



SFCTA

# QUARTERMASTER REACH ENVIRONMENTAL ASSESSMENT



SEPTEMBER 21, 2010



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# 1 PURPOSE AND NEED

The following describes the need for the project, the historic, existing and future conditions of the project site, the project objectives, and the purpose of the environmental assessment (EA).

## 1.1 NEED FOR THE PROJECT

The Presidio Trust seeks to “daylight” an approximately 850-foot length of stream, currently running through a subsurface culvert that ultimately discharges to Crissy Field Marsh, in order to restore (create) wetland habitat (project or proposed action). The project site in which the stream restoration would occur is referred to as the Quartermaster Reach (of Tennessee Hollow Creek) in recognition of past U.S. Army activities in the area. The Quartermaster Reach encompasses approximately 9.5 acres along the western edge of the Letterman district in the northeastern portion of the Presidio (see back cover).<sup>1</sup> The project site is also within the Doyle Drive construction corridor<sup>2</sup> and is at the

northernmost (lowest) end of the 278-acre Tennessee Hollow watershed.<sup>3</sup> The proposed action would provide an ecological corridor and pedestrian trail through the Quartermaster Reach that would connect a recently restored 450-foot stretch of stream and native habitat to the south (known as the Thompson Reach) to Crissy Field Marsh, and reveal and/or interpret missing historic elements in the site. The proposed action is being considered at this time to take advantage of the opportunity to be completed consistent/concurrent with design and construction of the Doyle Drive project. Coordination between the two projects would ensure the feasibility of the Quartermaster Reach restoration to the maximum extent possible with the future roadway.

The underlying need for the project is substantiated by the Presidio Trust Management Plan (PTMP),<sup>4</sup> which provides parameters, goals, and guidelines for site-specific actions and decisions within Tennessee Hollow:

<sup>1</sup> A portion of the project (approximately 0.5 acres north of Mason Street) occurs on National Park Service (NPS) land and requires NPS approval to be implemented. As a cooperating agency in the NEPA process, the NPS will adopt the environmental assessment, and then issue its own decision to allow the portion of project that occurs on NPS land to be implemented. The EA supports the conclusion that the project will not result in any significant effects that will require the preparation of an environmental impact statement. Given this, the NPS will prepare a finding of no significant impact (FONSI) (see Appendix C).

<sup>2</sup> Doyle Drive is a critical section of Route 101 that bisects the project site and connects San Francisco to the Golden Gate Bridge along the Presidio’s northern waterfront. Originally constructed in 1936, the roadway is nearing the end of its useful life. The San Francisco County Transportation Authority (SFCTA) propose to improve the roadway’s seismic, structural, and traffic safety, while better incorporating the roadway into the setting of the Presidio as a national park. The project will replace Doyle Drive with a “Presidio Parkway” placed in cut-and-cover tunnels at two critical points to reopen Presidio vistas and reconnect the waterfront to the Main Post and the rest of the Presidio. The impacts of the project, including the removal of historic structures, existing vegetation and wetlands, disruption of groundwater flow, construction storm water runoff, and

(continued)

*temporary noise, visual and traffic impacts associated with construction activities, were discussed in a final environmental impact statement/report (EIS/R) that was circulated in September 2008. Construction began in the fall of 2009. The Doyle Drive Final EIS/R can be viewed on the Doyle Drive’s website at [http://www.presidioparkway.org/project\\_docs/feis.aspx](http://www.presidioparkway.org/project_docs/feis.aspx).*

<sup>3</sup> The Tennessee Hollow watershed contains three creek tributaries; two of the three tributaries experience year-round flows (the Central/El Polin Springs and Eastern Tributaries), while the third (Western Tributary) is intermittent, flowing only during precipitation events. The characteristics of these streams have been substantially altered in the past by the construction of roads and buildings, placement of fill, planting of the historic forest, and other removal or alteration of vegetative cover. Today, the Tennessee Hollow watershed is covered by approximately 46 acres of impervious surfaces (i.e., roads, parking lots, and buildings). More than half of the creek system has been diverted into storm drains or lined concrete channels. Although there have been substantial changes to the creek system, small pockets of remnant creek and associated wetland habitat remain. These areas support some of the most biologically abundant and diverse wildlife habitat at the Presidio.

<sup>4</sup> The PTMP (Trust 2002) is the Trust’s formally adopted statement of land use policy for Area B of the Presidio.

*Restore and protect Tennessee Hollow as a vibrant ecological corridor and a unique backdrop to the developed environment of the Letterman district. Coordinate restoration of Tennessee Hollow with future planning for the Main Post, Crissy Field (Area B), Doyle Drive, and the Letterman district to ensure that the corridor provides an ecologically rich and complex buffer between planning districts (PTMP, Letterman District, Guidelines for Open Space/Vegetation/Views, page 84); and*

*Restoration will expand riparian habitats and allow for an integrated system of freshwater streams and freshwater, brackish, and tidal marsh, re-establishing a connection to Crissy Field Marsh (PTMP, Tennessee Hollow, page 19).*

## 1.2 SITE CONDITIONS TO BE IMPACTED BY PROJECT

The project site is bounded by Halleck Street to the west, Crissy Field Marsh to the north, the Thompson Reach to the south, and a series of buildings and parking lots to the east. The project site has undergone and will continue to experience substantial changes in topography, drainage, circulation, building and infrastructure construction, and demolition, with or without the proposed action.

### HISTORIC

The project site is located at the northern end of Tennessee Hollow, the Presidio's largest watershed. A central feature of the watershed is a creek system that has three branches or tributaries. The three creek branches flow from south to north, merging into one channel at the mid-point in the watershed near Lovers' Lane Bridge. From there, a single channel continues north where it eventually drains to Crissy Field Marsh and San Francisco Bay.

The Tennessee Hollow watershed and its creeks once served an important resource for native peoples as well as early explorers. During more than two centuries of military occupation, the watershed underwent extensive alterations.

Springs were dammed, native vegetation was cleared and segments of the creek were later filled to make way for buildings and other military needs. Today, approximately half of the creek system is buried in storm drains or contained in concrete channels.

### EXISTING

Currently, the site is relatively open and flat, gently sloping from south to north towards the bay, and predominately asphalt paved. Current surface elevations range from approximately 10.25 to 30.25 feet NAVD (North American Vertical Datum) south of Doyle Drive, east of Halleck Street. The 6-lane Doyle Drive spans over the project site as an elevated viaduct, and Gorgas Avenue and Mason Street cross the site at grade. Several buildings and former building foundations are situated within the site boundaries, including Building 230, which will be removed as part of the Doyle Drive project. A small cluster of eucalyptus trees are present near the southern boundary of the site. Native soils, below asphalt and fill, are primarily silty sands and clayey silts, characteristics of the historic marsh and channels. Within the project boundary, depth to native soil varies from 2 feet to over 7 feet below ground surface (bgs). For the majority of the project site, native soils are found between 4 feet and 7 feet bgs. Depth to groundwater averages 4.8 feet bgs, ranging from 2.3 feet to 7.5 feet bgs. Flow is approximately north towards the marsh and bay.

### FUTURE

The replacement of the existing Doyle Drive with a new Presidio Parkway will include substantial ground disturbance, greatly altering historic circulation patterns and landforms in the project site.<sup>5</sup> The redesigned roadway will feature a low

<sup>5</sup> *The discussion of impacts in the Doyle Drive Final EIS/R of ground disturbance to the already heavily modified topography of the project site to accommodate both the hydrologic restoration of the Quartermaster Reach and the elevated Doyle Drive structure is incorporated by reference into this EA.*

level causeway that emerges from cut-and-cover tunnels at Halleck Street, where the existing slope would be replaced with a retaining wall to accommodate the new facility. The facility will extend over the Quartermaster Reach to a new Presidio access at a depressed Girard Road along the site's eastern boundary. Excavation within the project site for the project will be completed as part of Doyle Drive construction and will be generally limited to within the artificial fill. Within the project site, the low causeway will rise to approximately 13 feet above the surrounding ground surface at its highest point to allow sufficient space to accommodate the proposed Quartermaster Reach connection. The alignment of the low causeway will also provide for the greatest separation possible between the northbound and southbound roadways over the Quartermaster Reach to maximize natural light for underlying vegetation and for a wildlife corridor. However, there may be some limits to the functionality of the Quartermaster Reach as a riparian and wildlife corridor due to the width of the structures and limited length and height of the Girard Road exit ramp (San Francisco County Transportation Authority 2008).

### 1.3 OBJECTIVES

In order for the project to be considered successful, the restored stream should:

- daylight the stream and provide increased tidal exchange between Crissy Field Marsh and the Quartermaster Reach;
- maximize native habitat and create a connected wildlife corridor from the Thompson Reach to Crissy Field Marsh, providing improved passage and habitat conditions for fish and other wildlife;
- provide a rich diversity of riparian, brackish marsh, and other native plant habitats that require minimal long term intervention;
- re-establish natural processes to the extent possible;

- protect groundwater resources;
- avoid excessive scour in stream and marsh channels;
- provide capacity for storm water runoff from Watershed B;
- enhance public use, access, and experience of the project site while maintaining visitor safety and protecting natural resources;
- reintroduce or interpret missing historic elements to enhance the now deteriorated association, setting, and feeling of the site consistent with the other objectives of the project; and
- be feasible to implement concurrent with the Doyle Drive project.

### 1.4 PURPOSE AND CONTENTS OF ENVIRONMENTAL ASSESSMENT

The EA identifies the environmental effects of the proposed Quartermaster Reach project. The Council on Environmental Quality's (CEQ) Regulations implementing the National Environmental Policy Act (NEPA) allow federal agencies such as the Trust to prepare an EA to assist agency planning and decision-making (40 CFR 1501.3). An EA provides evidence and analysis to determine whether an environmental impact statement (EIS) is required, aids a federal agency's compliance with the NEPA when an EIS is not necessary, and facilitates preparing an EIS if one is necessary (40 CFR 1508.9(a)). The EA tiers<sup>6</sup> from the PTMP Final EIS and analyzes

<sup>6</sup> See 40 CFR 1502.20 and 40 CFR 1508.28 (tiering). Tiering is defined as the coverage of general matters in broader EISs, with subsequent narrower tiered statements or environmental analyses, incorporating, by reference, general discussions and concentrating solely on the issues specific to the statement subsequently prepared. The CEQ NEPA Regulations encourage the use of tiered documents to "eliminate repetitive discussions of the same issues" and to "focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe." The PTMP Final EIS can be viewed at the Presidio Trust Library or on the Trust's website at <http://www.presidio.gov/Trust/Documents/EnvironmentalPlans/>.

specific project alternatives for restoring a stream channel from a culverted drainage to an open creek with an associated ecological corridor and wetland within Tennessee Hollow, an implementation activity and goal identified in the PTMP. In tiering from the PTMP Final EIS, the EA summarizes and incorporates by reference the information and analysis presented in the PTMP Final EIS and concentrates on site-specific issues related to the current project. PTMP Final EIS and other mitigation measures that have been incorporated into the current project are also discussed. The EA is divided into four sections with supporting appendices:

1. Purpose and need for the project
2. Description of the alternatives considered, including the no action and preferred alternatives
3. Environmental consequences of the alternatives, including mitigation measures and

4. A summary of the public involvement process, including responses to comments made during scoping; and a synopsis of agencies consulted, including issues raised during consultation

The Trust determined the specific contents of the EA through scoping, which commenced on October 6, 2009 and ended on December 1, 2009. During this time, the Trust established the precise nature and extent of the project, the range of alternatives, the specific impacts to be evaluated, and the methods to be used in their evaluation. The EA serves as the factual support for the conclusions in the finding of no significant impact (FONSI) (Appendix A). The EA/Draft FONSI was made available for public review during the 30-day period beginning July 1, 2010 and ending August 1, 2010 before the Trust made its final determination to move forward to implement the project and not prepare an EIS.



# 2 ALTERNATIVES

The following briefly describes the alternatives, including the no action and the preferred alternatives. All alternatives daylight an existing storm drain and restore an ecological corridor between the Thompson Reach and Crissy Field Marsh. All alternatives also provide pedestrian access and interpret the history of the site.

## 2.1 STREAM ALTERNATIVE (NO ACTION)

Under the Stream Alternative, stream restoration along the Quartermaster Reach as contemplated under the PTMP would be implemented, connecting the recently restored Thompson Reach to Crissy Field Marsh. Following rough grading and completion of the elevated roadway structure that would be undertaken as part of the Doyle Drive project, the stream would be daylighted from an existing 72-inch pipe to an open natural channel and associated riparian and coastal scrub corridor, capable of supporting wildlife habitat and seasonal and tidal water movements (Figure 1). A section of the existing 72-inch pipe would remain under Mason Street to convey water to Crissy Field Marsh. An existing 18-inch pipe to the east of the stream corridor also drains water to Crissy Field Marsh and would be retained. The Stream Alternative would restore approximately two acres of native vegetation (riparian, coastal scrub and dune scrub) similar to the Thompson Reach.

