Attachment 14. Project Narrative

Project Title

Heron's Head Park Shoreline Resilience

Applicant Name

Port of San Francisco

General Instructions

A. Project Description

Project Description

Heron's Head Park is owned and managed by the Port of San Francisco (Port) and located in the economically disadvantaged Bayview Hunters Point neighborhood of San Francisco (See **Form 8 – Attachments 3 & 4**). It is an approximately 21-acre peninsula comprised of approximately 14 acres of public open space and 7 acres of tidal wetlands, as well as tidal ponds, mudflats, and rocky intertidal shoreline. The eastern waterfront of San Francisco, where Heron's Head Park is located, and adjacent San Mateo county is highly urbanized, forming a lengthy shoreline with limited habitat for resident or migratory wildlife. Heron's Head Park is one of few remaining tidal marshes habitat in this area of San Francisco Bay.

In 1999, the Port expanded and enhanced wetlands at Heron's Head Park to provide a variety of habitat types, including high intertidal/transition zone vegetation, tidal salt marsh, refugial islands, and tidal ponds. Improvements in the adjacent uplands include a section of the San Francisco Bay Trail, native plant landscapes, and an environmental education center (The EcoCenter). Heron's Head Park provides valuable tidal marsh habitat for wildlife and equitable, convenient, and affordable access to natural coastal open space, education, and recreation in a neighborhood where such resources are scarce.

The proposed **Heron's Head Park Shoreline Resilience Project** ("the Project") is a multi-benefit project that will use a nature-based shoreline to protect and restore wetland habitat, improve ecological function of diverse intertidal habitats, and enable the shoreline to adapt to sea level rise. The Project consists of:

- Placing coarse sand and gravel stabilized by rock and cobble groynes along an existing tidal salt marsh to reverse coastal wetland loss to erosion, restore habitat quality and diversity, and enable sea level rise adaptation.
- Fabricating and installing subtidal oyster reef structures to support habitat for oysters, herring larvae, and other native epifauna.
- Restoring tidal salt marsh and transition zone plant habitat.
- Monitoring project outcomes, share findings, and take adaptive management measures.

Attachment 14. Project Narrative

Purpose and Need

Tidal wetlands are nationally recognized as habitat of unique value and at particular risk. San Francisco Bay has lost more than 90% of its historic tidal wetlands and is one third smaller than it was 100 years ago due to decades of filling along the bay shoreline. This has resulted in substantial loss, degradation, and fragmentation of habitat and decreased ecological function for many species. The Bay now has reduced biomass from loss of wetland vegetation and shellfish beds that once provided habitat structure and food resources. The San Francisco Estuary is also one of the most invaded estuaries in the world, with resultant loss of ecological function and disruption of the food web for native species. Reduced concentrations of sediment in the Estuary and rising sea level contribute to projections of future habitat loss. On-going loss of tidal marsh due to erosion of marsh edges is one of the most direct impacts of sea level rise on ecosystems in the Estuary (SFEI & Baye, 2020).

The original Heron's Head Park wetland enhancement project was constructed in winter 1998-99, and created approximately 10 acres of intertidal habitats, including tidal marsh, a tidal channel network, marsh ponds and transition/upland mounds. In the 20 years since the Port expanded and enhanced the wetlands at Heron's Head Park, the shoreline has experienced subsidence of the fill soils, erosion from wind-waves and tidal flows, and a low supply of ambient suspended sediment. These forces have caused a loss of both habitat acreage and ecological function. In the most impacted area, the shoreline has retreated up to 50 feet from its 1998 location, and one of the tidal ponds is consistently flooded rather than tidally flushed. Without protection from erosion and capacity to adapt to sea level rise the wetlands are expected to lose an estimated additional 80,000 sq. ft. over the next 30 years.

The Project purpose is to create a living shoreline that will enhance and preserve the physical, biological, and community benefit functions at Heron's Head Park for a design life of 30 years. The coarse material shoreline will enable wetlands to migrate with rising sea level so that some wetland habitat and key public access features remain through mid-century. With the proposed monitoring and stewardship, including ongoing removal of non-native species and replanting with locally adapted native wetland/transition zone plants, the Project will combat a significant infestation by invasive Algerian sea lavender, employ local youth, and provide volunteer opportunities for visitors and students. The Project will engage the surrounding community in implementation and demonstrate how marsh-fringing beach and other living shoreline elements can be integrated to create a resilient shoreline, thereby contributing to statewide efforts to develop technical understanding and implementation of natural systems-based approaches to shoreline stabilization.

In addition to improving ecological resilience, the Project serves another important purpose in protecting future access to coastal open space. Parks and natural areas improve public health and social well-being, provide space for outdoor recreation and places to bring neighbors together, and strengthen communities' social resilience. Due to its location in an urban area where direct public access to the Bay is limited and armored shorelines predominate, Heron's

Attachment 14. Project Narrative

Head Park is one of the few remaining areas of shoreline supporting tidal marsh habitats along the San Francisco waterfront. As one of the few locations providing public access to the Bay shoreline in the economically disadvantaged Bayview Hunter's Point community, Heron's Head Park is uniquely well-suited to provide access to natural shoreline habitat that many neighbors and Bay Area residents might not otherwise reach. It is within walking distance (approx. 0.3 miles) of the largest public housing complex in San Francisco and easily accessible by municipal transit. The park currently provides tidal marsh and shoreline habitats for native plant species and waterfowl, as well as a public trail commonly used for dog walking, bird watching, and fishing access to the bay.

