moves across the floodprone area. The dynamic surface water storage function replenishes soil moisture; influences the import and export of sediment, nutrients, and contaminants; contributes to spreading of plant propagules; provides a conduit for movement of aquatic organisms to access the wetland for feeding, breeding, and recruitment. In addition, the function reflects the attenuation of downstream peak discharge and volume, and the ability to improve water quality. The energy dissipation function acts by allocating storm flows across the roughness of the floodprone area. This encourages minor accretion and discourages erosion and channel incision.

Dynamic Subsurface Water Storage

The Dynamic Subsurface Water Storage function is defined by the capacity of the wetland to store water temporarily below the surface. Subsurface water is defined as water within the soil profile or geologic stratum to include pore water within the saturated zone and soil moisture in the unsaturated zone. “It is the pore space within sediment, riparian soils, and various geologic strata that provides the volume for storing water, and allows for the exchange of water between surface and shallow subsurface compartments” (Lee *et al.*, 2001).

Biogeochemical Functions

Nutrient Cycling/Transformation of Compounds

The Nutrient Cycling/Transformation of Compounds function is defined as the capacity of the wetland to import, transform, and remove nutrients, contaminants, and other elements and compounds and convert nutrients from one form to another through biotic or abiotic processes. Cycling of nutrients is a fundamental feature of wetland ecosystems and is necessary to support the diverse plant assemblages associated with wetland ecosystems. Nutrient uptake in wetlands is conducted primarily via adsorption by living plants, and release is primarily through processes of decomposition. Therefore, the two simplest indicators of this function are abundance of living plants and decaying organic matter. Finally, wetlands must have an adequate supply of phosphorous, nitrogen, and carbon and be saturated for sufficient duration to support plant growth and microbial decomposition.

Detention of Imported Elements and Compounds

The Detention of Imported Elements and Compounds function is defined as the capacity of the wetland to remove and sequester imported nutrients, contaminants, and other elements and compounds through biotic or abiotic processes. Elements include macronutrients essential to plant growth such at nitrogen, phosphorus, and potassium, as well as heavy metals, like zinc and chromium. Compounds include herbicides, pesticides, and other imported materials common in nuisance flows from urbanized areas (Brinson *et al.*, 1995). Elements and compounds enter the wetland from the landscape through biogenic (e.g., the result of weathering of rocks) or anthropogenic (e.g., the result of urban developments/ nuisance flow) sources. Retention of elements and compounds can occur via adsorption, absorption/ biological uptake, and microbial transformations in the wetland. The function therefore eliminates or significantly reduces the ability of the elements and compounds to migrate downstream. In contrast to Nutrient Cycling, this function assesses the ability of the wetland to act as a sink for compounds or elements (versus as a source of converted elements) within a span of one year or less (Brinson *et al.*, 1995).

Detention of Particulates

The Detention of Particulates function is defined as the ability of the stream to allow for the deposition and detention of inorganic and organic particulates from the water column, primarily through physical processes (Lee *et al.*, 1997). The function acts to accumulate sediment, which contributes to the nutrient load present for recycling. Deposition is also expected to increase surface elevation and change topographic complexity between flood events, which likely relocate overburden to downstream areas. Organic matter may also be retained for decomposition, nutrient recycling, and detrital food web support. The function reduces stream sediment load and coarse and fine woody debris that would otherwise be transported to downstream wetlands.

Organic Carbon Export

The Organic Carbon Export function is defined as the capacity of a wetland to export dissolved and particulate organic carbon produced in the riverine wetland. Mechanisms include leaching, flushing, and erosion. Exported organic carbon is a significant source of energy for the microbes that form the base of detrital food webs in downstream ecosystems.

Biologic Functions

Maintain Characteristic Plant Community Composition/Structure

The Maintain Characteristic Plant Community Composition/Structure function is defined as the capacity of a waters/wetland to support predominantly native, living-plant biomass. Vegetation accounts for most of the biomass of riverine wetlands, in the form of riparian trees, shrubs, and saplings. Mature riparian vegetation provides corridors for migration and movement between habitats, provides structural complexity that forms feeding, resting, and thermal cover habitat, and food for migratory and resident animals. Within the Assessment Area, this function is expected to provide complex organic compounds through the conversion of solar energy into organic matter (branches, leaves, etc.). The emphasis of the function is on the physical characteristics of the plant communities within the Assessment Area.

Maintain Habitat Interspersion and Connectivity

Riverine wetlands provide habitat for many groups of organisms. The Maintain Habitat Interspersion and Connectivity function is defined as the capacity of the wetland to permit aquatic organisms to enter and leave the wetland via permanent or ephemeral surface channels, overbank flow, unconfined gravel aquifers, or large contiguous habitat patches. The capacity of the wetland to perform this function is determined by available access for terrestrial or aerial organisms through contiguous areas of food and vegetative cover. The effects on site are such that the habitat promotes diversity and contributes to secondary production as well as providing media for reproduction, feeding, rearing, and cover. Habitat should provide dispersal mechanisms for plant propagules through corridors to other areas, for a wide-ranging or migratory species.

Maintain Characteristic Detrital Biomass

The function, Maintain Characteristic Detrital Biomass, is the process of production, accumulation, and dispersal of dead plant biomass of all sizes (Brinson et al., 1995). Sources of biomass may be transported by flowing water within the channel, upslope in the riparian zone, or upstream (Lee et al., 2001). The function supports detritus-based food chains and provides important resting, feeding, hiding, and nesting sites for animals of higher trophic levels. The function also provides surface roughness that decreases flow velocities and contributes to the delay and reduction of downstream peak discharges. In addition, Detrital Biomass plays an important role in nutrient cycling and detention of compounds and particulates, which in turn increases downstream water quality.

Maintain Spatial Structure of Habitat

The Maintain Spatial Structure of Habitat function is defined as the capacity of a wetland to support animal populations and guilds by providing heterogeneous vegetative habitats. The spatial structure of habitats indicates the suitability for a diverse set of animal populations characteristic of riverine ecosystems (Lee et al., 2001). Therefore, mature systems that provide complex structures generally support a more diverse set of animal species, by allowing for more aspects of their life cycle requirements be met in one location. Life history activities include predator escape, foraging, resting, and reproduction.

Maintain Characteristic Invertebrate Diversity

The Maintain Characteristic Invertebrate Diversity function is defined as the capacity of the wetland to maintain the density and spatial distribution of invertebrate populations. Invertebrates use almost every

micro-habitat available in waters and wetlands and are considered excellent indicators of wetland function (Lee et al., 1997). In fact, without invertebrates, wetland ecosystems would fail to function (Brinson et al., 1995). Invertebrates provide food in the form of energy to downstream aquatic invertebrates and vertebrates, decomposition of organic matter, and an increased availability of organic matter for microbial processes and nutrient cycling. Downstream, this function provides food for wide-ranging carnivores and insectivores and transports seed and propagules for germination elsewhere.

4.3 HGM BASELINE RESULTS

The results of the HGM Baseline analysis for the Upper Sulphur Creek Assessment Area provide valuable insight to the existing functional capacity of the waters, wetlands, and riparian habitat. This information can be used to finalize the restoration plan, establish success criteria, and assess future conditions following restoration activities. The baseline can be used to monitor success and manage the resources by focusing on variables that are most reflective of overall integrity such that a complete HGM is not necessary annually. This section summarizes the major results of the analysis, discusses and interprets the functional implications of the baseline.

The Creek is currently degraded to approximately 39 percent of its capacity in the Upper Reach, 0 percent in the Middle Reach, and 30 percent in the Lower Reach to perform the hydrologic, biogeochemical, and biologic functions identified by the Aliso Creek Watershed Guidebook (McNeil, 1997). The reduction in function is the result of extensive urbanization throughout the Assessment Area, which has concrete-lined portions of the creek, increased the base flow, confined the creek-bed and eliminated a floodplain, shortened intervals between flood events, and introduced exotic and invasive species. The functional implications of the results of this study are summarized below and shown for each reach in Table 9, *Baseline Functional Capacity Indices*.

Hydrologic Functions

The hydrologic functions performed by riverine waters and wetlands and analyzed by this assessment are: Maintenance of Characteristic Channel Dynamics, Dynamic Surface Water Storage and Energy Dissipation, and Dynamic Subsurface Water Storage. The hydrologic functional capacity ranges between 0 and 46 percent of the theoretical maximum across all three reaches. These functions are dependent on the width of the floodprone area, accelerated sediment sources, and channel roughness. The relatively narrow floodprone area, a result of fill material in the floodplain or concrete lining the low-flow channel, has confined the channel such that in large storm events riparian vegetation is removed by high flow velocities or is absent all together. Subsequently, the absence of mature vegetative structure directly decreases channel roughness and further reduces the ability of the Creek to dissipate flow energy. Furthermore, these functions are related to the development of Hydric soil characteristics. This requires that surface and subsurface water is stored for long enough duration to create redoximorphic features through chemical reduction/oxidation (redox) reactions characteristic of wetlands. The presence of hydric soil features such as redoxomorphic mottles or low chroma soil colors indicates that the floodplain is regularly saturated for extended durations (e.g., 1 to 2 weeks) (Environmental Laboratory, 1987).

These functions are also highly correlated with the development of other riverine functions such as biogeochemical, plant community, and habitat functions. For example, the functions provide the media (large floodprone area, topographic features, and biomass) for nutrient cycling to take place, thereby providing habitat and food sources to invertebrates. These functions can be reestablished through creating a floodprone area that is engaged in 1 to 5 year rain events, thereby both dissipating energy and allowing for temporary storage of water. Following reduction in flow velocities, vegetation would

reestablish and further dissipate energy, as well as provide biogeochemical and biologic benefits discussed previously.

Table 9 Baseline Functional Capacity Indices

Riverine Function / Reach Identification	Weighted Averages		
	Upper	Middle	Lower
Hydrologic Functions			
Maintenance of Characteristic Channel Dynamics	0.46	0.00	0.27
Dynamic Surface Water Storage and Energy Dissipation	0.33	0.00	0.27
Dynamic Subsurface Water Storage	0.25	0.00	0.23
Average for Hydrologic Functions	*0.35*	*0.0*	*0.26*
Biogeochemical Functions			
Nutrient Cycling	0.46	0.01	0.27
Detention of Imported Elements and Compounds	0.36	0.00	0.29
Detention of Particulates	0.40	0.00	0.27
Organic Carbon Export	0.36	0.00	0.30
Average for Biogeochemical Functions	*0.40*	*0.00*	*0.28*
Habitat Functions			
Maintain Characteristic Plant Community	0.38	0.01	0.27
Maintain Characteristic Detrital Biomass	0.46	0.01	0.41
Maintain Spatial Structure of Habitat	0.38	0.01	0.32
Maintain Habitat Interspersion and Connectivity	0.20	0.00	0.20
Maintain Characteristic Invertebrate Diversity	0.64	0.02	0.60
Average for Habitat Functions	*0.41*	*0.01*	*0.36*
Average Reach Function	0.39	0.00	0.30

Note: Weighted averages account for the length of the Creek in culverts. Culverts essentially perform little to no hydrologic, biogeochemical, or biologic functions according to HGM. Therefore, if a culvert is located within a reach, the score of the reach as a whole is lowered.
Source: Aspen Environmental Group, 2004

Biogeochemical Functions

The biogeochemical functions performed by riverine waters and wetlands are *Nutrient Cycling, Detention of Imported Elements and Compounds, Detention of Particulates,* and *Organic Carbon Export*. The capacity of the Assessment Area to provide these functions is estimated between 0 and 46 percent, depending on the reach. Cycling of nutrients is important to water quality by removal of nutrients, contaminants, and other elements and compounds. These items are converted through biotic and abotic processes and utilized by other organisms or plants. The functions are necessary to support diverse plant assemblages, as species perform a variety of functions that may rely more heavily on certain nutrients than others. These functions take into account floodprone area, soil structure, fine and coarse woody debris, and decay class.

The Assessment Area is not performing biogeochemical functions in the Middle Reach or in a portion of the Lower Reach because of the concrete lining in the active channel and culverts that do not allow for soil and water interactions. The limited vegetative structure due to the narrow floodplain and high

flow velocities in the Upper Reach and portions of the Lower Reach also decrease the ability for the channel to cycle nutrients. The narrow floodplain and high flood flows do not allow for particulates to settle out from the water column. In addition, organic carbon deposited during the summer season is quickly removed by flood flows early in the following winter season, prior to being decomposed by micro-invertebrates.

Biologic and Landscape Functions

The biologic functions performed by riverine wetlands in the geographic reference domain are *Maintenance of Characteristic Plant Community, Maintenance of Characteristic Detrital Biomass, Maintenance of Spatial Structure of Habitat, Maintenance of Habitat Interspersion and Connectivity, and Maintenance of Characteristic Invertebrate Diversity*. Riverine waters and wetlands are expected to contain plant communities that are distinct from the surrounding uplands and to provide corridors to core populations of species elsewhere. In addition, habitat should provide a diversity of micro- and macro-habitat climates for sensitive vertebrates, invertebrates, amphibians, and reptiles. Of the functions analyzed in this assessment, the biological functions scored the highest overall, ranging between 1 and 64 percent of the theoretical maximum. The Assessment Area was shown to provide possible foraging and breeding areas for the least Bell's vireo (LBV) and southwestern willow flycatcher (SWFC), and the northern red diamond rattlesnake. However, it is expected that without restoration efforts, these functions would continue to decline, due to invasion by exotic species, continued conversion to emergent marsh monoculture in the active channel, and close proximity to urban developments. "Removal or severe disturbance of riparian vegetation can lead to a change in the structure of macro-invertebrate communities, a decrease in the species diversity of stream ecosystems, and a decline in local and or regional diversity of animals associated with riverine corridors" (Brinson et al., 1995).

Reach Specific Baseline – Upper Reach

The Upper Reach is the highest functioning reach in the Assessment Area due primarily because it consists of a moderate sized floodprone area and soft bottom channel. As stated previously, this allows for mature vegetation to establish and biogeochemical functions to presume. This reach is functioning between 25 and 46 percent of the theoretical maximum for hydrologic and biogeochemical stream functions (see Table 9). Scoring for this reach is decreased by the weighted average, which takes into account the stream length that is under Moulton Parkway, essentially providing no functional value. In addition, invasive non-native species are dominant in this reach, currently estimated at 30 to 40 percent relative cover overall. These species will continue to proliferate and degrade the biogeochemical functions and biologic function by producing large amounts of biomass and competing with native vegetation for available nutrients. Therefore, it is important to institute an intensive weed eradication program for the continued and improved biogeochemical and biologic functionality of these reaches.

Reach Specific Baseline – Middle Reach

Of the three reaches within the Assessment Area, the Middle Reach is by far the lowest functioning area, functioning at 1 to 2 percent of the theoretical maximum and lower when weighted by the stream length in the culvert under Nueva Vista Drive and La Paz Road. The low scores are due to the fact that the reach is confined to a concrete v-ditch, which allows for no water and soil interaction. In addition, the floodprone area has been filled and is planted and maintained turf grass. When calculating many stream hydrologic and biogeochemical functions, the width of the floodprone area is the variable used most often. The floodprone area variable is defined as the distance across the channel at the elevation of twice the bankfull (1 to 2 year) elevation (see Attachment D for HGM variable definitions). Ideally, the

floodprone area would be approximately twice the bankfull width. The narrow floodprone area coupled with the concrete v-ditch allows high flow velocities. The lack of vegetation structure even outside of the v-ditch directly decreases channel roughness in the smallest storm event and further reduces the ability of the Creek to dissipate flow energy. Furthermore, high velocities and concrete lining reduces surface water storage and nutrient cycling among other biogeochemical functions.

These functions can be reestablished through creating a soft bottom active channel and floodprone area that allows flows to be allocated over a larger surface area or floodplain. Even if the area was not replanted as proposed in Section 5, Conceptual Restoration Plan, lowering the flow velocities would reestablish vegetation and further dissipate energy, as well as provide biogeochemical and biologic benefits discussed previously.

Reach Specific Baseline – Lower Reach

The Lower Reach has essentially two distinct areas, one functioning similar to the Upper Reach and one functioning similar to the Middle Reach. The reach is completely confined by artificial levees and there is no soil terrace or floodprone area on either side. In addition, almost all of the vegetation in the adjacent uplands is ornamental species, but some vegetation is unmaintained and the lower reach supports native vegetation within the active channel. Erosion is occurring throughout. Therefore, this reach scored between 20 and 60 percent of the theoretical maximum. If left alone, this area will probably not decline rapidly, but will not regain function either due to the concrete lining in the upper portion of the reach. The Lower Reach will benefit greatly in stream function from the removal of the concrete v-ditch, expansion of a floodprone area where possible, and an exotic and invasive species removal program (Section 5).

5. CONCEPTUAL RESTORATION PLAN

5.1 GOAL OF RESTORATION

The goal of a restoration program is to create and restore riverine functions and riparian habitat that are self-sustaining, provide water quality benefits, and that contribute to regional biodiversity of sensitive flora and fauna. Specific goals include:

- Recreate a dynamic stream equilibrium such that the maintenance of flow, erosion, and sedimentation is limited;
- Restore self-perpetuating habitat areas requiring no artificial input for recruitment and propagation of desirable plant species; and
- Restore or enhance wildlife habitat areas that allow for the entire range of biological components, processes, and interactions, including natural processes of ecological succession, in the restored communities.

5.2 RESTORATION TERMS

Restoration has been defined by the Society of Ecological Restoration (SER) as "the process of assisting the recovery and management of ecological integrity." The term "ecological integrity" includes a critical range of variability in biodiversity, ecological processes and structures, regional and historical context, and sustainable cultural practices, according to the SER definition (SER, 1998). For the purpose of this report, environmental "restoration" and "creation" are terms that describe the different types of restoration activities to take place, as defined below.

- ***Creation***—the process of creating a new habitat where one did not exist before;
- ***Restoration***—the process of re-establishing the site to a previously defined condition;
- ***Enhancement***—the alteration of a site for improvement to a targeted state;
- ***Management***—long-term maintenance and monitoring of the site.

5.3 PROPOSED RESTORATION

The following section details the conceptual restoration opportunities within each reach of the Assessment Area. Because of the scope and funding of this project, these are concepts soundly based on the existing conditions of the Assessment Area and preliminary hydrologic, geotechnical, and stability analysis; however, more detailed analysis is necessary to finalize the restoration design prior to implementation. Therefore, prior to implementing the conceptual restoration plan, a number of steps are required. These steps include obtaining authorization under Section 401 and 404 of the CWA from the RWQCB and the ACOE, respectively, and from the CDFG under the 1602 of the State Fish and Game Code (see Section 6, *Regulatory Constraints* and Section 7, *Future Work and Schedule*, for further information). Another regulatory requirement will be the California Environmental Quality Act (CEQA). The CEQA document will need to be completed before any of the above-mentioned CWA and Fish and Game permits can be obtained. It is expected that a Mitigated Negative Declaration (MND) would be adequate for the proposed project. Concurrent with the regulatory processes, analysis of detailed hydrology, geotechnical, and stream stability should be completed in order to finalize the Creek's depth-to-width ratio (the accurate width of the floodplain) and stream sinuosity within the existing constraints. Finally, grading, irrigation, and planting plans can be prepared such that an accurate cost estimate of the restoration actions can be determined.

The Assessment Area has been divided into three reaches with differing ownership, existing management strategies, and subsequently different existing conditions. Because of this, each reach provides unique opportunities and constraints for restoration and creation. In the event that costs and permission become an issue, the plan can be implemented by reach if necessary. Nonetheless, many of the restoration activities for the Assessment Area are likely required in order to accomplish the stated goals for restoring the Creek.

The conceptual restoration plan proposes to establish a stable stream channel configuration (morphology) for Upper Sulphur Creek in the Middle Reach and the upper portion of the Lower Reach under existing constraints. The Creek would be recontoured with a low-flow channel sized for a 1 to 2 year flow event, which defines the ACOE OHWM described in Section 3.5, *Delineation of Waters and Wetlands*. Sizing the channel in this way should balance the occurrence of erosion and sedimentation in the Creek (Riley, 1998) where accelerated erosion is currently occurring adjacent to the concrete v-ditch in both the Middle and Lower Reaches. Upstream of Glenn Rock Drive, historic Sulphur Creek has been forced underground, and the existing Creek has been confined by artificial slopes to the north and by Crown Valley Parkway to the south. Roadway culvert crossings along the creek perform as channel stabilizers.

Adjacent to the recontoured low-flow channel, one soil terrace expected to be engaged in a 2 to 5+ year storm will be established. Another floodplain, or a second soil terrace, will be established, where possible, to be inundated in 10-year flood events. Slopes of no greater than 2:1 will either remain in place or be regraded to maximize the capacity of the channel with the goal of maintaining channel capacity or conveying a 100-year flood event (see Section 5.5, *Effect of the Proposed Restoration on Water Quality and Flooding*). Expanding the floodplain in this manner may expose the native soil consisting of primarily Sorrento loam currently buried by fill material. If this soil is exposed it would be more permeable compared to the Alo clay and Botella clay that was deposited in the Creek from the hilltops to the northwest. The Sorrento soil series would increase infiltration of surface flows and decrease runoff and erosion.

Where little opportunity for expanding a floodplain exists, such in the downstream portion of the Lower Reach, native revegetation may need to be pruned in the first 2 to 3 years for flood capacity until the habitat is mature. The significance of allowing the vegetation to mature without mowing or clearing it, is a key component to achieving a balanced, functioning stream. By instructing maintenance workers to prune trees so the trees can grow tall and create a canopy, which will shade out a majority of the bushy undergrowth, the creek maintains its capacity and provides quality wildlife habitat and water quality benefits. When a channel is too narrow and vegetation is regularly removed in large flow events or when the channel is mowed (as with many flood control channels), the vegetation that grows back is bushier and impacts the capacity of the channel. This leads to an endless, intensive maintenance cycle that can never be stopped. In contrast, when the trees are allowed to mature, the canopy naturally shades out a significant portion of the undergrowth, insuring channel capacity is not compromised as well as reducing maintenance needs over the long term. The low flow channel, stream banks, and floodplain would be secured with erosion control fabric and planted with the native emergent wetland and cottonwood-southern willow scrub species described in Section 5.8, *Preliminary Plant Palette*.

An extensive invasive species eradication effort will be necessary throughout the Assessment Area to restore the Creek and its buffer areas (see Section 5.7, *Invasive Species Removal*). Removing invasive species is the key component of restoration efforts in the Upper Reach and a portion of the Lower Reach. Where large areas of invasive species are removed in the Creek or in the upland buffer areas, emergent wetland species, native cottonwood-southern willow scrub, or sage scrub will be planted. A

plant palette for cultivar sage scrub and oak-sycamore woodlands has been proposed for the streetscape and/or the buffer areas that prevent ornamental species from invading the restoration area. Non-invasive drought-tolerant ornamental bushes have been proposed to remain in place under various alternatives. This is due, primarily, to the cost of removing plants that pose little or no effect on the existing or restored native habitats. The long-term success of this restoration effort will require educating property owners within the Assessment Area and general public at large with regard to ornamental plantings (see Section 5.10, *Education and Recreation*).

In summary, the proposed restoration actions for the Upper Sulphur Creek Assessment Area are a combination of enhancing existing habitat through removal of exotic and invasive species and replanting, creating habitat through the removal of concrete v-ditches and replanting, and enhancing and creating native upland sage scrub buffers. See Table 10 for a summary of the approximate acreages of each restoration type within each reach.

Table 10 Enhancement, Restoration, and Creation of Jurisdictional Waters of the U.S., Wetlands, Riparian, and Native Buffer Habitat

Reach	Acreage
Upper Reach	
Enhancement of ACOE Waters of the U.S. and Wetlands	6.90
Enhancement of CDFG Riparian Habitat	8.00
Creation of CDFG Riparian Habitat	0.91
Restoration of Native Sage Scrub Buffer Habitat Alternative 1	6.70
Restoration of Native Sage Scrub Buffer Habitat Alternative 2	3.99
Middle Reach	
Creation of ACOE Waters of the U.S. and Wetlands	0.98
Creation of CDFG Riparian Habitat	3.90
Creation of Native Sage Scrub Buffer Habitat Alternative 1	0.41
Creation of Native Sage Scrub Buffer Habitat Alternative 2	0.00
Creation of Native Sage Scrub Buffer Habitat Alternative 3	0.58
Lower Reach	
Creation of ACOE Waters of the U.S. and Wetlands	0.53
Creation of CDFG Riparian Habitat	1.53
Enhancement of ACOE Waters of the U.S. and Wetlands	0.48
Enhancement of CDFG Riparian Habitat	0.63
Creation of Native Sage Scrub Buffer Habitat Alternative 1	0.48
Creation of Native Sage Scrub Buffer Habitat Alternative 2	0.48

Source: Aspen Environmental Group, 2004

Reach Specific Restoration

Upper Reach (Rancho Niguel Master Association)

The primary restoration action proposed for the Upper Reach is non-native exotic and invasive species removal followed by replanting barren areas with native species. This activity would return the Creek vegetation to self-sufficient native habitat with a minimal, if any, amount of excavation. many locations along the western stream bank, extending up to the existing dirt trail and near the waters edge on the eastern stream bank, are vegetated with invasive non-native species including primarily pampas grass, tamarisk, and annual weeds (see Figure 10a-10e, *Vegetation Map – Existing Conditions*). There are two invasive species and replanting alternatives proposed for the Upper Reach. In both alternatives, invasive species in specified areas would be removed through a combination of mechanical clearing and/or pre-

emergent herbicide spraying. Following the removal event, the areas would be revegetated with species specified in Section 5.8, depending on their proximity to the Creek and soil types. The proposed restoration alternatives are not expected to impact existing habitat areas other than temporary disturbance through noise and foot traffic to remove invasive species within or adjacent to the Creek. The restoration activities would constitute the enhancement of 6.9 acres of ACOE waters of the U.S. and wetlands and 8.0 acres of CDFG riparian habitat. Restoration would also consist of creating 0.91 acre of CDFG riparian habitat by revegetation on the western slope within the 5-year floodplain.