A new pedestrian trail would follow the alignment of a former railroad line and would complete the north/south connection between Lincoln and Mason streets as envisioned for the Tennessee Hollow Corridor in the Presidio Trails and Bikeways Plan. The upland elevations of the project site would be an open grassy area and/or landscaped with new ornamental and/or native

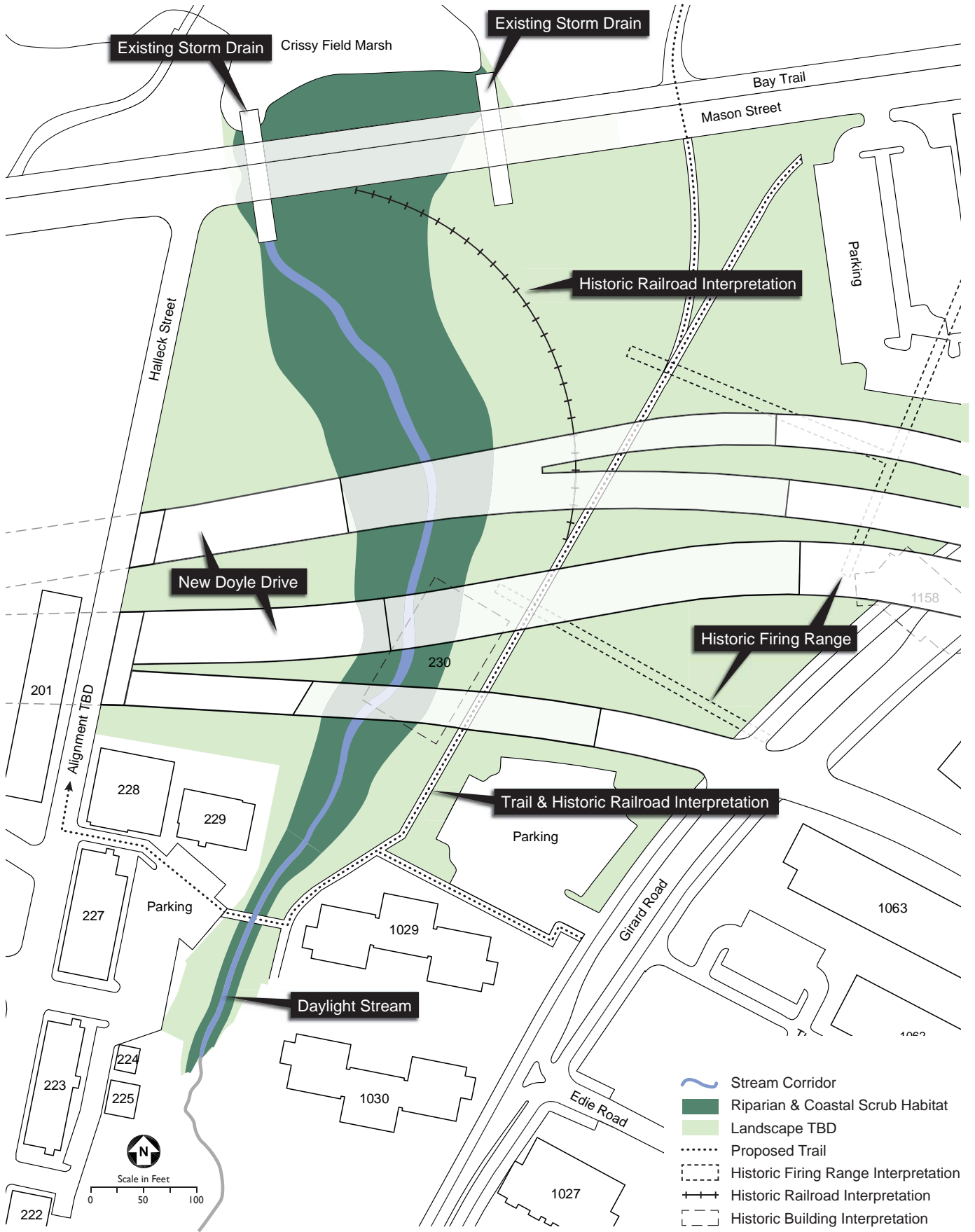
plantings as part of the overall design of the site. Firing ranges that once were at the site, or other features related to the historic cultural landscape (such as building footprints) may be represented by landscaped and topographic features if practicable. An east-west railroad spur through the central portion of the site would be interpreted in a manner that does not degrade the hydrology or habitat values of the restored habitat areas. An east/west trail would link Girard Road to Halleck Street, with a bridge above the restored stream that would clear span the active channel. To minimize impacts on ecological function, only one east-west crossing would occur. The foundations of Building 227 and associated parking would be protected. Parking for 40 cars would be made available for the adjacent developed Thornburgh area.








## 2.2 WETLAND ALTERNATIVE (PREFERRED ALTERNATIVE)

The Wetland Alternative would feature restoring the project site to a diverse wetland and riparian system following completion of the Doyle Drive roadway structure and rough grading (Figure 2). Existing storm water pipes would be daylighted throughout the project site and connect with Crissy Field Marsh through three 34-foot span box culverts placed beneath Mason Street. The segment of the existing 72-inch and 18-inch pipes beneath Mason Street may also be retained, providing additional conveyance of water between the project site and Crissy Field Marsh. Additional storm water from an adjacent watershed (Watershed B<sup>7</sup>) would be directed into the site to increase outflows. Constructed vegetated swales would filter the storm water before entering the

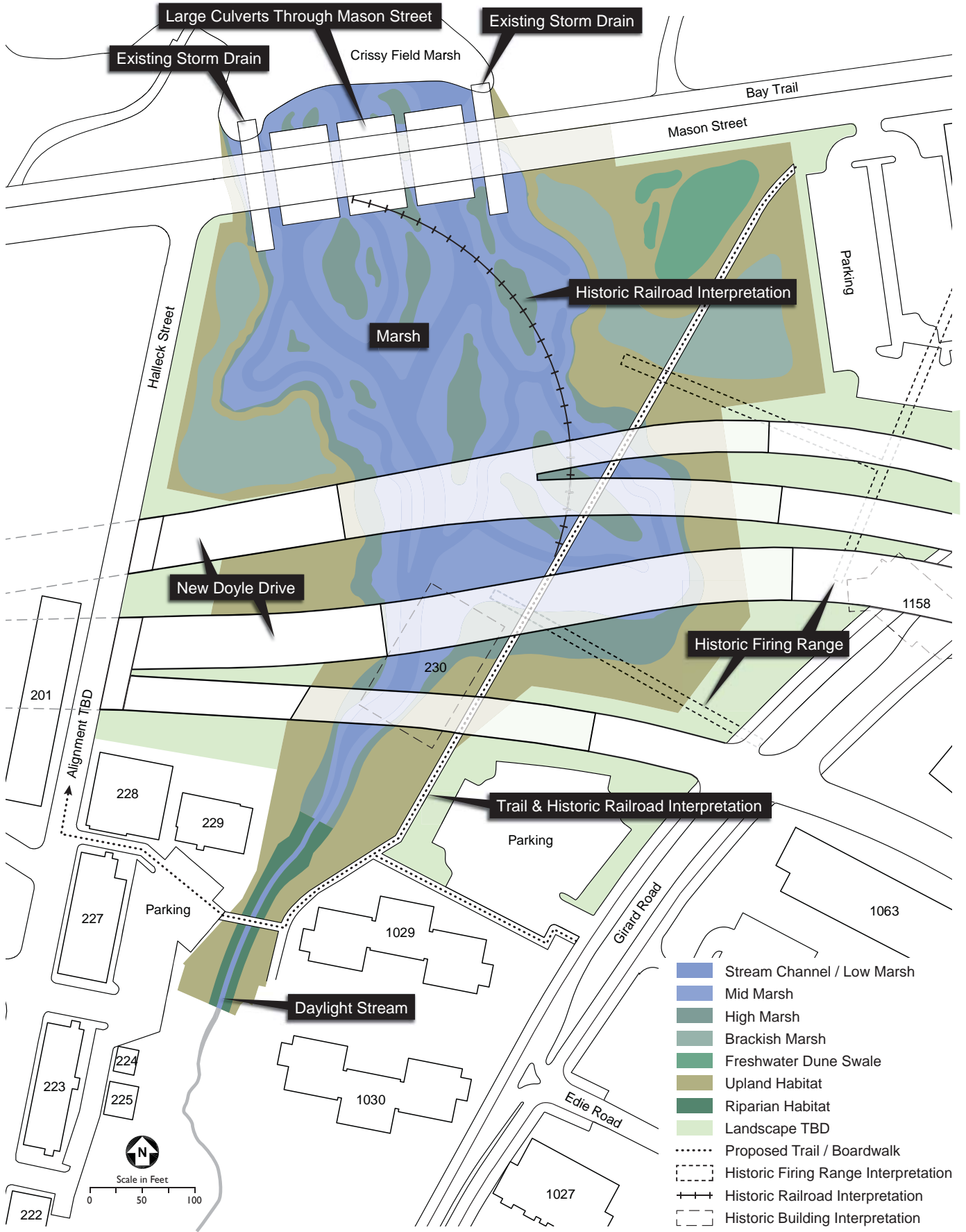
<sup>7</sup> See Figure 5.

# 1 STREAM ALTERNATIVE (NO ACTION ALTERNATIVE)



-  Stream Corridor
-  Riparian & Coastal Scrub Habitat
-  Landscape TBD
-  Proposed Trail
-  Historic Firing Range Interpretation
-  Historic Railroad Interpretation
-  Historic Building Interpretation

## 2 WETLAND ALTERNATIVE (PREFERRED ALTERNATIVE)



wetlands. Under this alternative, approximately 8.5 acres of native habitat would be restored, including upland scrub, riparian, freshwater dune swale, brackish marsh, and salt marsh.

A new pedestrian trail would follow the alignment of a former railroad line and would complete the north/south connection between the Main Post (Lincoln Boulevard) and Crissy Field (Mason Street) as envisioned for the Tennessee Hollow Corridor in the Presidio Trails and Bikeways Plan.

The trail would be a boardwalk and designed to be above water if feasible to allow sunlight for vegetation below. An east-west railroad spur through the central portion of the site would be interpreted in a manner that does not degrade the hydrology or habitat values of the project. An east/west trail would link Girard Road to Halleck Street, with a bridge above the restored stream that would span the active channel. To minimize impacts to the ecological function, only one east-west crossing would occur. Firing ranges that once were at the site, or other features related to the historic cultural landscape (such as building footprints) may be represented by landscaped and topographic features if practicable. The foundations of Building 227 and associated parking would be protected. Parking for 40 cars would be made available for the adjacent developed Thornburgh area.

## 2.3 LAGOON ALTERNATIVE

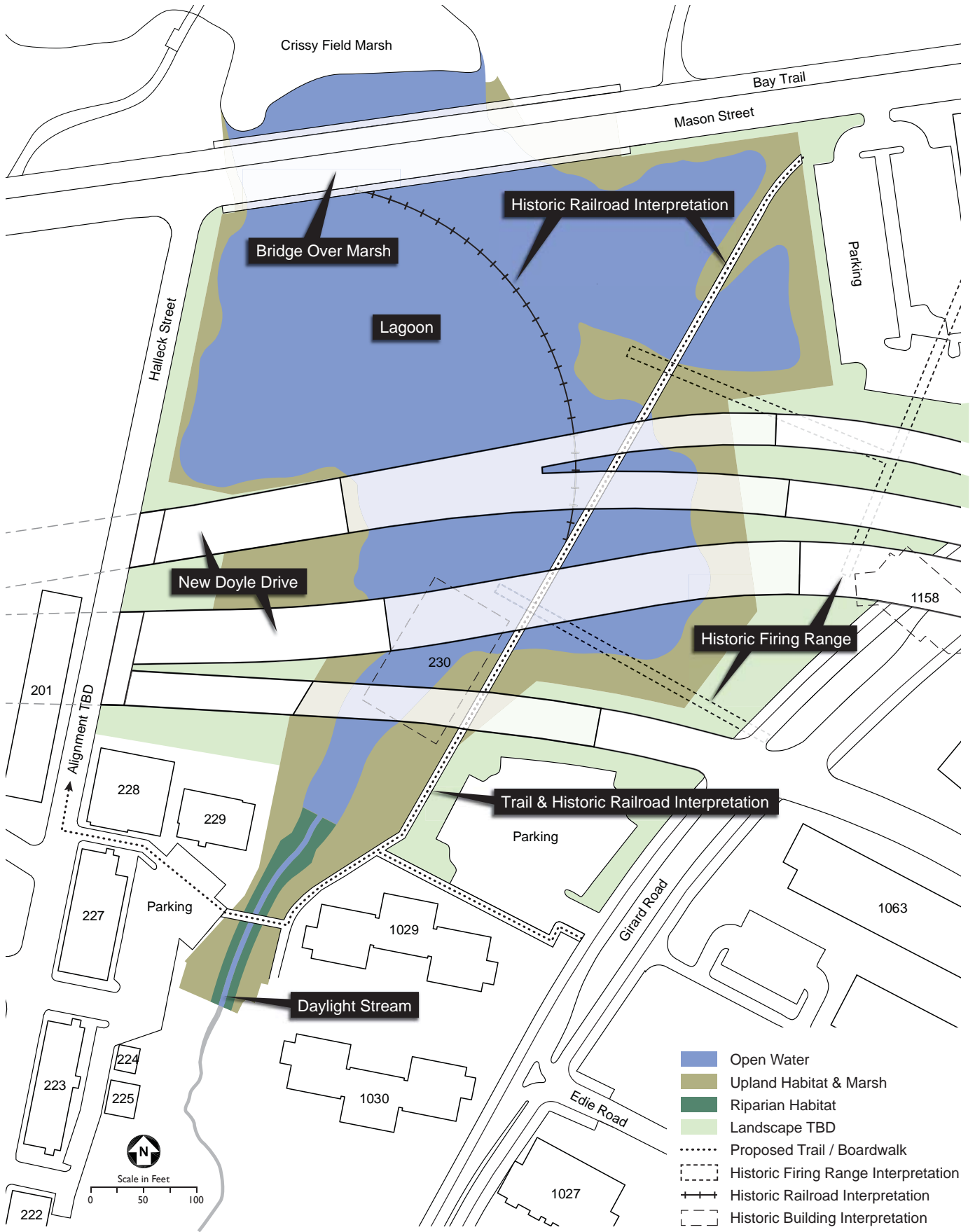
The Lagoon Alternative would grade the project site to maximize the tidal prism<sup>8</sup> within the project area to enhance continuous tidal action to Crissy Field Marsh. Similar to the Wetland Alternative, existing storm water pipes would be daylighted throughout the project site. The main body of the project reach between Mason Street and the Thompson Reach would be excavated deeper, providing deeper, intertidal and open water habitat. The southernmost portion of the project

site would be restored to riparian habitat. The existing 72-inch and 18-inch storm water pipes would be removed. A bridge over Mason Street, approximately 275 feet in length, would provide for water movement with storms and tides between the lagoon and Crissy Field Marsh. A wide swath of upland lying between Mason Street and Crissy Field Marsh would be excavated to accommodate a wider direct connection to Crissy Field Marsh beneath the bridge. The lagoon would consist primarily of open water surrounded by a narrow border of vegetation to create a transitional intertidal marsh (Figure 3). Plantings above the tidal zone would be progressively more upland in character to maximize buffering between the lagoon, wetland, and landscaped areas. Approximately six acres of open water (lagoon) would encompass the site, and approximately two additional acres would be restored to native riparian and coastal scrub habitat. Upland of the coastal scrub, the project site would be an open grassy area and/or landscaped with new ornamental and/or native plantings as part of the overall design of the site.

A trail alignment would facilitate pedestrian movement around the lagoon on the east side of the project site. Similar to the other alternatives, an east/west trail would link Girard Road to Halleck Street, with a bridge above the restored stream that would span the active channel. Firing ranges that once were at the site, or other features related to the historic cultural landscape (such as building footprints) may be represented by landscaped and topographic features if practicable. The foundations of Building 227 and associated parking would be protected. Parking for 40 cars would be reserved for the adjacent developed Thornburgh area.

<sup>8</sup> The volume of water flowing in and out of a tidal area with tides.

### 3 LAGOON ALTERNATIVE



# 3 ENVIRONMENTAL IMPACT OF THE ALTERNATIVES

## 3.1 WATER RESOURCES

### STREAM ALTERNATIVE

Improves hydrologic connection between the Thompson Reach and Crissy Field Marsh.