The park hosts regular community events and offers other outreach and educational opportunities. Through a partnership between the Port and the San Francisco Recreation and Parks Department, the EcoCenter at Heron's Head Park offers free, culturally relevant, environmental education and recreation programs (many bilingual) for a diversity of participants. A significant part the Project site's value to habitat conservation is the opportunity for public education and engagement with the type of natural shoreline that once encircled San Francisco Bay.

Goals and objectives to achieve the project purpose, and approach to achieving them are:

1. Construct a dynamically stable beach along the marsh edge. **Approach:** The Port will competitively bid construction, with specifications for experience and expertise in restoration work, that includes importing and placing approximately 12,000 cu.yd. of natural sand and gravel from the Bay and 1,300 cu. yd. rock and cobble to construct an intertidal beach and groynes over **2.06 ac.** along **1,600 lf**. of shoreline (see **Form 8 – Attachment 4**)**.** The beach and groynes will minimize habitat loss by preventing scarps at the marsh edge and restore tidal ponds that formerly existed at the site.

2. Enhance ecological function with physical structures that provide diverse and connected habitat that benefits a range of species. **Approach:** Construction of the intertidal beach and groynes will provide habitat structure and complexity that enhance biodiversity. Rock/earth sills placed along the high intertidal beach crest will provide substrate for high-intertidal plants. The gravel beach berm and rock groynes will provide foraging, roosting, and high tide refugial habitat for shorebirds. The physical structure of gravel beaches is more variable than the fine-grained mudflat substrate that currently dominates much of the shoreline. This structural variability offers invertebrates a greater array of microhabitats and a more sheltered microclimate, thus, the addition of coarse material could support a more diverse invertebrate population and potentially improve food resources for shorebirds. Increased habitat diversity would benefit invertebrates, fish, and birds, as described below (Expected Benefits). Similar projects constructed in the Bay have proven successful at stabilizing eroding marsh edges and improving abundance and diversity of wildlife (SFEI & Baye, 2020).

3. Incorporate Living Shoreline elements for habitat diversity and ecological function. **Approach:** Construction will include fabrication and placement of 66 oyster reef elements along the subtidal ends of the groynes, creating up to 0.02 ac. of subtidal surface area for oysters and other native epifauna, resulting in measurable recruitment and presence of adult native oysters and coverage of oyster reef elements predominantly by native species. Creating new habitat for native oysters and related epifauna, including mussels, crabs, shrimp, and seaweed, in turn may provide additional foraging opportunities for fish and birds and clean, hard substrate for herring spawning. The project design also includes placement of up to 20 cubic yards of large woody debris such as tree limbs and branches within the intertidal beach to provide additional high tide refugial habitat.

4. Restore native marsh and transition zone vegetation. Approach: The Port will contract with a local non-profit organization to propagate, plant, and maintain native salt marsh plants. The Project's revegetation workplan anticipates planting nearly 17,000 plants or propagules over 0.07 acres in the first two years and planting approximately 30,000 additional plants/propagules over the subsequent three years, restoring tidal salt marsh vegetation on up to 1.2 acres over the five-year project duration. Species will include marsh gumplant (*Grindelia stricta*), salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and the endangered California seablite (*Suaeda californica*). Marsh gumplant is an ecologically important native shrub that occurs in tidal marshes and provides food resources, vertical cover, and high tide refuge for multiple species. California seablite was extirpated from San Francisco Bay in the 1960s and is now found only in Morro Bay, California and a few reintroduction sites in the Bay. California seablite formerly existed at the Project site but the population has been significantly reduced du to loss of the coarse sand and shell substrate that it prefers due to erosion.

5. Remove critical mass of invasive species, reducing percent cover by invasive species in the tidal marsh to less than 30% by the end of the 5-year revegetation effort. **Approach:** The project includes 6-8 weeks/year of labor by trained habitat restoration crews comprised of local, transitional age youth to remove invasive species. This intensive mass removal of invasive species and replacement with native species will support the restoration of robust tidal marsh vegetation and related ecological function.

6. Monitor project outcomes to inform adaptive management. Approach: The Port will monitor physical and ecological outcomes of the Project for 10 years. Monitoring will evaluate the performance of the beach berm and groynes, assess success at reducing shoreline erosion and preserving the tidal wetlands, measure colonization of the reef structures and the restoration of former California seablite population, qualitatively evaluate habitat use by birds, and assess vegetation characteristics in the tidal marsh and native plant restoration areas. Monitoring will inform the Port's adaptive management measures as warranted to achieve habitat restoration goals. Monitoring methods, criteria, and adaptive management measures for the Project are described in the Monitoring and Adaptive Management Plan (Acta, 2020).

7. Contribute to understanding of living shoreline project implementation. The Project will build on a growing body of knowledge emerging from living shoreline projects in San Francisco Bay, benefitting from lessons learned from other habitat enhancement project such as the California Coastal Conservancy's San Francisco Bay Living Shorelines projects and the Richardson Bay Audubon Center's habitat enhancement project at Aramburu Island**. Approach:** Following construction during the grant term the project team will produce monitoring reports and present to Bay restoration agencies and practitioners and the general public. Presentations and other outreach will maximize the value of information gained from the project and contribute to the restoration community's and the public's understanding of the role of living shorelines, including vegetated marsh-fringing beaches and connected habitats, as a feasible and ecologically functional approach to shoreline stabilization. This outreach will be accomplished through various venues as opportunities allow and will include at least at one conference regarding San Francisco Bay and Delta ecology, such as the Bay-Delta Science Conference or the State of the Estuary Conference. Port staff will also leverage its existing environmental education and public outreach programs at Heron's Head Park and other public meetings and events to engage the general public in learning about the Project.