Alternative 1 proposes to remove all the non-native species within the Assessment Area on both the western bank and the eastern bank, leaving the grass and eucalyptus streetscape along Crown Valley Parkway in place. Following the removal of the non-native species, including the ornamental drought-tolerant species, the stream corridor and upland buffer area would be replanted with native vegetation divided into four plant palettes based on the following hydrologic regimes: perennial low flow active channel (1 to 2 year flow event), first soil terrace (2 to 5+ year flow event), alkali meadow understory (2 to 5+ year flow even), and upland sage scrub buffer areas in the surrounding uplands (see Section 5.8, *Preliminary Plant Palette*).

The perennial portion of the active channel will be planted with freshwater and emergent marsh species that are adapted to consistent inundation. These species could be shaded out with the establishment of a mature canopy over the long-term. The 1 to 5 year floodplains will be planted with a mixture of cottonwood and southern willow scrub canopy species and transitional species that are adapted to periodic flooding. In addition, these soil terraces will be planted with a dense understory of alkali and clay soil tolerant herb species observed intermittently throughout the Assessment Area. Upland buffer areas would be restored to native sage scrub. An adequate buffer area helps to protect sensitive flora and fauna within the riparian corridor from disturbances. Along trail edges, native cultivars will be selected and concentrated to optimize visual attractiveness for trail users. The approximate location of each planting scheme is shown in Figures 13a and 13b, *Upper Reach - Restoration Plan View*, Figure 14, *Upper Reach – Existing and Proposed Cross Section A*, and Figure 15, *Upper Reach – Existing and Proposed Cross Section B*. In addition to the enhancement of waters and wetlands, Alternative 1 would include the creation and restoration of approximately 6.70 acres of upland sage scrub restoration.

Although outside of the project implementation budget, two components are recommended for future implementation. The first is a split rail fence along the entire length of the dirt trail on the western bank. This fence would increase the aesthetic value of the area and protect the young plantings. The fence would also increase public safety such that the steep slopes and sometimes uninviting native vegetation are less accessible to children and domestic animals. The second optional component is to install an educational/recreational facility consisting of a kiosk and a few benches at the flood control access road on the western bank of the creek, near the corner of Moulton Parkway. This area is ideal for group gatherings to learn about the functions and values of creek ecosystems in southern California. The kiosk could include topics on the restoration project, native plants and wildlife use, and water quality benefits of streams and wetlands. The location is also ideal for residents to gather prior to or following a recreation or exercise routine along the 1-mile dirt path and meandering sidewalk. Section 5.10 expands on these two optional components.

Alternative 2 differs from Alternative 1 in that drought tolerant non-invasive bushes and trees, primarily acacia, planted on the upland banks would remain in place. In addition, grass park-like areas on the eastern bank and along Crown Valley Parkway would also remain in place. Because acacia is not considered invasive and it is drought-tolerant, it is not considered harmful to existing or restored native vegetation. Therefore, upland buffer areas would be restored to native sage scrub except where non-

invasive drought tolerant bushes and trees exist and the stream corridor would be replanted with native vegetation divided into the same four plant palettes as described above. In addition to the enhancement of waters and wetlands, Alternative 2 would include the creation and restoration of approximately 3.99 acres of upland sage scrub.

Middle Reach (Crown Royale HOA)

The Middle Reach provides the greatest opportunity for restoring and creating stream functions and values as it provides little or no habitat or water quality value at this time (see Section 4.3). There are three planting alternatives proposed for the restoration of the Middle Reach, all of which include removing the existing concrete low-flow v-ditch, grading an active channel and soil terrace where possible, planting a cultivar sage scrub/oak and sycamore woodland buffer along the bike path, and creating a park at the southwestern corner of the property near the La Paz Parkway and Crown Valley Parkway intersection. The active channel is designed to be inundated in a 1 to 2+ year flood event such that it can support a perennially inundated coastal freshwater marsh community (cattails and rushes). The soil terrace is designed to be inundated in 2 to 5+ year flood events to support a mixed cottonwood-southern willow scrub canopy and alkali meadow understory similar to that observed in the Rancho Niguel Master Association property. The restoration activities would constitute the creation of 0.98 acre of ACOE waters of the U.S. and wetlands and 3.90 acres of CDFG riparian habitat. The cultivar sage scrub/oak and sycamore woodland buffer proposed on the western bank adjacent to the bike path would be manicured and maintained to enhance the aesthetic value of the Creek. As with the Upper Reach, an optional split rail fence is proposed for the length of the bike path that would add an equestrian appeal similar to that observed along Moulton Parkway and in the Nelle Gail community.

An approximately 1-acre grass park area will be retained in the southwestern corner of the property near the La Paz Parkway and Crown Valley Parkway intersection. The existing grass within this area is under the canopy of eucalyptus trees and is of poor health. It is proposed that a portion of the fill material removed from the Creek channel during grading be placed here to raise its elevation and potentially add structure such as planted mounds. The park would be replanted with low water turf grass and the eucalyptus would be wholly or partially replaced by oaks and sycamore trees. The cultivar buffer, as described previously, would surround the park on the west. In addition, a split rail fence could (optionally) be installed between the buffer habitat and restored creek areas for safety and aesthetic value. Benches, a play area, and an educational kiosk are also future optional items. Initially a kiosk could be used to detail the restoration project and its proposed benefits to native plants, wildlife, water quality, and the community as a whole. Later the kiosk could be maintained to describe the success of the project, water quality improvements due to the wetlands and riparian areas, and the observed wildlife use in area.

The three alternatives differ with respect to the planting scheme for the upland buffer and streetscape areas on the eastern bank of the Creek, adjacent to Crown Valley Parkway. These alternatives primarily differ in the acreage of turf grass preserved versus converted to a native habitat type (see Table 11).

Table 11 Comparison of Alternatives for the Middle Reach

Alternative Number-Description	Turf grass (ac)		Native Sage Scrub Buffer	ACOE Waters of the U.S. and Wetlands (ac)		CDFG Waters of the State and Riparian (ac)	
	Existing	Proposed	Proposed	Existing	Proposed	Existing	Proposed
1-Balanced turf grass/buffer	4.18	2.04	0.40	0.44	0.98	0.44	3.90
2-Maximum turf grass	4.18	2.89	0.00	0.44	0.98	0.44	3.90
3-Maximum native buffer	4.18	1.66	0.60	0.44	0.98	0.44	3.90

Source: Aspen Environmental Group, 2004.

Alternative 1 (Balanced turf grass/native buffer) proposes to retain turf grass between the curb and the sidewalk and approximately 12 feet of turf grass to the west of the sidewalk. To increase the aesthetic value and provide a manicured look to the restored native landscape, a 5-foot to 12-foot wide streetscape of non-invasive drought tolerant cultivar plants and oak/sycamore trees would be maintained adjacent to the turf grass. A native buffer area vegetated with sage scrub and native grassland understory and a sparse oak and sycamore woodland canopy would be created downslope on the eastern bank blending into the restored mixed southern willow scrub and freshwater wetlands (see Figure 19, *Middle Reach – Restoration Plan View/Alternative 1* and Figure 20, *Middle Reach – Existing and Proposed Cross Section C/Alternative 1*). Alternative 1 would constitute the creation of 0.41 acre of native sage scrub buffer habitat.

Alternative 2 (Maximize Turf Grass) differs greatly from the above alternatives in that it reduces the area for upland restoration and creation and maximizes the turf grass retained. In this alternative the turf grass would extend downslope to the mixed southern willow woodland, excluding the cultivar and native sage scrub buffer areas (see Figure 21, *Middle Reach – Restoration Plan View/Alternative 2*; Figure 22, *Middle Reach – Existing and Proposed Cross Section C/Alternative 2*). Alternative 2 would not include the creation of native sage scrub buffer habitat due to the retention of turf grass area.

Alternative 3 (Maximize Native Buffer) proposes the greatest level of replanting with native and buffer species. The only turf grass that would remain would be the area between the curb and the sidewalk and at the approximately 1 acre park area. This alternative proposes the greatest potential to increase habitat use by native wildlife, but , other tan the streetscape enhancement, does not significantly differ from Alternative 1 (see Figure 23, *Middle Reach – Restoration Plan View/Alternative 3*; Figure 24*, Middle Reach – Existing and Proposed Cross Section C/Alternative 3*). Alternative 3 would constitute the creation of 0.5 acre of native sage scrub buffer habitat.

Lower Reach (Niguel Ridge HOA)

The Lower Reach extends southwest from La Paz Road to approximately 400 linear feet past La Plata Drive. In total, the reach is approximately 2,000 linear feet and is divided into two distinct portions of the upper and the lower portion. Three large, grouted rock structures occur within this area. The first is at the east end near La Paz Road, the second is approximately 135 feet east of La Plata Drive, and the third is immediately east of La Plata Drive. In addition, one storm drain outfall with grouted rock occurs in the approximate center of the reach. The downstream portion of the reach extends from La Plata Drive approximately 800 linear feet to the southwest. This section of the creek is soft-bottomed supporting coastal freshwater marsh, a few patches of southern willow scrub, and a heavy invasion of pampas grass, salt cedar, and annual invasive weeds. The surrounding slopes are similar to the upper portion of this reach, supporting ornamental plants on the west slopes and ornamental and ruderal vegetation on the east slopes. Opportunities for restoration are highly constrained in the Lower Reach due to the narrow corridor, steep gradient, steep side slopes and unstable geology, utility lines, and the

presence of outfalls, culverts, and grade control structures. Therefore, the restoration actions also differ within each portion of the Lower Reach.

There are two alternatives proposed for the Lower Reach that differ only in planting schemes (as shown in Figures 25 through 30). Both alternatives propose removing the concrete v-ditch, grading an active channel, and planting the channel within the 5-year flood elevation on the west bank. In addition, both alternatives propose to remove ornamental plants and replant with native and cultivar sage scrub species on the eastern slope. In the upper portion of the reach, the v-ditch removal is proposed between La Paz Road and the grouted drop structure approximately three-fourths the way downstream on the reach. It is also anticipated that the concrete v-ditch between the drop structure and the culvert under La Paz Road would also be removed as it is contributing to localized erosion along the sides of the v-ditch. However, a detailed sediment and hydrologic analysis is necessary before a firm decision is made on the v-ditch in this area.

Due to the narrow width of this reach, an active channel will be created where the v-ditch was removed to support coastal freshwater marsh. However, mixed southern willow riparian will also likely be planted partially within and on the surrounding slopes of the active channel instead of on a soil terrace such as was proposed for the Middle Reach. Riparian tree cuttings will be harvested from the project site and planted at a depth of several feet or where groundwater is encountered. All areas outside of the 1-year flood event would be planted with alkali meadow floodplain species as an understory community to stabilize soils. A soil terrace or wider active channel may be possible in areas were transmission poles are not present, but this is unlikely. Scattered ungrouted rock is also proposed for this reach as check dams to add roughness to the creek bed and slow stream velocities. The removal of the v-ditch would create approximately 0.53 acre of ACOE waters and wetlands and 1.33 acre of CDFG riparian habitat.

Minor grading one ponded area and exotic and/or invasive species removal and replanting within the active channel are the primary actions proposed for the downstream section of the Lower Reach, from La Paz Road to the City's property. Grading would be limited to the area immediately downstream from La Paz Road where sediment has deposited creating a large pond surrounded by emergent marsh species. The grading would restore the ability of natural stream flow to downstream areas as with upstream reaches. The wetland habitat in this area will narrow, but southern willow riparian will be planted in its place. Following weed removal in the remainder of the reach, replanting would occur within the 2-year flood elevation so not to disturb the existing western slopes. No changes are proposed to this slope due to the geotechnical failures that the Niguel Ridge HOA is having repaired currently. Planting schemes for the eastern slopes are proposed in the following alternatives. Weed removal in this portion of the reach would result in the enhancement of approximately 0.48 acre of ACOE waters and wetlands and 0.63 acre of CDFG riparian habitat. In addition, approximately 0.20 acre of CDFG riparian habitat would be created for a total of 1.53 acres of CDFG created habitat between the upper portion and the lower portion of the Lower Reach.

Alternative 1 (Maximize Native Buffer) proposes to remove exotic species, including ornamental bushes and ruderal habitat on the eastern slopes up to the edge of the bike trail. Slopes on the east side of the channel and outside of the 5-year flood horizon would be drill seeded or hydroseeded with native sage scrub seeds and container plants. Scattered sycamore and oak trees will also be planted where possible and where transmission lines are not present. In the upper portion of this reach, a 5-foot wide cultivar sage scrub buffer would be planted in buffer areas adjacent to the bike path; the existing streetscape would remain in place between the bike path and curb. Landscape plans would be designed for the cultivar buffer such that the area would be planted in an organized and manicured fashion,

allowing for the long-term maintenance. In the lower portion of this reach, a 12-foot wide strip of existing ornamental streetscape adjacent to the existing sidewalk would remain in place. This area is expected to accommodate a future bike trail that would complete a portion of the Niguel Trail Plan. Approximately 0.48 acre of native sage scrub buffer would be created for Alternative 1.

Alternative 2 (Retain Non-Invasive Ornamentals) proposes to remove invasive species, but to leave the streetscape between Crown Valley Parkway and the bike path intact and retain drought tolerant noninvasive ornamental plants between the bike path and the restored riparian habitat. All invasive species such as pampas grass, tamarisk, and annual weeds would be removed and the barren areas replanted. In the upper portion of this reach, sage scrub and a cultivar sage scrub buffer would be planted on the eastern slopes of the restored creek as with Alternative 1. In the lower portion of this reach, the same 12-foot wide strip of existing ornamental streetscape would be left in place. The same approximately 0.48 acre of native sage scrub buffer would be created for Alternative 2.

5.4 FUNCTIONAL GAIN OF PROPOSED RESTORATION PLAN

Functional capacity indices (FCI) were estimated for each of the restoration planting alternatives (Table 12) in order to calculate functional capacity units. The FCI scores were estimated for Year 10 following restoration planting, assuming a mature riparian community would be developed in that period of time. FCI scores were not significantly different between planting alternatives (Table 12) due to the fact that the jurisdictional waters, wetlands, and riparian habitat would be the same between the alternatives with only the native upland buffer areas differing. In several cases, the FCI scores were the same between alternatives because the width of the native buffer was similar enough to fall within the same range (See Attachment D for the HGM Variable Scores). In short, HGM is not able to capture small variations in riverine systems such as these (removing vs. retaining non-invasive ornamental plants) because of its distinct categories and ranking system. However, benefits to the system as a whole, especially to local wildlife, are realized when all exotic species are removed within the adjacent uplands.

Functional capacity units (FCUs) were calculated by multiplying the *variable subindex scores* for the baseline and for the planting alternatives by the acreage of the Assessment Area (HGM Baseline Assessment Area and the Conceptual Restoration Assessment Area). The Assessment Area for the baseline was defined as the existing jurisdictional habitat and native buffer. The Assessment Area for the conceptual restoration was defined as the area that would be restored jurisdictional habitat (the same for all alternatives) and the extent of native buffer established under each planting alternative, as depicted in Figures 16a and 16b, 23, and 28.

The acreage multiplied by the *variable functional scores* was used in the algorithms to calculate the FCUs of the entire Assessment Area. This allows for the normalization of functional capacity such that different size aquatic resources can be compared. The ACOE has made a practice at utilizing FCUs to compare the benefits of multiple restoration alternatives. Specifically, FCUs are utilized to discern the most cost-effective alternative (defined as the highest FCU gain/cost). Another utility of FCUs is to make decisions between two wetland candidates for conservation and preservation, when financially, only one can be preserved. Cost is not the only consideration in cases like this; however, landscape position with respect to existing and proposed surrounding developments must also be taken into account, for example, when purchasing land for preservation.

In this situation, the proposed alternatives differ only in planting schemes due to the existing physical constraints that allow for only one grading cross-section for the Middle Reach and little to no grading within the other two reaches. Therefore, the FCUs will primarily be used to simply demonstrate to the regulatory agencies that the increase in function justifies the temporary disturbances during restoration

activities. The resulting values in this section represent the comparison of the capacity of the Assessment Area to carry out each of the hydrologic, biogeochemical, and habitat functions expected of a healthy riverine system pre and post-restoration (see Table 13).

Table 12 Functional Capacity Indices for Proposed Restoration Alternatives

Heading	Baseline FCI	Restoration FCIs (Year 10)		
		Alt 1	Alt 2	Alt 3
Upper Reach		Maximize native buffer	Retain Non-Invasive Ornamentals	Not proposed
Hydrologic	0.35	0.41	0.41	N/A
Biogeochemical	0.40	0.46	0.46	N/A
Habitat	0.41	0.48	0.48	N/A
Middle Reach		Balanced turf grass/ native buffer	Maximize turf grass	Maximize native buffer
Hydrologic	0.00	0.47	0.43	0.47
Biogeochemical	0.00	0.54	0.52	0.54
Habitat	0.01	0.61	0.58	0.61
Lower Reach		Maximize native buffer	Retain Non-Invasive Ornamentals	Not proposed
Hydrologic	0.26	*0.26*	*0.26*	N/A
Biogeochemical	0.28	*0.30*	*0.29*	N/A
Habitat	0.36	*0.43*	*0.38*	N/A
Average Increase				

Note: Categories within HGM are not fine scaled enough to capture all the benefits of removing non-invasive species from adjacent uplands. FCI scores were calculated based on predicted values for year-10 following restoration.
Source: Aspen Environmental Group, 2004.

Table 13 Increase in Functional Capacity Units Based on Acreage of Assessment Area

Heading	Baseline FCU	Restoration FCUs			Range of Increase in FCUs
		Alt 1	Alt 2	Alt 3	
Upper Reach					
Hydrologic	2.62	3.65	*3.65*	N/A	1.03
Biogeochemical	2.94	4.10	*4.10*	N/A	1.16
Habitat	3.08	4.27	*4.27*	N/A	1.19
Middle Reach					
Hydrologic	0.00	1.83	1.68	*1.83*	1.68-1.83
Biogeochemical	0.00	2.11	2.03	*2.11*	2.03-2.11
Habitat	0.01	2.38	2.26	*2.38*	2.26-2.37
Lower Reach					
Hydrologic	0.13	*1.07*	1.07	N/A	0.94
Biogeochemical	0.14	*1.24*	1.20	N/A	1.06-1.10
Habitat	0.18	*1.77*	1.56	N/A	1.38-1.59
Totals	9.1				11.57-13.32

*The Alternative with the highest increase in value was used to calculate the Increase in FCUs, shown in bold italics.
Note: Functional Capacity Increase is calculated based on predicted values for year-10 following restoration.
Source: Aspen Environmental Group, 2004.

Regardless of what alternative is used, overall the conceptual restoration of Upper Sulphur Creek would more than double the functional capacity of the Creek. The largest increase in value occurs in the Middle Reach because of the absence of existing native habitat and the large acreage proposed for

habitat creation. The next greatest return in functional capacity is in the Lower Reach due to the ability to remove the concrete v-ditch and increase acreage of habitat significantly in the upper portion of this reach. The increase in function is limited; however, due to the fact that reach is restricted by utility lines, steep slopes, and Crown Valley Parkway and therefore the acreage of restoration is quite small in the lower portion. Nonetheless, the Lower Reach is contiguous with an existing restoration area and needs to be restored for the long-term protection of downstream areas. Although not significantly lower than the Lower Reach, the lowest functional gain occurs in the Upper Reach due to only invasive species removal and revegetation being proposed. In addition, HGM is too coarse-grained to pick up all the benefits of restoration to surrounding areas, such as, the benefits of removing invasive species in the Upper Reach increasing the function as well as protecting the downstream reaches from invasion and future degradation.

The functional assessment has shown that the proposed project would result in a substantial increase in functions and value for the creek system. Because the proposed alternatives are "planting alternatives" the difference in values are very similar. However, again it is important to note that HGM is not fine-grained enough to account for all the benefits of a narrow versus a broad native buffer habitat.

5.5 EFFECT OF THE PROPOSED RESTORATION ON WATER QUALITY AND FLOODING

Overview

Riparian areas, located at the interface between upland areas and bodies of water, provide a vital role with their placement in the ecosystem. Located along banks of streams, rivers, lakes, and wetlands, riparian areas offer numerous functions benefiting water quality. Healthy riparian vegetation stabilizes streambanks, traps sediment eroded from upland areas, and can remove plant nutrients and contaminants from runoff before they reach a receiving waterbody such as Aliso Creek or the Pacific Ocean. Riparian areas also allow for groundwater recharge by slowing stream velocities and below ground aeration by roots. Streamside vegetation also serves as regional and local wildlife corridors for species habitat movement and dispersal, thereby protecting the biodiversity of the region or of localized habitat islands.

Functions of Riparian Buffers (Streamside Forests):

- To slow flood waters and reduce the volume of water through root absorption;
- To improve water quality by filtering runoff and promoting sediment deposition;
- To allow water storage in plant roots and to provide pathways to groundwater layers;
- To provide canopy cover that shades and cools the stream, improving habitat conditions for in-stream organisms (fish, salamanders, frogs, etc.). This shade also provides relief from extreme heat for terrestrial animals;
- To provide habitat for a variety of birds and small mammals. These buffers also act as corridors to similar habitat, providing food, shelter and nesting sites;
- Riparian areas also provide great opportunities for recreational activities such as hiking, bird watching, and picnicking (Virginia Department of Forestry web page, 2003).

Studies have shown that watersheds where riparian restoration has occurred, including bio-engineering (tree revetments and willow planting along streambanks to protect eroded areas), improved grazing and management practices, have shown marked water quality improvement. One study monitored a restored riparian watershed and a watershed with a degraded to non-existing riparian area through November 2000. Data from the untreated control watershed helped account for the year-to-year variations in

weather. In the first treated watershed, the study found that average phosphorus, nitrogen, and sediment levels in the stream decreased by 12 to 34 percent, and *E. coli* and fecal coliform bacteria counts dropped by 30 to 40 percent compared to pre-treatment levels. Phosphorus, nitrogen, and sediment export from the watershed decreased 30 to 50 percent. The stream protection kept nearly 1 ton of phosphorus, 2 tons of nitrogen, and 126 tons of sediment out of the water each year. These changes, combined with the narrower and deeper stream, led to improvements in the macro-invertebrate community as well (Meals, 2000).

Erosion Control

Riparian vegetation creates a buffer, adjacent to waterways, providing for stabilizing streambanks and retarding erosion (Western SARE Professional Development Project, 2001). These buffers help reduce runoff velocities. The reduced velocities allow for sediment rich water to drop out prior to entering receiving waters. Without buffer areas, chances are greater for soil erosion and runoff to directly enter receiving waterbodies. Vegetation influences soil erosion in several ways: (1) foliage and leaf residues intercept rainfall and dissipate energy; (2) root systems physically bind or restrain soil particles; (3) residues increase surface roughness and slow velocity of runoff; (4) roots and residues increase infiltration by maintaining soil porosity and permeability (Manci, 1989); and (5) plants deplete soil moisture through transpiration, giving the ground a "*sponge effect*" to allow it to absorb water (Abbey, 1988).

Pollutant Trapping

In addition to slowing runoff, riparian vegetation plays a critical role in filtering runoff, and capturing sediments during flooding. Vegetated riparian areas act as living filters to intercept and absorb pollutants before they enter waterways. Additionally, riparian vegetation allows for the uptake of nutrients that are later released when the vegetation dies or decomposes. The effectiveness of riparian areas to filter pollutants is influenced by the width and nature of the streamside vegetation, and the nature of the discharge flow. The longer the detention time and the more diffused the infiltration, the better filtering effectiveness. Reclaiming degraded streams tributary to major river systems would help reduce non-point source pollution (Skinner et al., 1985). Vegetation traps sediment during high flow events. Nutrients are removed as water flows through mature riparian zones. Anaerobic bacterial activity is maximized in the riparian zone. Nutrients capable of being eliminated by anaerobic bacteria to a gaseous by-product could be reduced in well-managed riparian zones before polluting stream flow. The high potential plant production of riparian zones favors assimilation and retention of nutrients (Manci, 1989).

Flooding

Riparian areas and floodplains function together. They accommodate floodwater and act as areas for natural surface water storage, which reduces flooding. The riparian/floodplain areas allow for the capacity to store and release groundwater and maintain stream flow (Mckinnon, 2001). Floodplain vegetation also acts as a filter to improve the quality of water prior to discharging from the area. Fluvial processes are the physical means by which waterways and their floodplains are formed and which drive their constant evolution by deposition and erosion of sediments and rocks (Devon County Council, 1999).

Putting Theory into Practice

The paragraphs above addressed how restoration has the potential to enhance water quality. Restoration, including channel creation, floodplain expansion, and vegetation, contributes to beneficial effects addressing erosion control, pollutant trapping, and flood protection. See Table 14 for a comparison of existing conditions and proposed actions. The following paragraphs will identify how the benefits above mentioned can actually be applied to restoring Upper Sulphur Creek.