No increase in tidal prism to Crissy Field Marsh.

Provides tidal exchange between the Quartermaster Reach and Crissy Field Marsh.

No impacts to groundwater aquifers.

Exceeds hydrologic threshold for flow velocity.

### WETLAND ALTERNATIVE

Improves hydrologic connection between the Thompson Reach and Crissy Field Marsh.

Minimal increase in tidal prism to Crissy Field Marsh.

Provides tidal exchange between the Quartermaster Reach and Crissy Field Marsh.

No impacts to groundwater aquifers.

Meets hydrologic threshold criteria.

### LAGOON ALTERNATIVE

Improves hydrologic connection between the Thompson Reach and Crissy Field Marsh.

Moderate increase in tidal prism to Crissy Field Marsh.

Provides tidal exchange between the Quartermaster Reach and Crissy Field Marsh.

Potentially impacts groundwater aquifers through construction of bridge.

Meets hydrologic threshold criteria.

### AFFECTED ENVIRONMENT

An overview of the Presidio’s water resources are provided on pages 3-151 to 3-171 of the Doyle Drive Final EIS/R and pages 113 to 121 and 240 to 247 of the PTMP Final EIS. Information relevant to the Quartermaster Reach is summarized in the section below. Additional hydrologic and water quality investigations have been completed within the project site and are cited where referenced below.

#### Regulatory Setting

The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. The statute employs a variety of regulatory and non-regulatory tools to achieve the broad goals of restoring and maintaining the chemical,

physical, and biological integrity of the nation’s waters so that they can support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.”

*SECTION 404, CLEAN WATER ACT:* Section 404 establishes a program to regulate disposal of dredge or fill material in the waters of the United States. Waters of the United States are broadly defined to include waterways, their tributaries, and adjacent wetlands (33 CFR 328.3). Actions such as displacing soil into a wetland are subject to authorization by the U.S. Army Corps of Engineers and compensatory mitigation for any adverse impacts.

In addition to waters in the project site, potential jurisdictional wetlands and other waters of the

United States subject to Section 404 of the CWA in the project vicinity include El Polín Springs, the remnant riparian habitat in the Eastern Tributary, the area around the spring that feeds the Eastern Tributary, and Crissy Field Marsh.

As a policy matter, the Presidio Trust seeks to protect and enhance wetland habitat (Presidio Trust 2002). Additionally, Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid “new construction located in wetlands unless the head of the agency finds 1) there is no practicable alternative to such construction, and 2) the proposed action includes all practicable measures to minimize harm to wetlands.”

*SECTION 401, CLEAN WATER ACT:* Every applicant for a federal permit or license for any activity that may result in a discharge to waters of the United States must first obtain a State Water Quality Certification that the proposed activity will comply with state water quality standards. This Section 401 program protects all surface waters in its regulatory scope, but has special responsibility for wetlands, riparian areas, and headwaters because these water bodies have high resource value. As the appropriate state reviewing agency, the Regional Water Quality Control Board (RWQCB) may recommend mitigation for filling of wetlands and other impacts in accordance with the state wetland policy.

### **Physical Setting**

The 278-acre Tennessee Hollow Creek watershed is a north-south aligned drainage located within the Presidio of San Francisco (Figure 4). Three steep tributaries (Eastern, Central, and Western) define the upper watershed, which transitions from steep headwater hills to a flat coastal alluvial plain at the confluence of the tributaries, near McArthur Avenue between Fernandez Road and Presidio Boulevard (KHE and CGC 2006). The mainstem drainage, including the portion within the project site, is perennial downstream of its convergence.

After passing through a historic stone and concrete-lined channel below the confluence, the

creek enters a 72-inch storm drain that passes beneath Lincoln Boulevard and discharges into the recently daylighted and restored Thompson Reach, a 440-linear-foot section completed in 2005. The Quartermaster Reach of Tennessee Hollow Creek is located downstream (north) of the Thompson Reach, and consists of 850 linear feet of creek currently confined to a 72-inch tidally-influenced culvert buried under the existing ground surface beneath the existing Doyle Drive. This culvert discharges into Crissy Field Marsh just north of the intersection of Halleck and Mason Streets. To the east of the 72-inch pipe, a second 18-inch storm drain follows Marshall Street and discharges north to Crissy Field Marsh.

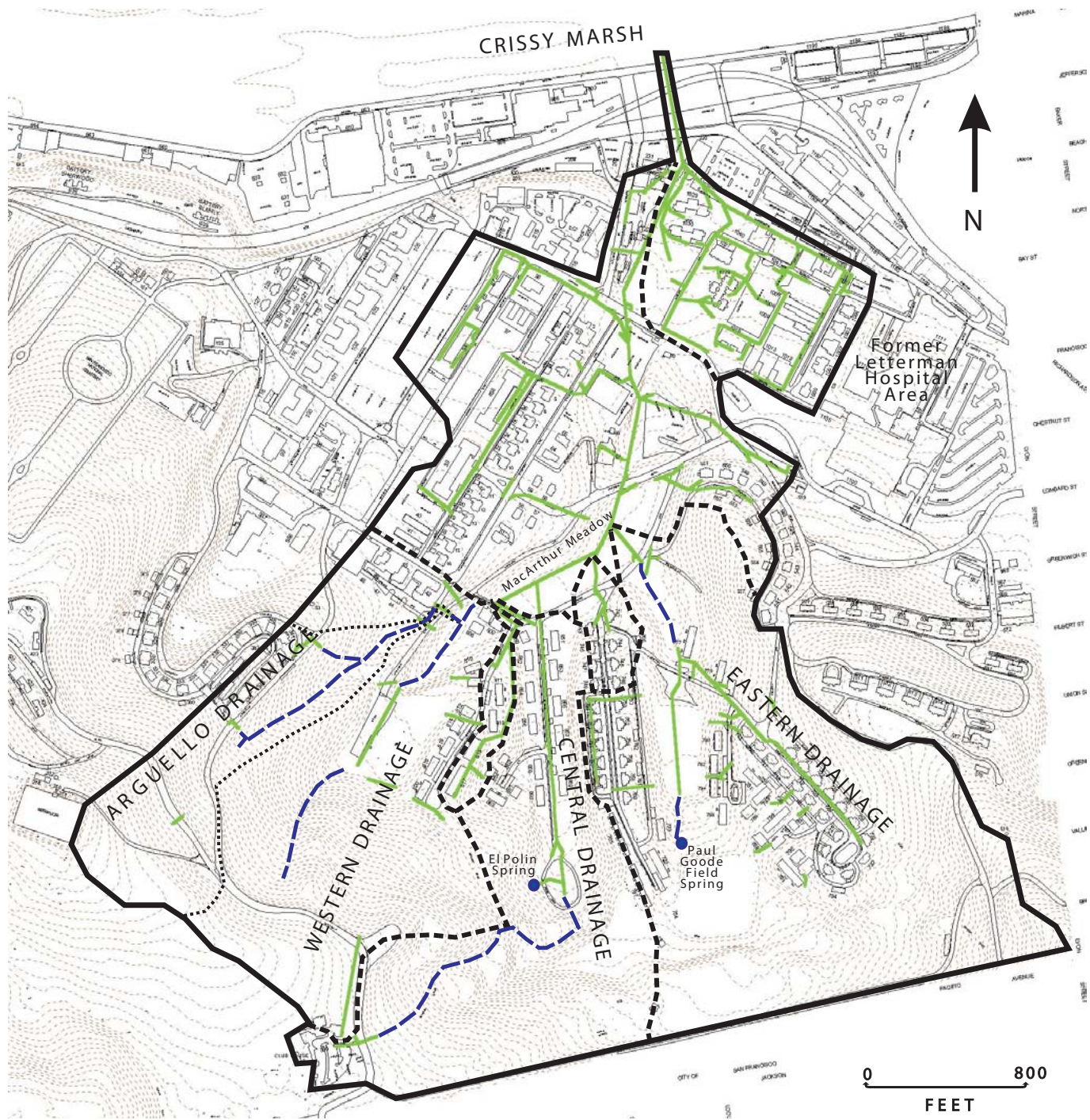
In its natural state, the Quartermaster Reach section of the Tennessee Hollow watershed likely exhibited all of the classic characteristics and processes of a San Francisco Bay plain watershed creek, emerging onto a coastal tidal wetland and lagoon.

### **Surface Water Flow Conditions**

The Tennessee Hollow surface water monitoring program describes the major sources for surface water, runoff produced from the three tributaries, surface and groundwater monitoring program framework, and water chemistry signatures (KHE 2003). The lower reaches of Tennessee Hollow Creek are characteristic of flash-prone urban streams, displaying sharp, flood peaks that arise almost instantaneously in response to a rainfall event, and recede quickly to relatively low base flow rates as storms pass. In the summer, base flow rates suggest irrigation runoff enters the system. Numerous lateral storm drains contribute storm and irrigation runoff to the main 72-inch storm drain.

Watersheds C and D currently drain to the project site (Figure 5). Watershed D conveys the Tennessee Hollow watershed and discharges to Crissy Field Marsh via the main 72-inch storm drain. Watershed C discharges to Crissy Field Marsh via the 18-inch diameter drain pipe. Watershed B is currently directed to San

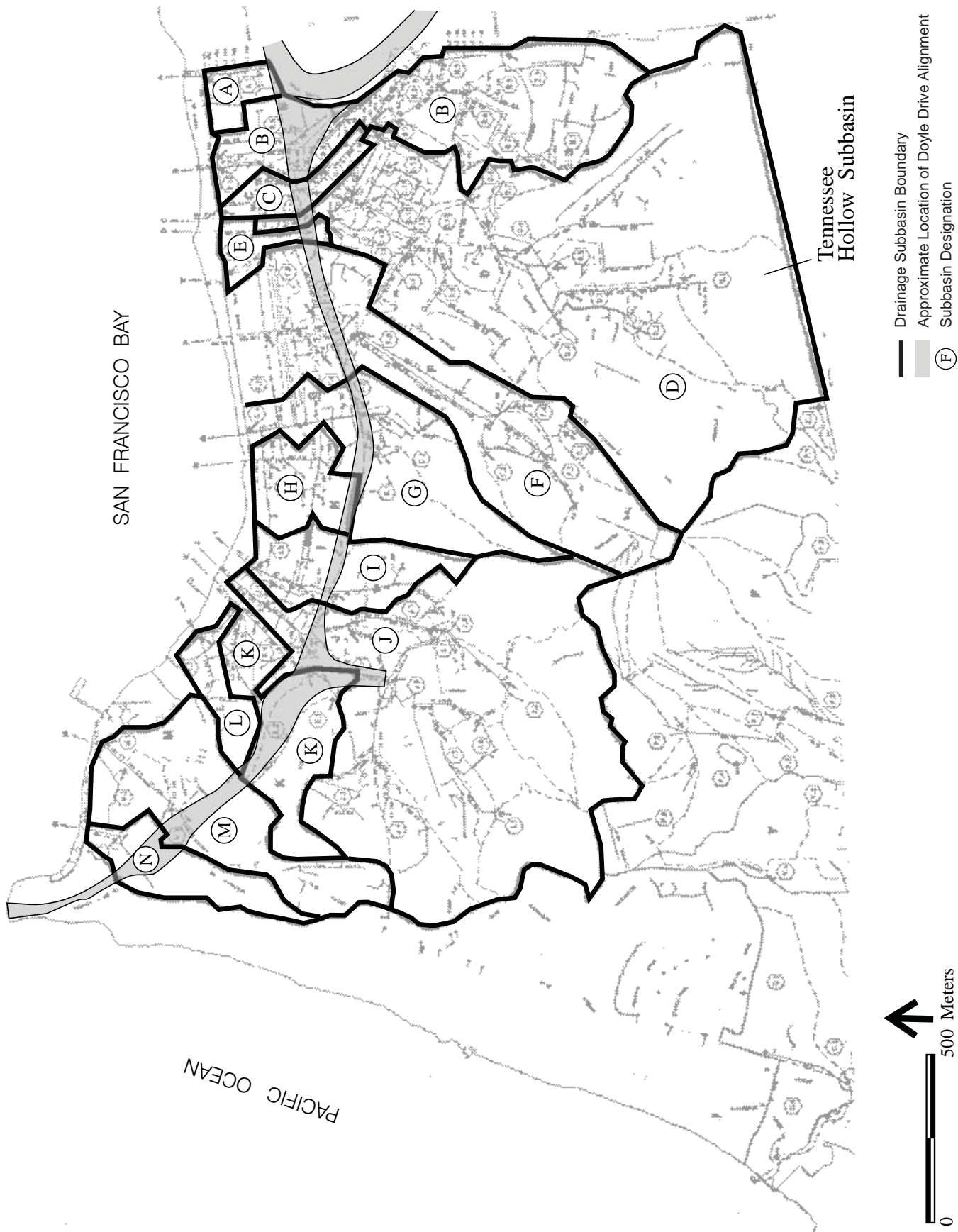
# 4 TENNESSEE HOLLOW CREEK WATERSHED



- 2002 Watershed Divide
- - - Tributary Drainage Basin Divide
- ..... Sub-basin Divide
- - - Earthen Tributary Channel
- Concrete Lined Channel or Storm Drain



# 5 WATERSHED SUBBASINS



Francisco Bay via a 42-inch diameter concrete pipe, outside of the project site boundaries. During construction of Doyle Drive, storm water from Watershed B may be directed into the project site. The 100-year storm event produces a peak flow rate of 229 cfs for the combined system of Watersheds B, C, and D (Dames & Moore 1994). Peak flow rates were independently compared to studies by Kamman Hydrology & Engineering with good correlation (KHE 2004). If only Watersheds C and D contribute to the Quartermaster Reach, as they currently do, the 100-year storm event produces a peak flow rate of 157 cfs.

Mean daily flow measured upstream of the project site in Water Year (WY) 2002<sup>9</sup> ranged from 0.01 to 2.3 cubic feet per second (cfs), with an average base flow of around 0.02 cfs. The peak flow in 2001/02 was measured at 12 cfs. Regardless of season, contributions of runoff to Crissy Field Marsh from the Tennessee Hollow watershed are relatively minor compared to the diurnal tidal exchange when the marsh inlet to the bay is open.

The project site has not been included in the Federal Emergency Management Agency's (FEMA) regional flooding hazards mapping program (none of the city has been included in the federal program). Therefore, areas subject to flooding during the 100-year storm event, if any, have not been delineated within the Presidio by FEMA. No other sources of floodplain data for the project site have been identified. However, flooding has not been identified as a major past problem or a concern within the project site.