Expected Benefits. The Project will have immediate positive impact by creating a resilient shoreline that prevents ongoing loss of wetlands and restores ecological function to a small but important area that is utilized by over 100 resident and migratory bird species and supports the endangered California seablite. The beach and oyster reef habitat will enhance the existing mosaic of tidal wetland, tidal pond, and transition zone habitat. Similar living shoreline projects that include oyster reef elements have improved habitat for fish, birds, and other aquatic species. The California Coastal Conservancy's larger scale living shorelines project in San Rafael found millions of native oysters settled on subtidal reef structures, and use of the project area by birds, native fishes, sharks, shrimp, crabs, and other species increased[1].

By integrating the biological and physical goals of shoreline protection and intertidal and shallow subtidal habitat restoration, we expect to achieve the following results and long-term benefits:

- **A stable and resilient shoreline.** There is no feasible sea level rise adaption measure that would maintain the existing tidal marsh beyond 2050 that does not first control shoreline erosion. The Project design balances the goals of preventing erosion and resultant habitat loss without over-building in the near term, while also minimizing the need for disruptive maintenance and related environmental impacts in the future. It will place material of the type, quantity, and location that, based on site-specific modelling of longshore sediment transport, will maintain a functional shoreline for the 30-year life of the project, create a foundation for future adaptive management opportunities, and provide the greatest habitat benefit with the least amount of impact.

[1] *www.sfbaylivingshorelines.org; www.marincountyparks.org/projectsplans/land-and-habitat-restoration/island-enhancement-aramburu)*

- **Enhancement of tidal salt marsh habitat.** The Project will enhance nearly seven acres of tidal salt marsh in an area where wetlands and ecologically valuable habitat are critically scarce, and where other habitat enhancement projects in the immediate vicinity (Pier 94 Wetlands, India Basin Shoreline) form a viable network of natural shorelines along the predominantly hardened San Francisco waterfront.
- **Greater habitat diversity and improved habitat function.** The Project will increase structure and complexity of habitat, expand and diversify foraging habitat for multiple bird, fish and invertebrate species, including the federally and state listed California Ridgway's Rail, and may improve foraging habitat for California least tern, four California Species of Special Concern (black skimmer, Alameda song sparrow, salt marsh common yellowthroat, northern harrier), and many coastal-dependent migratory and resident bird species such as black oystercatcher, American widgeon, surf scoter, greater scaup, northern pintail, and canvasback. The project may improve foraging habitat for fish including Pacific herring, a State-Managed California Commercial Fishery, fish managed under the Coastal Pelagic Fisheries Management Plan, three federally threatened fish species (Green sturgeon, Chinook salmon, steelhead). The beach will provide habitat for the endangered California seablite, and through active cultivation, planting, and maintenance, will increase populations of both common and rare wetland plants. The subtidal oyster habitat elements will enhance ecological function by providing nursery habitat for juvenile fish and substrate for development of Pacific herring larvae, as well as foraging habitat for many invertebrate and fish species.
- **Increased food resources and foraging habitat throughout the tidal elevation gradient.** The Project will plant native marsh vegetation in strategic locations in the transition zone and tidal marsh plain, providing food resources, and creating a tall marsh vegetation canopy that functions as high tide refuge. The beach and beach wrack will support invertebrates that are food for wildlife. The beach berm would also provide high tide refuge where shorebirds rest and conserve energy when the tidal flats are submerged.
- **Synergistic interaction between habitat types.** Ecologically, tidal flat foraging habitat and high tide roost habitat function together, as described above. Both the marsh revegetation and the oyster reef elements are expected to provide food and habitat resources that will benefit more species than either habitat element would achieve in isolation.
- **Increased awareness and appreciation of natural shorelines.** The lessons learned about living shoreline design, construction, and performance over time will inform the developing science and practice of living shoreline implementation. Due to its location in an urban area where direct public access to the bay is limited and armored shorelines predominate, Heron's Head Park is uniquely well-suited to provide public access to natural shoreline habitat that many neighbors and Bay Area residents might not otherwise reach. A significant part of Heron's Head Park's value to habitat conservation is the opportunity for public education and direct engagement with the type of shoreline that once encircled San Francisco Bay, and development of appreciation and advocacy for natural shoreline restoration.

Attachment 14. Project Narrative

Background and Project History

The background and history of Heron's Head Park itself are described above. This section describes the background, history, and current status of the Herons' Head Park Shoreline Resilience Project. The Project was conceived in 2017, when the Port recognized the severity of impacts from shoreline erosion, habitat loss and invasive species, and the threats posed by sea level rise at Heron's Head Park and initiated planning, engineering design, and permitting of the proposed Heron's Head Park Shoreline Resilience Project.

In 2019, the San Francisco Bay Restoration Authority recommended award of $1.1M of Measure AA funds to the Port to initiate wetland enhancement, and community engagement elements of the Project, support five years of ongoing salt marsh habitat planting and maintenance, and subsequently monitor physical and ecological performance of key project elements. The first phase of work funded by the Restoration Authority consists of the first two years of invasive species removal, native plant propagation and planting, and community-based outreach. This phase began in November 2020 and continues through 2023, after which a work plan and grant agreement for three additional years of planting and maintenance, and subsequent post-implementation monitoring will be negotiated and executed, subject to approval by the Restoration Authority Governing Board.