Table 14 Preliminary Hydraulic Conditions for Proposed Channel Compared to Existing Channel

Reach	Existing Channel			Proposed Channel		
	Approx. Channel Capacity (cfs)	Approx. Flood Return Period for Full Channel(yrs)	Avg Mannings	Approx. Channel Capacity (cfs)	Approx. Flood Return Period for Full Channel (yrs)	Avg Mannings
Upper Moulton	760	25	0.05	1800	>25	0.05
Upper Nueva Vista	1000	100	0.045	2260	>100	0.05
Middle	1000	100	0.02	1950	>100	0.04
Lower La Paz	1000	100	0.025	1570	>100	0.03
Lower La Plata	1220	25	0.07	1750	>25	0.07

RBF Consulting, 2004.

Upper Reach

The hydraulic conditions along the Upper Reach remain similar to existing conditions. Minor changes to the hydraulic conditions are attributed to the slight increase in channel roughness due to the proposed revegetation plan within the floodplain limits of the channel. No channel geometry changes or regrading of the channel is proposed along this reach. Changes to hydraulic parameters from existing to project conditions include slight decrease in flow velocity and a slight increase of the flow depths (as much as 0.5 feet for the 100-year flood event).

Middle Reach

Channel modifications proposed for this reach include channel geometry changes, including removal of a low-flow v-ditch, regrading the channel, and increased vegetation coverage. All of these activities will contribute to changes to the channel hydraulics. Channel regrading, which includes meandering, widening the portion of the channel conveying the frequent events (2 year) and incorporating of 10- to 20-foot soil terraces within the 5 year conveyance area, will result in increased flow capacity to the channel primarily for frequent flood events (2-yr to >5-yr events). Increase in channel roughness as a result of proposed revegetation generally shows a decrease in flow velocity. The proposed channel modifications generally show flow velocity similar or lower than existing conditions. The removal of the existing low-flow concrete ditch is not expected to affect the channel hydraulics or the channel stability since flow velocities will generally remain low for each flood event analyzed including frequent flood events (2-yr and 5-yr events). Removal of the concrete lined dry-weather flow channel will result in an increase in infiltration capacity of the channel especially for frequent flood events and improve water quality (reduce water temperature).

Lower Reach

In general, the hydraulic conditions of the Lower Reach will remain the same as existing conditions. Localized changes will include regrading of the channel to provide positive drainage (i.e., elimination of the ponding of water due to the accumulation of the sediment just downstream of the culvert at La Plata). The proposed regrading will improve the hydraulic conditions of the channel. Proposed revegetation of the channel will result in a slight roughness and increase of channel roughness. Project conditions flow velocity and flow depth for all analyzed return periods will remain at or lower than existing conditions.

5.6 WILDLIFE MOVEMENT

Wildlife generally travel along prominent features such as ridgelines, drainages, canyons, or riparian areas within larger open spaces, which provide necessary resources (e.g., water, food, cover) that facilitate "regional" movement. Movement may also occur on a "local" scale, which would be that of non-migratory movement of amphibians, reptiles, and some birds. The presence of urban development surrounding the Upper Sulphur Creek corridor presents a severe constraint to regional wildlife movement, but local movement by urban edge-adapted species may still occur. In addition, some sensitive migratory birds such as the least Bell's vireo and the southwestern willow flycatcher, as well as sensitive resident birds such as the California gnatcatcher are known to nest in quality habitat in close proximity to urbanization (e.g., a nesting pair of southwestern willow flycatcher located further downstream on lower Sulphur Creek).

The proposed restoration will have a negligible effect on improving terrestrial wildlife movement or regional wildlife movement because the Creek is confined by urban developments on all sides. Movement of this type would need to take place via a series of culverts under Moulton Parkway, Nueva Vista Drive, La Paz Road, and La Plata Drive. However, by restoring existing riparian habitat and by creating additional habitat in the Middle and Lower Reaches, local wildlife movement by urban edge-adapted species as well as some sensitive birds mentioned above will likely be significantly improved. In addition, because the proposed restoration is contiguous with a restoration effort further downstream, this restoration area could play a small role in local movement between Aliso and Wood Canyons Regional Park.

5.7 INVASIVE SPECIES REMOVAL

Eradication of weed species that compete with native plants will be important for long-term sustainability of the existing and proposed habitat. An aggressive weed removal program will be necessary to maximize the restoration process. Eradication of unwanted species will include, but not necessarily be limited to, those locally occurring invasive species identified by the California Exotic Pest Plant Council (see Table 15). Of the species listed, the following weed species are predominant in the Upper Sulphur Creek restoration reaches: salt cedar (*Tamarix* sp.), Andean pampas grass (*Cortaderia jubata*), castor bean (*Ricinus communis*), and eucalyptus (*Eucalyptus globulus*).

Recommended methods for control of particular species have been cross-referenced using CalWeed Database of the California Interagency Noxious Weed Coordinating Committee and Invasive Plants of California Wildlands (Bossard et al., 2000). Weed densities and control demands will depend on the seasonal rains and temperatures each year of project implementation. The timing of weed control may be different for each of the restoration areas, based on soil moisture and the growth and development of the desired native plant species. It should be anticipated that frequent (semi-monthly to monthly) monitoring of the restoration areas will be required for weed management for at least two years.

Monitoring will be effective for early identification of seedling weed species and to schedule control methods according to the phenology of each weed species.

For efficient control of invasive species, specified weeds must be controlled before they produce viable seed. Methods of control will depend on the species, the density of weeds, the area of infestation, and the ecological sensitivity of the habitat. Hand or mechanical means are preferred methods for control of

Table 15 Target Exotic and Invasive Species

Scientific Name	Common Name
Ammophila arenaria	European beach grass
Arundo donax	giant reed, arundo
Carpobrotus edulis	iceplant, sea fig
Centaurea solstitialis	yellow starthistle
Cortaderia jubata	Andean pampas grass, jubata grass
Cortaderia selloana	pampas grass
Cynara cardunculus	artichoke thistle
Cytisus scoparius	Scotch broom
Eucalyptus globules	Tasmanian blue gum
Foeniculum vulgare	wild fennel
Genista monspessulana	French broom
Lepidium latifolium	perennial pepperweed, tall whitetop
Pennisetum setaceum	fountain grass
Rubus discolor	Himalayan blackberry
Senecio mikanioides (=Delairea odorata)	Cape ivy, german ivy
Taeniatherum caput-medusae	medusa-head
Tamarix chinensis, T. gallica, T. parviflora and T. ramosissima	tamarisk, salt cedar

Source: California Exotic Pest Plant Council

weed species. Some species may be controlled by a combination of cutting and removal, followed by spot foliar herbicide spray application on re-growth. All invasive plants and their associated humus shall be disposed of at an appropriate off-site location.

Limited use of selected herbicides is specified when no other effective alternative is available to remove and control certain noxious weed species. Herbicide treatment is specified for weed species that may re-sprout from roots or rhizomes. Herbicides that are registered for use in California for natural areas are specified for particular weed species at specific rates noted on the labels. For this weed management plan, recommended herbicides include mainly glyphosate (e.g., Round-Up Pro or Rodeo) and triclopyr (Garlon 3-A). Only USEPA approved, glyphosate-base, systemic herbicides (e.g., Rodeo or equivalent) will be allowed when applying herbicides within 100 feet of the Creek. Glyphosate is a non-selective herbicide, and its mode of action works against both broadleaf weeds and grasses. Triclopyr acts on woody and broadleaf species. Therefore, application of herbicides must be implemented without harming non-target native species.

The following glyphosate concentrations shall be used according to the type of application required as per the product label:

Foliar Spray Application—a minimum of two percent solution
Foliar Wick Application—a 33 percent solution
Cut Stump Treatment—a 100 percent solution

The following triclopyr concentrations shall be used according to the type of application required as per the product label:

Foliar Spray Application—15 percent solution
Cut Stump Treatment—a 100 percent solution

The site maintenance contractor must have a pest control business license that requires that at least one individual employed by the business be in possession of a qualified applicator's license or certificate. All State licensed businesses must be currently registered in Orange County. If a qualified applicator is not present during the herbicide treatment, all applicators must have undergone documented herbicide application training. Personnel must wear all protective clothing required by law and follow all label directions and precautions. All re-entry times specified on an herbicide label shall be observed and posted. Herbicide preparation shall be allowed only in approved staging areas more than 100 feet from a stream course or body of water.

A brightly colored dye should be used in all herbicide applications to aid the applicator in achieving good coverage of the target species. The material shall be a non-toxic material, such as Blazon, Turfmark, or equivalent. The dye shall be mixed with the herbicide at no more than half the rate specified on the label.

Herbicide treatment should be conducted only when weather conditions are conducive to effective uptake of the herbicide by the target species (e.g., sunny, dry with ambient temperatures 65 degrees Fahrenheit, and when plants are at the specified growing stage), and when wind conditions are such that herbicide drift is minimized (5 mph or less). Treated plants or stumps shall not be disturbed until the applied herbicide has had time to take effect, per the manufacturer's instruction.

The following guidelines for weed removal and/or herbicide treatment should be followed for each specified weed species:

Arundo (*Arundo donax*)

Arundo removal techniques will include either mowing large patches or aerial spraying of individual patches using the concentrations specified above. No Arundo was observed in the Upper Sulphur Creek Assessment Area; however, because the site is heavily infested by other invasive species, Arundo may also be present.

Salt cedar (*Tamarisk* sp.)

Salt cedar removal should initially be conducted by manual removal of the tree, the roots and the associated duff. Removal of seedlings following the initial removal should be completed prior to seed set. If resprouting occurs, a cut-stump method of herbicide application is recommended.

Tree Tobacco (*Nicotiana glauca*)

All individuals of these species should be removed from the Assessment Area. Seedling plants can be removed by hand pulling. For larger individuals, stump treatment with glyphosate should be used. The plants should be treated in spring when actively growing. A phased treatment is recommended. Phase 1: The plants should be cleanly cut, horizontally, close to the ground (using a saw, rotary brush cutter, or similar tool). All the cut vegetation shall be removed from the project area the same day it is cut and disposed of legally off site. Phase 2: The stumps or stems should be re-cut, cleared of sawdust, and immediately painted with 100 percent glyphosate within two minutes of cutting before the cut surface

begins to congeal to ensure penetration of the herbicide. In the irrigated zones, care should be taken to apply the herbicide between irrigation events. Plants should be checked a month after application to determine the success of the herbicide treatment. Any re-growth from the treated stumps should be treated with the foliar herbicide application in the same season or as re-growth appears in the next growing season.

Castor Bean (*Ricinus communis*)

All individuals of this species should be removed from the project area. Seedling plants can be removed manually; larger individuals should be treated using either the foliar spray treatment method or the cut stump treatment and their vegetative mass removed for legal disposal. The plants should be sprayed during active growth in the spring. Foliar spray shall be with Round-Up Pro/Rodeo at the prescribed minimum 2 percent solution. For very large individuals, the stump treatment described above may be used. Plants should be checked a month after application to determine the success of the herbicide treatment. Re-application may be necessary for mature castor bean individuals. Areas where castor bean plants have been removed should continue to be monitored annually because the castor bean seeds are thought to be quite long-lived.

Pampas Grass (*Cortaderia selloana* and *Cortaderia jubata*)

Pampas grass has the ability to reach distant open spaces due to the light wind dispersed seed followed by very rapid growth (Department of Conservation, 2003.) These species can invade disturbed areas such as cleared bush margins and firebreaks where it competes with native vegetation. The dry biomass from pampas such as dead leaves, leaf bases and flowering stalks creates a significant fire hazard. To control the species, remove it manually by digging and grubbing seedlings and small plants. Chain-sawing and slashing can be combined with chemical spraying of re-growth on larger plants, as well as the application of herbicides from spring to autumn, or after flowering. The herbicides and methods described previously are ideal for this species. With all other species using this method, make sure you leave the plants in the ground until the roots have died off. Do not re-apply herbicide until the plant actively begins growing again.

Eucalyptus (*Eucalyptus globulus*)

The trees have allelopathic qualities that prevent some native species from taking root in the vicinity of a eucalyptus tree due to the nature of the chemical compounds that the tree is exuding. While removing individual trees by felling can be expensive, this method, together with stump grinding, can be effective. Stump grinding is done to prevent stump (re) sprouting. A self-propelled grinder is used to remove tree material to a depth of approximately 2 feet below surface. Another way to control stump sprouting is achieved through the direct application of tricloptyr or glysophate to the outside of the stump's cut surface at the time of tree felling.

Eucalyptus removal will be determined on a case-by-case basis within the Assessment Area. Many of the mature eucalyptus are part of the streetscape along Crown Valley Road and are not proposed for removal. However, small trees and seedlings within the active channel or on the creek banks should be removed and replaced with native buffer species such as oaks, sycamores, cottonwoods, and willows. In addition, future planting of eucalyptus trees within 100 feet of the active creek channel should be prohibited.

Annual Weeds

Annual weeds, such as black mustard (*Brassica nigra*), short pod mustard (*Hirschfeldia incana*), tocalote (*Centaurea melitensis*), sweet clover (*Melilotus indicus*), bur clover (*Medicago polymorpha*), and exotic and invasive annual grasses should be controlled mainly by hand pulling and weed whipping, but may entail limited use of herbicide treatments depending on the density of the weeds.

Maintenance for weeds is not limited to the above-mentioned weeds, but will include any exotic and invasive plant species present in the Assessment Area that would threaten the establishment of the riparian and RSS communities. Removal of invasive species will be particularly important in the buffer area on the slopes of the Upper Reach. In Alternative 2, drought tolerant non-invasive ornamental bushes are to remain. These species do not threaten the establishment of sage scrub species surrounding them or tend to "escape" the uplands and invade streams or wetlands. Therefore, in removing the annual weeds and invasive species such as pampas grass and salt cedar, care should be taken to not harm non-invasive ornamental bushes such as acacia species.

5.8 PRELIMINARY PLANT PALETTE

The preliminary plant palettes for the conceptual restoration plan are reflective of the species indigenous to this region. Consideration of typical precipitation, natural soil moisture, and normal plant growth cycles will contribute to the ultimate restoration success. The goal of restoration planting is to encourage development of patchiness, and structural and spatial diversity of habitat. Plant cuttings, such as willows or mule fat, should be collected within the Sulphur Creek watershed to the extent feasible, properly stored or planted immediately. In addition, willow cuttings and other riparian and emergent species should be installed during periods of ample moisture to ensure establishment of root system, preferable during the winter season. The following plant palettes are preliminary in nature as reference sites have not been sampled due to the conceptual nature of the restoration plan.

Five vegetation communities have been proposed:

- Table 16, Coastal Freshwater Marsh/Emergent Wetland – Container/Cuttings Plant Palette. These species should be planted directly adjacent to the low flow, which is defined by the dry season run-off within the active creek channel. These species will stabilize slopes and create a partial understory for the southern willow scrub.
- Table 17, Cottonwood-Southern Willow Scrub Riparian Canopy. These tree species should be planted on the stream terraces, some within the OHWM or 1 to 2-year creek channel, but more on the 3 to 5 year terrace.
- Table 18, Alkali Meadow Floodplain Understory 2 to 5+ year flow event. These species should be planted on the banks of the active channel, the soil terraces and up into the dryer understory of the 3 to 5 year channel terrace along with the tree species previously listed.
- Table 19, Coastal Sage Scrub Community is a native southern California landscape found through dry upland areas. This palette should be planted on the slopes of all three reaches.
- Finally, in Table 20, Cultivar Sage Scrub and Oak/Sycamore Woodland Community is recommended for use in streetscape and as buffer areas to the native communities. Utilizing native cultivar species is beneficial in many ways. Most importantly, this will minimize the escape of ornamental species into the Creek, which can cause an increase in maintenance costs as well as competition with native species. With a decrease in native species, wildlife habitat and water quality benefits also decrease. In addition, the cost of natives and native cultivars to plant, water, and maintain through pruning is much lower after the initial years of weed control (Growing Native, 2003). However, formal landscape plans should be completed for the installation of this plant palette as streetscape such that there is a managed uniformity to the native species.

Table 16 Coastal Freshwater Marsh Community

Scientific Name	Common Name	Size	Density (acre)
Eleocharis macrostegia	Spikerush	Bare root	250/acre
Juncus mexicanus	Mexican rush	Bare root	250/acre
Juncus xiphiodes	Rush	Bare root	250/acre
Scirpus acutus var. *leopoldii*	Spiny rush	Bare root	150/acre
Scirpus americanus	Three-square	Bare root	150/acre
Scirpus californicus	California bulrush	Bare root	150/acre
Leymus triticoides	Alkali wild rye	Leach tube or D-40	50/acre

Source: Aspen Environmental Group, 2004

Table 17 Cottonwood-Southern Willow Scrub Riparian Canopy

Scientific Name	Common Name	Size	Density (acre)
Salix lasiolepis	Arroyo willow	cuttings	100
Salix goodingii	Black willow	cuttings	100
Salix laevigata	Yellow willow	cuttings	100
S. exigua	Sandbar willow	cuttings	200
Populus fremontii	Fremont's cottonwood	cuttings	100
*Baccharis salicifolia**	Mule fat	cuttings	200

Source: Aspen Environmental Group, 2004

Table 18 Alkali Meadow Floodplain Understory

Scientific Name	Common Name	Size	Density
Frankenia salina	Alkali heath	Liners	0.5'
Distichlis spicata	Salt grass	Liners	0.5'
Limonium californicum	Western marsh-rosemary	1 gallon	2-3'
Atriplex canescens	Four-wing saltbush	1 gallon	4-5'
Baccharis salicifolia	Mule fat	cuttings	4-5'
Mimulus aurantiacus	Sticky monkeyflower	1 gallon	2-3'
Mulenbergia rigens	Deergrass	1 gallon	2-3'
Ribes speciosum	Fuchsia flowered gooseberry	1gallon	10'
Rosa californica	California rose	1 gallon	10'

Source: Aspen Environmental Group, 2004

Table 19 Sage Scrub Community

Scientific Name	Common Name	Purity/Germination	Bulk lbs/acre
Artemisia douglasiana	Mugwort	15/60	2
Encelia californica	Bush sunflower	40/60	3
Eriogonnum fasciculatum	California buckwheat	10/65	6-12
Eschscholzia californica	California poppy	98/75	2
Isocoma menziesii	Coast goldenbush	40/30	2.5
Salvia apiana	White sage	70/50	2
Salvia mellifera	Black sage	70/50	2
Lasthenia californica	Coast goldfields	50/60	1
Leymus condensatus	Giant wild rye	80/80	0.25
Mimulus aurantiacus	Sticky monkey flower	2/60	1
Plantago ovata	Plantain (nurse crop)	98/75	10
Bromus carinatus[a]	California brome	95/80	1.5
Eriophyllum confertiflorum[a]	Golden yarrow	30/60	3
Hemizonia fasciculate[a]	Fasciculated tarweed	10/25	1
Lupinus bicolor[a]	Dove lupin	98/80	2
Trifolium tridentatum[a]	Tomcat clover	90/80	2
Vulpia microstachys[a]	Small fescue	90/80	6-8
Lotus scoparius	Deerweed	?	3

[a] Erosion Control Species
Source: Aspen Environmental Group, 2004

Table 20 Cultivar-Sage Scrub and Oak/Sycamore Woodland Community

Scientific Name	Common Name	Size	Density
Quercus spp.	Oak	5 gallon	TBD
Platanus racemosa	California sycamore	5 gallon	TBD
Ceanothus spp.	Ceanothus	1 gallon	TBD
Malosma laurina	Laurel sumac	1 gallon	TBD
Rhus integrifolia	Lemonade berry	1 gallon	TBD
Rhus ovata	Sugarbush	1 gallon	TBD
Mahonia sp.	Golden abundance	1 gallon	TBD
Encelia californica	Bush sunflower	1 gallon	TBD
Mimulus spp.	Monkey flower	1 gallon	TBD
Salvia spp.	Sage	1 gallon	TBD
Artemisia spp.	Sagebrush	1 gallon	TBD
Rosa californica	California rose	1 gallon	TBD
Festuca Idahoensis	Blue fescue	1 gallon	TBD

Source: Aspen Environmental Group, 2004

5.9 PRELIMINARY COST ESTIMATE

For several reasons, a cost estimate for the conceptual plan is difficult to determine especially when there are multiple alternatives and optional items. It is necessary to have the final hydrologic analysis, sediment analysis, and developed grading and landscape plans to hone the estimate. Therefore, Table 21, Preliminary Cost Estimate, includes a long list of items that we know to be necessary for implementation and associated cost of each item is a rough estimate based on the conceptual restoration design and cross sections for each reach. In order to develop this estimate, several contractors were

Table 21 Preliminary Cost Estimate

Restoration Item	Cost	Upper		Middle			Lower		Total
		Alt 1	Alt 2	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	
IMPLEMENTATION STAGE									
Concrete V-Ditch Removal	N/A	$0	$0	$30,000	-	-	$50,000	-	$80,000
Grading/Hauling	$15/cu yd	$0	$0	$150,000	-	-	$45,000	-	$195,000
Weed Removal (uplands)	$5,000/ac	$40,000	$20,000	$70,000	-	-	$45,000	$35,000	$125,000*
Weed Removal (stream and wetlands)		$40,000	$40,000	$0	-	-	$20,000	$20,000	$60,000*
Agronomic Soil Test	$150/sample	$0	$0	$600	-	-	$450	-	$1,050
Erosion Control/Straw Wattles	$7,500/ac	$0	-	$12,975	-	-	$6,150	-	$19,125
Emergent Marsh and Riparian (Plants, Willow Cuttings, Installation)	$5,000/ac	$10,000	-	$30,000	-	-	$30,000	-	$70,000
Temporary Irrigation (Native Sage Scrub)	$3,000/ac	$20,000	$20,000	$4,000	$3,000	$5,000	$9,000	$5,000	$28,000
Native Sage Scrub Hydroseeding (Seed, Mycorrhizal Innoculum, Installation)	$6,500/ac	$43,000	$26,000	$13,000	$6,500	$19,500	$13,000	$13,000	$45,500*
Cultivar Streetscape (5' wide) (Irrigation, Plants, and Installation)	$5/sq ft	$0	$0	$200,000	$150,000	$200,000	$200,000	$150,000	$300,000*
Contingency 20%									$184,735
TOTAL Implementation Stage									$1,108,400
POST IMPLEMENTATION STAGE									
Optional Educational Kiosks	$1,500/ea	$1,500	-	$1,500	-	-	$0	-	$3,000
Optional Split Rail Fencing	$25/lin ft	$82,000	$82,000	$45,000			$46,875		$162,625
Maintenance (5 years) (weed removal, irrigation maintenance, replanting labor)	$4,000/ac	$60,000	-	$34,000	-	-	$32,000	-	$130,000
Biological Oversight/Monitoring (5 years)	$5,000/ac	$33,000	-	$33,000	-	-	$33,000	-	$100,000

$0 = not proposed
* =the total was calculated by using the lowest cost from each alternative

Source: Aspen Environmental Group and RBF Consulting, 2004

contacted for preliminary estimates on the cost of seed, plant materials, invasive species removal, and installation. Once an alternative is chosen, contractors can be contacted again to provide a more precise estimate. If costs are out of alignment with currently available funding, materials or labor donations may be sought, including staging of projects over a longer time frame or other strategies that may be developed.

The cost items have been categorized into the Implementation and Post Implementation Stages. The Implementation Stage is where the prescribed restoration activities occur. These include items from removing the v-ditch and grading through to planting. The Post Implementation Stage are items that are outside the scope of the current project funding, but are thought to be required by the regulatory agencies as part of the conditions of project approval. These include 5 years of maintenance, monitoring, and reporting. One additional item was grouped into this category, split rail fencing. Because of the high estimated cost of this line item and the inaccessibility of the Upper and Lower Reaches due to steep slopes, this item was made optional. It is expected that at a future date, the City or individual HOAs may want to install a split rail fence to enhance the aesthetic value of the restoration area and give it a feel similar to that of the Nelle Gail Ranch trail system.

The Upper Reach was the least expensive on a per-acre basis. This is due to the fact that there is no grading proposed for the reach and the primary cost is in invasive species removal and replanting. The cost of the Middle Reach is by far the most expensive due to the presence of the concrete v-ditch, the need to grade an active channel and revegetation. The Lower Reach includes a combination of the two activities and cost is reflective of this.

5.10 EDUCATION

A small educational component has been proposed in the Conceptual Restoration Plan by proposing locations for educational signage, including at least one in the Upper Reach adjacent to the existing bike path and another in the Middle Reach adjacent to the existing park and sidewalk. The goal would be to educate the community on water quality, native vegetation, and wildlife in easy to read bullet-point and picture formats. Information would be presented to the individual HOAs and local schools regarding the restoration efforts and benefits to water quality, habitat and vegetation, and wildlife.

As part of the restoration project, “park” area is proposed to be retained at the corner La Paz and Crown Valley Parkway. The Assessment Area currently includes a sidewalk and a bike path throughout most of its length. However, one area along the Lower Reach was excluded from native landscaping to provide a place for a future bike path.

6. REGULATORY CONSTRAINTS

Three federal and State agencies have primary regulatory responsibility over activities within inland streams, lakes, wetlands, and other riparian areas in California. The U.S. Army Corps of Engineers' (ACOE) regulates discharges of dredged and fill material into waters of the United States, pursuant to Section 404 of the Federal Clean Water Act (CWA); the California's Regional Water Quality Control Boards (RWQCB) regulate discharges into waters of the state, pursuant to Sections 401 and 402 of the Federal Clean Water Act and the California Porter-Cologne Act; and the California Department of Fish and Game (CDFG) regulates several types of activities within streams and lakes under the Fish and Game Code Sections 1600-1616.