### Tidal Influence

Tidal datums for National Oceanic and Atmospheric Administration's (NOAA) San Francisco Bay Presidio tide gauge are presented in Table 1 along with the associated tidal-

inundation-duration statistics relative to Crissy Field Marsh.

## 1 SAN FRANCISCO BAY TIDAL ELEVATIONS (MEAN TIDAL MONTH) AT STATION 9414290

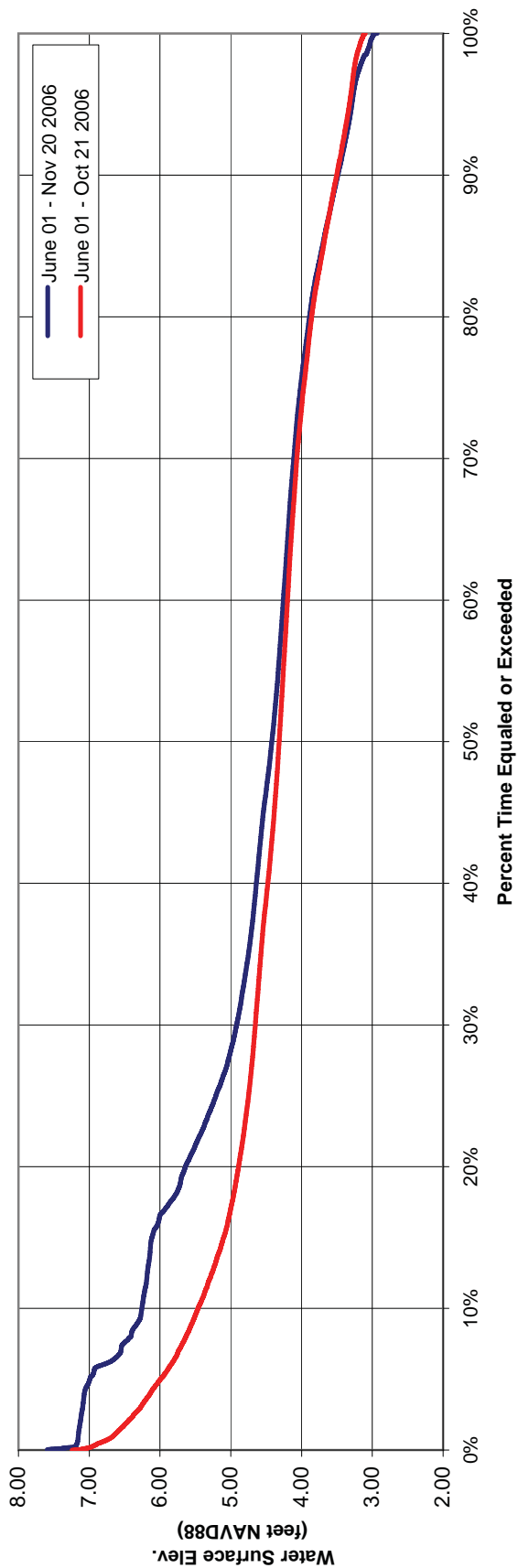
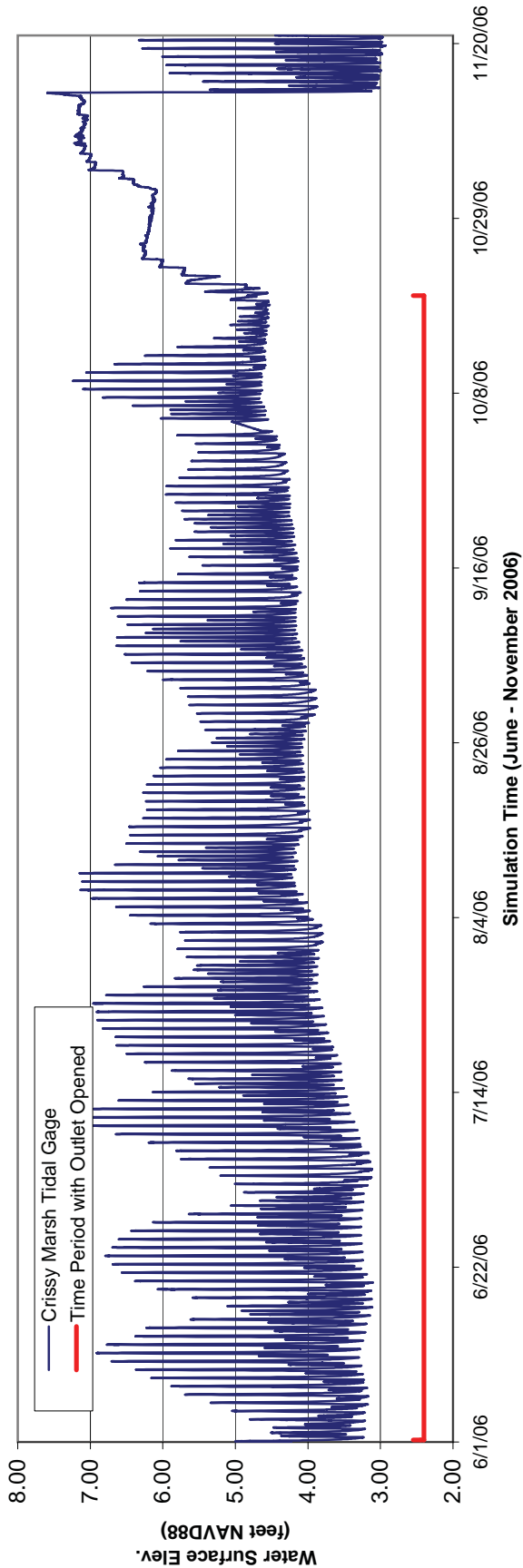
DATUM	FEET (NAVD88)	PERCENT TIME EQUALED OR EXCEEDED
MHHW	5.9	6.4
MHW	5.3	13.7
MSL / MTL	3.3	57.0
MLW	1.2	84.3
MLLW	0.1	93.6

Source: NOAA

Water level measurements within Crissy Field Marsh have been continuously recorded and studied since 2005. The time period between June 1 and November 20, 2006 (NPS 2006) is presented in Figure 6 and is representative of the full range of tide water elevations recorded within Crissy Field Marsh. When the inlet connecting Crissy Field Marsh and San Francisco Bay is open, maximum observed tide levels reached 7.2 feet NAVD88 and were equal to maximum water levels recorded in the bay at NOAA's Presidio tide gauge. The minimum tidal level in Crissy Field Marsh never fell below 3.0 feet (NAVD88); this elevation represents the lowest bed elevation of the channel (or thalweg) within Crissy Field Marsh as it passes over the flood tidal delta before draining into San Francisco Bay. Over the observed time period, the low water elevations in the marsh gradually increased as sand deposited in the inlet and marsh. After October 21, 2006, the inlet to the bay closed for several weeks and the marsh no longer drained during low, outgoing tides. Marsh water levels gradually increased due to continual inputs of bay water over the top of the sand barrier during high

<sup>9</sup> A water year is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2002, is called the "2002 water year."

# 6 RECORDED WATER LEVELS AT CRISSY FIELD MARSH (JUNE - NOVEMBER 2006)



tides. This event produced maximum water surface elevations in Crissy Field Marsh of approximately 7.6 feet NAVD88. Because the existing Tennessee Hollow 72-inch storm drain has a very shallow gradient and the base of the outfall is located at an elevation equivalent to MLLW, tidal influence is propagated over 900 feet upstream of Crissy Field Marsh into the northern half of the recently restored Thompson Reach.

### **Groundwater Conditions**

Within the Tennessee Hollow watershed, groundwater is found in dune sands and Colma formation sediments in the southern and central areas of the watershed, and within the interbedded sands and bay mud in the north (KHE 2002 and 2003). Groundwater is also encountered in Franciscan bedrock along the margins and underlying the watershed; however, bedrock is not generally considered to be a considerable source of groundwater in comparison to overlying unconsolidated sediments (Montgomery Watson 1996, KHE 2002).

Within the Tennessee Hollow watershed, groundwater flow is generally from south to north, towards San Francisco Bay. Depth to groundwater in the watershed ranges from the ground surface at El Polín and Eastern Tributary Springs to approximately 65 feet bgs in the Eastern Tributary watershed. Groundwater elevations rise and fall seasonally with changes in precipitation.

Within the project site, groundwater levels tend to be 4 to 6 feet below the ground surface (bgs) in the low lying areas where the mudflat, low and mid-high marsh complex are proposed in the Wetland Alternative. Variations to this include the area north of Mason Street where groundwater is closer to the surface (range of 0.5 to 3 feet bgs) and a range of 10 to 13 feet bgs in the southwest end of the project site. Typical seasonal variability in groundwater levels is around 0.5 to 2.0 feet.

Subsurface conditions beneath the project site (near the planned Doyle Drive causeways) consists of a layered alluvial sand aquifer within

the upper 30 feet, with three distinct water-bearing zones separated by less permeable clay layers (bay mud). The layers are identified as the unconfined Shallow Zone (0 to 7 feet bgs), the semi-confined Intermediate Zone (12 to 20 feet bgs) and the confined Deep Zone (22 to 85 feet bgs). The unconfined Shallow Zone occurs in fill material placed on top of the 7-foot thick Bay Mud clay. This Bay Mud layer is interpreted to represent the historic tidal marshplain that occurred prior to filling of this area. The upper 7 to 8 feet of the confined Deep Zone consists of relatively young marine beach sands, lying on top of Colma Formation sand, which constitutes the lower portion of the Deep Zone.

There is an upward vertical hydraulic gradient within the layered aquifer system. This upward flow of groundwater is a likely slow yet steady supply of freshwater to Crissy Field Marsh and the proposed restored creek and brackish marsh areas under the Wetland Alternative. Excavating into the confining clay layer would be avoided where possible in order to minimize impacting the underlying semi-confined intermediate aquifer zone.

Tidal effects on groundwater are minor and limited to the near shore environment, raising/lowering elevations only 0.01 to 0.1 feet. Tidal effects on groundwater wells located 300 feet from shore of Crissy Field Marsh were measured at less than 0.05 feet of change in elevation.

### **Water Quality**

A variety of surface and groundwater quality investigations have been completed in the watershed. Most of the long term monitoring is being done in association with the Presidio Environmental Remediation Program. Several landfill/fill sites in the watershed have been remediated, or are slated for remediation. Monitoring of the potential contamination of groundwater and seep water is integral to remediation planning, implementation and post-cleanup monitoring. The entire Tennessee Hollow Creek corridor (and most of the watershed) has

been designated by the RWQCB as a Freshwater Ecological Protection Zone (Water Board Order No. R2-2003-0080).

As a result, this area is subject to more stringent cleanup levels than other areas of the Presidio. Cleanup levels are designed to be protective of human health and ecological receptors, and anticipate the future restoration of the creek. All remediation activities in the watershed have been or will be designed to ensure the protection of human and ecological health, as well as the future creek habitat.

In addition to monitoring associated with the remediation program, water quality sampling was conducted to inform planning for the Tennessee Hollow Upper Watershed Revitalization project (upstream and south of the project site). Parameters measured include pH, specific conductance (conductivity), salinity, total dissolved solids, temperature, Escherichia coli (E. coli) coliform bacteria, and dissolved oxygen. Data were reviewed to determine whether current water quality would pose any limitations or concerns for future restoration. In general, all parameters monitored were compliant with relevant Basin Plan objectives for surface waters in the San Francisco Bay basin; and no impediment to creek restoration was identified (Presidio Trust 2007). When the marsh inlet is open, freshwater inflow has a spatially limited effect on marsh water quality that appears to be primarily confined to the areas within several meters of the outfall pipes where they drain into the marsh. Water quality monitoring adjacent to the outfalls in Crissy Field Marsh indicate high levels of nutrients and bacteria, relative to other areas of the marsh.

No saltwater intrusion into the groundwater aquifer has been identified. Groundwater wells located 150 feet and further from shore show total dissolved solids and chloride levels comparable to freshwater levels. Two sampled wells, HGB-2-20, located northwest of the proposed northernmost causeway and HGB-3-28, just west of Building 230, showed salinity levels of only 0.3 parts per

trillion (ppt). Crissy Field Marsh surface water salinity generally ranges from 30 to 32 ppt from late spring through fall when the inlet is open. Hypersaline conditions have not been observed during the periods of inlet closure and tidal exclusion in the summer. During inlet closures in the winter, salinities drop when freshwater runoff enters the marsh from storm drains without inputs of saline water from the bay. Groundwater contributions also provide freshwater inflow to Crissy Field Marsh. During prolonged inlet closure during the winter, measured average daily marsh salinities have dropped as low as 13 ppt, but tend to remain above 20 ppt.

### **Sea Level Rise and Climate Change**

Tide heights and tidal datums increase over time with sea level rise. The NOAA's National Ocean Service (NOS), the federal agency responsible for sea level monitoring and providing tidal data, periodically updates tidal datums to account for sea level rise; the most recent update occurred in 2003 for measuring stations in the region. Based on historic measurements from 1977 to 2006, NOS estimates a 4.7 millimeter per year (mm/yr) sea level rise (equivalent to 1.55 feet in 100 years) at the San Francisco Bay Presidio gauge. A recent study of sea level rise by the Pacific Institute predicts that mean sea level along the California coast is projected to rise from 1.0 to 1.4 meters (m) by the year 2100 (Pacific Institute 2009, IPCC 2007, USACE 2009). Because of future accelerated sea level rise, the USACE (2009) established guidance for incorporating direct and indirect physical effects of projected future sea-level rise change in managing, planning, engineering, designing, constructing, operating, and maintaining all USACE civil works projects.

### **Storm Surge and Tsunami Hazards**

Under existing conditions, storm surge high tides (8.7 feet) would not overtop Mason Street or adversely impact the Quartermaster Reach corridor. However, under a 1-meter predicted future sea level rise conditions (circa 2100 A.D.), a synchronous storm surge during high tide (12.0

feet) would top Mason Street (low point in existing roadway is 10.4 feet) under all alternatives being considered. This is an anticipated condition that would be equivalent under all project scenarios.

San Francisco Bay, and its tidally influenced tributaries, are partially protected from inundation and damage associated with tsunamis<sup>10</sup> because of the restricted hydraulic access at the Golden Gate. The predicted 100-year tsunami wave run-up at the bay front adjacent to the project site has been estimated at 10.5 feet (Baseline 2004). As stated in Baseline's technical report for Doyle Drive:

*Those portions of the project site below the elevation of extreme high tide or tsunami wave run-up elevation, added to the incremental increase in elevation resulting from predicted sea level rise, and not protected by berms, levees or other similar features, could be subject to increased flooding hazards as time progresses. Based on review of a detailed topographic map, it appears that the existing grade along some portions of the alignment in the vicinity of the Main Post and Tennessee Hollow is at or below the elevation that may allow flooding by the tsunami hazard described.*

## ENVIRONMENTAL CONSEQUENCES

The following project restoration objectives guided the hydrologic and water quality analyses of environmental consequences:

- Maximize ecological wetland and aquatic habitat, including brackish marsh habitat.
- Provide increased tidal exchange between Crissy Field Marsh and the Quartermaster Reach.
- Provide improved passage and habitat conditions for fish and wildlife.
- Avoid excessive scour and bed erosion.

