

COASTAL CONSERVANCY

Staff Recommendation  
November 21, 2024

**PALO ALTO HORIZONTAL LEVEE PILOT PROJECT**

Project No. 19-048-02  
Project Manager: Vanessa Aczon

**RECOMMENDED ACTION:** Authorization to disburse up to \$2,000,000 to the Association of Bay Area Governments to undertake the Palo Alto Horizontal Levee Pilot Project, consisting of replacing an existing levee by constructing a 500 linear-foot berm, of which 315 linear-feet will be a horizontal levee, at the Baylands Nature Preserve in Palo Alto, Santa Clara County.

**LOCATION:** City of Palo Alto, Santa Clara County

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EXHIBITS

- Exhibit 1: [Project Location Maps](#)
  - Exhibit 2: [Project Plan](#)
  - Exhibit 3: [Project Letters](#)
  - Exhibit 4: [Project Photos](#)
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**RESOLUTION AND FINDINGS**

Staff recommends that the State Coastal Conservancy adopt the following resolution and findings.

Resolution:

The State Coastal Conservancy hereby authorizes a grant of an amount not to exceed two million dollars (\$2,000,000) to the Association of Bay Area Governments (“the grantee”) to undertake the Palo Alto Horizontal Levee Pilot Project, consisting of replacing an existing levee by constructing a 500 linear-foot berm, of which 315 linear-feet will be a horizontal levee, at the Baylands Nature Preserve in Palo Alto, Santa Clara County (the “project”).

Prior to commencement of the project, the grantee shall submit for the review and written approval of the Executive Officer of the Conservancy (Executive Officer) the following:

1. A detailed work program, schedule, and budget.
2. Names and qualifications of any contractors to be retained in carrying out the project.

3. A plan for acknowledgement of Conservancy funding
4. Evidence that all permits and approvals required to implement the project have been obtained.
5. Evidence that the grantee has entered into agreements sufficient to enable the grantee to implement, operate, and maintain the project.

Based on the accompanying staff recommendation and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed authorization is consistent with Chapter 4.5 of Division 21 of the Public Resources Code, regarding goals of the San Francisco Bay Area Conservancy Program.
2. The proposed project is consistent with the current Conservancy Project Selection Criteria.

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## **STAFF RECOMMENDATION**

### **PROJECT SUMMARY:**

Staff recommends the Conservancy authorize a \$2,000,000 grant to the Association of Bay Area Governments (ABAG) for the San Francisco Estuary Partnership (SFEP, a regional program of ABAG) to construct the multi-benefit Palo Alto Horizontal Levee Pilot project, which consists of replacing an existing levee by constructing a 500 linear-foot berm, of which 315 linear-feet will be a horizontal levee (the “project”). The project is located within the City of Palo Alto’s (the “City”) Baylands Nature Preserve (Preserve), and adjacent to its wastewater treatment facility, the Palo Alto Regional Water Quality Control Plant (RWQCP) (Exhibit 1). The horizontal levee portion of the berm will be a gentle, vegetated slope that will have a variety of habitat types and will provide multiple benefits including habitat for sensitive and endangered species, wastewater polishing treatment, public access, and flood protection for adjacent communities and the City infrastructure.

The San Francisco (SF) Bay has experienced over two centuries of habitat loss and ecological degradation due to human activity. These activities have significantly altered natural processes such as freshwater flows, tidal exchanges, and the abundance of native species in certain areas. As a result, habitats have become fragmented, wildlife populations have diminished, and ecosystems tend to lack the resilience needed to adapt to climate change. To combat these pressing issues, horizontal levees may be a solution that can remedy some of these impacts and provide multiple benefits.

The Preserve faces challenges related to habitat, flooding, and water quality, making it an ideal site for the multi-benefit, nature-based intervention proposed. The Preserve has some of the region’s most important native marsh vegetation, waterfowl and shorebird habitat, and endangered species, including the salt marsh harvest mouse and Ridgway’s rail. Despite this, the project site currently consists of poor-quality upland habitat that is overrun by invasive plants, which rapidly transitions from the existing levee system to the adjacent tidal marsh. While existing levees help reduce potential flooding from the SF Bay, and protect critical infrastructure, such as the RWQCP and other City assets, they remain vulnerable to overtopping

during king tides, storm events, and future sea level rise. Additionally, these existing levees are not engineered to meet Federal Emergency Management Agency accreditation standards, leaving critical infrastructure at risk. RWQCP, like many wastewater treatment facilities, discharges effluent with certain residual contaminants, including nutrients and contaminants of emerging concern, such as pharmaceuticals. While the RWQCP currently meets all discharge permit limitations, there remains opportunity to improve SF Bay water quality by further treating this effluent.