The Conceptual Restoration Plan proposes to temporarily impact Upper Sulphur Creek through the removal of hardscape and invasive species and grading. As such, the project would require permits from the ACOE, the CDFG, and the RWQCB before any activity could commence within the Assessment Area. Both permanent and temporary impacts are regulated and would trigger the need for these permits. Processing of the Section 401 and 1602 permits can occur concurrently with the Section 404 and can utilize the same information and analysis. However, the focus of each permit and the required response time differs between the agencies. In addition, the RWQCB and the CDFG cannot issue a final 401 Water Quality Certification (WQC) or a Streambed Alteration Agreement (SAA), respectively, without a certified CEQA document, but they can review, advise, and negotiate the details of a proposed project prior to issuance. Likewise, the ACOE cannot issue a Section 404 permit without ensuring that the project complies with all effluent limitations and water quality standards, which is provided by a 401 WQC.

A brief summary of all the required permits is shown below:

Section 404

Section 404 of the CWA regulates the discharge of dredged material, placement of fill material, or excavation within "Waters of the U.S." and authorizes the Secretary of the Army, through the Chief of Engineers, to issue permits for such actions. "Waters of the U.S." are defined by the CWA as "rivers, creeks, streams, and lakes extending to their headwaters and any associated wetlands." Wetlands are defined by the CWA as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." Permits can be issued for individual projects (individual permits) or for general categories of projects (general permits) including Nationwide Permits (NWPs). To streamline their permitting program, ACOE headquarters has issued more than 40 permits NWPs that are for similar types of activities having minimal impacts on the aquatic ecosystem on an individual and cumulative basis. One of these permits, NWP 27, Wetland and Riparian Restoration and Creation Activities, authorizes activities that result in the net increase of aquatic ecosystem functions and values such as restoration projects. The baseline analysis, proposed restoration actions, and expected functional gain outlined in this document provide the necessary evidence for the project to qualify for NWP 27 authorization.

To gain authorization under NWP 27, the City is required to submit a request of verification to the ACOE that this project qualifies for authorization. The written request or application should include an Environmental Impact Assessment including the baseline conditions of Upper Sulphur Creek, conceptual restoration plan and associated temporary impacts, and the expected functional gain following activities. The ACOE will determine whether or not the activity meets the terms and

conditions of NWP 27. If a project qualifies, a letter may be issued verifying compliance. Verification of compliance may be conditioned with specific terms regarding construction protocol, use of best management practices, avoidance of endangered species habitat, and mitigation requirements to ensure that the project will have minimal incremental or cumulative impacts to aquatic resources. If a project meets the general terms and conditions of a NWP, but will result in greater than minimal impacts, the District Engineer may take discretionary authority and require the project to be processed as an Individual Permit (IP). The review process for a NWP is generally less extensive than for an IP and can often be completed within 30 days.

Projects which cannot be permitted under a NWP must undergo a more extensive review under the IP process, which typically takes 120 days. The ACOE decides whether to issue an IP based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity. According to ACOE regulations, permits should not be issued for activities that will create "significant" degradation of the "Waters of the U.S." or have "significantly adverse effects on wetlands values." However, the CWA provides no clear definition of "significant." From preliminary discussions with the ACOE, the need for an IP is unlikely.

Section 401

Section 401 of the CWA requires that:

> "any applicant for a Federal permit for activities that involve a discharge to waters of the State, shall provide the Federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge will comply with the applicable provisions under the Federal Clean Water Act."

Therefore, before the ACOE will issue a Section 404 permit, the City is required to apply for and receive a Section 401 water quality certification from the RWQCB. The application will need to include two required forms, referred to as the Notification and the Questionnaire, and the appropriate fee. The applications will not be considered "complete" until which time it includes a complete CEQA document (e.g., IS/MND or Environmental Impact Report [EIR]); however, the applications should still be submitted such that the RWQCB can review and comment prior to the CEQA certification. Processing of a water quality certification generally takes 60 days, but the ACOE may grant the RWQCB time extensions of up to one year. A 21-day public comment period is included in the processing of the water quality certification. The RWQCB may add conditions to their certification to remove or mitigate potential impacts to water quality standards. Such conditions must ultimately be included in the Federal Section 404 permit. The State Water Quality regulations contain an "aggrieved party provision" that allows any person or group who objects to the issuance of a water quality certification to petition the State Water Board to reconsider the RWQCB decision within 30 days of issuance.

Under separate authorities granted by State law (i.e., the Porter-Cologne Water Quality Control Act), a RWQCB may choose to regulate discharges of dredge or fill materials by issuing or waiving (with or without conditions) Waste Discharge Requirements (WDRs), a type of State discharge permit, instead of taking a water quality certification action. Processing of a WDR is similar to that of a Section 401 certification; however, the RWQCB has slightly more discretion to add conditions to a project under the Porter-Cologne Act than under the Federal CWA.

1602 Agreement

Section 1602 of the California Fish and Game Code requires any person, State or local governmental agency, or public utility to obtain a Streambed Alteration Agreement when it begins a construction project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. From the baseline information and proposed restoration action, the City is required to notify the CDFG for the Upper Sulphur Creek Restoration Project. Based on the notification materials submitted to the CDFG and, if necessary, an investigation of the project site by the CDFG, the CDFG will determine if a proposed project may impact fish or wildlife resources.

If the CDFG determines that a proposed project may substantially adversely affect existing fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. A completed CEQA document must be submitted to the CDFG before they will issue a Streambed Alteration Agreement (SAA). Within 30 days of receipt of a "complete" notification package, the CDFG will propose measures, possibly in the form of a draft SAA, necessary to protect the fish or wildlife that utilize the project area. The City of Laguna Niguel would have 14 days to accept the SAA and associated measures or request modifications. If the measures are acceptable, the Streambed Alteration Agreement will be issued. If the measures are not acceptable, the applicant may request a meeting with the CDFG within seven days from the date the CDFG receives the response or by some other mutually agreed upon date for the purpose of developing measures that are acceptable to both the applicant and the CDFG. If an agreement is not reached with the CDFG on acceptable protection measures, an arbitration panel will be established to resolve any disagreements. If a panel is requested, it must be established within 7 days of the meeting with the CDFG. The arbitration panel will be composed of a representative from the CDFG, the applicant, and a mutually agreed upon third person who will act as the panel chair. The panel must complete the arbitration within 14 days from the date the panel is established unless a time extension is mutually agreed upon.

Section 7 Endangered Species Consultation

This process is required only if the proposed project would affect a threatened or endangered species. Focused surveys for least Bell's vireos and southwestern will flycatchers were completed for the Assessment Area and no sensitive species were observed. Therefore, it is not expected that this process will be necessary.

Orange County Flood Control District Encroachment Permit

The Orange County Flood Control District (OCFCD) has a floodplain easement over the lower reach. An encroachment permit is required for construction. OCFCD will review the Conceptual Plan during CEQA process to define areas of concern. To attain an encroachment permit, the fees must be paid and final plans must be approved by OCFCD.

7. FUTURE WORK AND SCHEDULE

The following is a list of items that are necessary to implement and monitor the success of the Conceptual Restoration Plan.

1. Submit Initial Study/Mitigated Negative Declaration (IS/MND) State Clearing House and Appropriate Distribution List – September 29, 2004 (Public Review Period Ends – October 29, 2004)
    a. Respond to Comments and Finalize MND – November 30, 2004
    b. Adopt MND – December 15, 2004
2. Initiate regulatory process with ACOE, CDFG, RWQCB, and OCFCD – September 1, 2004
    a. Prepare and submit agency applications – September 20, 2004
    b. Receive agency permits – February 28, 2005
3. Gather hydrologic information on the depth of annual and flood flows in specific stream reaches.
    a. Complete final channel hydraulics – September 15, 2004
    b. Complete detailed stream stability and sediment transport analysis – September 28, 2004
4. Finalize Vertical and Horizontal Channel Alignment (proper stream width-to-depth ratio for the active channel and soil terraces) – October 19, 2004
5. Prepare Grading Plans – November 16, 2004
6. Hone cost estimate from grading plans and modify as necessary – December 28, 2004
7. Develop landscape and irrigation plans for cultivar buffer areas only – December 14, 2004
8. Finalize maintenance easements for system modifications with HOA landowners.
9. Finalize Restoration Plan via a Monitoring and Maintenance Plan
    a. Develop Success Criteria – September 30, 2004
    b. Prepare Maintenance Program – November 30, 2004
    c. Determine if any recreational and educational materials can be accommodated under remaining budget
10. Complete Construction
    a. Begin invasive species removal – March 2005
    b. Begin grading – May 30, 2005
    c. Planting and irrigation – October and November 2005
11. Institute monitoring program
    a. Submit as-built and monitoring reports to the State Water Resources Control Board and Wetlands Recovery Project – March 31, 2006 (End of Grant)
    b. Evaluate success and failure (rectify) – January 2006 - annually
    c. Prepare annual monitoring and agency reports – January 2006 – January 2011.

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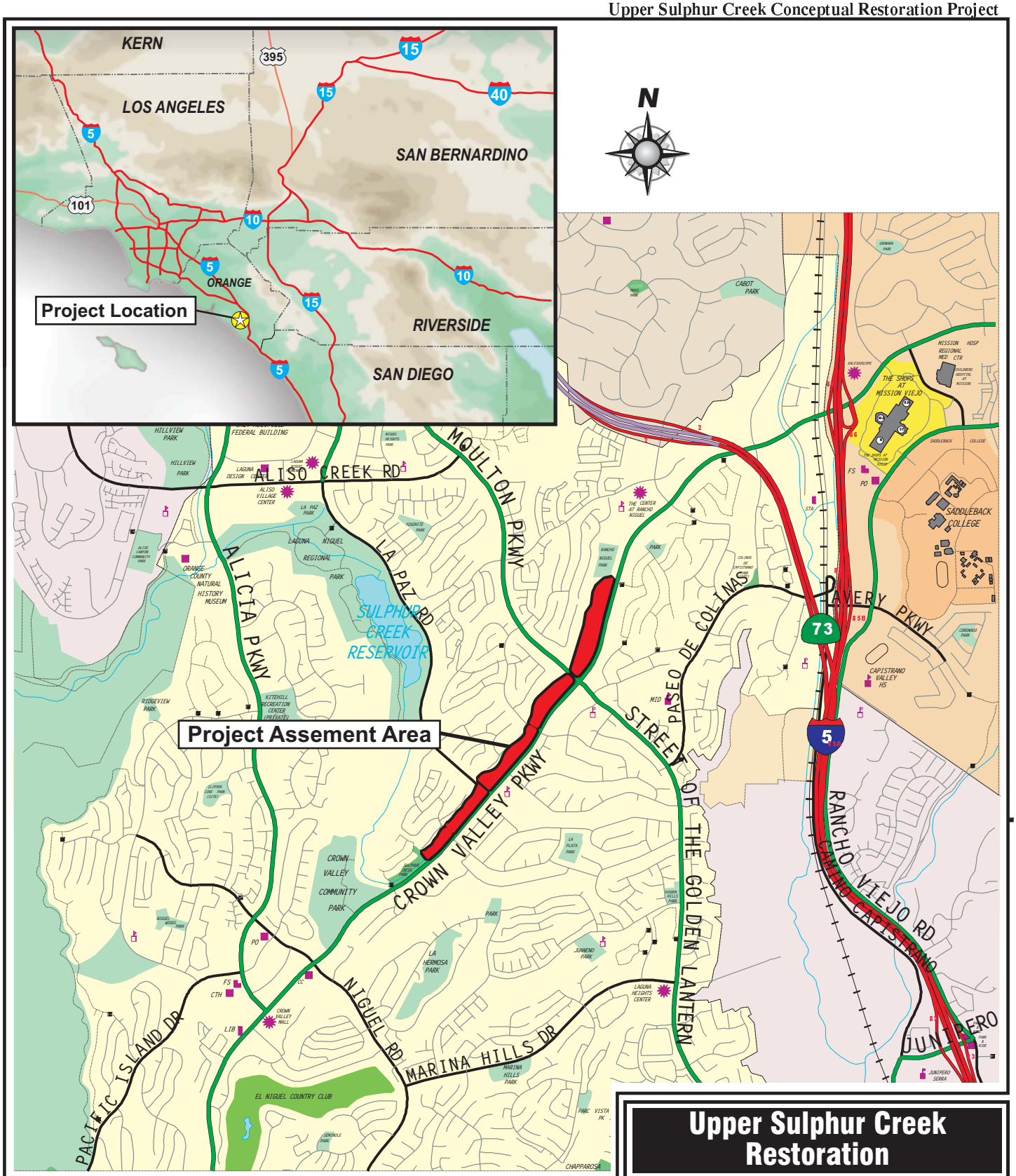


Map: Thomas Bros. Los Angeles/Orange Co.,2004.

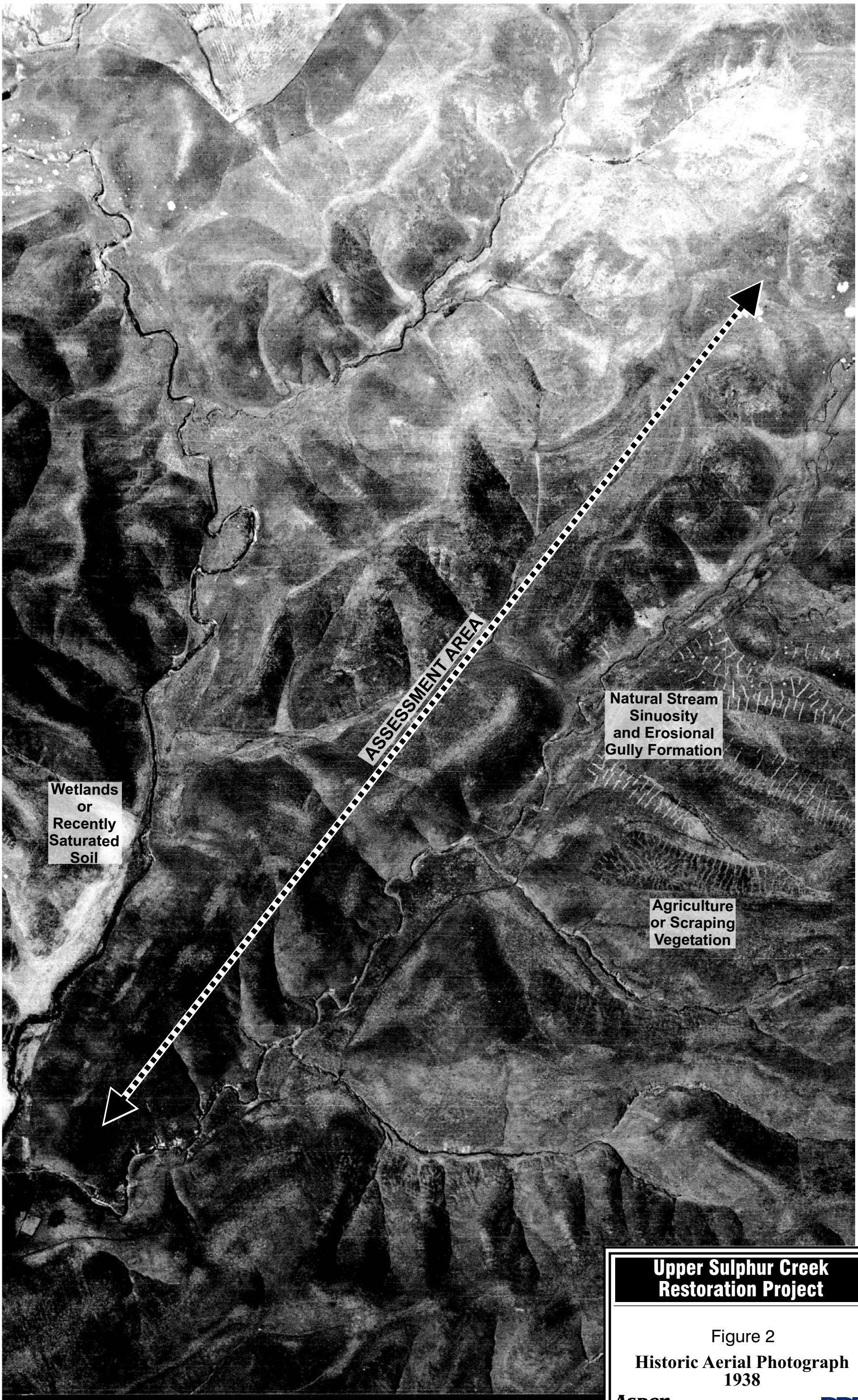
Upper Sulphur Creek Restoration

Figure 1

Project Location

Aspen Environmental Group

RBF



Source: Rupp Aerial Photography, 2004

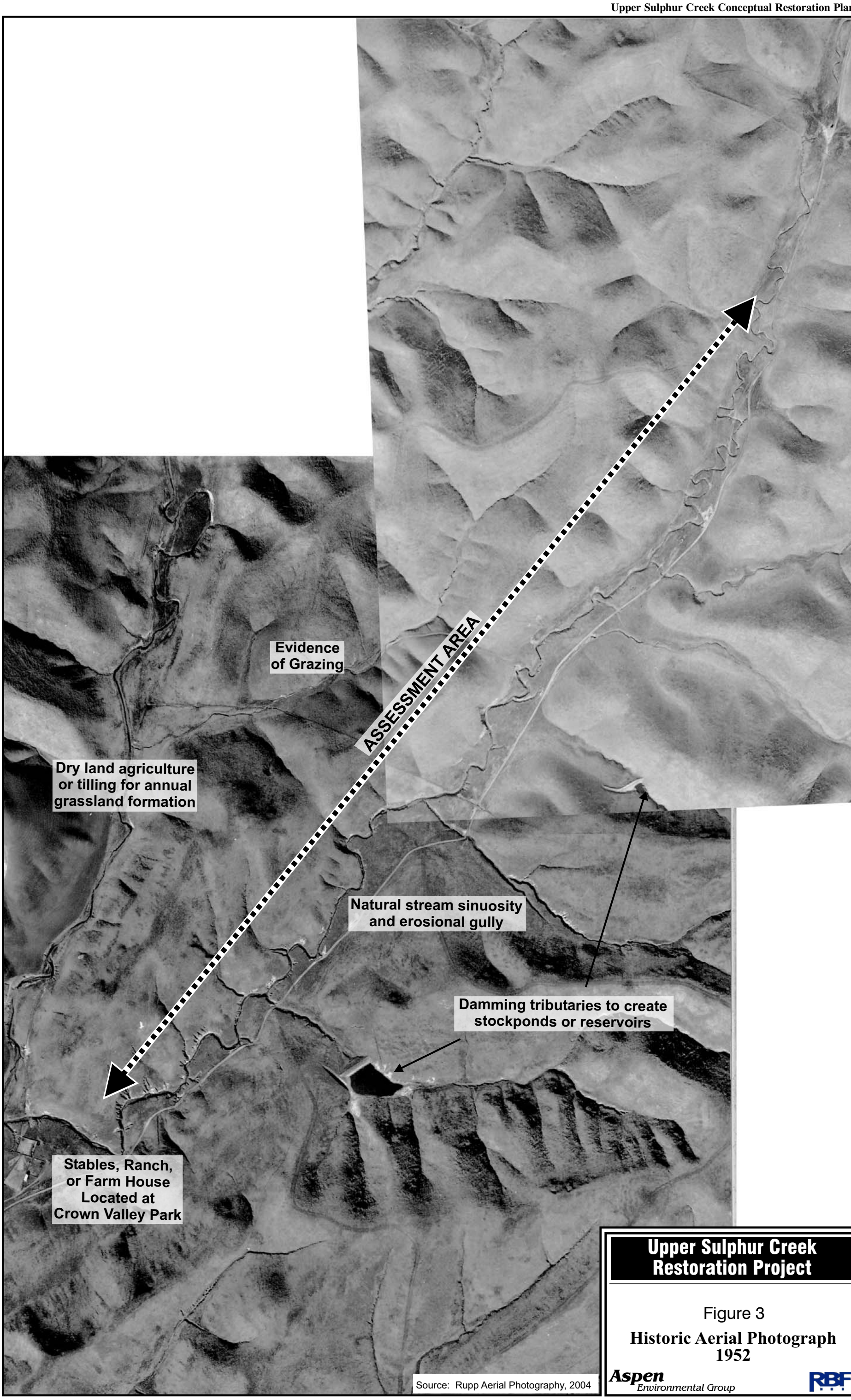
Upper Sulphur Creek Restoration Project

Figure 2

Historic Aerial Photograph 1938

Aspen Environmental Group

RBF



Upper Sulphur Creek Restoration Project

Figure 3

Historic Aerial Photograph 1952

Aspen Environmental Group

RBF

Source: Rupp Aerial Photography, 2004

Upper Sulphur Creek Restoration Project

Figure 4

Historic Aerial Photograph 1965

Aspen Environmental Group

RBF

Source: Rupp Aerial Photography, 2004

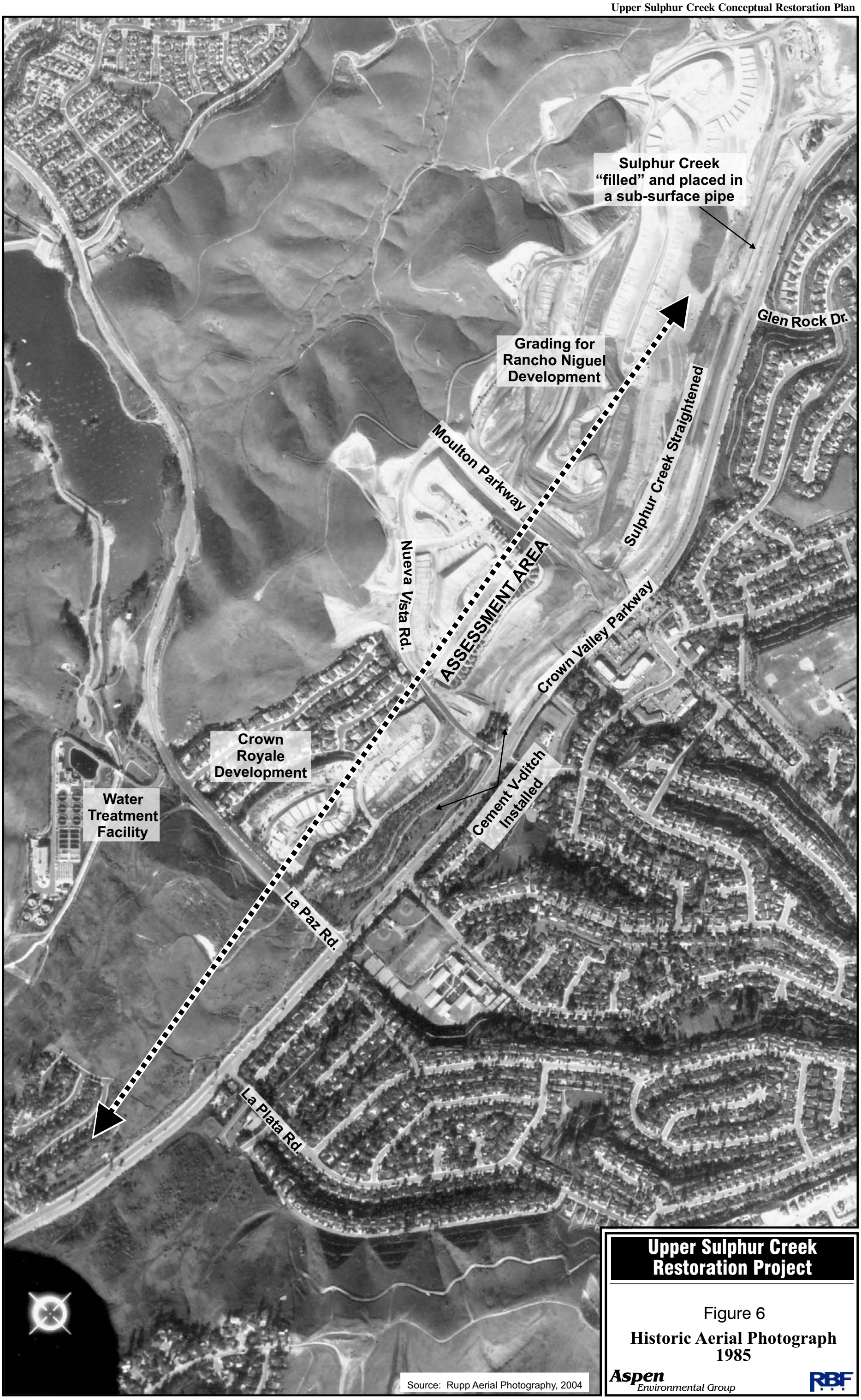
Upper Sulphur Creek Restoration Project

Figure 5

Historic Aerial Photograph 1971

Aspen Environmental Group

RBF



Upper Sulphur Creek Restoration Project

Figure 6

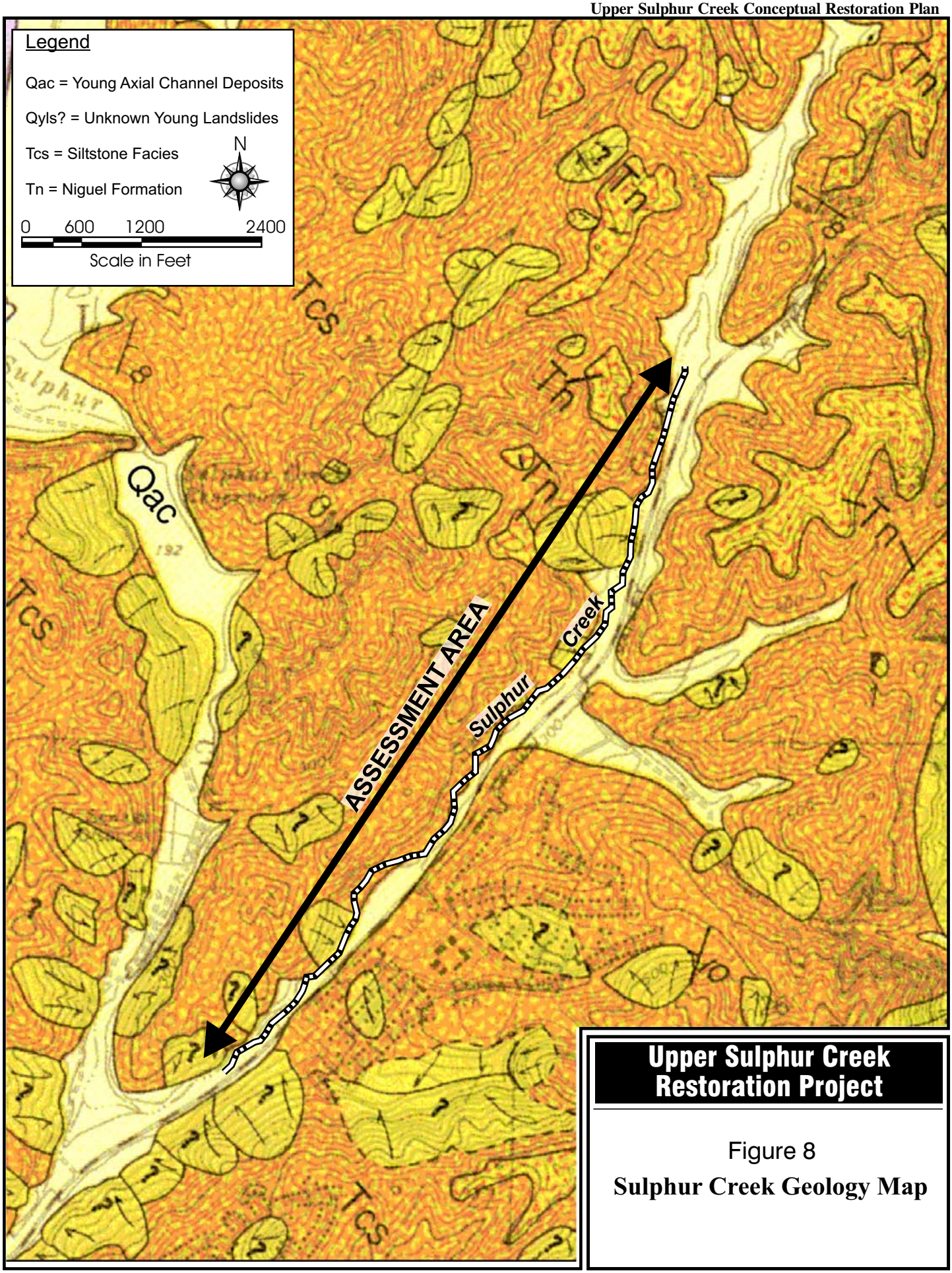
Historic Aerial Photograph 1985

Aspen Environmental Group

RBF

Aerial from the City of Laguna Niguel, June 2003.