<sup>10</sup> A tsunami is a sea wave produced by an offshore earthquake, volcanic eruption, or landslide.

- Provide increased drainage of storm water runoff from the Presidio.
- Protect groundwater resources

Specific project design criteria for the Mason Street crossing include:

- conveying daily and monthly spring high tides through the crossing without attenuating the Quartermaster Reach water levels;
- maintaining the surface of Mason Street at the existing height (approximately 10.4 feet NAVD88) while providing at least 3 feet of vertical overhead space for buried utility crossing within the crossing structure<sup>11</sup>;
- minimizing scour velocities through the crossing structure; withstanding salt water corrosion;
- considering visual aesthetics;
- improving passage for fish and wildlife; minimizing shading and other impacts to vegetation and wildlife;
- preventing tidal damping<sup>12</sup>;
- preventing damage to groundwater aquifers and aquitards;
- allowing the flexibility for the Quartermaster Reach to be a dynamic ecological system; and
- providing sufficient capacity to convey the 100-year storm event flows being directed into the Quartermaster Reach (Dames and Moore 1994).

Influence of sea-level rise, wave run-up, and tsunamis were also evaluated as part of this analysis.

<sup>11</sup> A 5.6-foot (NAVD88) elevation is the maximum bridge or culvert soffit elevation given roadbed and utility crossing constraints.

<sup>12</sup> For purposes of this section, tidal damping refers to constraining and reducing the exchange of water and associated water levels between Crissy Field Marsh and the Quartermaster Reach.

The maximum design width of the Quartermaster Reach at the Mason Street crossing spans nearly 270 feet, and cumulative width of roadway and sidewalks (in the direction of flow) is approximately 56 feet. Concrete with epoxy-coated reinforcement was assumed to be the material of choice for the crossing structure(s) due to its tolerance to salt water corrosion.

### Methodology

A hydraulic model was used to evaluate the wetland/creek restoration and crossing alternative design configurations against project objectives and crossing design criteria listed above. The MIKE11 hydraulic model code was used to develop models reflecting the proposed restoration design for each alternative. MIKE11, developed by DHI Water and Environment, Inc., is a FEMA-accepted model for simulating flow, water levels, water quality, and sediment transport in rivers, floodplains, tidal wetlands, reservoirs and other inland water bodies.

Model runs representative of each alternative were completed using design storm hydrographs as input (peak flows ranging from the 10- to the 150-year recurrence interval) and static tidal water surface elevations. Results were verified with model runs illustrating no storm water inflow coupled with dynamic tidal cycling from the representative period from June 1, 2006 through November 21, 2006 to observe velocities created by tidal action alone. Scour due to wave or wind action was not studied.

The specific hydrologic and model boundary conditions simulated for each alternative include the following:

- Existing flood flow conditions, including floods having a 10- through 150-year recurrence interval from Watersheds C and D. Although the design life of the Mason Street crossing is between 75 and 100 years, the 150-year flood was chosen to represent the possible increase in flood magnitude associated with climate change.
- Project flood flow conditions, including floods having a 10- through 150-year recurrence interval from Watersheds B, C, and D.
- Crissy Field Marsh minimum tide level of 3.0 feet NAVD88 as restricted by existing-conditions inlet elevations.
- Crissy Field Marsh minimum tide level of 1.5 feet NAVD88, reflecting potential reduced inlet elevation (associated with climate change and/or Crissy Field Marsh adaptive management actions).
- Maximum Crissy Field Marsh water level of 8.7 feet, reflecting extreme storm and atmospheric conditions (based on highest observed [100-year] storm tide at Presidio Gage, 01/27/83).
- Predicted maximum Crissy Field Marsh water level of 12.0 feet, reflecting future storm conditions assuming 1.0-meter of sea level rise by the year 2100 (USACOE 2009).

Throughout the alternatives development process, a suite of evaluation criteria were developed to evaluate the relative success of any given alternative in meeting specific project objectives. The following hydrologic design criteria, developed by the technical design team, were used for this purpose:

- No attenuation or restricted tidal exchange between Crissy Field Marsh and the Quartermaster Reach wetlands is acceptable. Reducing tidal exchange would reduce area of wetland inundation.
- No potential substantial impact to the intermediate semi-confined aquifer zone. Breaching the confining clay layer between upper and intermediate aquifers could adversely alter the hydraulic properties and function of the intermediate zone. Alternatives were designed to avoid this potential impact.
- Constricting the Mason Street crossing connection between Crissy Field Marsh and the Quartermaster Reach could yield elevated

flow velocities, which would cause undesirable channel and marshplain scour in the vicinity of the crossing. Therefore, the Mason Street crossing was designed so that velocities during summer (no flood inflow) tidal exchange were less than 1.5 feet/second (ft/s). A scour velocity threshold of 1.5 ft/s was deemed reasonable for the crossing structure as this flow velocity is capable of mobilizing and transporting silt and fine grained sand, material that occurs in Crissy Field Marsh and is anticipated through the Quartermaster Reach.

- The crossing was also designed to keep flood scour velocities under 3.0 ft/s during a 100-year peak flow. A scour velocity threshold of 3.0 ft/s is likely to cause localized scour on a very low frequency period. It is believed that this type of scour would be within the natural range of disturbance during flood flows and would fill in or recover over time in response to average sediment delivery and deposition acting during non-flood periods.

### **Stream Alternative**

Creek channel grading work would not adversely alter the underlying groundwater conditions or extend through the upper Bay Mud clay segregating the upper and middle aquifers.

Modeling results indicate that there would be little to no tidal damping under the Stream Alternative. This is primarily a result of there being very little storage volume associated with channel creation. The existing culverts would provide sufficient exchange to match water levels between Crissy Field Marsh and the restored Quartermaster Reach channel.

Daylighting the creek and directing it through an earthen channel would introduce the possibility for channel erosion and evolution immediately after construction. However, based on observations of revegetation success in the recently restored and adjacent Thompson Reach, it is likely that the Quartermaster Reach would become well vegetated with riparian and wetland vegetation within 2 to 3 years after construction. The

establishment of vegetation would act to stabilize the channel and narrow flood/marshplain, reducing the erosion potential to a level that would be experienced in a naturally occurring tidal creek channel. During and immediately post-construction, erosion control measures would be provided so that the water quality at Crissy Field Marsh would not be substantially degraded.

During 10-year and larger floods, coupled with Crissy Field Marsh minimum tide level of 3.0 feet NAVD88 as restricted by the existing-conditions inlet elevation, flow velocities exceed the 3.0 ft/s design criteria (7.3 ft/s during a 10-year flood to 7.9 ft/s during a 100-year flood). Flow velocities under non-flood, maximum tidal exchange periods also exceed the stipulated design tidal exchange velocity threshold criteria of 1.5 ft/s (maximum velocity is 4.5 ft/s). Flood events during high tide conditions would lead to considerable back water conditions, with the Quartermaster Reach water levels approaching 10 feet in elevation or less than half a foot from overtopping Mason Street.

Directing all tidal and flood flow through a remnant section of the 72-inch storm drain culvert would create areas of elevated flow velocity both immediately upstream and downstream of the crossing. Flow velocities would exceed the threshold to mobilize and transport existing sediment and are believed to pose a considerable threat for erosion unless mitigated. Apart from potentially elevated turbidity associated with channel erosion, creation of the stream corridor is not anticipated to negatively affect water quality to the created creek and wetland system or to substantially alter the water quality in Crissy Field Marsh. Currently, flow in the 72-inch culvert originates from runoff and storm drain returns servicing the Presidio. Daylighting the creek would potentially provide the opportunity to improve runoff water quality, as flow rates would be attenuated and exposed to filtration by riparian and wetland plants. Filtration would be further enhanced with the inclusion of vegetated swales, located at the outfall of all storm drains feeding the Quartermaster Reach. In addition, the created



creek channel and surrounding wetlands may intersect the underlying unconfined shallow water table and groundwater seepage may augment creek flow, reducing salinity.

*CONCLUSION: Daylighting the Quartermaster Reach would have no adverse effect on surface water flow, groundwater conditions, or water quality. Over the long term, flood water attenuation and filtration by the restored wetland and ecological corridor may provide improvements to water quality, in both the restored project reach and the receiving Crissy Field Marsh. Short term, construction-related impacts pose the greatest potential impacts to water quality.*

### **Wetland Alternative**

Similar to the Stream Alternative, construction for the Wetland Alternative could introduce the potential for erosion within the project site and carried into Crissy Field Marsh. During and immediately post-construction, erosion control measures would be provided, consistent with mitigation measures in the PTMP Final EIS, Tennessee Hollow Upper Watershed Revitalization Project EA, and the Doyle Drive Final EIS/R.

Under this alternative, a broad, diverse tidal marsh-creek interface would be created, resulting in increased wetland acreage. Because of the wider openings of the three box culverts and the existing 72-inch pipe culvert, compared to the Stream Alternative, an additional comparatively wide area of uplands lying between Mason Street and Crissy Field Marsh would be excavated and converted to tidal marsh habitat. The proposed culvert configuration would accommodate full tidal exchange under high/low tide and high/low storm flow conditions without any tidal damping.

An important objective of the project is to expand brackish marsh habitat within the Crissy Field Marsh / Tennessee Hollow Creek interface. The approach for creating brackish marsh habitat relies on groundwater as the primary freshwater supply, mixed with higher salinity bay waters. To

achieve this, project grades would be lowered by excavation to expose the underlying shallow unconfined water table as a seepage front along a gently sloped surface. This type of exposure would occur around the perimeter of the deeper tidal marsh excavations and internal channels. The type and extent of brackish marsh habitat would be limited by slope and extent of exposed seepage. This approach to access additional fresh water could be augmented by integrating storm water outfalls that discharge at more distal and higher elevations and flow across the gently sloping flood/marshplains. Alternate brackish marsh designs propose to excavate an off-channel depression to expose and contain groundwater, similar to the existing dune swale north of Mason Street. An intervening berm would be designed to segregate this depression or pond from adjacent tidal waters except for inundation during higher tides on a desired frequency. Adaptive management of the intervening berm height and/or gated control structures would allow for fine tuning the amount and frequency of mixing between tidal salt water and fresh ponded groundwater to get the desired habitat or alleviate potential water quality impairments.

Similar to the Stream Alternative, creek channel and marshplain grading work would not adversely alter the underlying groundwater conditions as excavation would not extend through the upper Bay Mud clay segregating the upper and middle aquifers. Construction of the three box culverts may extend into and slightly through the upper Bay Mud clay to accommodate culvert footings. Incursions through the upper Bay Mud clay, if any, would only occur for one or two feet into the upper portion of the intermediate aquifer. Where this occurs, culvert designs would include engineered impermeable material placed into the bottom of excavations and beneath the culverts to preclude a hydraulic connection between upper and intermediate aquifers.

Hydraulic modeling results indicate that little to no tidal damping would occur between Crissy Field Marsh and the Quartermaster Reach under any

modeling scenario for this alternative. The culverts would provide sufficient conveyance to provide full tidal exchange, even when culverts are completely submerged. Modeling results also indicate that during current (existing conditions) low creek inflow (non-flooding) periods, when water level fluctuations are tied to tidal exchange (the inlet between Crissy Field Marsh and San Francisco Bay is open), culverts having a soffit elevation of 5.6 feet (NAVD88) would be completely inundated (filled) about 9 percent of the time (based on representative Crissy Field Marsh tidal data collected between June and October 2006). When the outlet to Crissy Field Marsh is closed, a soffit elevation within Crissy Field Marsh of 5.6 feet would be exceeded or equaled 21 percent of the time (based on representative Crissy Field Marsh tidal data collected between June and November 2006).

The 100-year storm event produces a peak flow rate of 229 cfs (Dames and Moore 1994), which includes all flows generated by Watersheds B, C, and D. Peak flow rates were independently compared to studies by KHE with good correlation (KHE 2004). To demonstrate existing flood conditions flowing through three 34-foot span box culverts and the 72-inch pipe culvert, a high tide of 8.7 feet elevation in Crissy Field Marsh (maximum Crissy Field Marsh tide level reflecting existing condition storm surge based on highest observed [100-year] storm tide at Presidio Gage, 01/27/83) coupled with a 100-year storm event of 229 cfs flowing into the Quartermaster Reach, produced water surface elevations upstream of Mason Street of 8.8 feet. The difference in water surface elevation between upstream and downstream of the Mason Street crossing was negligible. Under future sea-level rise conditions, a high tide of 12.0 feet coupled with a 150-year storm event (240 cfs), produced water surface elevations upstream of Mason Street of 10.0 feet.

Peak velocities through the culvert crossing occur during peak storm runoff and low tide water conditions. Based on review of available Crissy Field Marsh tidal data, a minimum 1.5-foot tail

water depth occurring during low tide conditions (the existing conditions low-tide water level in Crissy Field Marsh is about 3.0 feet) was assumed. For this analysis, culvert soffit height of 5.6 feet was irrelevant because water surfaces do not reach the soffit elevation during low tide and high velocity conditions. For example, a Crissy Field Marsh minimum tide level of 1.5 feet (reflecting potential reduced inlet elevation associated with climate change and/or Crissy Field Marsh adaptive management actions) coupled with a 150-year storm event (240 cfs), produced water surface elevations upstream of Mason Street of 2.6 feet.

Under 100-year flood conditions (Watersheds B, C and D contributing flows and inlet bed elevation of 3.0 feet), the three 34-foot span box culverts and the 72-inch pipe culvert experience maximum velocities of 1.6 ft/s. Under future flood conditions (150-year flood, Watersheds B, C and D contributing flows, and inlet bed elevation of 1.5 feet), peak flow velocities increase to 4.0 ft/s. During non-flooding periods, maximum tidal exchange velocities do not exceed 0.8 ft/s.

Similar to the Stream Alternative, the restoration of tidal wetland and ecological corridor through the Quartermaster Reach associated with the Wetland Alternative would likely provide improvements to water quality in Tennessee Hollow Creek and Crissy Field Marsh. Daylighting the creek and the creation of a broader marshplain/ecological corridor would introduce flood storage and water filtration benefits, reducing urban runoff constituent loading to Crissy Field Marsh and San Francisco Bay. Where possible, storm drain runoff directed into the Quartermaster Reach would be routed through low gradient, vegetation-lined swales outside of the proposed habitat restoration areas to dissipate flow energy and better filter urban runoff. Creek flows, augmented with groundwater seepage would also create brackish marsh habitat, an extremely valuable habitat type that has become rare throughout the San Francisco Bay.