The project will tackle these challenges by constructing nature-based flood protection in the form of a horizontal levee within the Preserve. A first of its kind, this project will use highly treated wastewater from the RWQCP to irrigate the gently sloped, vegetated levee before it is released into the SF Bay, serving as a model for the entire SF Bay Area. This project will offer flood protection, wastewater polishing, habitat for sensitive species, and public access. The project will involve removing the existing 590-foot U-shaped berm and moving it farther inland and raising its height by approximately two feet. A 500-foot-long berm will be constructed of which 315-feet will be a vegetated horizontal levee. The vegetated horizontal levee slope will be located along the broadest area of the berm and will be irrigated with treated wastewater. As the remaining 185 foot-areas adjacent to the new levee berm will be too narrow and steep to accommodate the various elements of the horizontal levee, these areas instead will be revegetated to create riparian and upland grassland habitat. A section of an existing trail situated on the existing berm will be relocated to the top of the new berm, enhancing the public's experience by offering improved views of wildlife and the surrounding natural environment. The horizontal levee and its native plants will create high-tide refugia for local species, while the vegetation will also protect the levee from erosion. The habitats that will be created within the area of the horizontal levee will feature freshwater and brackish marsh, grassy wet meadow, and riparian scrub. As treated wastewater flows through the levee, it will nourish plants and improve water quality by reducing nitrogen, phosphorus, and contaminants of emerging concern through natural filtration processes. The treated wastewater will undergo further polishing as it passes through the treatment zone within the levee, filtering through layers of soil, rock, sand, and woodchips. As a result, the water is left cleaner when it is ultimately discharged into the SF Bay. These water quality benefits were demonstrated in monitoring data from a similar pilot project, the Oro Loma Horizontal Levee project, which used a gently sloped vegetated design that helped filter treated wastewater. This project is anticipated to result in key information that may be integrated into larger levee improvement projects that would allow for broader implementation of horizontal levees throughout the Baylands.

Construction of the project will involve the following primary components:

- Construction of the berm with various components such as the horizontal levee portion, treatment zone, habitat slope, and stormwater swale
- Removal of an existing levee
- Programming of electrical systems to control delivery of treated wastewater to the horizontal levee

- Installation of valve vaults, flow meters, vales, and infiltration chambers in the new horizontal levee
- Installation of a new storm drain culvert
- Relocating 0.11 miles of existing public access trail
- Planting of native vegetation on the gentle slope

Additional project activities include the installation of at least three interpretive signs. These signs will offer information about the horizontal levee, the impacts of sea level rise, and California Native American Tribes whose ancestral homeland includes this area, highlighting their cultural perspectives on restoration efforts, including horizontal levees.

Save The Bay will carry out native planting for the project following the completion and demobilization by the construction contractor. Th City will take responsibility for long-term maintenance, partnering with the U.S. Geological Survey to monitor the site for the next five years. As outlined in a Cooperative Agreement between the City and ABAG, the City is committed to long-term management, maintenance, and monitoring of the project. The City will integrate this project into the ongoing maintenance of the Preserve. Additionally, SFEP and the City will continue to support community monitoring and science programs through collaborations with non-profits such as Nuestra Casa and Save the Bay.

Design, engineering, and permitting, which started in 2018, have now been completed for the project. An initial bid for construction was released in April 2024, but returned construction bids exceeded the \$1.7 million cost estimate, ranging from \$3 million to \$4.5 million. While the project has secured approximately \$2 million for construction from the U.S. Environmental Protection Agency (EPA), additional funding is needed to cover the remaining construction costs. With Conservancy funding, construction of the project will be able to move forward. The project anticipates re-bidding for construction in early January 2025 and starting construction in Summer of 2025.

**Site Description:** The project is situated within the Preserve, one of the largest areas of undisturbed marshland in the SF Bay. The Preserve is a mix of tidal marshlands, seasonal wetlands, and upland habitats, offering critical support for various sensitive and endangered species such as the Ridgeway’s rail and the salt marsh harvest mouse. It hosts a substantial resident population of birds and serves as a major migratory stopover on the Pacific Flyaway. This area also serves as a hub for public access and recreation, featuring trails, educational signage, and planned community engagement events like planting activities. It is a vital space where ecological preservation, public infrastructure, and community participation intersect.

The project site is bordered by tidal marshes to the east, north, and south, and by Embarcadero Road, and the existing flood control levee to the west. Behind the levee, essential City infrastructure is safeguarded, including the RWQCP, Palo Alto airport, and the corporation yard, along with private office buildings and developments extending inland beyond Highway 101. The RWQCP, owned and operated by the City, serves multiple communities, including Palo Alto, Mountain View, Los Altos Hills, Stanford University, and the East Palo Alto Sanitary District, by treating and discharging wastewater.