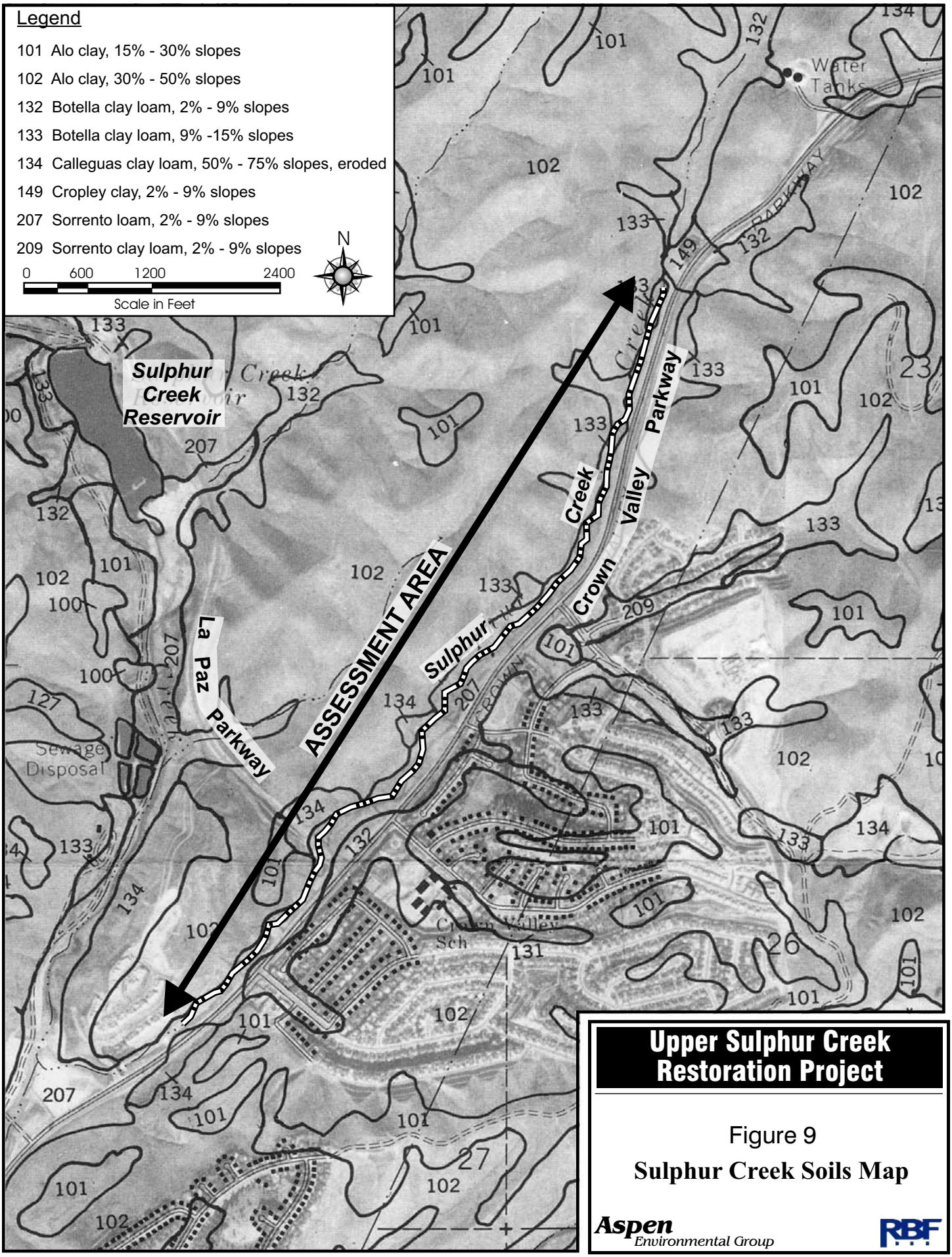
Aspen Environmental Group	Drawing: 1115-Figure7.cdr	Aerial Photograph 2004	Upper Sulphur Creek Restoration Figure 7



Upper Sulphur Creek Restoration Project

Figure 8

Sulphur Creek Geology Map



Upper Sulphur Creek Restoration Project

Figure 9

Sulphur Creek Soils Map

Aspen Environmental Group

RBF

Legend

- Park/Ornamental
- Flood Control Channel
- Cottonwood-Willow Riparian
- Southern Willow Scrub
- Alkali Meadow
- Ruderal - Disturbed
- Ruderal - Pampas Grass
- Coastal Freshwater Marsh
- Coyote Bush Scrub
- Sagebrush-Buckwheat Scrub
- Sidewalk/Concrete Structures

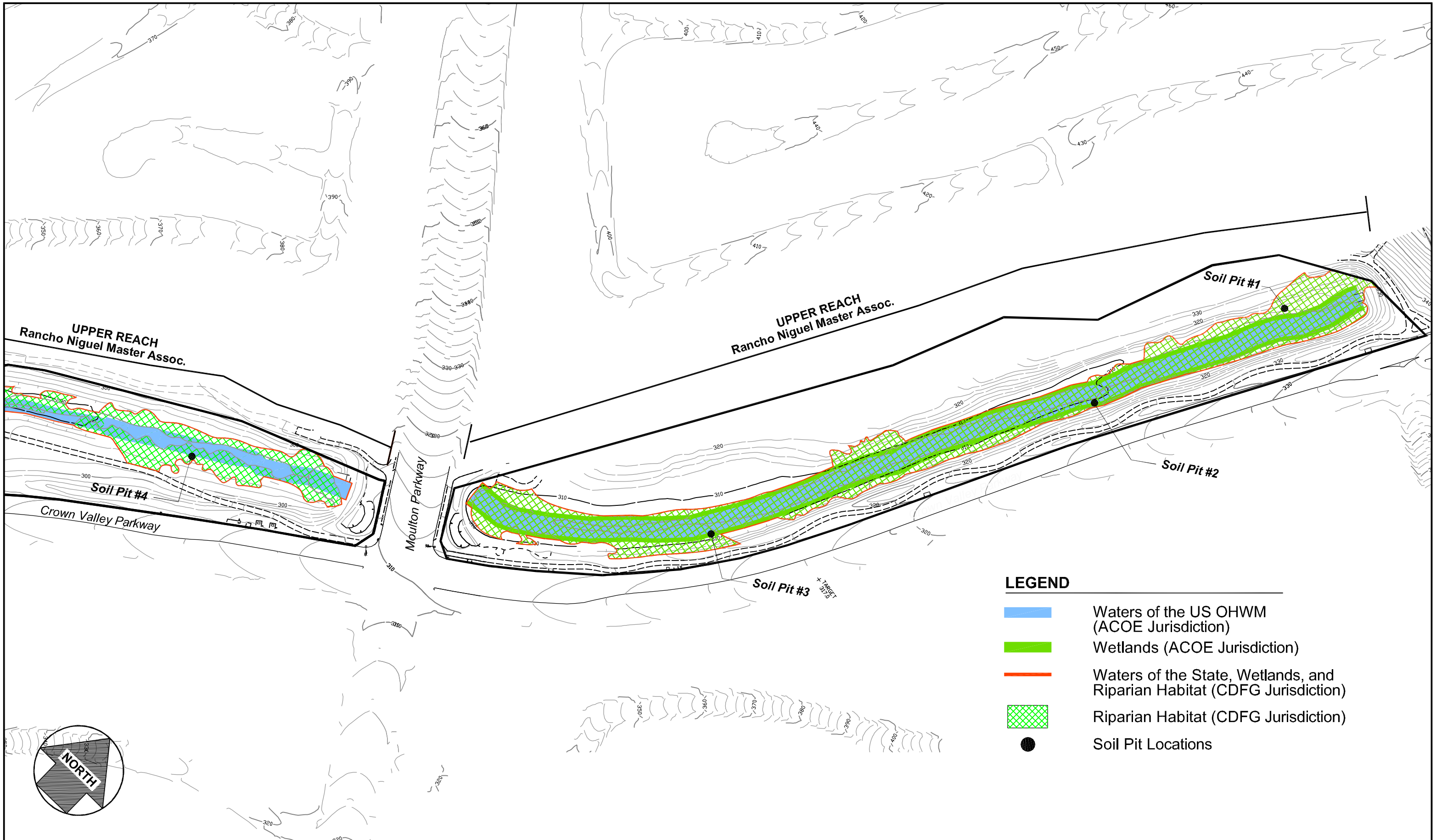
Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 600' Date: August 25, 2004 File: 1115VegUpper.dwg	**Vegetation Map Existing Conditions**	**Figure 10a**

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115VegUpper.dwg	**Vegetation Map Existing Conditions**	**Figure 10b**

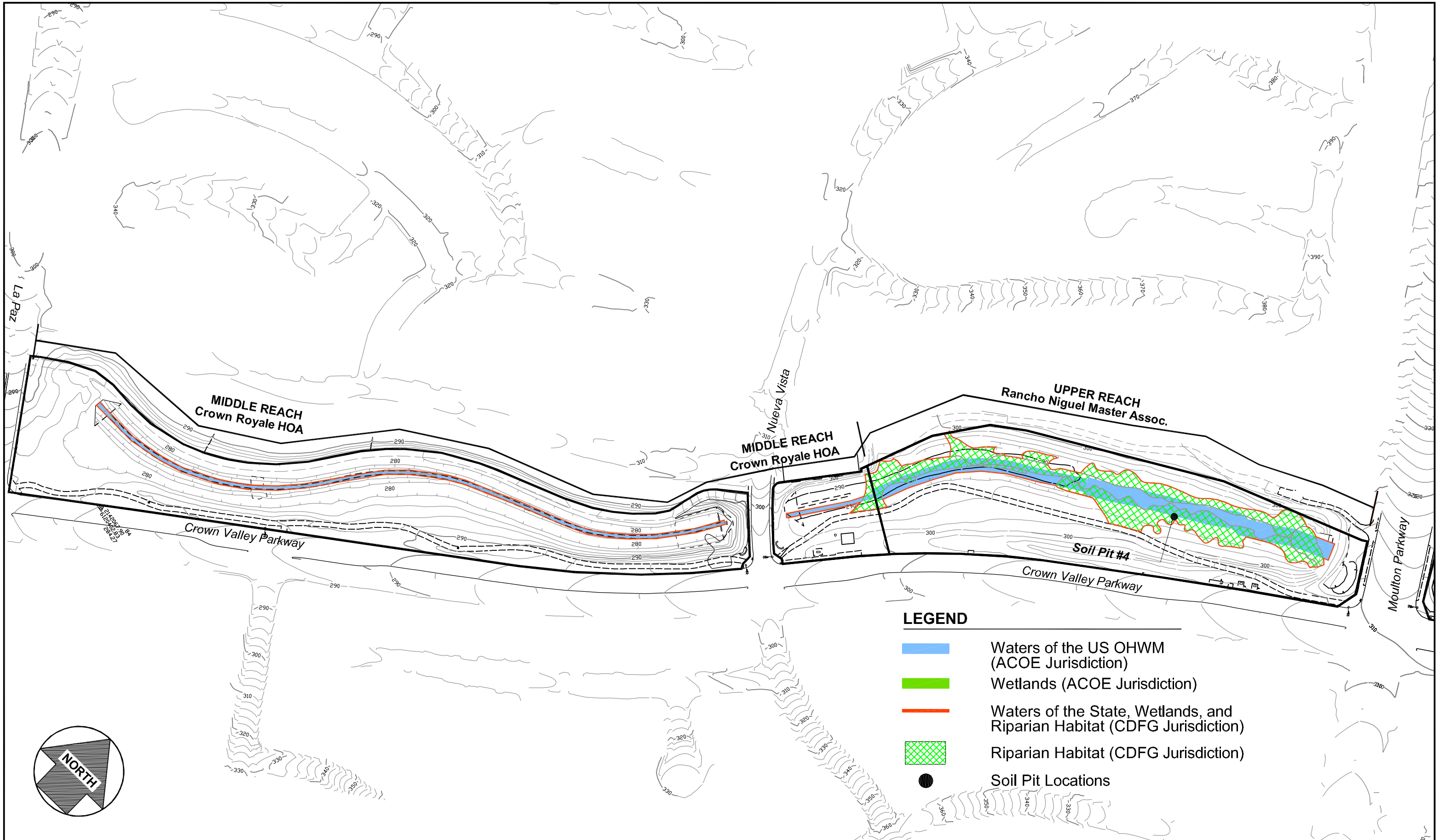
Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115VegMiddle.dwg	**Vegetation Map Existing Conditions**	**Figure 10c**

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115VegMiddle.dwg	**Vegetation Map Existing Conditions**	**Figure 10d**

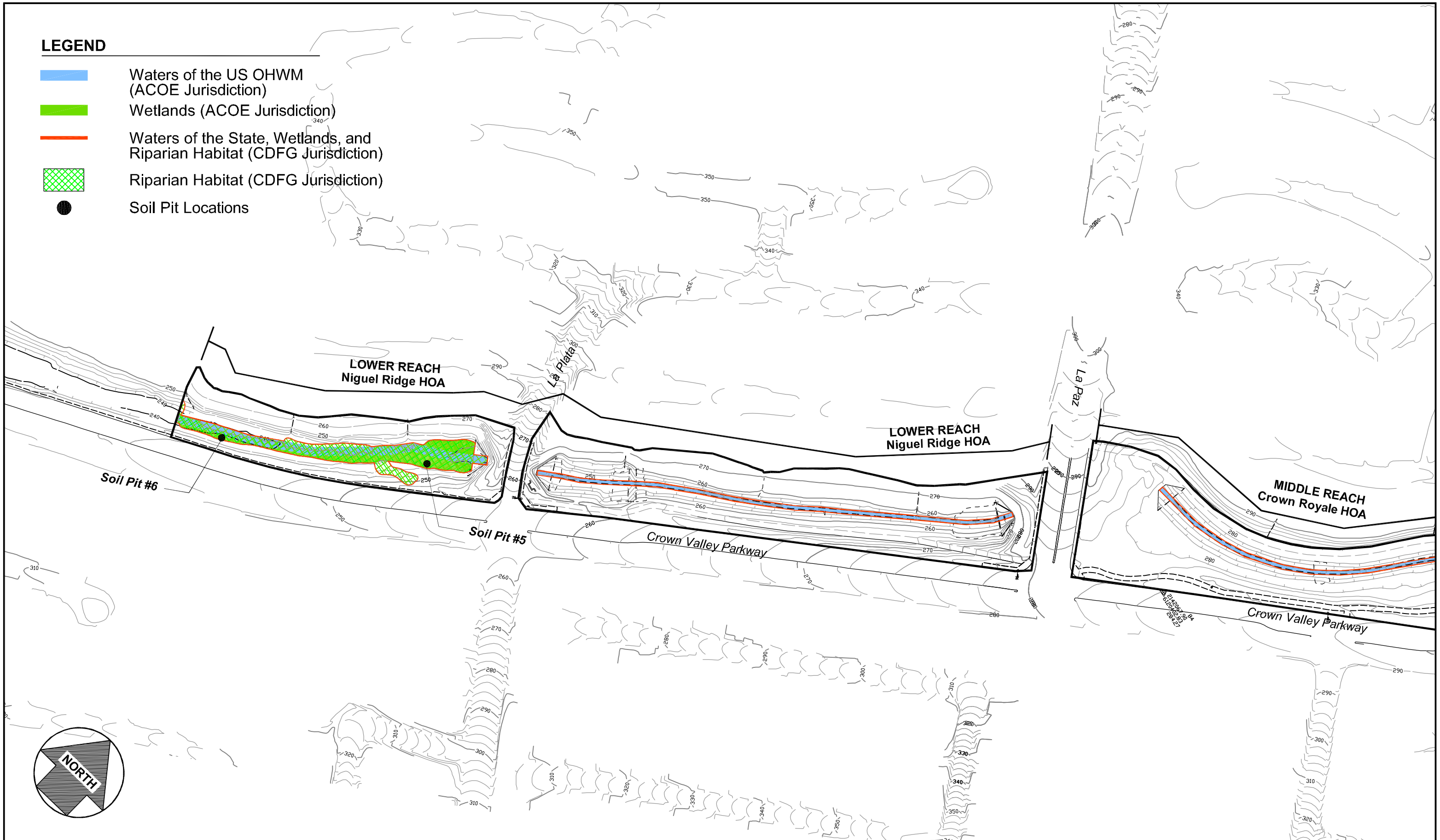
Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115VegLower.dwg	**Vegetation Map Existing Conditions**	**Figure 10e**



Aspen *Environmental Group*	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 200' Date: August 25, 2004 File: 1115-Delineation4.dwg	**Jurisdictional Waters and Wetlands - Existing Conditions**	**Figure 11a**



Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 200' Date: August 15, 2004 File: 1115-Delineation4.dwg	**Jurisdictional Waters and Wetlands - Existing Conditions**	**Figure 11b**



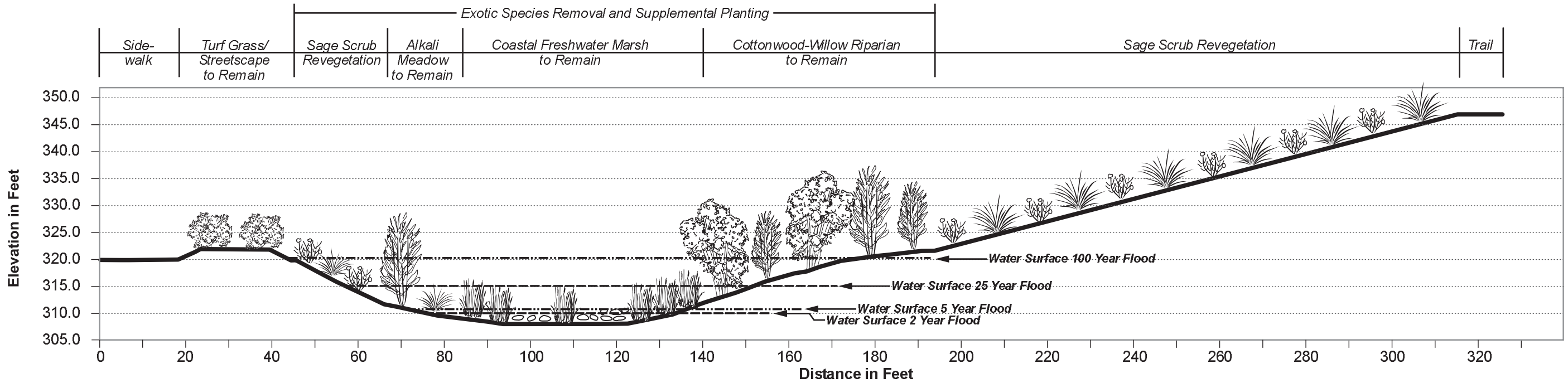
Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 200' Date: August 25, 2004 File: 1115-Delineation4.dwg	**Jurisdictional Waters and Wetlands - Existing Conditions**	**Figure 11c**

Aerial from the City of Laguna Niguel, June 2003.