*CONCLUSION: As proposed, the Wetland Alternative would have no adverse impact on surface water flow, groundwater conditions, or water quality. The alternative satisfies all project hydrologic design criteria with the exception of potentially high 100-year flood flow velocities through the culvert crossing under future sea-level rise conditions and a lower Crissy Field Marsh inlet channel bed elevation (1.5 feet vs. current 3.0 feet). Under current hydrologic conditions, the Wetland Alternative satisfies all hydrologic design criteria. With the implementation of successful construction best management practices, there would be no substantial environmental impacts associated with this alternative.*

### **Lagoon Alternative**

The increased tidal prism associated with the Lagoon Alternative would provide an improved inlet condition between Crissy Field Marsh and San Francisco Bay. Although the alternative would maximize the extent of tidal prism in the project site, the incremental increase is not anticipated to be sufficient to keep the inlet of Crissy Field Marsh open, without occasional mechanical intervention.

Construction of a bridge crossing would require the installation of numerous pilings driven through or into the three aquifer layers (and through the two Bay Mud confining clay layers) underlying the site, posing the greatest threat to groundwater resources. Although piling borings could be cased off to minimize the creation of vertical hydraulic connections between aquifer layers, the sheer number of pilings (likely over 100) would introduce more risk of disturbing subsurface stratigraphic conditions and groundwater flow dynamics. Regardless, the increased width in connection between Crissy Field Marsh and the Quartermaster Reach would allow for increased geomorphic evolution and adjustment of the restored project site.

Excavation of a deeper and broader lagoon body may completely eliminate (remove) the shallow unconfined aquifer zone. This would reduce the

area of marsh/floodplain that intersects groundwater, limiting the extent of the low gradient seepage front and sustainable brackish marsh and seasonal wetlands within the project site.

The Lagoon Alternative would provide complete and unimpeded tidal exchange and flood water drainage and no tidal damping, even with: 1) future sea-level rise conditions, 2) the addition of drainage Watershed B, and 3) a 150-year flood. The large conveyance capacity provided by an unrestricted 270-foot connection with Crissy Field Marsh results in peak flood flow velocities of 0.03 ft/s.

The restoration of tidal wetland and ecological corridor through the Quartermaster Reach associated with the Lagoon Alternative would likely provide improvements to water quality in Tennessee Hollow Creek and Crissy Field Marsh. Creation of a lagoon with fringing marshplain and riparian vegetation would introduce flood storage and water filtration benefits, reducing urban runoff constituent loading to Crissy Field Marsh and San Francisco Bay. Where possible, storm drain runoff directed into the Quartermaster Reach would be routed through a low gradient vegetation-lined swale to dissipate flow energy and better filter urban runoff.

Potential erosion during construction would be addressed through erosion control practices, consistent with mitigation measures in the PTMP Final EIS, the Tennessee Hollow Upper Watershed Revitalization Project EA, and the Doyle Drive Final EIS/R.

Unlike the Stream Alternative, the Lagoon Alternative is designed to increase tidal prism into Crissy Field Marsh. The increase in tidal prism would result in an incremental benefit to the hydrology of Crissy Field Marsh by providing added volume to help keep the inlet of the mouth open. However, the increase in tidal prism associated with the Quartermaster Reach project is not anticipated to be sufficient to keep the mouth of Crissy Field Marsh open, without

continued mechanical breaching. The increased tidal prism may also affect sediment transport within and outside of Crissy Field Marsh. However, given the small incremental increase in tidal prism relative to the overall tidal system governing the hydrology and sediment dynamics of Crissy Field Marsh, the resulting change from the Lagoon Alternative is anticipated to be minor.

*CONCLUSION: With the successful installation of bridge pilings that do not disturb subsurface and groundwater flow conditions, the Lagoon Alternative satisfies all project hydrologic design criteria. However, the Lagoon Alternative is the most likely to impact groundwater conditions because of the number of pilings necessary for construction. Similar to the other alternatives, temporary construction impacts to water quality post the highest potential for impacting environmental conditions. Implementation of successful construction best management practices would mitigate these potential impacts.*

## **MITIGATION MEASURES**

The following mitigation measures, as adapted from the PTMP Final EIS, the Tennessee Hollow Upper Watershed Revitalization Project EA, and the Doyle Drive Final EIS/R, will be implemented to minimize impacts of the project on water resources:

*QRWR-1 EROSION CONTROL DURING CONSTRUCTION:* A storm water pollution prevention plan (SWPPP) will provide for best management practices (BMPs) to control erosion, runoff, and sediment transport during construction.

*QRWR-2 CREEK CHANNEL BANK EROSION CONTROL:* Hydraulic analyses will aid in developing appropriately sized, aligned, and stable channels. Special analyses and design considerations will be conducted for fixed points along the creek alignment (e.g., culverts) where bank instabilities most commonly develop. The hydraulic analyses will inform optimal floodplain and marshplain design to attenuate peak flows

and trap sediment delivered to the wetland. The hydraulic analysis will also be used to direct channel revegetation efforts that stabilize earthen banks. Special attention will be given to evaluating and protecting culturally sensitive areas bordering restoration channels. Post-channel construction conditions will be monitored to identify and adaptively manage channel bank conditions.

*QRWR-3 TRAIL CREATION:* Placement and construction of new trails will minimize disruption to soil and slopes susceptible to erosion. Trails and boardwalks that intersect natural surface water will include measures to avoid or reduce interference with natural flow dynamics. Trails and boardwalks will be constructed and maintained in a manner consistent with best management practices (BMPs) established in the Presidio Trails and Bikeways Master Plan.

*QRWR-4 CULVERT OUTFALLS ARMORING:* Armoring will be placed as warranted at the entrance and exit points of culverts to mitigate scouring should flood flows exceed 3 ft/s and/or tidal scour exceed 1.5 ft/s. Armoring will be extended sufficient distances to address all areas potentially exposed to scour, including approach and exit channel alignments. Armoring will be limited to the minimum needed, and designed to maintain benthic habitat to the maximum extent possible.

*QRWR-5 STORM WATER MANAGEMENT AND TREATMENT:* In order to address potential erosion, turbidity and pollutants in storm water inflow to the project, vegetated swales will be incorporated into the receiving areas of storm drains. To the maximum extent possible, vegetated swales will be created outside of the proposed habitat restoration areas. The low-relief vegetated channels will be designed to dissipate high flow energy and filter out sediment and pollutants from discharge. Bio-swales will then feed into properly vegetated constructed wetlands that will additionally filter storm water runoff in the same fashion.

## 3.2 BIOLOGICAL RESOURCES

### STREAM ALTERNATIVE

Approximately 3 acres of native riparian habitat and coastal scrub habitat along both sides of a daylighted stream channel would be restored.

No impact on existing salt marsh or coastal scrub habitat.

Potential for colonization by special status plant species previously restored to Crissy Field Marsh.

### WETLAND ALTERNATIVE

Approximately 0.1 acre of native riparian vegetation, 3 acres of native upland habitat, and 5 acres of salt marsh and other intertidal wetland would be restored.

Approximately 0.16 acres salt marsh and 0.2 acres coastal scrub habitat would be disturbed and restored post-construction.

Increased potential for colonization by special status plant species due to increased amount of habitat.

### LAGOON ALTERNATIVE

A 6-acre, deep water lagoon similar to Crissy Field Marsh would be created, and approximately 0.1 acre of riparian habitat, and 2 acres of upland habitat and marsh habitat would be restored.

Approximately 0.16 acres salt marsh and 0.2 acres coastal scrub habitat would be disturbed and restored to intertidal habitat post-construction.

Increased potential for colonization by special status plant species due to increased amount of habitat.

### AFFECTED ENVIRONMENT

An overview of the Presidio's biologic resources are provided on pages 3-256 to 3-310 of the Doyle Drive Final EIS/R and pages 83 to 130 and pages 365 to 369 of the PTMP Final EIS.

#### Regulatory Setting

**FEDERAL ENDANGERED SPECIES ACT OF 1973:** The federal Endangered Species Act (ESA) contains a comprehensive program designed to protect threatened and endangered species and their ecosystems. Section 9 of the Act prohibits taking of any endangered species of fish or wildlife. Section 7 applies specifically to federal agencies, directing them to conserve listed species and limiting federal agency actions that adversely affect species and their habitat.

**MIGRATORY BIRD TREATY ACT (16 U.S.C. 703-711):** The Migratory Bird Treaty Act (MBTA) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Migratory birds

include geese, ducks, shorebirds, raptors, songbirds, and many other species.<sup>13</sup>

**EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS):** EO 11990 was issued in 1977 "...to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative..." This order provides that federal agencies are to take a leadership role in the preservation and enhancement of wetlands. Agencies are directed to include wetlands considerations in their assessments under NEPA and provide an opportunity for early public review of any plans or proposals for new construction in wetlands.

**EO 13112 (INVASIVE SPECIES):** The National Invasive Species Council oversees implementation of EO 13112, which directs

<sup>13</sup> *Protections of the MBTA do not apply to non-native, human-introduced bird species such as the rock pigeon (the familiar "pigeon" of cities and parks) (70 FR 12710-12716 [Mar. 15, 2005]).*

federal agencies to prevent the introduction of potentially invasive non-native species and control invasive species on lands for which they are responsible. The Trust implements this requirement through protective measures provided in the Presidio Vegetation Management Plan (Presidio Trust and NPS 2001).

*EO 13186 (RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS):* Recognizing that “migratory birds are of great ecological and economic value,” federal agencies are required to avoid or minimize the negative impacts of their actions on migratory birds and take active steps to protect these birds and restore or enhance their habitat. This includes preventing or abating pollution or detrimental alteration of the environment, as practicable, and incorporating migratory bird conservation into agency planning processes whenever possible.

### **Pre-settlement Habitats and Historical Changes**

Pre-historically, the project site was part of a 127-acre tidal marsh that stretched along the Crissy Field shoreline. Within the project site, the marsh consisted of slough channels and emergent marsh vegetation transitioning into brackish and riparian habitat to the south where the Tennessee Hollow Creek emerged from the bluffs and freshwater flowed into the tidal marsh. Dunes occurred to the north, fronting the marsh habitat and the bay.

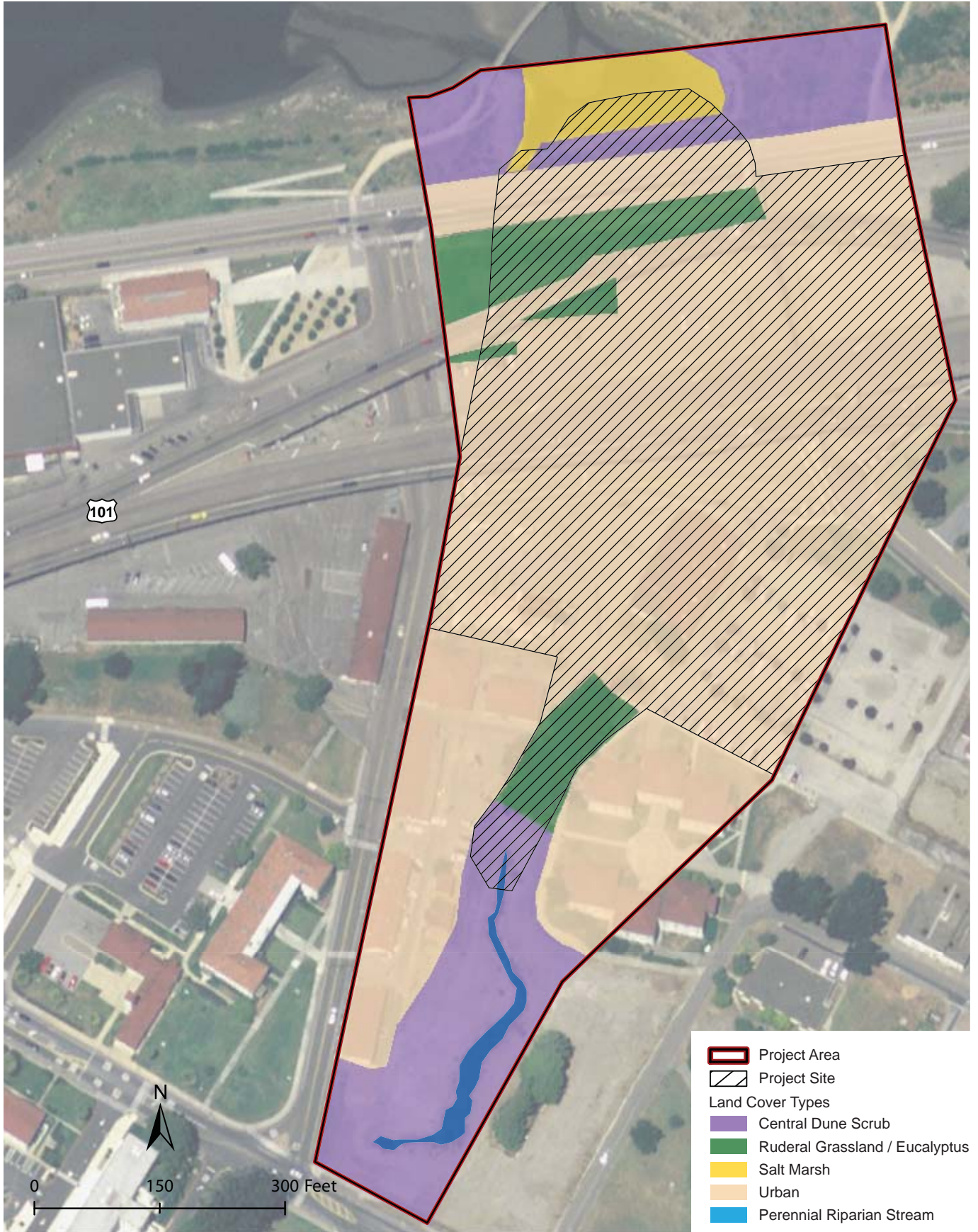
Historical vegetation within the project site likely consisted of saltmarsh species and vegetation in the surrounding area likely consisted of coastal scrub and coastal prairie species, and northern dune scrub habitat. Filling of bayfront tidal marsh at the Presidio began in the late 1800s under the U.S. Army. The natural landscape of the project site was substantially altered further during construction of the Panama-Pacific International Exposition in 1914, when over 630 acres of San Francisco’s bayfront tidal marsh was filled with dredged materials from the bay.