To date, the Port has completed planning and engineering design for the Project. The Basis of Design Report and 100% plans are provided with **Form 8 – Attachment 8 and 9**. All permits and authorizations required for Project implementation, including CEQA determination and permits from the U.S. Army Corps of Engineers, San Francisco Bay Regional Water Quality Control Board, and Bay Conservation and Development Commission are in hand (provided with **Form 8 – Attachment 13**).

On February 16, 2021, the Ocean Protection Council (OPC) approved an award of $1.667M from its Prop. 68 Coastal Resilience Grant Program for Project implementation. The OPC funding represents approximately 47% of the cost to implement the shoreline construction element and would be complimentary (additive) to the CDFW Prop.1 funding requested with this grant application. **The Port currently seeks $1,493,000 from the Prop. 1 Watershed Restoration Grant Program to complete funding for the shoreline construction**. The Port does not anticipate seeking any other Prop. 1 funding for this project.

The Port has funded all Project planning, design, permitting, and project management to date. The Port will continue to fund project management through its operating budget. Secured and unsecured costs for the major Project elements and funding sources are:

Project Element	Amount	Funding Source	Status
Tidal Marsh Planting & Maintenance (2 yrs); Community outreach	$297,000	SF Bay Restoration Authority	Secured, under current grant agreement
Tidal Marsh Planting & Maintenance (3 yrs); Future Monitoring (5 yrs)	$803,000	SF Bay Restoration Authority	Recommended for award, subject to Board approval

			of future workplan and budget.
Shoreline construction, including oyster reef elements, environmental compliance, post-construction site restoration:	$1,667,000	Ocean Protection Council Prop. 68	Approved for award. Workplan, budget, and grant agreement in progress
Total Shoreline Construction Cost = $3,160,000	$1,493,000	Proposed CDFW Prop. 1	Request in current grant application
Total Project Cost	**$4,260,000**		

The Project is entirely ready to proceed to construction upon securing required funding. Each of the Project elements is described further in the Scope or Work below.

Site Description and Landscape Context – Required for Acquisition, Planning, and Implementation projects

The Project is a natural infrastructure, or living shoreline, approach that will achieve balance between the project's objectives. The natural infrastructure approach generally aims to create and maintain nature-based landscapes that are appropriate to the physical setting and provide ecological benefits as well as shoreline stabilization functions. The target ecosystems to benefit from the Project are high intertidal/transition zone, intertidal wetland, including emergent salt marsh, and subtidal hard substrate. The marsh habitats support numerous species including the special status Ridgway's rail and California seablite.

The Project will provide opportunities to assess mudflat-gravel beach interactions, the ecological value of littoral shore forms in SF Bay (there are few remaining coarse beaches in the Bay due to historical development), and beach-wetland interactions. It will result in a new reference site for future constructed beaches and provide an opportunity to better understand wave-induced transport processes of littoral sediments exposed to wind waves and boat and ship wakes. The Project will also provide a reference site for assessing the performance of littoral transport retention structures.

The entire Project Area is owned by the Port and will be managed in accordance with the Port's public trust mission, including protection of natural resources as a trust priority, in perpetuity. The Project site and improvements will be maintained by the Port in accordance with its strategic plan goal of protecting the bay and its shoreline habitat. The Project is designed to conserve wetlands at the site for a minimum of 30 years. Less that ¼-mile to the north is the Port's Pier 94 wetland, which is more protected and less frequented by visitors. Directly across India Basin, less that ¼-mile south of the Project, the City of San Francisco is creating 0.3 tidal wetlands in conjunction with a sediment remediation and shoreline park development.

The Project will directly prevent coastal wetland loss and restore ecological function of nearly seven acres of degraded estuarine intertidal emergent wetlands, a nationally declining wetland type pursuant to the National Wetland Priority Conservation Plan. It will create new estuarine

intertidal reef habitat, a regionally decreasing habitat type (SF Bay Subtidal Goals 2010) at the Project site as follows:

TABLE 1. WETLANDS CONSERVATION EXTENT		
Habitat type	**Marsh Restoration (acres)**	**% of Project area**
Declining coastal wetlands— estuarine intertidal emergent	6.8	50
Regionally declining estuarine intertidal reef habitat	<0.1	<1
Total wetlands	**6.8**	**50**
Other Aquatic Habitat: tidal ponds, rocky intertidal, vegetated and unvegetated gravel beach, intertidal mudflats	0	50
Total Project acres	**13.5**	**100**

The Project holds regional significance in that it:

- Supports the natural resource goals and objectives of several ecosystem and coastal watershed management plans. **Table 2** describes the relevant management plans and how the Project specifically relates to one or more objectives of each plan.
- Benefits special-status and other species within the Project site and in San Francisco Bay. **Table 3** lists anticipated benefits to a selection of special-status species that occur in San Francisco Bay and, where applicable, the management plans that identify critical habitat. The Project will directly restore habitat for the Federal and State-listed endangered California Ridgway's rail and the Federal endangered California seablite. **Table 4** provides a summary of anticipated project-related benefits to fish.
- Protects and enhances foraging, nesting, and roosting habitat in the San Francisco Bay Estuary, a Wetland of International Importance, and a critical stopover for birds on the Pacific Flyway. **Table 5** summarizes the potential benefits to coastal-dependent and migratory birds that use tidal marshes, mudflats, rocky shorelines, and shallow subtidal area in San Francisco Bay.