With the City as the landowner and its partnership with SFEP, SFEP is well-positioned to implement the proposed project.

**Grant Applicant Qualifications:** ABAG brings extensive experience in managing grant funds, providing contracting and financial services for SFEP, a regional program of ABAG. Established in 1988 under the Clean Water Act’s National Estuary Program, SFEP was formed when the San Francisco Estuary was designated as an *estuary of national significance*. Over the past 30 years, SFEP has successfully executed numerous large-scale, multi-million-dollar projects focused on improving Bay Area water quality, largely funded through government grants and contracts. These include multiple awards from the EPA and the Conservancy, enhancing SFEP’s capacity to implement the Estuary Blueprint—a comprehensive plan detailing key actions to restore and protect the San Francisco Estuary.

Through ABAG, SFEP administers subaward agreements and contracts with detailed scopes of work, schedules, and deliverables. They provide timely progress reports that meet with grant requirements, ensuring clear communication and accountability with funding agencies. Furthermore, given the importance of long-term management, maintenance, and monitoring for this proposed project, ABAG entered into a Cooperative Agreement with the City for long-term management. The City will take on the long-term responsibility for managing, maintaining, and monitoring the project to ensure its ongoing success. With a proven track record of project management, successful collaborations with dozens of agencies and nonprofits, SFEP is well-equipped to successfully deliver this vital project.

**CONSISTENCY WITH CONSERVANCY’S PROJECT SELECTION CRITERIA:**

The proposed project is consistent with the Conservancy’s Project Selection Criteria, last updated on September 23, 2021, in the following respects:

**1. Extent to which the project helps the Conservancy accomplish the objectives in the Strategic Plan.**

See the “Consistency with Conservancy’s Strategic Plan” section below.

**2. Project is a good investment of state resources.**

The proposed project is a valuable investment of state resources because it will provide important data and lessons learned to inform surrounding larger levee improvement projects. The information gathered will pave the way for the widespread planning, implementation, and monitoring of horizontal levees across the SF Baylands. As the project will enhance flood protection for vital infrastructure and surrounding communities, it will also restore and enhance transitional habitats that will provide refuge for wildlife. The Conservancy’s funding is the final necessary component needed to implement the project and is significantly leveraged by federal funds.

**3. Project includes a serious effort to engage tribes. Examples of tribal engagement include good faith, documented efforts to work with tribes traditionally and culturally affiliated to the project area.**

The proposed project site is located within the traditional homeland of the Ramaytush Ohlone. The project has engaged in significant collaboration with the Association of

Ramaytush Ohlone (ARO), a non-profit organization that represents the interests of the Ramaytush Ohlone. Numerous meetings have been held, including one site visit, in which valuable feedback was received regarding the project's design.

The project team is collaborating with ARO to develop interpretive signage, demonstrating its commitment to fostering a meaningful relationship.

This ongoing partnership highlights the team's dedication to honoring the interests and heritage of the Ramaytush Ohlone through meaningful collaboration.

**4. Project benefits will be sustainable or resilient over the project lifespan.**

The proposed project is fundamentally rooted in sustainability and resilience, harnessing natural processes and ecosystems through the integration of green infrastructure into the landscape of Palo Alto. Over time, the proposed project is anticipated to accumulate sediment and the gentle slope will offer resilience against rising sea levels by allowing marsh to move upward as sea levels increase. This will support marsh migration in response to rising sea levels, ultimately preserving biodiversity and providing natural buffers against flooding. Additionally, through the horizontal levee, it will further remove nutrients and contaminants of emerging concern from treated wastewater, contributing to improved water quality of the SF Bay.

**5. Project delivers multiple benefits and significant positive impact**

The proposed project will deliver a range of significant benefits to both the environment and surrounding communities. Through restoring transitional habitats and enhancing the diversity of freshwater ecosystems, the project plays a vital role in revitalizing and supporting the local biodiversity. It also provides flood protection for essential infrastructure and the local community, mitigating risks linked with rising sea levels.

In addition to environmental benefits, the project will enhance visitors and residents experience through the thoughtful relocation of the existing trail. It will allow for better wildlife observation and enjoyment of natural resources. Moreover, the installation of interpretive signage will promote awareness and appreciation of the efforts being conducted in the area, and the historical and cultural landscape. This will help strengthen the connection between community and its natural surroundings, ensuring a sustainable future for the environment and people.