### **Existing Biological Habitats and Resources**

The project site contains five different land cover types: intertidal salt marsh, central dune scrub, ruderal grassland, urban, and perennial stream/riparian (Figure 7). Additionally, the project site is bordered on the north by the southwest corner of Crissy Field Marsh, an 18-acre restored tidal marsh.

**CENTRAL DUNE SCRUB:** Central dune scrub occurs on stable dune deposits inland from the immediate coast. Central dune scrub occurs in patches over a total of 48.5 acres in the Presidio (Trust 2002) and is rare in California. Several patches of central dune scrub surround Crissy Field Marsh, with a fringe of central dune scrub forming the boundary between Crissy Field Marsh and the northern edge of the project site (SFCTA 2005a). A portion of this central dune scrub (approximately 0.2 acres) occurs within the project area. Central dune scrub contains densely packed shrubs interspersed with sparsely vegetated openings in the shrub canopy. Dominant plants in the dunes around Crissy Field Marsh include American dunegrass (*Leymus mollis*), sandhill sage (*Artemisia pycnocephala*), beach evening primrose (*Camissonia cheiranthifolia*), coastal sand verbena (*Abronia latifolia*), pink sand verbena (*Abronia umbellata*), and silver burr-ragweed (*Ambrosia chamissonis*) (NPS 2006). Dune field disturbances, including erosion, sand accumulation, and animal burrowing, create openings in the dune scrub that support several special status plants, including San Francisco lessingia (*Lessingia germanorum*), San Francisco spineflower (*Chorizanthe cuspidata*), San Francisco campion (*Silene verecunda* ssp. *verecunda*), San Francisco wallflower (*Erysimum franciscanum*), and dune gilia (*Gilia capitata* ssp. *chamissonis*). Representative wildlife observed in this habitat includes house finch (*Carpodacus mexicanus*), California towhee (*Pipilo crissalis*), and white-crowned sparrow (*Zonotrichia leucophrys*).

# 7 LAND COVER TYPES



**RUDERAL GRASSLAND:** Approximately 0.8 acres of non-native ruderal grassland and eucalyptus occurs within the project site. Ruderal vegetation often occurs in disturbed areas and tends to contain nonnative, weedy species and may support stands of noxious weeds. Typical plant species include bromes (*Bromus* spp.) and wild oats (*Avena fatua*). Disturbed non-native ruderal grasslands provide very low-quality habitat for wildlife. Wildlife species commonly found in disturbed ruderal grassland areas such as this include mourning dove (*Zenaida macroura*), non-native European starling (*Sturnus vulgaris vulgaris*), and Brewer's blackbird (*Euphagus cyanocephalus*). A number of other bird species use the eucalyptus trees, likely for roosting and foraging. This area is unlikely to support special status species.

**URBAN:** Urban land (consisting primarily of pavement and hardscape) covers approximately 85 percent (7.3 acres) of the project site, in the form of roads, elevated highway, parking lots, landscape vegetation, and buildings. Very few native plant or wildlife species tend to occur in such highly developed areas because most vegetation has been removed, and these areas remain highly disturbed with considerable amounts of human activity. These areas are unlikely to support special status species.

**PERENNIAL STREAM / RIPARIAN:** A small portion of the Thompson Reach, daylighted and restored in 2005, is located within the project site. The Thompson Reach supports both riparian and coastal scrub plant species and fauna that use the site. The remainder of the stream flows underground in culverts through the project site. This area is unlikely to support special status species.

**SALT MARSH:** Crissy Field Marsh adjoins the project site at the southeast corner of the marsh north of Mason Street. Dominant salt marsh plant species located in Crissy Field Marsh include Pacific cordgrass (*Spartina foliosa*), pickleweed (*Salicornia virginica*), salt grass (*Distichlis*

*spicata*), sand spurrey (*Spergularia* sp.), salt marsh daisy (*Jaumea carnosa*), and alkali heath (*Frankenia salina*) (NPS 2006).

Additionally, a number of bird species use Crissy Field Marsh including snowy and great egrets (*Egretta thula* and *Ardea alba*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), willet (*Catoptrophorus semipalmatus*), yellowlegs (*Tringa* sp.), sanderling (*Calidris alba*), western sandpiper (*Calidris mauri*), California gull (*Larus californicus*), Forster's tern (*Sterna forsteri*), song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*) and brown pelican (*Pelecanus occidentalis californicus*) (NPS 2006).

Dominant fish species in Crissy Field Marsh include arrow goby (*Clevelandia ios*), threespine stickleback (*Gasterosteus aculeatus*), staghorn sculpin (*Leptocottus armatus*), cheekspot goby (*Ilypnus gilberti*) topsmelt (*Atherinops affinis*) and nonnative yellowfin goby (*Acanthogobius flavimanus*). Native invertebrate species include yellow shorecrab (*Hemigrapsus oregonensis*) and Blacktail bay shrimp (*Crangon nigricauda*), amphipods (predominantly *Grandidierella japonica* and *Corophium* spp.), oligochaetes from the Tubificidae family, nematodes, and several species of polychaetes (*Capitella capitata*, *Tharyx parvus*, *Polydora* spp., *Pseudopolydora* spp.) (NPS 2006).

### **Special Status Plant and Wildlife Species**

For the purpose of this section, special status species are defined as:

- species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA) (Title 50, Code of Federal Regulations [CFR], Section 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the Federal Register [FR] for proposed species);
- species that are candidates for possible future listing as threatened or endangered under ESA (67 FR 40657, June 13, 2002);



- species that are federal species of concern (i.e., former U.S. Fish and Wildlife Service [USFWS] C1 or C2 candidates);
- species that are listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (Title 14, California Code of Regulations [CCR], Section 670.5);
- plants listed as rare under the California Native Plant Protection Act of 1977 (California Fish and Game Code, Section 1900 et seq.);
- plants considered by CNPS to be “rare, threatened, or endangered in California and elsewhere”(CNPS List 1B species);
- animals in California listed by the California Department of Fish and Game (CDFG) as endangered and threatened and plants listed as rare, threatened, and endangered;
- species that meet the definitions of rare or endangered under the State CEQA Guidelines, Section 15380; and
- animals fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

Of the 39 endangered, threatened, and sensitive plants with the potential to occur in and around the project area (Table B-1 in Appendix B), seven are known to occur, as described below.

*PINK SAND-VERBENA (ABRONIA UMBELLATA):* Pink sand-verbena occurs in disturbed sandy areas, coastal dunes and scrub. Pink sand-verbena blooms from April to August and occurs in foredune areas along Crissy Field (NPS 2006) near but not within the project site. Pink sand-verbena is a CNPS List 1B species.

*SAN FRANCISCO SPINEFLOWER (CHORIZANTHE CUSPIDATA VAR. CUSPIDATA):* San Francisco spineflower is an early dune colonizer, dependent on having open sandy habitat for establishment. San Francisco

spineflower blooms June to August and is found throughout inland sand dunes at Crissy Field consisting of 3,000 to 5,000 individuals in 2004 (NPS 2006) and occurs within the project area, but not within the project site. San Francisco spineflower is a federal species of concern and CNPS List 1B species.

*POINT REYES BIRD’S BEAK (CORDYLANTHUS MARITIMUS SSP. PALUSTRIS):* Point Reyes bird’s beak occurs in coastal salt marshes. At Crissy Field Marsh, Point Reyes bird’s beak occurs on the west shore of the marsh (NPS 2006) outside of the project site. Point Reyes bird’s beak is a federal species of concern and CNPS List 1B species.

*SAN FRANCISCO WALLFLOWER (ERYSIMUM FRANCISCANUM):* San Francisco wallflower is commonly found in coastal dune scrub and on serpentine slopes. San Francisco wallflower blooms March to June and occurs on dune swales and upland marsh habitat around Crissy Field Marsh (NPS 2006) near but not within the project site. San Francisco wallflower is a federal species of concern and CNPS List 1B species.

*DUNE GILLIA (GILIA CAPITATA SSP. CHAMISSONIS):* Dune gilia is found in Coastal sand dunes and openings of coastal dune scrub. Dune gilia blooms from May to August and occurs on coastal dunes around Crissy Field Marsh (NPS 2006) near but not within the project site. Dune gilia is a CNPS List 1B species.

*SAN FRANCISCO LESSINGIA (LESSINGIA GERMANORUM):* San Francisco lessingia occurs on open sandy soils and is only known in San Francisco and San Mateo Counties, including populations at five sites in the Presidio. This species blooms August through November and has occurred in the dune scrub surrounding Crissy Field Marsh (NPS 2006) (last observed in 2007) near but not within the project site. San Francisco lessingia is a federal and state endangered, and CNPS List 1B species.

*SAN FRANCISCO CAMPION (SILENE VERECUNDA SSP. VERECUNDA)*: San Francisco campion mostly occurs in sunny patches on open sandy soil between shrubs and has been re-established at Crissy Field Marsh. Only two populations are found on the Presidio at Crissy Field Marsh (NPS 2006) near but not within the project site. San Francisco campion blooms March to June. San Francisco campion is a federal candidate for being listed as an endangered species and is a CNPS List 1B species.

Of the 32 endangered, threatened, and sensitive wildlife species with the potential to occur in and around the project site (Table B-2 in Appendix B), six have low to moderate likelihood to occur, as described below.

*COOPER'S HAWK*: Cooper's hawk are protected in California under California Fish & Game Code Section 3503.5. This species nests in large trees, including conifers and eucalyptus, located in forest or woodland habitat. Cooper's hawk has been observed and is known to nest in the Presidio (SFCTA 2005a), and may potentially use trees in the project site. Nesting within the project site has not been observed.

*WESTERN SNOWY PLOVER (COASTAL POPULATIONS)*: Western snowy plover are found on beaches above the normal high tide limit in flat, open areas with sandy or saline substrates. This species' only known breeding areas in San Francisco Bay are salt ponds and edges (USEPA et. al. 1999). This species overwinters in the Wildlife Protection Area at the west end of Crissy Field. It has a low potential to occur in the project site and is not expected to nest in, or near to, the project site. Western snowy plovers are a federally listed threatened species and a state species of special concern.

*SALTMARSH COMMON YELLOWTHROAT*: Saltmarsh common yellowthroat are found in freshwater marshes in summer and salt or brackish marshes in fall and winter. Saltmarsh common yellowthroat is an uncommon resident

that may breed in the Presidio at Mountain Lake (Jones & Stokes Associates 1997). This species requires tall grasses, tules, and willow thickets for nesting and cover, and is unlikely to occur at Crissy Field Marsh due to its lack of tall vegetation. Saltmarsh common yellowthroat are listed as federal and state species of special concern.

*BROWN PELICAN*: Brown pelican tend to forage in littoral ocean zones, just outside the surf line but may be found resting nearer to the shore. Brown pelican are regular visitors along the shores of the Presidio and within Crissy Field Marsh but nest on islands off the coast and forage in open bay and ocean waters. This species is a known, common visitor to Crissy Field Marsh in the direct vicinity of the project site. This species has recently been delisted under both the federal and state Endangered Species Act.

*PALLID BAT*: Pallid bat are found in a variety of habitats throughout most of California. Pallid bat are not known to occur in the vicinity of the project site. A 2002 bat survey of the area of the Presidio near Doyle Drive found that a number of structures exist in the area with the potential to provide roosting habitat (SFCTA 2005a). However, no signs of bat use were found during this survey. Pallid bat is a species of special concern in the state of California.

*FRINGED MYOTIS*: Fringed myotis are found in a variety of habitats throughout most of California. Fringed myotis are not known to occur in the vicinity of the project site. A 2002 bat survey of the area of the Presidio near Doyle Drive found that a number of structures exist in the project area with the potential to provide roosting habitat (SFCTA 2005a). However, no signs of bat use were found during this survey. Fringed myotis is a federal species of special concern.

## **ENVIRONMENTAL CONSEQUENCES**

The project would largely affect areas that are already built on, previously disturbed, or colonized by non-native vegetation. The project site is within

the construction corridor of the Doyle Drive project. As such, proposed ground-disturbing or other construction activities would have minimal potential to impact biological resources given the ongoing Doyle Drive project activities will have already disturbed the site. In the long term, restoration activities would prove beneficial to biological resources in the project site and vicinity.

### **Stream Alternative**

The Stream Alternative would remove approximately 0.8 acres of ruderal vegetation, which would result in a loss of low quality wildlife habitat, and restore approximately 2 acres of native riparian habitat and coastal scrub habitat along both sides of a daylighted stream channel. Revegetation with native species, providing a vegetated corridor through the project site, would have a long term beneficial effect by expanding native riparian habitat and improving habitat connectivity, benefitting wildlife movement between the Thompson Reach and Crissy Field Marsh. Restored riparian and scrub vegetation would have a long term beneficial effect on native wildlife by increasing the area of habitat able to support a diversity of wildlife, including birds, hepetofauna, small mammals, and insects such as bees and butterflies. The daylighted stream would provide improved habitat for the three-spined stickleback fish, observed in the Thompson Reach.

Riparian and coastal scrub habitat restoration along the stream channel would have a beneficial effect on special status plants by increasing the amount of habitat available for special status plant population establishment. Several sensitive plant species were restored to Crissy Field Marsh. Restoration of the project site may allow additional colonization by the species.

If not controlled, excavation and grading activities during and immediately following construction under this alternative could lead to sediment delivery to Crissy Field Marsh. Sediment into the marsh could affect aquatic flora and fauna species present in Crissy Field Marsh. Dust from

construction activities may also affect flora and fauna in the site. Mitigation measures incorporated into the alternative would limit water quality impacts and sediment input to the marsh, and reduce levels of dust.

*CONCLUSION: The alternative would restore approximately 2 acres of native riparian habitat and coastal scrub habitat, which would provide improved habitat and wildlife movement between the Thompson Reach and Crissy Field Marsh. The alternative would result in negligible change to salt marsh habitat in Crissy Field Marsh, as existing habitat in Crissy Field Marsh would not be disturbed. With mitigation measures to control sedimentation, erosion, and dust during construction, the alternative would result in minor impacts to existing native vegetation and wildlife species.*

### **Wetland Alternative**

The Wetland Alternative would remove existing ruderal vegetation, which would result in a loss of low quality wildlife habitat, and restore approximately 0.1 acre of native riparian vegetation, three acres of native upland habitat, and five acres of salt marsh and other intertidal wetland habitats. Vegetation removal and grading at the interface between the project site and Crissy Field Marsh would affect approximately 0.16 acres of existing salt marsh habitat and the loss of approximately 0.17 acres of central dune scrub. The impact on special status plant individuals due to vegetation removal would be minor because native plants would be salvaged prior to grading. No permanent loss of native vegetation would occur as the project site would be restored to native habitat, and the overall extent of habitat would be increased.