Best Available Science and Conceptual Models

The Project will serve as an important demonstration of the capacity for natural systems-based shoreline stabilization to protect wetlands from erosion, diversify habitat and improve overall ecological function. The Project design has been informed by a team (described below) that brings expertise and experience in these disciplines, including design, construction, and monitoring similar projects in San Francisco that have proven successful at stabilizing eroding marsh edges and improving abundance and diversity of wildlife (SFEI & Baye, 2020). The Project conceptual design, alternatives analysis, Basis of Design Report, and 100% design plans have been reviewed for technical/scientific merit and feasibility by the Technical Advisory Committee ("TAC"), the Port's Engineering Division, and a 3rd -party engineering peer reviewer. The

qualifications of the design team and TAC are described further under "Collaboration, Integration, and Community Support" below.

The innovative techniques outlined in this project description are already being applied individually to several restoration projects in the region. The Baylands Ecosystem Goals Update (Goals Project 2015) suggests that integrating subtidal habitat elements into nature-based adaptation can reduce the impacts of sea level rise and erosion and reintroduce valuable habitat types, such as oyster reefs and coarse marsh-fringing beaches. There are several projects proposed for San Francisco Bay that plan to use similar approach. The lessons learned from the Project about living shoreline design, construction, and performance over time will inform the developing science and practice of living shoreline implementation and guide future managers interested in providing foraging habitat for waterbirds and fish while also providing shoreline protection.

With respect to analyzing the Project's adaptive capacity as sea level rises, the Project design relies on the sea level rise estimates provided in the 2018 California Sea Level Rise Guidance from the Ocean Protection Council and Natural Resources Agency ("2018 State Guidance"), which represents the best available science. The 2018 State Guidance recommends use of probabilistic projections to understand potential sea level rise impacts, which associate a likelihood of occurrence with projected sea level increases and rates tied to a range of emission scenarios.

The Project design team from Environmental Science Associates (ESA) brings considerable experience and scientific expertise. Project Manager Eddie Divita is a licensed Hydrologist and Civil Engineer with experience in engineering design of coastal, wetland, and estuarine restoration projects in San Francisco Bay. Senior Engineer, Bob Battalio has over 30 years of experience in coastal engineering and multi-benefit restoration project design. Anne Borgonovo has provided engineering and construction oversight to several coastal stabilization and restoration projects, including one of the first natural system-based sea level rise adaptation projects in San Francisco Bay.

Collaboration, Integration, and Community Support

The Project enjoys strong support from local, regional, and State institutions as evidenced by the award of **$1.1M from the San Francisco Bay Restoration Authority**, recommended award of $**1.667M from the Ocean Protection Council** Coastal Resilience Grant Program, and donation of coarse sand and gravel material required for Project construction, valued at **$417,000, from a neighboring sand and aggregate supplier** (letters of financial commitment on file, available upon request).

Beyond direct financial contribution, the Project benefits from collaboration between local (Port), regional, and State agencies and other Project partners, including:

- The **California State Coastal Conservancy** provides technical assistance regarding living shoreline project design, permitting, and construction and serves as project manager for the San Francisco Bay Restoration Authority grant.
- **Technical Advisory Committee** (TAC): The Project's TAC has guided planning and design. TAC members include Kathy Boyer, faculty and research scientist at the Estuary and Ocean Science (EOS) Center at San Francisco State University, and Chela Zabin from the Smithsonian Environmental Research Center, who bring specialized expertise in ecology and habitat restoration for the native tidal marsh plants and native oysters respectively. The TAC includes ecologist and botanist Peter Baye, lead author of the San Francisco Estuary Institute's "*New Life for Eroding Shorelines*" report. The TAC will be retained to continue providing expert guidance during construction, monitoring, and adaptive management.
- **Literacy for Environmental Justice** (LEJ): LEJ is a community-based, non-profit environmental education and youth empowerment organization created specifically to address the ecological and health concerns of Bayview Hunters Point and communities of southeast San Francisco. LEJ operates a native plant nursery in Hunters Point that specializes in growing locally adapted native species for shoreline and coastal upland habitats. The Port has contracted with LEJ to cultivate, install, monitor, and maintain the tidal salt marsh plants that will be installed over a 5-year period, beginning November 2020. This work will be conducted by LEJ's "Eco-Apprentices", low-income, predominantly minority transitional-age youth (age 18-26) with an interest in habitat restoration.

The Project partners also engage directly with regional stakeholders, including academic and scientific institutions, environmental advocacy groups, resource and regulatory agencies, and state, local, and federal land managers with interest, opportunity, or obligation to conserve coastal wetlands. Collaboration with these groups is done through a variety of workshops, meetings, conferences, and informal networking, all of which contribute to understanding best practices and provide opportunity to maximize effectiveness of wetland habitat enhancement projects in the bay.

The Project will increase public education, awareness, and advocacy for coastal wetlands in the local community and the region. The Project site is visited by thousands of people each year, approximately 75% from the City and County of San Francisco and 34% from the immediately surrounding economically disadvantaged community. The wildlife habitat at Heron's Head Park is a well-loved, uniquely accessible educational and recreational resource with a passionate constituency. The coastal wetlands are the essential focal point of the site and the public engagement programs. Most of the education programs and all volunteer programs include service-learning, wherein participants have an opportunity for direct observation of wetland habitat and wildlife and hands-on habitat stewardship. Action taken now to protect the wetlands from loss to erosion will preserve this educational and recreational asset for at least a generation in a community where such opportunities are scarce.