**6. Project planned with meaningful community engagement and broad community support.**

Since the beginning of the project, there has been a strong commitment to meaningful community engagement. The City has hosted over 28 outreach events targeting various audiences, including providing direct presentations to stakeholders, hosting public workshops, City Council Commission meetings, and having community events like BioBlitzes and King Tide walks. Other outreach efforts have included engagement with more than ten different organizations, gathering feedback and conducting outreach activities during the design phase, ultimately reaching over 200 individuals. This extensive outreach has provided valuable insights that have informed the project's design. Meaningful engagement will remain a top priority even after construction of the project. Through grant funding

received by the U.S. EPA, SFEP and the City will continue to collaborate with other non-government organizations to implement community science and monitoring activities.

The project has also garnered widespread public support, including from agencies such as the San Francisco Bay Regional Water Quality Control Board, Valley Water, U.S. Geological Survey Western Ecological Research Center, and regional organizations including San Francisco Estuary Institute and Bay Area Clean Water Agencies. Additionally, non-profit organizations such as Nuestra Casa, Save the Bay, and Environmental Volunteers support the project. See Project Letters in Exhibit 3.

**PROJECT FINANCING**

<b>Coastal Conservancy</b>	<b>\$2,000,000</b>
U.S. EPA Water Quality Improvement Fund	\$3,495,823
U.S. EPA Bipartisan Infrastructure Law	\$518,000
<b>Project Total</b>	<b>\$6,013,823</b>

The anticipated source of Conservancy funding for this proposed project is a FY 2022/2023 appropriation from the General Fund for the purpose of “urgent sea level rise adaptation and coastal resilience needs using nature-based solutions or other strategies” (Budget Act of 2022, SB 154 as amended by the Budget Act of 2023, SB 101). The proposed project is consistent with this fund source because it will implement a multi-benefit pilot project that is a nature-based strategy for sea level rise adaptation needs.

Unless specifically identified as “Required Match,” the other sources of funding and in-kind contributions described above are estimates. The Conservancy does not typically require matching funds or in-kind services, nor does it require documentation of expenditures from other funders or of in-kind services. Typical grant conditions require grantees to provide any funds needed to complete a project.

**CONSISTENCY WITH CONSERVANCY’S ENABLING LEGISLATION:**

The proposed project is consistent with Chapter 4.5 of Division 21 of the Public Resources Code, which establishes the San Francisco Bay Area Conservancy Program. All references in this section are to the Public Resources Code.

Pursuant to Section 31162, the Conservancy may award grants in the nine-county San Francisco Bay Area that will help to achieve certain goals, including improving public access to and around the Bay, restoring and enhancing natural habitats, and promoting projects that provide natural areas accessible to urban populations for recreational and educational purposes. The proposed project is located entirely within Santa Clara County, one of the designated nine counties of the San Francisco Bay Area.

Consistent with Section 31162(b), the proposed project will restore and enhance natural habitats by creating transitional uplands between tidal wetlands and terrestrial uplands.

Consistent with Section 31162(d), the proposed project will relocate an existing hiking trail that will enhance the public's experience by offering improved views of wildlife and the natural landscapes, while also providing educational opportunities.

**CONSISTENCY WITH CONSERVANCY'S [2023-2027 STRATEGIC PLAN](#):**

Consistent with **Goal 3.2 Restore or Enhance Habitats**, the proposed project will restore and enhance transitional habitat between tidal wetlands and terrestrial uplands.

Consistent with **Goal 4.1 Sea Level Rise Adaptation Projects**, the proposed project will adapt to sea level rise by providing a transitional slope that will support sediment growth and accumulation.

Consistent with **Goal 4.3 Multi-benefit Nature-Based Climate Adaptation**, the proposed project will restore transitional zone between upland areas and the Bay marshes that will offer a habitat to marsh species, as well as refugia during high tides. The project will additionally improve water quality, adapt to sea level rise, provide flood protection to surrounding communities, and public access opportunities for low-impact recreation and engagement to open space.

**CEQA COMPLIANCE:**

The proposed project is categorically exempt from the California Environmental Quality Act (CEQA) under California Code of Regulations, Title 14, Section 15333. This exemption is applicable to small restoration projects that do not exceed five acres in size to assure the maintenance, restoration, or enhancement of habitat for fish, plants, or wildlife provided that there are no impacts to endangered or threatened species, hazardous materials will not be disturbed or removed, and the impacts are not significant when viewed in connection with the effects of other projects. This project is exempt under Section 15333 because it does not exceed five acres in size and will restore and enhance habitat for fish, plants, and wildlife by replacing a traditional levee with a horizontal levee with native plants and creating freshwater and brackish marsh, all of which will improve conditions for waterfowl and sensitive and endangered species.

Upon approval of the project, Conservancy staff will file a Notice of Exemption.