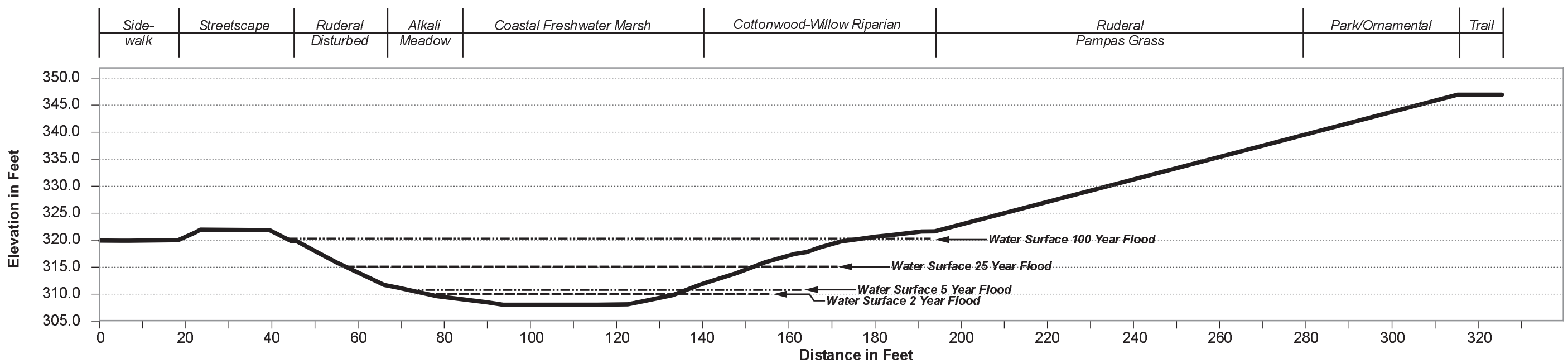
Aspen Environmental Group	Drawing: 1115-xsecmap.cdr	Cross-Section Location Map	Upper Sulphur Creek Restoration Figure 12

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-UpperAlt1.dwg	**Restoration Plan View** **Alternative 1 - Upper Reach**	**Figure 13a**

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-UpperAlt1a.dwg	**Restoration Plan View** **Alternative 1 - Upper Reach**	**Figure 13b**



Proposed Condition



Existing Condition

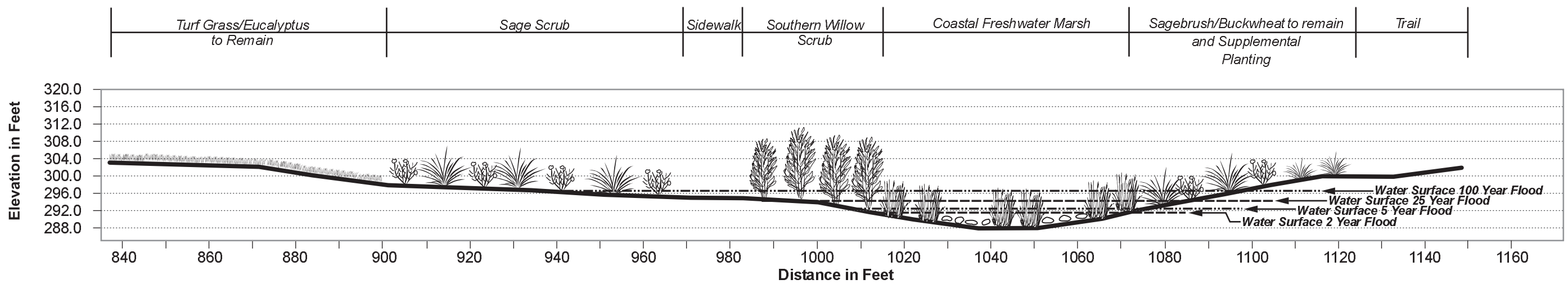
Aspen Environmental Group

Scale - Horizontal: 1"=25'
Vertical: 1"=20'
Drawing: 1115xsec8900alt1.cdr

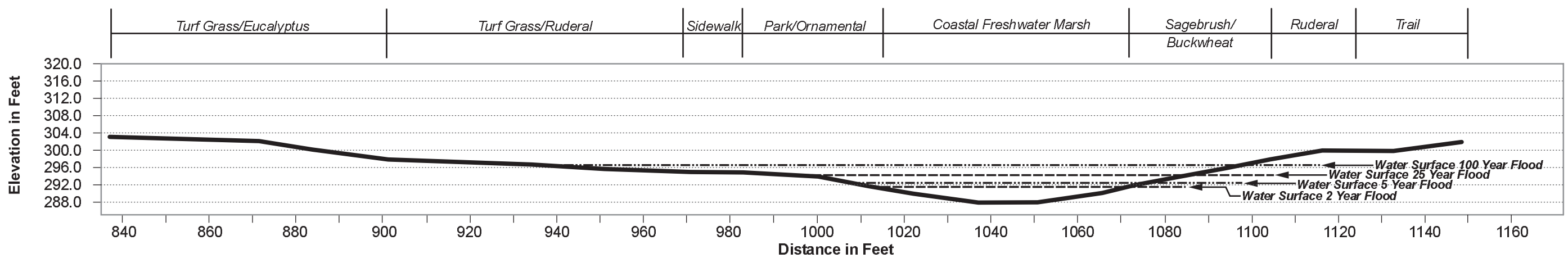
Existing and Proposed Cross-Section A
Alternative 1
Upper Reach - Rancho Niguel Master Association

Upper Sulphur Creek Restoration

Figure 14



Proposed Condition

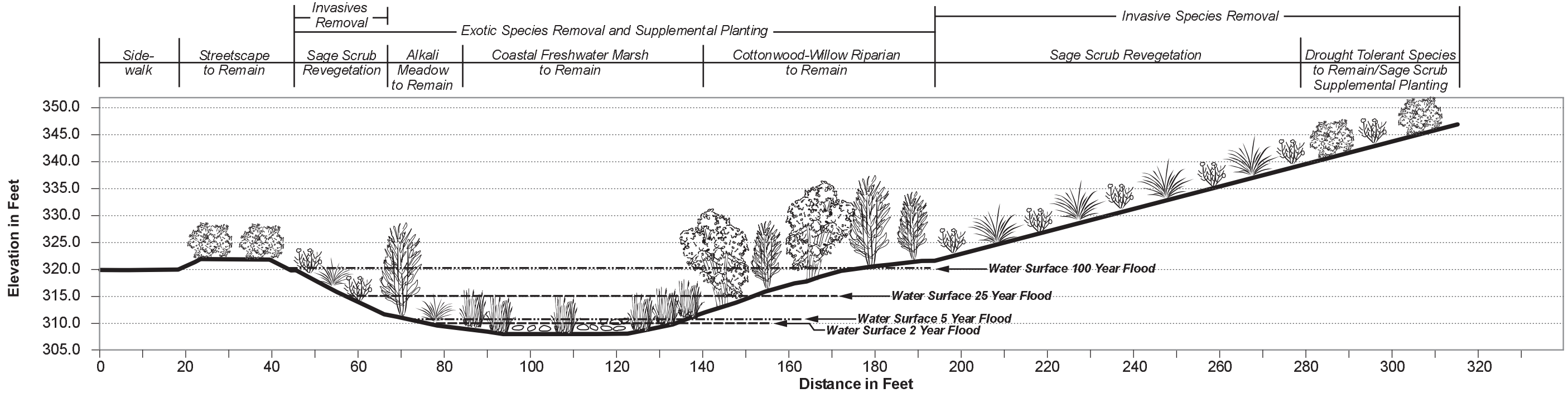


Existing Condition

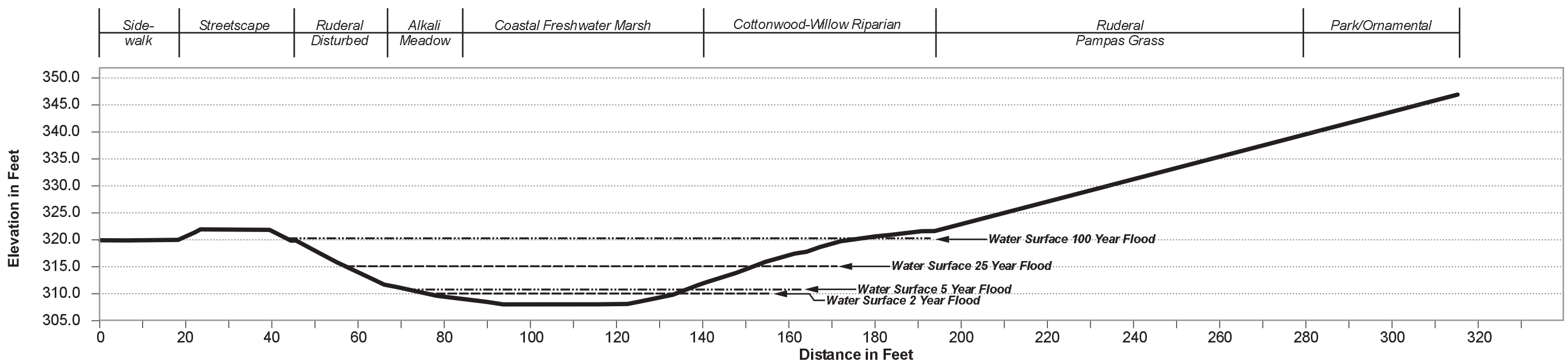
Aspen Environmental Group	Scale - Horizontal: 1"=10' Vertical: 1"=10' Drawing: 1115xsec6800alt1.cdr	**Existing and Proposed Cross-Section B** **Alternative 1** **Upper Reach - Rancho Niguel Master Association**	**Upper Sulphur Creek Restoration** Figure 15

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-UpperAlt2.dwg	**Restoration Plan View Alternative 2 - Upper Reach**	**Figure 16a**

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-UpperAlt2a.dwg	**Restoration Plan View Alternative 2 - Upper Reach**	**Figure 16b**

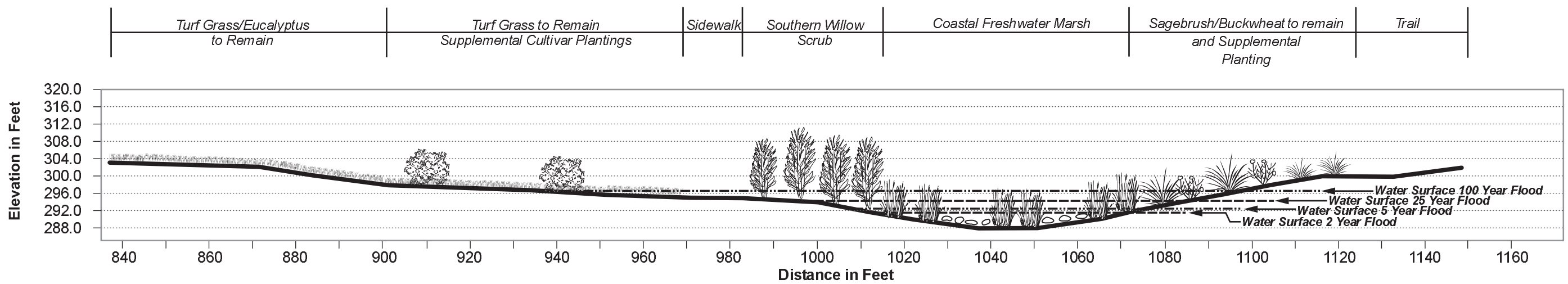


Proposed Condition
(No Grading Proposed)

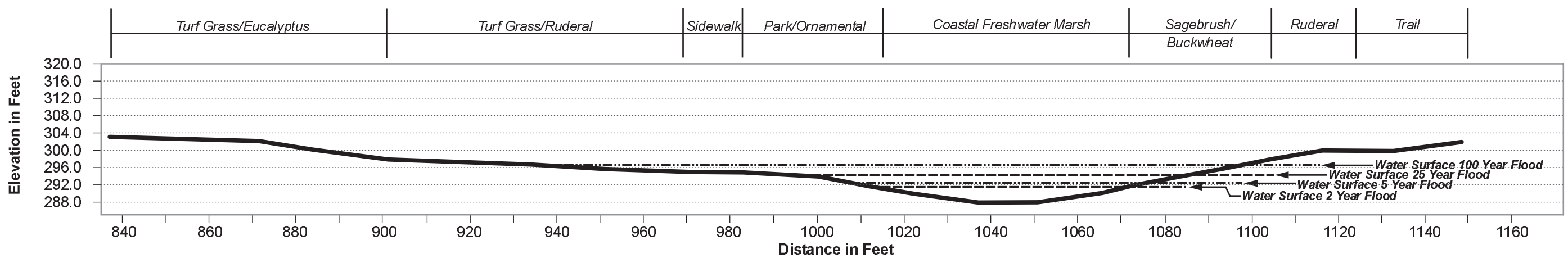


Existing Condition

Aspen Environmental Group	Scale - Horizontal: 1"=25' Vertical: 1"=20' Drawing: 1115xsec8900alt2.cdr	**Existing and Proposed Cross-Section A** **Alternative 2** **Upper Reach - Rancho Niguel Master Association**	**Upper Sulphur Creek Restoration** Figure 17



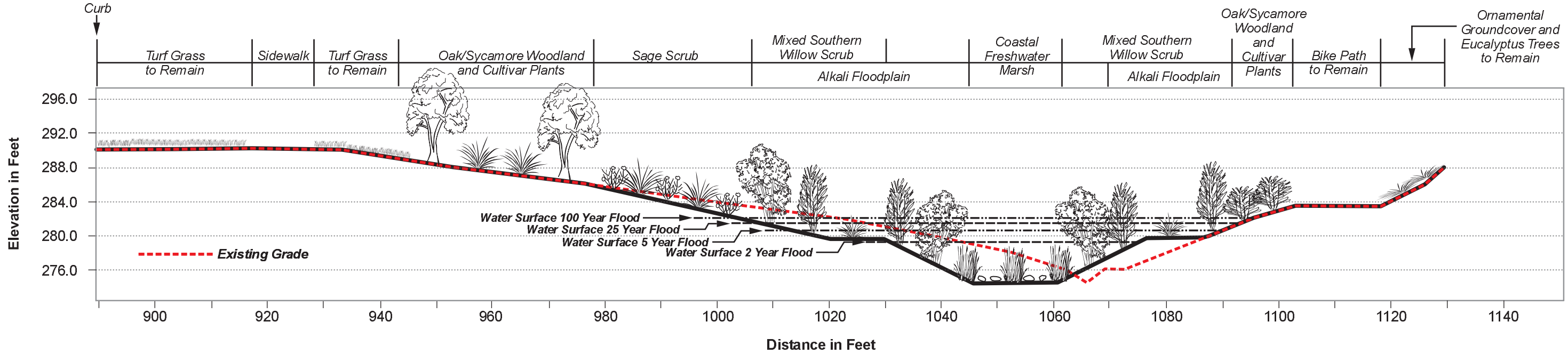
Proposed Condition
(No Grading Proposed)



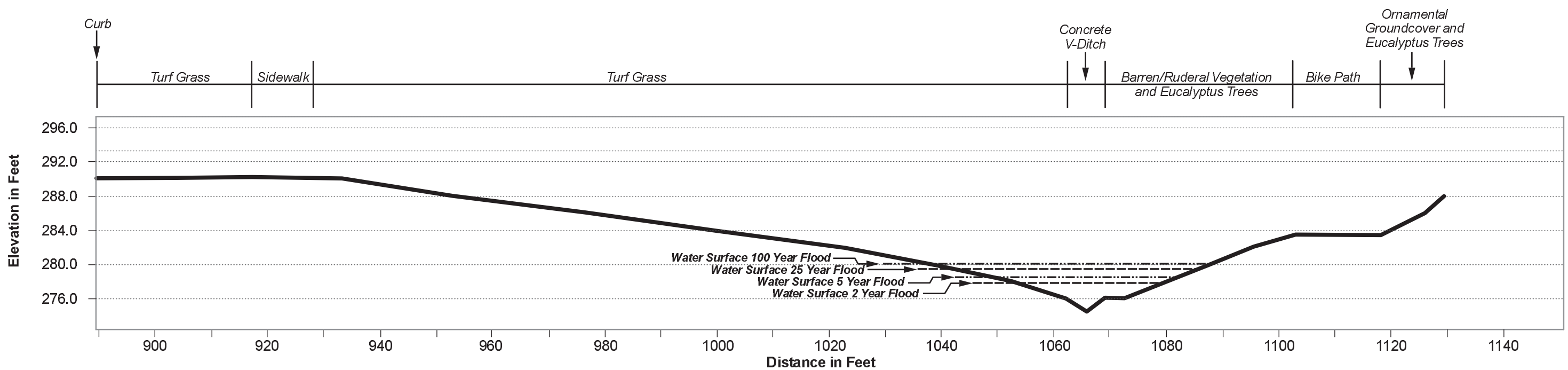
Existing Condition

Aspen Environmental Group	Scale - Horizontal: 1"=10' Vertical: 1"=10' Drawing: 1115xsec6800alt2.cdr	**Existing and Proposed Cross-Section B** **Alternative 2** **Upper Reach - Rancho Niguel Master Association**	**Upper Sulphur Creek Restoration** Figure 18

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 120' Date: August 25, 2004 File: 1115Planting-MidAlt1.dwg	**Restoration Plan View** **Alternative 1 - Middle Reach**	**Figure 19**



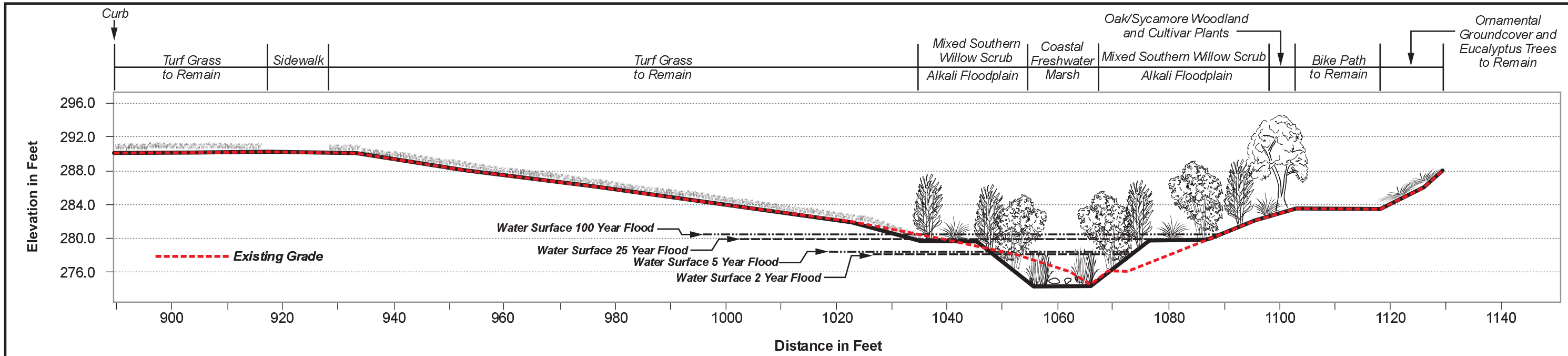
Proposed Condition



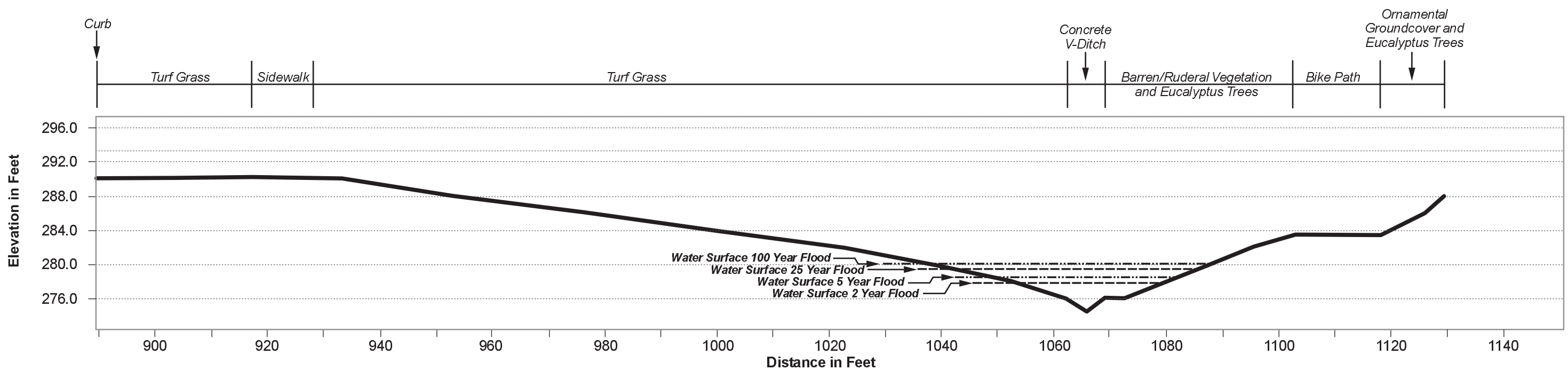
Existing Condition

Aspen Environmental Group	Scale - Horizontal: 1"=18' Vertical: 1"=12' Drawing: 1115xsec5600-1b.cdr	**Existing and Proposed Cross-Section C** **Alternative 1** **Upper Reach - Crown Royale HOA**	**Upper Sulphur Creek Restoration** Figure 20

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 120' Date: August 25, 2004 File: 1115Planting-MidAlt2.dwg	**Restoration Plan View** **Alternative 2 - Middle Reach**	**Figure 21**

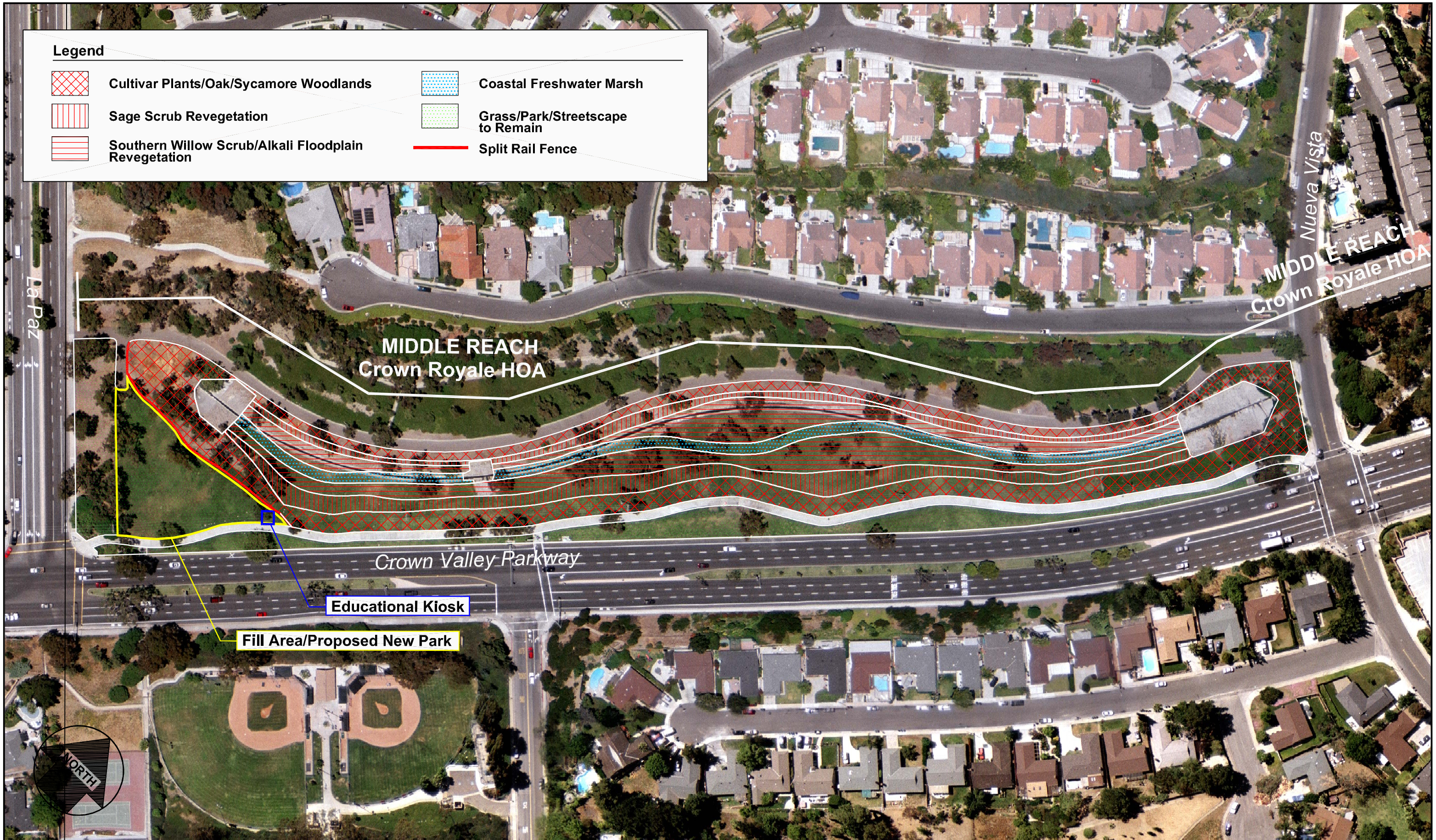


Proposed Condition

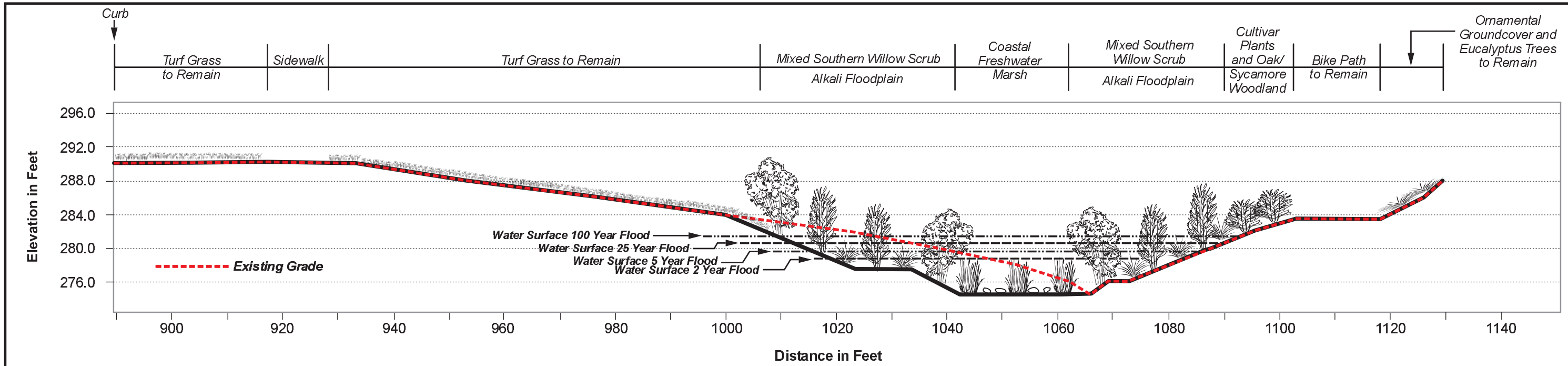


Existing Condition

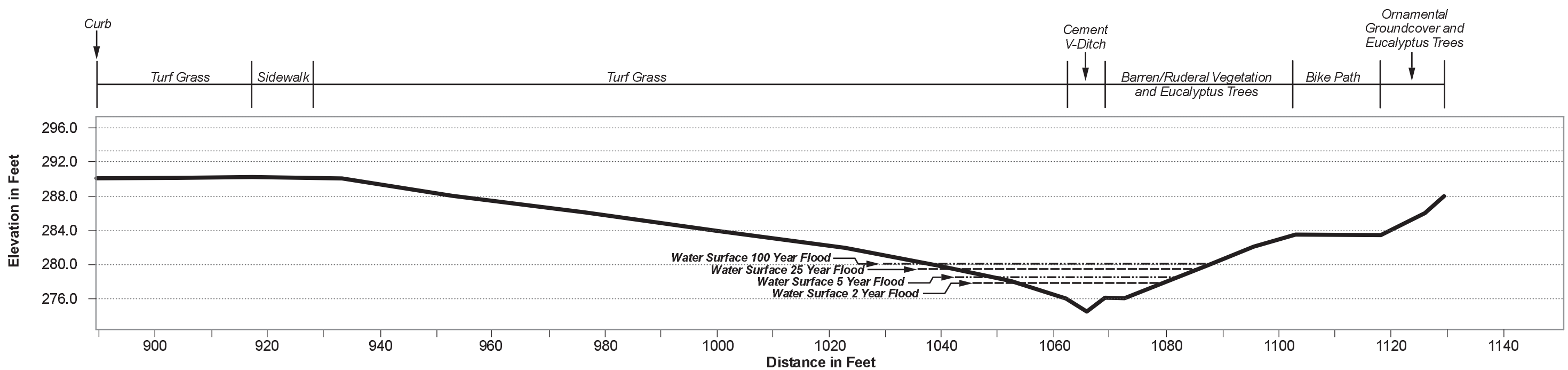
Aspen Environmental Group	Scale - Horizontal: 1"=18' Vertical: 1"=12' Drawing: 1115xsec5600-2.cdr	**Existing and Proposed Cross-Section C** **Alternative 2** **Upper Reach - Crown Royale HOA**	**Upper Sulphur Creek Restoration** Figure 22



Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 120' Date: August 25, 2004 File: 1115Planting-MidAlt3.dwg	**Restoration Plan View** **Alternative 3 - Middle Reach**	**Figure 23**



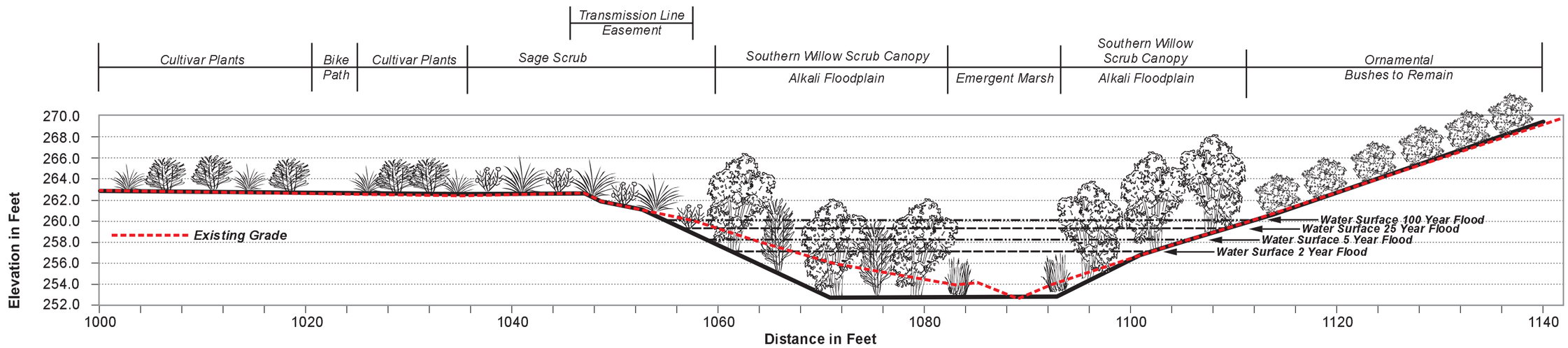
Proposed Condition



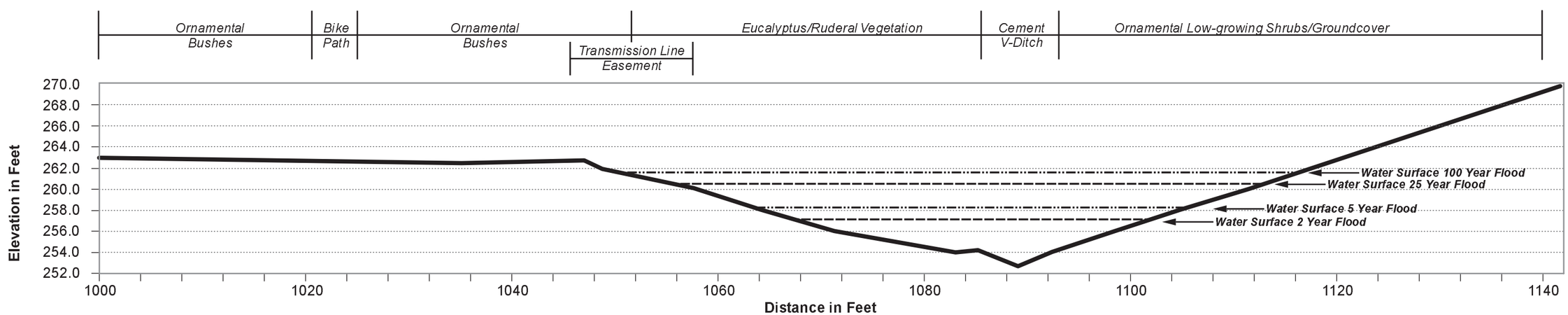
Existing Condition

Aspen Environmental Group	Scale - Horizontal: 1"=18' Vertical: 1"=12' Drawing: 1115xsec5600-3b.cdr	**Existing and Proposed Cross-Section C** **Alternative 3** **Middle Reach - Crown Royale**	**Upper Sulphur Creek Restoration** Figure 24

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-LowerAlt1.dwg	**Restoration Plan View** **Alternative 1 - Lower Reach**	**Figure 25**



Proposed Condition



Existing Condition

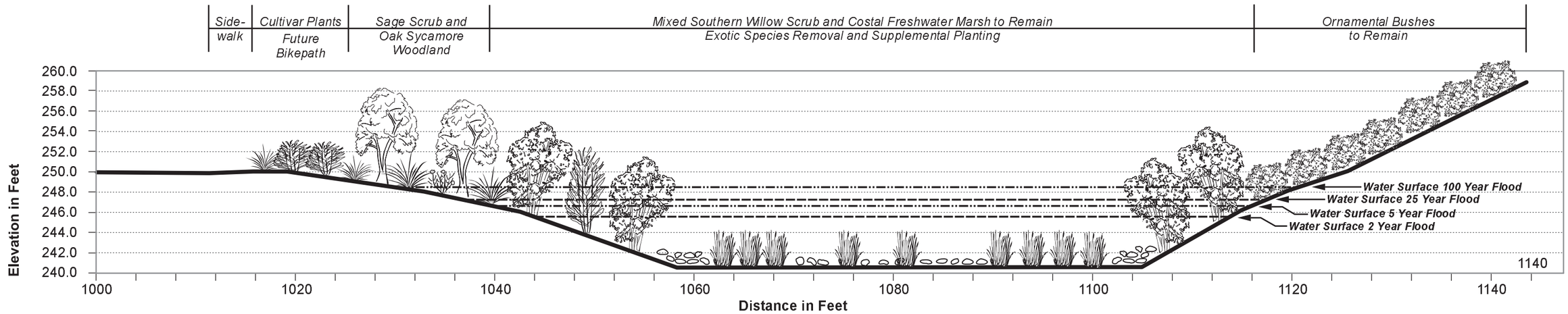
Aspen Environmental Group

Scale - Horizontal: 1"=10'
Vertical: 1"=10'
Drawing: 1115xsec3600a2.cdr

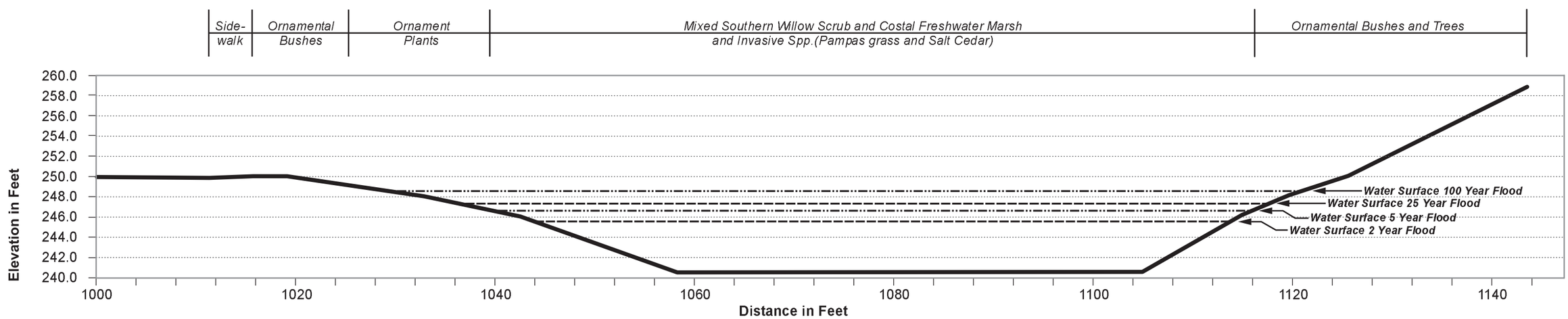
Existing and Proposed Cross-Section D
Alternative 1
Lower Reach - Niguel Ridge HOA

Upper Sulphur Creek Restoration

Figure 26



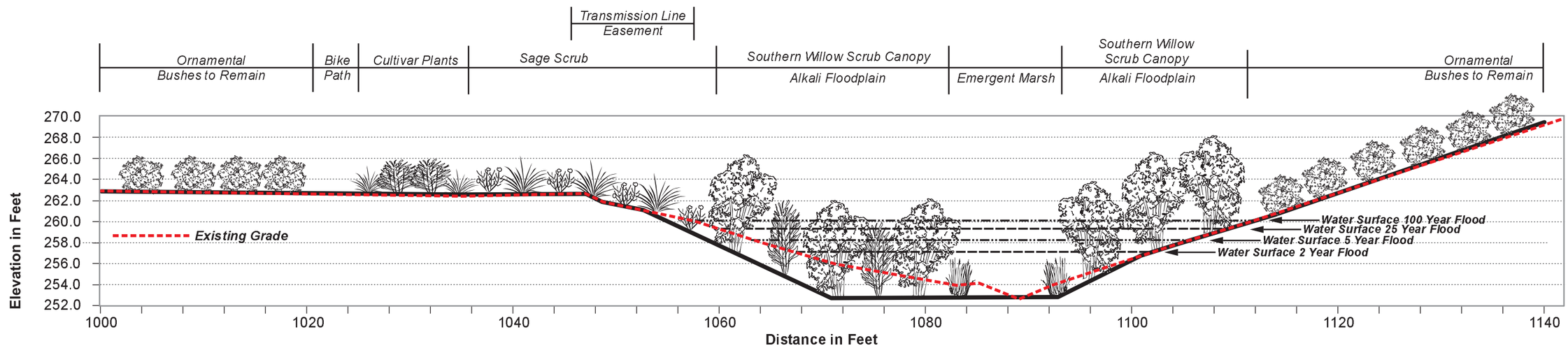
Proposed Condition



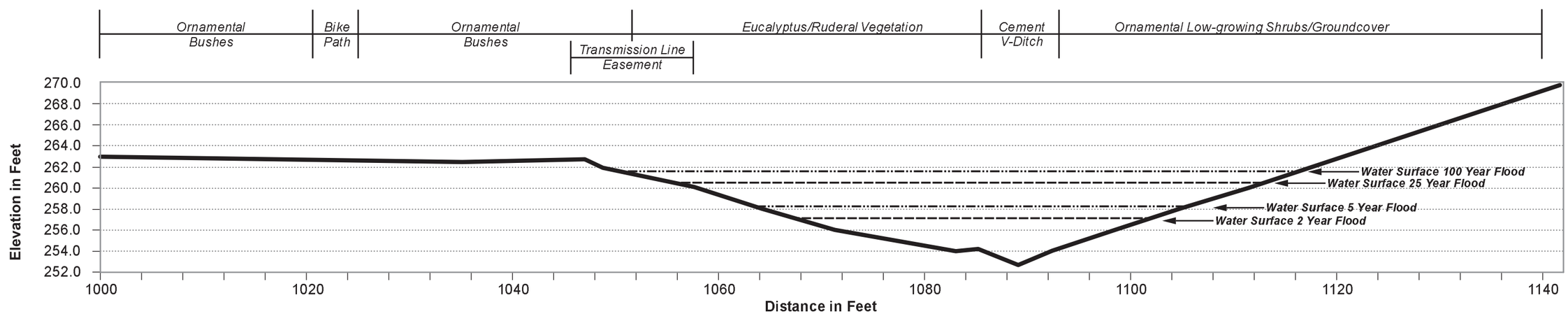
Existing Condition

Aspen Environmental Group	Scale - Horizontal: 1"=10' Vertical: 1"=10' Drawing: 1115xsec2900a.cdr	**Existing and Proposed Cross-Section E** **Alternative 1** **Lower Reach - Niguel Ridge HOA**	**Upper Sulphur Creek Restoration** Figure 27

Aspen Environmental Group	Prepared by: C.Hattori Project Manager: M.Mattson Program Manager: S.MacNeil	City of Laguna Niguel Upper Sulphur Creek	Scale: 1" = 150' Date: August 25, 2004 File: 1115Planting-LowerAlt2.dwg	**Restoration Plan View** **Alternative 2 - Lower Reach**	**Figure 28**



Proposed Condition



Existing Condition

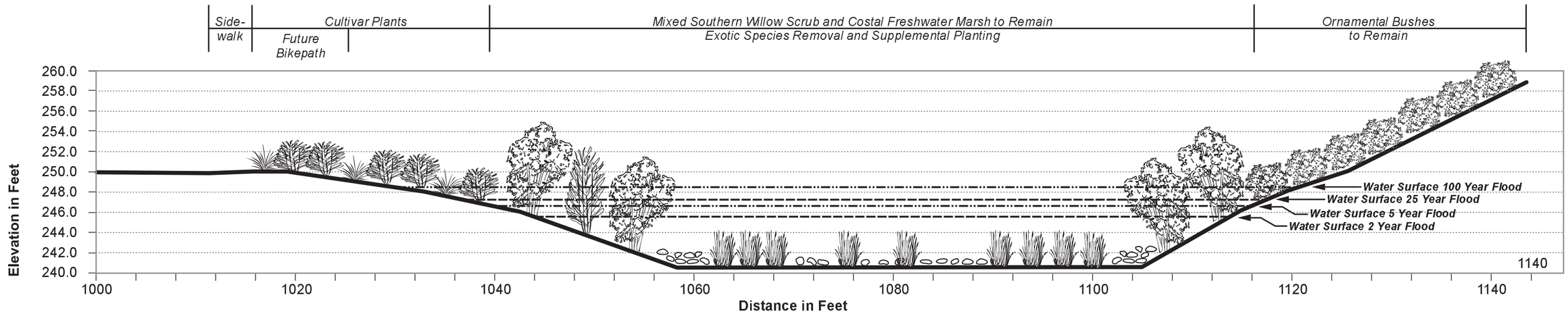
Aspen Environmental Group

Scale - Horizontal: 1"=10'
Vertical: 1"=10'
Drawing: 1115xsec3600b2.cdr

Existing and Proposed Cross-Section D
Alternative 2
Lower Reach - Niguel Ridge HOA

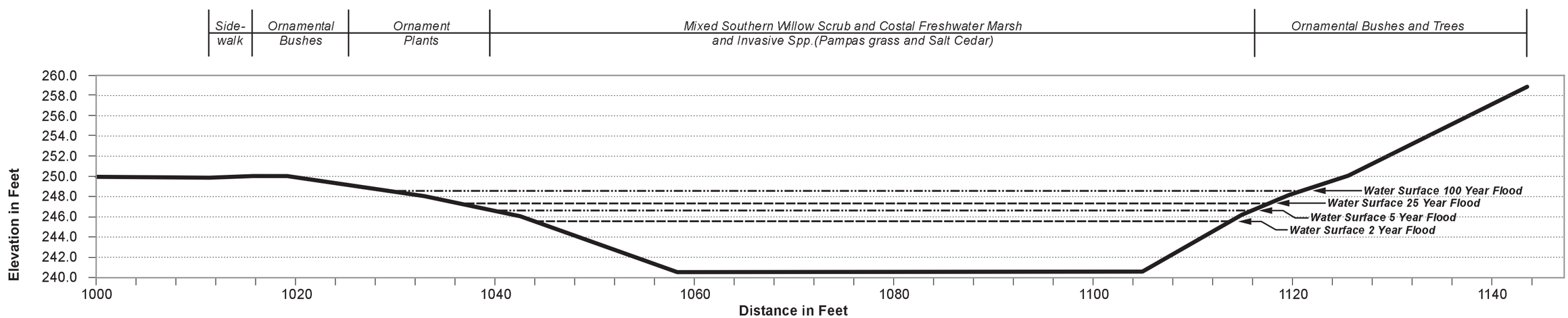
Upper Sulphur Creek Restoration

Figure 29



Proposed Condition

(No Grading Except to Correct Ponding)



Existing Condition

Aspen Environmental Group

Scale - Horizontal: 1"=10'
Vertical: 1"=10'
Drawing: 1115xsec2900b.cdr

Existing and Proposed Cross-Section E
Alternative 2
Lower Reach - Niguel Ridge HOA

Upper Sulphur Creek Restoration

Figure 30

ATTACHMENT E.

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER FOCUSED SURVEY RESULTS

LEAST BELL'S VIREO FOCUSED SURVEY RESULTS

August 12, 2003

Mr. Daniel Marquez
U.S. FISH AND WILDLIFE SERVICE
Carlsbad Field Office
6010 Hidden Valley Road
Carlsbad, California 92009

Re: Results of Focused Least Bell's Vireo Surveys for the Upper Sulphur Creek Project Site, Orange County, California

Dear Mr. Marquez:

This letter report summarizes the methodology and findings of surveys for the least Bell's vireo (*Vireo bellii pusillus*) (LBV) conducted by **PCR Services Corporation (PCR)** on the Upper Sulphur Creek property in Orange County, California. The surveys were conducted to determine the presence and location or absence of LBV within the Upper Sulphur Creek project site. No LBV's were observed or otherwise detected on-site during any of the survey efforts.

STUDY AREA

The Upper Sulphur Creek project site is located in southern Orange County within the City of Laguna Niguel as shown in Figure 1, *Regional Map*, attached. The project site extends from Moulton Parkway west along Crown Valley Parkway, to approximately 0.5 mile south of La Paz Street. The Upper Sulphur Creek project site is contained within an unsectioned portion of the United States Geological Survey 7.5' San Juan Capistrano Quadrangle, T. 7 S. and R. 8 W., as shown in Figure 2, *Vicinity Map*, attached.

Elevations range from 320 feet above mean sea level (MSL) in the eastern portion of the property to approximately 240 feet above MSL in the western portion of the property.

VEGETATION

Descriptions of each of the plant communities found on the Upper Sulphur Creek property are given below and are based on the Orange County Habitat Classification System (OCHCS)[1] and PCR findings. The communities are named for the dominant species found within them. The OCHCS Classification Number is included for ease of review. Figure 3, *Plant Communities*, attached depicts their location.

[1] *Gray, J. and D. Bramlet. 1992. Habitat Classification System: Natural Resources Geographic Information System (GIS) Project. Environmental Management Agency. County of Orange, Santa Ana, California.*

One Venture, Suite 150, Irvine, California 92618-3328 INTERNET www.pcrnet.com TEL 949.753.7001 FAX 949.753.7002

Riparian Communities

Riparian communities support species that occur along watercourses or water bodies and that are adapted to seasonal flooding. Structurally, riparian areas may range from a dense canopy of large trees with a bramble/thicket understory within a steep canyon, to open, lower-growing species within a sandy wash.

Herbaceous Riparian (OCHCS 7.1) vegetation is an early successional stage of riparian scrub and forest. Flooding (or other disturbance factors) often scours woody riparian vegetation away after which the site is rapidly colonized by pioneer wetland herbaceous plants. Species characteristic of this community occurring along upper Sulphur Creek include cattail (*Typha latifolia*), sedges (*Cyperus* sp.), bulrush (*Scripus* sp.), mugwort (*Artemisia douglasiana*), sweet clover (*Melilotus indica*), dallies grass (*Paspalum dilatatum*), rabbitsfoot grass (*Polypogon monspeliensis*), smilo grass (*Piptatherum* [*Orizopsis*] *miliaceum*), Mexican sprangeltop (*Leptochloa uninervia*), cocklebur (*Xanthium strumarium*) and a few scattered willows (*Salix* sp.). Approximately 0.93 acre of herbaceous riparian habitat occurs within the upper Sulphur creek study area.

Southern Willow Scrub (OCHCS 7.2) in upper Sulphur Creek contains scattered willow species consisting of red willow (*Salix laevigata*) and arroyo willow (*S. lasiolepis*), and lesser amounts of black willow (*S. goodingii*), and an open understory of mule fat (*Baccharis salicifolia*), coyote brush (*Baccharis pilularis*), and cattail occurring often in the active channel. Approximately 1.01 acres of southern willow scrub occurs within the study area.

Watercourses

Flood control channels, streams, rivers, etc.

Flood Control Channel (OCHCS 13.4) is a concrete lined channel. This channel runs throughout the site and constitutes 1.31 acres of the survey area.

Developed and Disturbed

Developed areas include urban areas, roads, parks, and clear and graded sites whereas disturbed areas are either barren or recently altered.

Ornamental landscaping (OCHCS 15.5) consists of introduced trees, shrubs, flowers, and turf grass associated with development. In addition, the mapped areas on-site include groups of ornamental species that have invaded from adjacent landscaped hillsides. Some of these species include gum tree (*Eucalyptus* sp.), pampas grass (*Cortaderia sellona*), salt grass (*Distichlis spicata*), Mexican fan palm (*Washingtonia robusta*), white alder (*Alnus rhombifolia*), cottonwood (*Populus* sp.) western sycamore (*Platanus racemosa*), salt cedar (*Tamarix* sp.), and pine (*Pinus* sp.). These areas occur throughout the Upper Sulphur Creek study area totaling approximately 35.05 acres.

Developed (OCHCS 15.1) areas within the Upper Sulphur Creek study area are roads, right of ways, trails, and rip rap totaling approximately 2.44 acres.

METHODOLOGY

Surveys for the LBV were conducted by PCR biologists Jason Berkley. Methods employed were in conformance with U.S. Fish and Wildlife Service *Least Bell's Vireo Survey Guidelines* issued January 19, 2001. Accordingly, eight (8) surveys were performed between April 10 and July 31, 2000. Surveys were conducted no less than ten (10) days apart, between dawn and 11:00 A.M., within all portions of the study area containing suitable riparian habitat and adjacent habitat potentially used for foraging. Weather conditions were suitable for surveys, with skies ranging from clear to 100 percent overcast and winds below Beaufort scale 2. Surveys were suspended whenever conditions became less than favorable. Temperatures during surveys ranged between 42 and 86 degrees Fahrenheit.

Approximately 1.94 acres of potentially suitable habitat is present on-site and was covered in its entirety during each survey. This includes willow scrub (1.01acres) and herbaceous riparian (0.93 acre). The field investigators slowly walked along or within the riparian habitat, stopping at approximately 150- to 200-foot intervals, looking and listening for LBV. Surveys were conducted on April 10, 26, May 5, 20, June 4, 18, 25, and July 9, 2003. Survey details are listed in Table 1, below.

Table 1

Survey Data

Date	Time	Wind (Beaufort)/ Temperature (F)	Weather	Results	Surveyors
4/10/03	0615-0720	0-0 / 42°-46°	overcast-clear	No LBV observed	Berkley
4/26/03	0740-0900	0-0 / 54°-58°	clear-clear	No LBV observed	Berkley
5/05/03	0700-0900	0-0 / 62°-64°	clear-clear	No LBV observed	Berkley
5/20/03	0630-0745	0-0 / 62°-68°	clear-clear	No LBV observed	Berkley
6/04/03	0630-0830	0-0 / 62°-66°	overcast-overcast	No LBV observed	Berkley
6/18/02	0830-0945	0-1 / 64°-68°	overcast-overcast	No LBV observed	Berkley
6/25/02	0800-1000	0-1 / 68°-78°	overcast-clear	No LBV observed	Berkley
7/09/02	0530-0930	0-1 / 66°-76°	overcast-overcast	No LBV observed	Berkley

Source: PCR Services Corporation, 2003

RESULTS

No LBV's were observed or otherwise detected during any of the focused survey efforts. Bird activity was relatively high during surveys and a list of all bird species observed in included in the Avian Compendium, attached.

Sensitive species[2] observed include Cooper's hawk (*Accipiter cooperii*) [California Special Concern Species (CSC)-nesting].

During all site visits, at least one pair of brown-headed cowbird (*Molothrus ater*) was observed.

Should you have any questions regarding the methodology or findings in this report, please do not hesitate to contact Jason Berkley at (949) 753-7001 or by e-mail at j.berkley@pcrnet.com.