Attachment 14. Project Narrative

The Port partners with the San Francisco Recreation & Parks Department (RPD) and City College of San Francisco to operate active and well-developed environmental education and volunteer programs both outdoors in Heron's Head Park and in "The EcoCenter at Heron's Head Park" (the EcoCenter). Programs include single-day or series of field trips for K-12 schools, universities, and the public. Staff and volunteers lead regular volunteer habitat stewardship events. RPD offers a 6-month service and leadership skills development program for local teenagers interested in environmental conservation ("the Greenagers"), a summer "Wetlands Explorers" day camp, and many other programs and events created in collaboration with other community partners. RPD staff offer regular drop-in bird-watching walks for beginning birders and Golden Gate Audubon Society leads scheduled field trips for birders of all skill levels. In 2020, RPD offered a new series of "Fishing for Youth at Heron's Head Park" classes (cancelled due to pandemic, will resume).

B. Scope of Work

Project Objectives

Project objectives are summarized in **Form 4**. Specific goals and objectives to achieve the Project purpose, and approach to achieving them are described in more detail in **Section 14.A. Project Description – Purpose and Need** above.

Approach and Statement of Work

The tasks listed below correspond to the numeric list of tasks in **Form 5 - Timeline**. Note that following Scope of Work includes all of the tasks that comprise the Heron's Head Park Shoreline Resilience Project as a whole. This inclusive description of the Scope of Work is essential to convey the full scope of the Project, the work required to complete it, and the breadth of potential benefits of the project. However, it includes tasks that have been, are currently, or will be funded by the Port or with grant funding from other sources. **With this application for Prop. 1 Watershed Restoration Grant Program funds, the Port seeks funding to support Task 5 – Shoreline Construction**. Consequently, this application describes a proposed CDFW grant term beginning August 1, 2022, which is the earliest that shoreline construction could begin due to seasonal restriction, and ending June 30, 2023, six months after the date that seasonal restrictions require the shoreline construction to be completed. Many of the tasks described below are essential precedent to, or will occur concurrent with, the shoreline construction work proposed for CDFW funding. The objectives listed below correspond to the numbered list of Project objectives described above under **Project Description – Purpose and Need.**

Task 1	**Project Management**	**Responsible Party:**	**Objective (Form 4)**	**Timeline (Form 5)**
		Port of San Francisco	Objectives #1 - #7	Present through completion of shoreline construction (1/31/23),

				Final Report to CDFW (6/30/23), and through post-restoration monitoring (2032)

Project management by Port staff began with initial scoping and contracting for planning studies and conceptual design in 2017. It will continue through completion of construction of habitat protection and enhancement elements in January 2023 and post-restoration monitoring for 10 years (through 2032 assuming that the Project construction is completed in January 2023). Port staff have and will continue to provide technical and administrative services associated with performing and completing the work for this Project, including managing contracts and grant agreements, obtaining and ensuring compliance with all regulatory permits and authorizations, administering this and other grant agreements, managing bids and contracts, managing construction inspection and monitoring, and contracting for, managing, and reporting on post-restoration monitoring and data management and dissemination. **Deliverables** include Quarterly Reports and invoices (within 30 days of the end of each quarter), Draft Final Report (within 30 days of the end of the last quarter of the construction period and60 days before the end of the grant term), and Final Report (submitted prior to the end of the grant term). The first Quarterly Report will be submitted within 30 days after the quarter during which CDFW construction begins (July-Sept 2022), by 10/31/2022.

Task 2	**Restoration Design**	**Responsible Party:**	**Objective (Form 4)**	**Timeline (Form 5)**
		Port of San Francisco and ESA	Objectives #1 - #4	Completed. Submitted to CDFW 2/19/21

The Port initiated engineering design of the Project in 2017 through a contract with Environmental Science Associates (ESA). ESA prepared the Basis of Design Report (4/13/20, see **Form 8 – Attachment 9**) and conceptual, 65%, 90%, and 100% engineering design plans and technical specifications (see **Form 8 – Attachment 8**).

Task 3	**Stakeholder Engagement**	**Responsible Party:**	**Objective (Form 4)**	**Timeline (Form 5)**
		Port of San Francisco, ESA, and LEJ.	Objective #7	Conducted 2018 through 2032. First Quarterly Report to CDFW 10/31/22

The Port initiated stakeholder engagement in 2017 with presentations by Port Staff to the public meetings of the Port's citizen advisory committees (Southern Waterfront Advisory Committee, Waterfront Land Use Plan Sustainability Committee), local community groups in the Bayview Hunters Point neighborhood (EcoCenter Advisory Committee, Bayview Residents Improving their Environment) and the local chapter of the Audubon Society. This outreach has continued

through the design and permitting process and will continue through construction and post-restoration monitoring.

Beginning Summer 2021, Project partner Literacy for Environmental Justice (LEJ) will initiate additional community outreach developed and presented by LEJ's EcoApprentices (see description under "Collaboration" above). Their outreach will be youth- and community-driven: The EcoApprentices will develop and deliver presentations about the Project (with technical support/supervision from Port) to groups and venues of their choosing. The EcoApprentices' outreach is funded by the San Francisco Bay Restoration Authority Grant to the Port.

Project partner ESA has presented the project to more technical audiences, including presenting at an on-line symposium on coarse grain beaches as habitat and shoreline resilience improvements hosted by the California Coastal Conservancy. More such presentations will be appropriate in the future as implementation experience yields lessons learned and results of post-restoration monitoring.

Additionally, the Port has more recently developed a robust Waterfront Resilience Program (WRP) Communications and Engagement Plan that provides additional capacity for community engagement about the Heron's Head Park Shoreline Resilience Project. Inclusion in the WRP Communications and Engagement Plan will provide more resources for community engagement and enable meaningful stakeholder input in addition to dissemination of information about the Project. Port staff will also continue to leverage its existing environmental education and public outreach programs at Heron's Head Park and other public meetings and events to engage community stakeholders and the public in the project.

The Deliverable for this task will consist of reporting on stakeholder engagement activities to CDFW in Quarterly Reports, to be submitted within 30 days after each quarter during which CDFW construction occurs. The first CDFW-funded construction activities will occur during the July-Sept 2022 quarter, with first report submitted by 10/31/22.

Task 4	**Salt Marsh Habitat Restoration**	**Responsible Party:**	**Objective (Form 4)**	**Timeline (Form 5)**
		Port of San Francisco; LEJ	Objectives #4 - #5	November 2020 - December 2025

The salt marsh habitat restoration element of the Project is described briefly above with respect to Project objectives under **Project Description – Purpose and Need**. It is a 5-year effort to remove invasive species, replace with locally adapted and propagated native salt marsh species, and employ local youth in the restoration effort. This task is funded by the Port's existing grant agreement with the San Francisco Bay Restoration Authority. The first phase of the Project was initiated in November 2020 with invasive species removal and seed collection. Salt marsh habitat restoration will be conducted in two phases:

Scope	Schedule	Funding Status
Wetland plant restoration, Phase 1: First 2 of total of 5 yrs. wetland plant habitat restoration	Fall 2020 through Fall 2022.	Funds awarded by the San Francisco Bay Restoration Authority
Wetland plant restoration, Phase 2: Three additional years of wetland habitat restoration, including planting along new habitat features, will follow construction of stabilized shoreline.	Upon completion of shoreline construction, anticipated January 2023.	Funds designated for award to Port by the SF Bay Restoration Authority, subject to approval of Phase 2 work plan and budget.

The **Deliverable** for this task will consist of reporting on salt marsh restoration activities to CDFW in Quarterly Report, to be submitted within 30 days after each quarter during which CDFW construction occurs. The first CDFW-funded construction activities will occur during the July-Sept 2022 quarter, with first report submitted by 10/31/22.

Task 5	Shoreline Construction	Responsible Party:	Objective (Form 4)	Timeline (Form 5)
		Port of San Francisco, ESA	Objectives #1-#3	August 2022 -January 2023.

Task 5. Shoreline Construction is the Project element for which the Port seeks funding from the CDFW Prop. 1 Watershed Restoration Grant Program. Project design and permitting are complete, and the Project is currently ready to proceed to construction. Permits restrict on-site construction to occur only between August 1 and January 31 to protect nesting birds and special status species. If the requested CDFW Prop. 1 funds are awarded in May or June 2021, considering that grant agreement negotiation and approval and bid solicitation and award process takes about 6 months, the next possible window of opportunity for construction would be August 2022 through January 2023. Shoreline construction will consist of the following subtasks:

- **Task 5.1. Construction Management and Design Engineering Team Oversight**. Prior to beginning construction, the Port will contract with ESA to provide technical support and consultation to Port staff during the bid period and through the 6-month construction period to assist with questions from bidders and oversight of the selected Contractor to ensure that construction conforms to design standards and technical specifications. The team will include Eddie Divita, who was the primary design engineer, and Ann Borgonovo, who has extensive experience overseeing construction of habitat restoration. See **Form 1 – Project Team and Qualifications**. The Port will also contract with a qualified consultant to provide on-site inspection and contract administration

during the 6-month construction period. This is an essential function that the Port is not able to fulfill with in-house staff capacity.

- **Task 5.2. Solicit Bids**. If funds are available by January 2022, the Port will initiate the bidding process in February 2022. Port staff will assemble bid documents including construction drawings and administrative and technical specifications, advertise the bid opportunity, conduct a pre-bid site walk, and address questions from bidders. The design and construction management team will support the process. The **Deliverable** for this task will consist of documentation of the bid solicitation process to be submitted to CDFW upon receipt of bids by the end of May 2022.

- **Task 5.3. Bids Due.** At bid opening, projected to occur by the end of May 2022, Port staff will determine the lowest bid from a responsive (meets all requirements of the bid process) qualified (meets technical and administrative requirements specified by the contract) bidder. The **Deliverable** for this task will be documentation of bids received and basis for determination of the lowest bid from responsive qualified contractor.

- **Task 5.4 Authorization to Award through Executed Subcontract**. Port staff will secure Port Commission and funders' approval of the recommended Contractor, obtain Contractors' submittals required prior to contract execution (e. g. insurance, bonding, licenses, or other qualifications), execute the contract, and issue a Notice to Proceed. This process typically requires a couple of months and is projected in the Project Timeline to occur during June and July 2022, enabling the Contractor to mobilize at the earliest permitted date of 8/1/22. The **Deliverable** for this task will be the executed contract between Port and Contractor, the subcontract to the Port's grant agreement with CDFW.

- **Task 5.5 Mobilization, Pre-Construction Surveys, and Training.** Beginning 8/1/22 and before shoreline work can begin on 9/1/22, the Contractor will be able to mobilize equipment and materials to the site and begin establishing temporary upland staging and construction access routes. Contractor will conduct pre-construction topographic surveys and obtain Port and supporting team approval of construction schedule, health and safety plan, stormwater pollution prevention plan and similar pre-construction submittals.

  The Port will contract with qualified biologists to complete pre-construction surveys for potential presence of Ridgway's rail and eelgrass and locations of existing California seablite populations, which will be marked and protected. Biologists will also provide environmental awareness training regarding the environmental permit conditions, sensitive resources at the site, and the impact avoidance and minimization measures that must be implemented during construction to the Contractor's field management and construction personnel prior to commencement of work. The **Deliverable** for this

task will be documentation of construction activities in Quarterly Reports and invoices, the first of which will be submitted to CDFW by 10/31/22.