Sincerely,
PCR SERVICES CORPORATION

Jason Berkley
Wildlife Biologist

attachments

[2] *California Department of Fish and Game. July 2003. Special Animals. State of California. The Resources Agency. Department of Fish and Game. Wildlife and Habitat Data Analysis Branch. California Natural Diversity Data Base.*

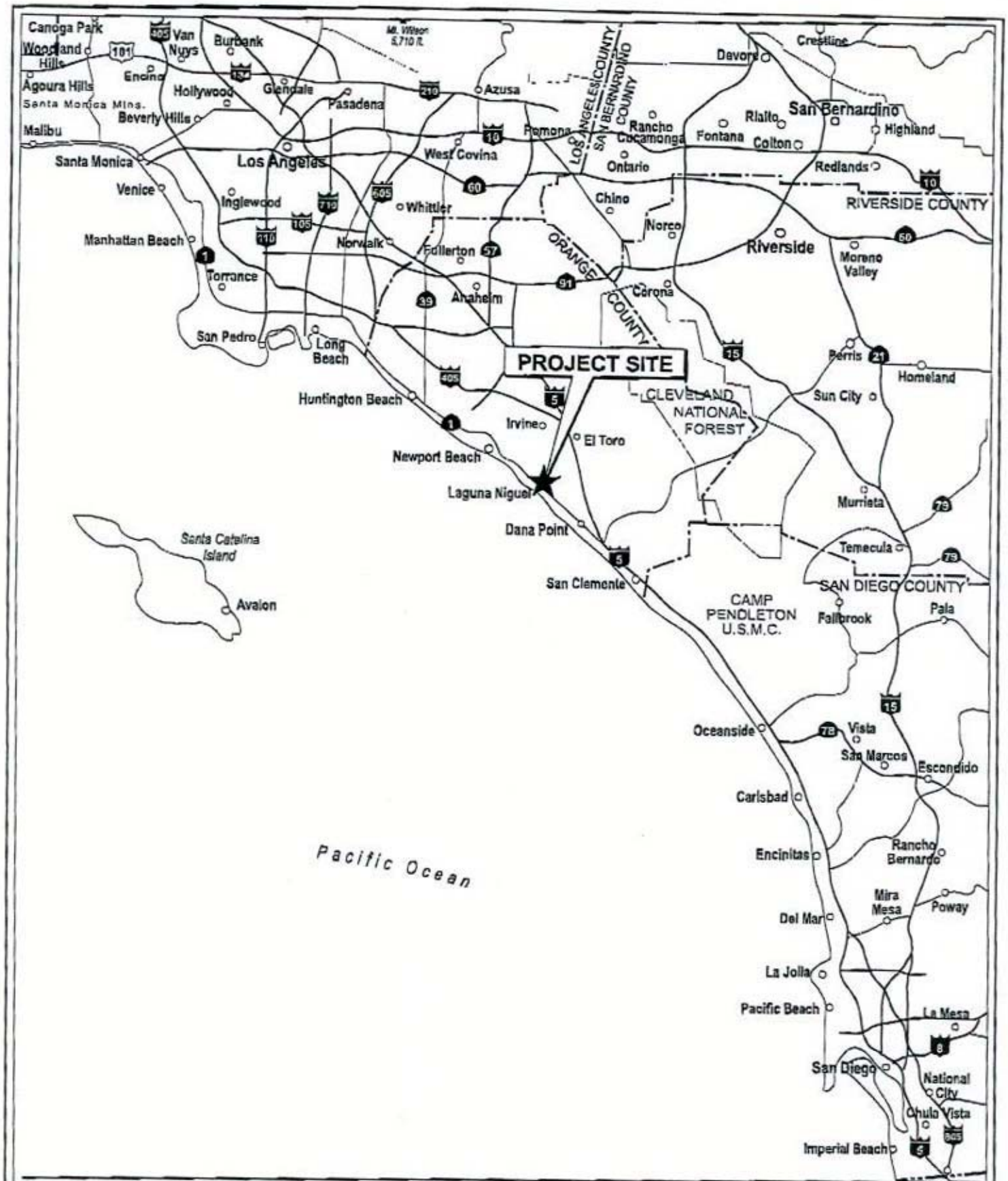
ATTACHMENT A: LBV COMPENDIUM

BIRDS

SCIENTIFIC NAME	COMMON NAME
Anatidae	**Waterfowl**
Anas platyrhynchos	mallard
Accipitridae	**Hawks**
Accipiter cooperii	Cooper's hawk
Buteo lineatus	red-shouldered hawk
Falconidae	**Falcons**
Falco sparverius	American kestrel
Columbidae	**Pigeons and Doves**
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Selaspharus rufus	rufous hummingbird
Selasphorus sasin	Allen's hummingbird
Picidae	**Woodpeckers**
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
Tyrannidae	**Tyrant Flycatchers**
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
Tyrannus verticalis	western kingbird
Corvidae	**Jays and Crows**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
Hirundinidae	**Swallows**
Stelgidopteryx serripennis	northern rough-winged swallow
Aegithalidae	**Bushtits**
Psaltriparus minimus	bushtit
Regulidae	**Kinglets**
Regulus calendula	ruby-crowned kinglet
Mimidae	**Thrashers**
Mimus polyglottos	northern mockingbird

BIRDS

SCIENTIFIC NAME	COMMON NAME
Sturnidae	**Starlings**
* *Sturnus vulgaris*	European starling
Parulidae	**Wood Warblers**
Wilsonia pusilla	Wilson's warbler
Geothlypis trichas	common yellowthroat
Emberizidae	**Emberizids**
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
Melospiza melodia	song sparrow
Icteridae	**Blackbirds**
Molothrus ater	brown-headed cowbird
Fringillidae	**Finches**
Carpodacus mexicanus	house finch
Carduelis tristis	American goldfinch
Carduelis psaltria	lesser goldfinch
Passeridae	**Old World Sparrows**
* *Passer domesticus*	house sparrow



Source: PCR Services Corporation, 2003

Figure 1
Upper Sulphur Creek
Regional Map

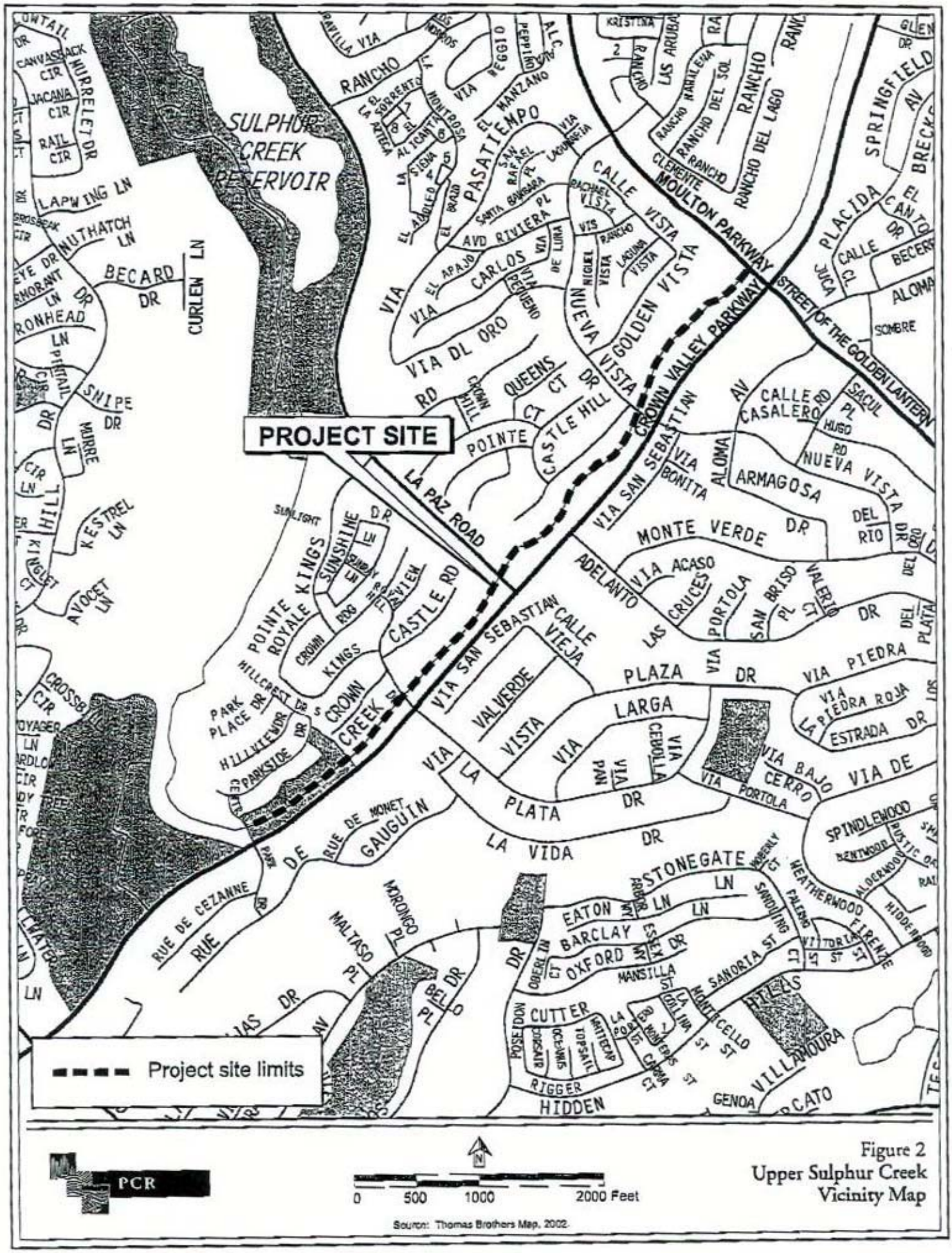


Figure 2
Upper Sulphur Creek
Vicinity Map

Jun-22-04 03:00pm From-PUBLIC WORKS +848 362 4385 T-736 P.013/013 F-578

PCR

N

600 0 600 Feet

Source: Eagle Aerial, 2001; PCR Services Corporation, 2003.

Figure 3
Upper Sulphur Creek Plant Communities

SOUTHWESTERN WILLOW FLYCATCHER FOCUSED SURVEY RESULTS

August 12, 2003

Mr. Daniel Marquez
U.S. FISH AND WILDLIFE SERVICE
Carlsbad Field Office
6010 Hidden Valley Road
Carlsbad, California 92009

Re: Results of Focused Southwestern Willow Flycatcher Surveys for the Upper Sulphur Creek Project Site, Orange County, California

Dear Mr. Marquez:

This letter report summarizes the methodology and findings of surveys for the southwestern willow flycatcher (*Empidonax traillii extimus*) (SWWF) conducted by **PCR Services Corporation (PCR)** on the Upper Sulphur Creek property in Orange County, California. The surveys were conducted to determine the presence and location or absence of SWWF within the Upper Sulphur Creek project site. No SWWF's were observed on-site during any of the survey efforts.

STUDY AREA

The Upper Sulphur Creek project site is located in southern Orange County within the City of Laguna Niguel as shown in Figure 1, *Regional Map*, attached. The project site extends from Moulton Parkway west along Crown Valley Parkway, to approximately 0.5 mile south of La Paz Street. The Upper Sulphur Creek project site is contained within an unsectioned portion of the United States Geological Survey 7.5' San Juan Capistrano Quadrangle, T. 7 S. and R. 8 W., as shown in Figure 2, *Vicinity Map*, attached.

Elevations range from 320 feet above mean sea level (MSL) in the eastern portion of the property to approximately 240 feet above MSL in the western portion of the property.

VEGETATION

Descriptions of each of the plant communities found on the Upper Sulphur Creek property are given below and are based on the Orange County Habitat Classification System (OCHCS)[1] and PCR findings. The communities are named for the dominant species found within them. The OCHCS Classification Number is included for ease of review. Figure 3, *Plant Communities*, attached, depicts their location.

Riparian Communities

Riparian communities support species that occur along watercourses or water bodies and that are adapted to seasonal flooding. Structurally, riparian areas may range from a dense canopy of large trees

[1] *Gray, J. and D. Bramlet. 1992. Habitat Classification System: Natural Resources Geographic Information System (GIS) Project. Environmental Management Agency, County of Orange, Santa Ana, California.*

Irvine, California 92618-3328 INTERNET www.pcrnet.com TEL 949.753.7001 FAX 949.753.7002

Jun-22-04 02:58pm From-PUBLIC WORKS +949 362 4385 T-736 P.007/013 F-579

with a bramble/thicket understory within a steep canyon, to open, lower-growing species within a sandy wash.

Herbaceous Riparian (OCHCS 7.1) vegetation is an early successional stage of riparian scrub and forest. Flooding (or other disturbance factors) often scours woody riparian vegetation away after which the site is rapidly colonized by pioneer wetland herbaceous plants. Species characteristic of this community occurring along upper Sulphur Creek include cattail (*Typha latifolia*), sedges (*Cyperus* sp.), bulrush (*Scripus* sp.), mugwort (*Artemisia douglasiana*), sweet clover (*Melilotus indica*), dallies grass (*Paspalum dilatatum*), rabbitsfoot grass (*Polypogon monspeliensis*), smilo grass (*Piptatherum* [*Orizopsis*] *miliaceum*), Mexican sprangeltop (*Leptochloa uninervia*), cocklebur (*Xanthium strumarium*) and a few scattered willows (*Salix* sp.). Approximately 0.93 acre of herbaceous riparian habitat occurs within the Upper Sulphur Creek study area.

Southern Willow Scrub (OCHCS 7.2) in upper Sulphur Creek contains scattered willow species consisting of red willow (*Salix laevigata*) and arroyo willow (*S. lasiolepis*), and lesser amounts of black willow (*S. goodingii*), and an open understory of mule fat (*Baccharis salicifolia*), coyote brush (*Baccharis pilularis*), and cattail occurring often in the active channel. Approximately 1.01acres of southern willow scrub occurs within the study.

Watercourses

Flood control channels, streams, rivers, etc.

Flood Control Channel (OCHCS 13.4) is a concrete lined channel. This channel runs throughout the site and constitutes 1.31 acres of the survey area.

Developed and Disturbed

Developed areas include urban areas, roads, parks, and clear and graded sites whereas disturbed areas are either barren or recently altered.

Ornamental landscaping (OCHCS 15.5) consists of introduced trees, shrubs, flowers, and turf grass associated with development. In addition, the mapped areas on-site include groups of ornamental species that have invaded from adjacent landscaped hillsides. Some of these species include gum tree (*Eucalyptus* sp.), pampas grass (*Cortaderia sellona*), salt grass (*Distichlis spicata*), Mexican fan palm (*Washingtonia robusta*), white alder (*Alnus rhombifolia*), cottonwood (*Populus* sp.) western sycamore (*Platanus racemosa*), salt cedar (*Tamarisk* sp.), and pine (*Pinus* sp.). These areas occur throughout the Upper Sulphur Creek study area totaling approximately 35.05 acres.

Developed (OCHCS 15.1) areas within the Upper Sulphur Creek study area are roads, right of ways, trails, and rip rap totaling approximately 2.44 acres.

METHODOLOGY

Surveys for the SWWF were conducted by PCR biologist Jason Berkley (Permit No. TE009015-1). Methods employed were in conformance with U.S. Fish and Wildlife Service *Southwestern Willow Flycatcher Presence/Absence Survey Guidelines*, issued July 11, 2000. Accordingly, five surveys within all portions of the study area containing suitable riparian habitat and adjacent habitat potentially used for foraging were conducted within three survey periods. All surveys were conducted at least five days apart and began at dawn and ended between 9:00 and 10:00 A.M., within all portions of the study area containing suitable habitat. Temperatures during surveys ranged between 62 and 86 degrees Fahrenheit. Weather conditions were suitable for surveys, with skies ranging from clear to 100 percent overcast, and winds below Beaufort scale 2.

One permitted field investigator slowly walked over the site, stopping at appropriate intervals, uttered pishing sounds, and played a tape of recorded SWWF vocalizations. The tape was played for several seconds at each interval, followed by a brief pause to listen for a response. Surveys were conducted on May 20, June 4, 25, and July 2, and 9, 2003.

Approximately 1.94 acres of potentially suitable habitat is present on-site and was covered in its entirety during each survey. This includes willow scrub (1.01 acres) and herbaceous riparian (0.93 acre). Survey details are listed in Table 1, below.

Table 1

SURVEY DATA

Date	Time	Wind (Beaufort)/ Temperature (F)	Weather	Results	Surveyors
5/20/03	0630-0745	0-0 / 62°-68°	overcast-clear	No SWWF Found	Berkley
6/04/03	0630-0830	0-1 / 62°-66°	overcast-clear	No SWWF Found	Berkley
6/25/03	0600-0900	0-1 / 64°-78°	overcast-overcast	No SWWF Found	Berkley
7/02/03	0530-1000	0-1/ 68°-86°	clear-clear	No SWWF Found	Berkley
7/09/03	0530-0930	0-1 / 66°-76°	overcast-overcast	No SWWF Found	Berkley

Source: PCR Services Corporation, 2003

RESULTS

No SWWF's were observed during the survey efforts. Bird activity was relatively high during surveys and a list of all bird species observed in included in the Avian Compendium, attached.

During all site visits, at least one pair of brown-headed cowbird (*Molothrus ater*) was observed.

Should you have any questions regarding the methodology or findings in this report, please do not hesitate to contact Jason Berkley at (949) 753-7001 or by e-mail at j.berkley@pcrnet.com.

Sincerely,
PCR SERVICES CORPORATION

Jason Berkley
Wildlife Biologist

attachments

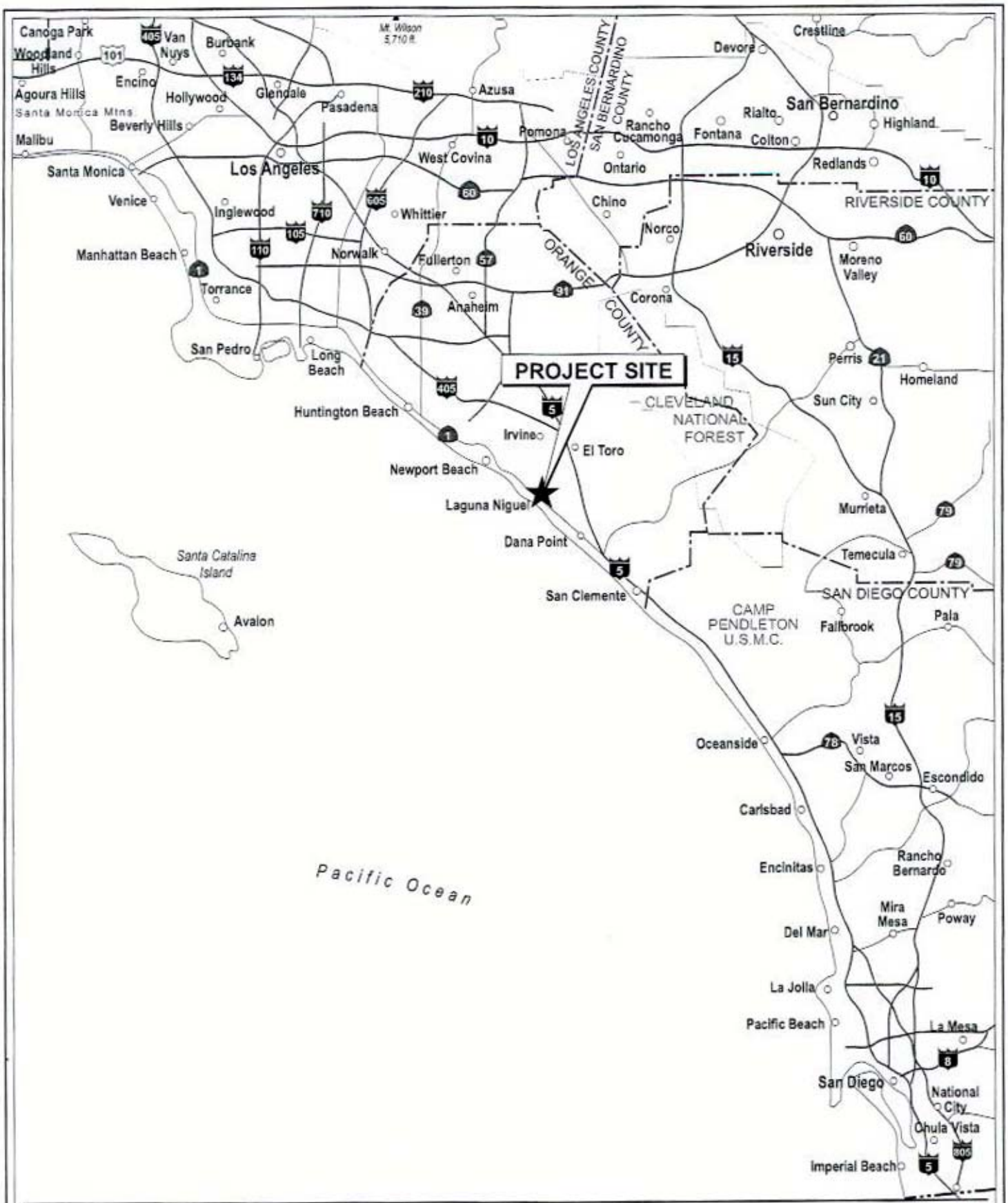
ATTACHMENT A: SWWF COMPENDIUM

BIRDS

SCIENTIFIC NAME	COMMON NAME
Anatidae	**Waterfowl**
Anas platyrhynchos	mallard
Accipitridae	**Hawks**
Buteo lineanus	red-shouldered hawk
Columbidae	**Pigeons and Doves**
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Picidae	**Woodpeckers**
Picoides nuttallii	Nuttall's woodpecker
Tyrannidae	**Tyrant Flycatchers**
Sayornis nigricans	black phoebe
Tyrannus verticalis	western kingbird
Corvidae	**Jays and Crows**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Aegithalidae	**Bushtits**
Psaltriparus minimus	bushtit
Troglodytidae	**Wrens**
Thryomanes bewickii	Bewick's wren
Mimidae	**Thrashers**
Mimus polyglottos	northern mockingbird
Sturnidae	**Starlings**
* *Sturnus vulgaris*	European starling
Parulidae	**Wood Warblers**
Geothlypis trichas	common yellowthroat
Emberizidae	**Emberizids**
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
Melospiza melodia	song sparrow
Fringillidae	**Finches**
Carpodacus mexicanus	house finch

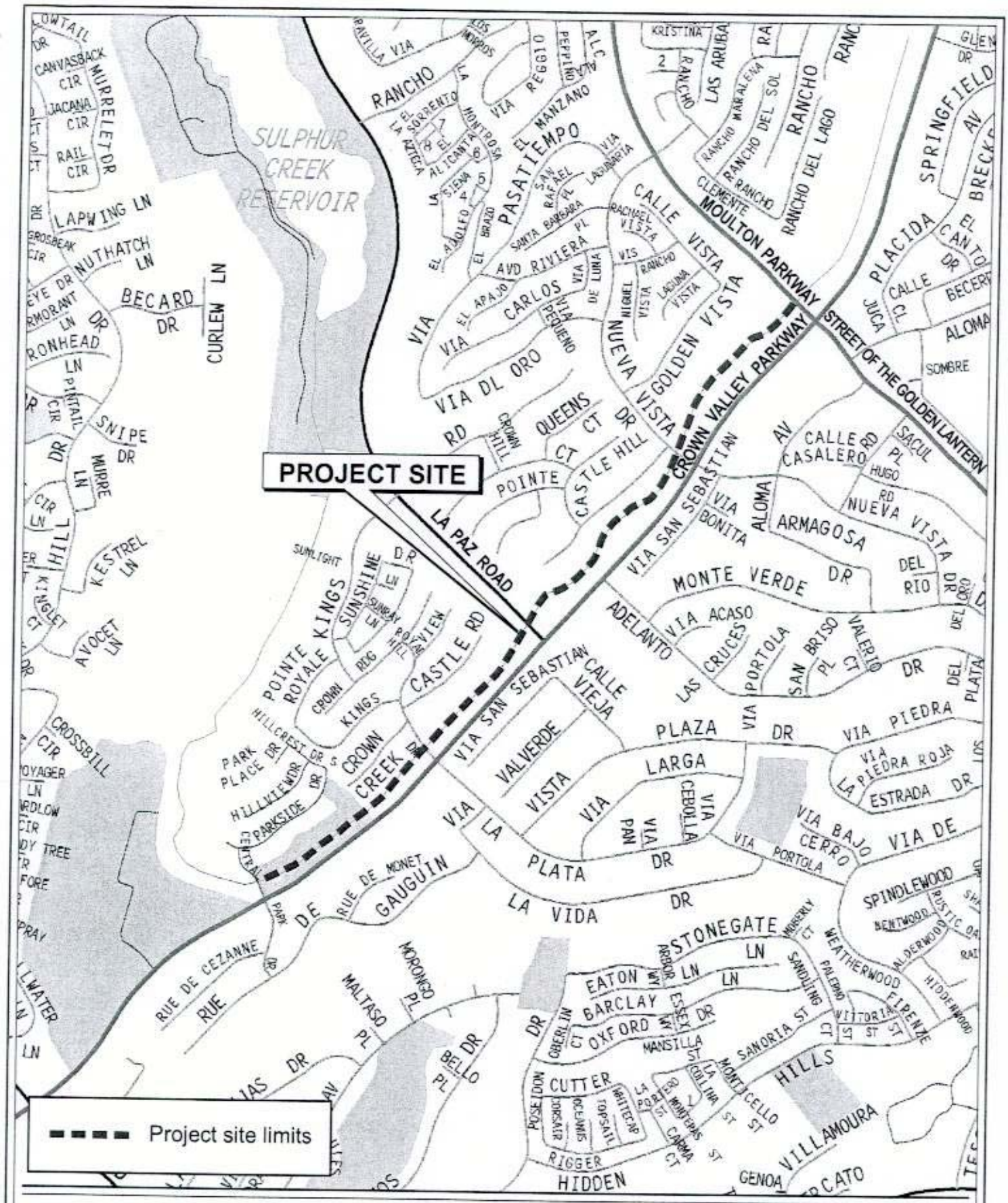
BIRDS

SCIENTIFIC NAME	COMMON NAME
Carduelis psaltria	lesser goldfinch



Source: PCR Services Corporation, 2003.

Figure 1
Upper Sulphur Creek
Regional Map



PCR

0 500 1000 2000 Feet

Source: Thomas Brothers Map, 2002.

Figure 2
Upper Sulphur Creek
Vicinity Map

PCR

N

600 0 600 Feet

Source: Eagle Aerial, 2001; PCR Services Corporation, 2003.

Figure 3
Upper Sulphur Creek Plant Communities