- **Task 5.6 Construct Shoreline.** This task is described in detail in the Basis of Design Report (provided with **Form 8 – Attachment 9**) and includes the following:
  1. After September 1st, to avoid disturbance to nesting birds, Contractor will establish temporary construction access routes to the shoreline and deliver bulk materials (sand, gravel, cobble, rock) to the unloading area shown on construction plans (see **Form 8 – Attachment 8**). It is estimated that the Project will require 1,350 truck trips to deliver material to the site, including transport of donated coarse sand/gravel from a nearby sand processing facility.
  2. Contractor will place rock groynes and drift sills, reinforced pond sills, coarse beach material, and natural wood habitat elements, working only during low tide when material can be placed in areas that are not inundated. These shoreline features will be surveyed and inspected at specified milestones to ensure that design quantities and elevations are achieved.
  3. Upon completion of the shoreline construction, LEJ will plant salt marsh species that have been cultivated for the Project, including the endangered California seablite, along the shoreline and beach crest (see **Task 4. Salt Marsh Habitat Restoration**).
  4. Contractor will remove all temporary construction materials and restore the site as specified by the constructions plans and specifications, including restoring vegetation in any impacted areas and reconstructing asphalt and decomposed granite paths.
  5. Throughout the construction period, biologists and other qualified consultants under contract to the Port will continue to monitor presence of Ridgway's rail and compliance with species and habitat, water quality, air quality, noise reduction, and other requirements.

Deliverables for this task will be documentation of construction activities in Quarterly Reports and invoices, the first of which will be submitted to CDFW by 10/31/22, and in the Draft Final and Final Reports.

Task 6	Oyster Reef Balls	Responsible Party:	Objective (Form 4)	Timeline (Form 5)
		Port of San Francisco, Supplier: Reef Innovations, Installation TBD	Objectives #1-#3	August 2022 - January 2023.

Oyster reef balls will be fabricated and delivered under separate contract, and installed along the toe of the constructed shoreline, most likely using marine equipment to place the reef balls during high tide. Oyster reef balls must be installed in September, when oysters are most likely to colonize the reefs but outside of the protected bird nesting season. Installation may be conducted by Port staff using Port-owned barges, cranes, and work boats as resources allow. A

specialized marine construction contractor may be required. The **Deliverable** for this task will be documentation of oyster reef installation in Quarterly Reports and invoices and in the Draft Final and Final Reports.

Task 7	Post-restoration Monitoring & Management	Responsible Party:	Objective (Form 4)	Timeline (Form 5)
		Port of San Francisco, Consultants and Contractors TBD	Objectives #6	Spring 2023 -Winter 2032.

This task is described briefly above with respect to Project objective #6 under **Project Description – Purpose and Need**, and in detail in the *Monitoring and Adaptive Management Plan* provided as **Form 8 – Attachment 15.** With grant funding from the San Francisco Bay Restoration Authority (5 years) and subsequently supported by Port operating funds, the Port will monitor the physical and ecological outcomes of Project implementation for 10 years. Long-term monitoring will yield data as described below.

C. Dissemination of Information: Data Management and Access, Data Sharing, and Publications

The Port will conduct post-restoration monitoring beginning upon completion of construction and continuing for 10 years as described in the Monitoring and Adaptive Management Plan (**provided with Form 8 – Attachment 15**), including methods, equipment, and metrics. Monitoring will produce the following data:

- Geospatial and topographic survey data regarding vertical and horizontal location, volume, and elevation of the dynamically- stable beach and oyster reef balls, quantitative measurement of longshore and cross-shore movement of beach material, and aerial extent of beach, tidal marsh, and tidal flats.
- Geospatially referenced location of scarps indicating marsh erosion, and documented retention of tidal ponds.
- Geospatially referenced areal extent and percent cover of marsh vegetation as well as relative cover by native vs. non-native species, species diversity, mean cover height and density.
- Quantitative data regarding colonization of oyster reef balls, including density, size distribution, percent cover, and species composition.
- Quantitative and qualitative measures of California seablite population recovery, including geospatially-references location, size, aerial extent, survival, and reproduction.
- Qualitative data regarding wildlife use of the site collected quarterly surveys.

The Project site is currently represented in the EcoAtlas Project Tracker, and applicable wetland monitoring data will be uploaded to the EcoAtlas on an on-going basis. Observation of special status species will be to the California Natural Diversity Database (CNDDB).

Scientists from the Estuary and Ocean Science Center at San Francisco State University will support seed collection, planting, and monitoring the endangered California seablite at the source population and the Project site and report their activities to the Rare Plant Working Group of the US Fish & Wildlife Service-led Tidal Marsh Recovery Plan. Records will include GPS locations of where plant materials were collected and planted, how the plant material was collected, how it was propagated, and how, and when it was outplanted.

The Port has not yet developed a data management plan, but will do so concurrent with project implementation, prior to post-restoration monitoring data collection, in coordination with resource, regulatory, and funding agencies to ensure that data quality, retention, and minimum CDFW and other applicable data management standards. Data and information will be shared with the public, scientific and restoration community, resource and regulatory agencies, and other stakeholders as described with respect to **Task 3. Stakeholder Engagement** above.

D. References

California State Coastal Conservancy. 2010. *San Francisco Bay Subtidal Habitat Goals Report: Conservation Planning for the Submerged Areas of the Bay*. Oakland, CA.

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SFEI and Peter Baye. 2020. *New Life for Eroding Shorelines: Beach and Marsh Edge Change in the San Francisco Estuary*. Publication #984, San Francisco Estuary Institute, Richmond, CA.