Restoration of the site would have a long term beneficial effect on native habitat through habitat expansion and improved habitat connectivity between the Thompson Reach and Crissy Field Marsh. The alternative would restore two habitat types rare to the Presidio: brackish marsh and freshwater dune swale. Because both habitat

types are dependent on connection to the groundwater aquifer, the opportunities for creation in the Presidio are limited, and focused primarily in the project site. Compared to the Stream Alternative, the Wetland Alternative would provide approximately five acres of additional habitat, and a more diverse complex of habitat types for wildlife, benefitting a more diverse array of native plant and wildlife species. Restoration of the site would provide a vegetated corridor through the project site, benefitting wildlife movement between the Thompson Reach and Crissy Field Marsh.

The restoration of native riparian, upland, and salt marsh/intertidal wetland habitat would have a beneficial effect on special status plants by increasing the amount and diversity of habitat available for special status plant establishment. Compared to the Stream Alternative, the expanded area of the Wetland Alternative would provide a larger area for colonization of the sensitive plant species previously restored to Crissy Field Marsh.

If not controlled, excavation and grading activities during and immediately following construction could lead to erosion, dust, and sediment delivery to Crissy Field Marsh, affecting both aquatic flora and fauna species present in the marsh and adjacent terrestrial species. Mitigation measures incorporated into the alternative would limit water quality impacts and sediment input to the marsh, and would reduce levels of dust from construction activities. As the Wetland Alternative would be designed to reduce scour and water velocities, scour from increased flow velocities through the project site that could otherwise negatively impact aquatic vegetation and invertebrates in Crissy Field Marsh near the project area would be minimized. Therefore, the impact of scour on vegetation and wildlife species in Crissy Field Marsh would be minor.

*CONCLUSION: The Wetland Alternative would restore approximately 0.1 acre of native riparian vegetation, three acres of native upland habitat, and five acres of salt marsh and other intertidal*

*wetland habitats, including two habitat types rare to the Presidio: brackish marsh and freshwater dune swale. A minor amount of existing salt marsh and dune scrub habitat would be affected during construction of the project. Compared to the Stream Alternative, the Wetland Alternative would provide approximately five acres of additional habitat, and a more diverse complex of habitat types for wildlife, benefitting a more diverse array of native plant and wildlife species. The alternative would have a beneficial effect on establishment of special status plants introduced into the existing Crissy Field Marsh by increasing the amount and diversity of intertidal wetland habitat available.*

### **Lagoon Alternative**

The Lagoon Alternative would restore approximately 0.1 acre of riparian habitat, and two acres of upland habitat and marsh habitat, and would create a six-acre lagoon. Restoration of the site would have a long term beneficial effect on the area's native habitat because it would expand these habitat types and improve habitat connectivity. Compared to the Stream Alternative, the alternative would result in greater aquatic habitat overall, but less riparian acreage. The increase in open water habitat would provide the most benefit to aquatic species. The Lagoon Alternative is expected to have some beneficial effect on the existing intertidal habitats in Crissy Field Marsh by incrementally increasing the tidal prism into the marsh.

Similar to the other alternatives, removal of the ruderal vegetation during construction would result in a loss of low quality wildlife habitat. Vegetation removal and grading at the interface between the Quartermaster Reach and Crissy Field Marsh would affect approximately 0.16 acres of existing salt marsh habitat and the loss of approximately 0.17 acres of central dune scrub. The Lagoon Alternative would result in a permanent loss of existing coastal scrub habitat at the interface of the Quartermaster Reach and Crissy Field Marsh, as the area would be regraded and restored to intertidal habitat

following salvaging of native plants. However, the alternative would result in a net increase of almost two acres of coastal dune scrub.

The restoration of native riparian, upland, and lagoon habitat would have a beneficial effect on special status plants by increasing the amount of habitat available for special status plant population establishment. Native riparian, upland, and lagoon habitat restoration would have a long term beneficial effect on native wildlife by increasing the amount of these habitats available for population expansion. Restoration of the site would provide a vegetated corridor through the project site, benefitting wildlife movement between the Thompson Reach and Crissy Field Marsh. Compared to the Stream Alternative, the Lagoon Alternative would have a more limited terrestrial band around the lagoon, potentially deterring the movement of smaller mammals through the project site at higher water surface elevations. This impact is considered to be minor. Similar to the Stream and Wetland Alternatives, construction of the project could lead to erosion, sedimentation, and dust, which could negatively affect both water quality to Crissy Field Marsh and the flora and fauna. Mitigation measures incorporated into the project would result in only minor impacts to water quality, fauna, and flora from construction activities.

*CONCLUSION: The Lagoon Alternative would restore approximately 0.1 acre of riparian habitat, two acres of upland habitat and marsh habitat, and would create a six-acre lagoon. A minor amount of existing salt marsh and dune scrub habitat would be affected during construction of the project. Compared to the Stream Alternative, the alternative would result in greater aquatic habitat overall, but less riparian acreage. The Lagoon Alternative could reduce wildlife movement through the deeper portions of the lagoon, but would generally promote wildlife movement through the project site. The restoration of native riparian, upland, and lagoon*

*habitat would have a beneficial effect on special status plants by increasing the amount of habitat available for special status plant population establishment.*

## **MITIGATION MEASURES**

The following mitigation measures, as adapted from the PTMP Final EIS, the Tennessee Hollow Upper Watershed Revitalization Project EA, and the Doyle Drive Final EIS/R, will be implemented to minimize impacts of the project on biological resources:

### **QRBR-1 WILDLIFE, NATIVE PLANT COMMUNITIES, AND SPECIAL STATUS SPECIES AVOIDANCE AND MINIMIZATION MEASURES:**

Appropriate measures in accordance with established Trust practices, procedures, and protocols will be implemented to avoid and minimize short term construction-related impacts and long term project impacts to natural communities. Measures will be selected that promote and enhance habitat restoration and success to the greatest extent practicable and will address: construction access, staging and heavy equipment use; basic dust control; backfill soils; contractor training; control of invasive plant species; plant selection, propagation, salvaging and revegetation; erosion and siltation control; signage and interpretive materials; access restrictions; nonnative animal species control; fencing and protective barriers; plant buffers; protection of nesting birds; use of irrigation, fertilizers and herbicides; trail alignment and construction; noise attenuation; and night light intrusion.

**QRBR-2 VEGETATION RESTORATION AND MANAGEMENT:** A vegetation restoration and management plan will be developed in accordance with the Presidio Vegetation Management Plan and standard Trust restoration practice. The plan will outline procedures for restoration, revegetation, site stewardship and management, and monitoring.

### 3.3 CULTURAL RESOURCES

#### STREAM ALTERNATIVE

No change in planned conditions. No adverse effect. Proposed ground disturbing activities would take place in areas previously disturbed during project activities associated with the Doyle Drive project. No modification of the existing pipe culvert under Mason Street. Area would be restored to a native vegetated open space.

#### WETLAND ALTERNATIVE

Alternative has the potential to disturb known and unknown cultural resources and would be subject to existing protocols and practices to minimize or avoid potential adverse effects. There would be an indirect effect to Building 227 from the construction of a retaining wall to protect its foundation and associated parking, but this adverse effect would be mitigated through project design. Proposed interpretive enhancements would increase public awareness of the Presidio's cultural resources and have a beneficial effect.

#### LAGOON ALTERNATIVE

Same as Wetland Alternative.

An overview of the Presidio's cultural resources and historic context are provided on pages 68 to 82 and 212 to 219 of the PTMP Final EIS. Information relevant to the project site is summarized below. Additional archival research and field studies have been completed within the project site where archaeological discoveries have been made. Information obtained during the archaeological and architectural research for the Doyle Drive project and the Quartermaster Reach project would continue to be used to develop and refine future interpretive programs, as well as inform the physical design of proposed improvements in the project site. As described in Section 1.2, the present-day site conditions will be altered dramatically by the Doyle Drive project, including the removal of existing buildings, structures and landscape features. The discussion below therefore analyzes the post-Doyle Drive environment, rather than the project site as it appears today.

#### AFFECTED ENVIRONMENT

##### Regulatory Setting

The Presidio Trust is a federal agency and must comply with numerous laws, regulations, and statutes that protect cultural resources. Among these are the National Historic Preservation Act of

1966; Executive Order 11593 (Protection and Enhancement of the Cultural Environment); the Archeological Resources Protection Act of 1979; and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Together, these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources. During preparation of the PTMP, the Trust consulted with the Advisory Council on Historic Preservation (ACHP), the California State Historic Preservation Officer (SHPO), and the National Park Service (NPS), and executed a Programmatic Agreement (PTPA) for the Trust's management plan and various operation and maintenance activities within Area B of the Presidio. The National Trust for Historic Preservation and the Fort Point and Presidio Historical Association (now known as the Presidio Historical Association) also consulted on the PTPA and signed the final agreement as concurring parties. The PTPA establishes procedures by which the Trust will satisfy its

responsibilities under the NHPA, including those associated with the proposed undertaking.<sup>14</sup>

### History

The Quartermaster Reach is located at the northernmost (lowest) end of the 278-acre Tennessee Hollow watershed, which has a rich history of human use and occupation. It is located within the traditional territory of the Yelamu, one of around 50 independent Ohlone tribes who spoke related languages and shared certain cultural similarities. While no known prehistoric sites have been discovered within the project site, at least two known prehistoric sites have been discovered adjacent to the project site (CA-SFR 6/26 and CA-SFR 129), along the former bayshore estuary (currently referred to as Crissy Field) where Tennessee Hollow drains.

The project site is located north of the original Spanish military fortification, El Presidio de San Francisco (El Presidio). El Presidio was established on June 27, 1776 by approximately 40 families who made the long journey from northern Mexico to establish the third military fortification in Alta California (Voss 2005). Although detailed information regarding early explorer use of the area is limited, early records indicate that access to and availability of fresh water from Tennessee Hollow was key to the early occupation of the area by both native people and early explorers, and key to the establishment of the Presidio military post in the area.

Forming a break in the coastal terrace bluff along the northern Presidio, the Tennessee Hollow drainage through the area provided a point of access between the marsh and the military post. The area also served as a target range for several decades (ca. 1880 to 1900) under the U.S. Army's administration of the Presidio. Over time, the U.S. Army transformed the marsh in a series of infill efforts that created improved access to the dock and warehouses that were later developed near

the shore of the bay. The creation of additional land allowed the U.S. Army to expand Presidio facilities and infrastructure into a previously unusable area north of the Main Post.

With the development of Letterman Hospital and the Quartermaster warehouses in the early 1900's, multiple rail lines were developed to link the area to Fort Mason and the San Francisco waterfront. As uses changed and buildings were added and/or removed, some of these lines were removed, extended, or relocated within the area. This type of development also entailed water engineering efforts to control and confine drainage with underground pipes. By the interwar years, the area had become increasingly crowded with military warehouses, roads, and other infrastructure. The construction of Doyle Drive in the 1930s and post-WWII paving projects and building removals resulted in changes to the built environment which obscured much of the area's earlier history (Barton 2007). At the time of the 1993 National Historic Landmark (NHL) Update, the only buildings that remained in the project site from the Quartermaster period were Buildings 201 (Exchange Store, 1896), 230 (Warehouse, 1917), 228 (Bakery, 1909), 229 (Bakery, 1897), and 227 (Warehouse, 1897). Of these, Buildings 230 and half of 201 will be removed by the Doyle Drive project prior to implementation of the proposed project. Other historic resources identified in the 1993 documentation include Halleck and Old Mason Streets (1885, 1920), which form the project boundaries to the west and north, respectively, and the stone retaining wall located north of Buildings 228 and 229.<sup>15</sup>

### Cultural Landscape

The spatial organization and land pattern of the cultural landscape of the Quartermaster Reach was derived from the natural topography and hydrology of the site. The north-south orientation

<sup>14</sup> A copy of the executed PTPA is available in Appendix D of the PTMP Final EIS.

<sup>15</sup> The 1993 NHL forms refer to Mason Street in the Presidio as Old Mason Street, presumably to avoid confusion with Mason Street in the City and County of San Francisco. This EA refers to Old Mason Street as simply Mason Street.

of the stream channel established the alignment of the target range and target butts within the swale of the Quartermaster Reach. The orientation and locations of the warehouses and the railroad later followed the same organizational pattern of the stream and target range.

As the site evolved and different uses came and went, new features replaced old ones. The great majority of the features that defined the area during the period of significance (1776-1945) are missing today, including buildings, landforms, vegetation, water features and circulation routes (with the exception of roadways). Almost all features were eventually impacted or removed by the construction of Doyle Drive in the 1930s, the gradual removal of Letterman Hospital infrastructure and support buildings beginning in the mid 1970s, and the reconstruction of Doyle Drive beginning in 2009 (Barker and Barnaal 2008).

Other known and predicted cultural landscape features within the project site that were not identified during NHL documentation efforts include the sole remaining rail line beneath Mason Street. The predicted location of this feature was recently confirmed during project inventory and evaluation studies for the Doyle Drive project. This rail line is present within the project site along Mason Street, beneath the asphalt pavement, from approximately 200 feet east of the intersection of Halleck Street to the intersection of Marshall Street. It continues east, roughly parallel to Mason Street, to the intersection with Lyon Street at the NHL's eastern boundary.

There were as many as four lines present along Mason Street at the height of the railroad operation at the Presidio during the early 1900s. The rails were used to transport medical supplies, personnel, and injured soldiers to and from Fort Mason and the Presidio. The existing rail line represents a single track that was retained by the U.S. Army through a 1978 Memorandum of Agreement (MOA) with the NPS and California SHPO that addressed removal of obsolete

railroad tracks at the Presidio. It was agreed through the execution of the MOA, that a single track would be maintained to convey the historical significance of the railroad to the Presidio, however all other lines, timbers, switches, etc. were removed and sent to the National Science Foundation (NSF) in Socorro, New Mexico for re-use there. The existing steel rails are approximately 56 inches apart and are present immediately beneath the asphalt pavement along Mason Street. The entire feature (rail line and ties) is approximately 8.5 feet wide and is intact. Although not specifically called out in the Presidio NHL documentation as a contributing resource, the rail lines are assumed to be eligible for listing on the National Register (under criterion A). The rail line west of Halleck Street was subsequently removed by the U.S. Army, leaving only the portion between Halleck Street and the Marina Gate intact within the Presidio. Utility trenching for the Doyle Drive project is expected to remove all but approximately 40 linear feet of the remaining rail line within the project site. Minimization and mitigation measures for these impacts will be addressed through the Doyle Drive PA, and will inform documentation and/or mitigation measures for any remaining portions of the rail line as part of the Quartermaster Reach project (ICF 2010). Following the Doyle Drive utility work, the remaining portion of rail line within the project site would be isolated from the larger track and lack integrity as a historic feature.

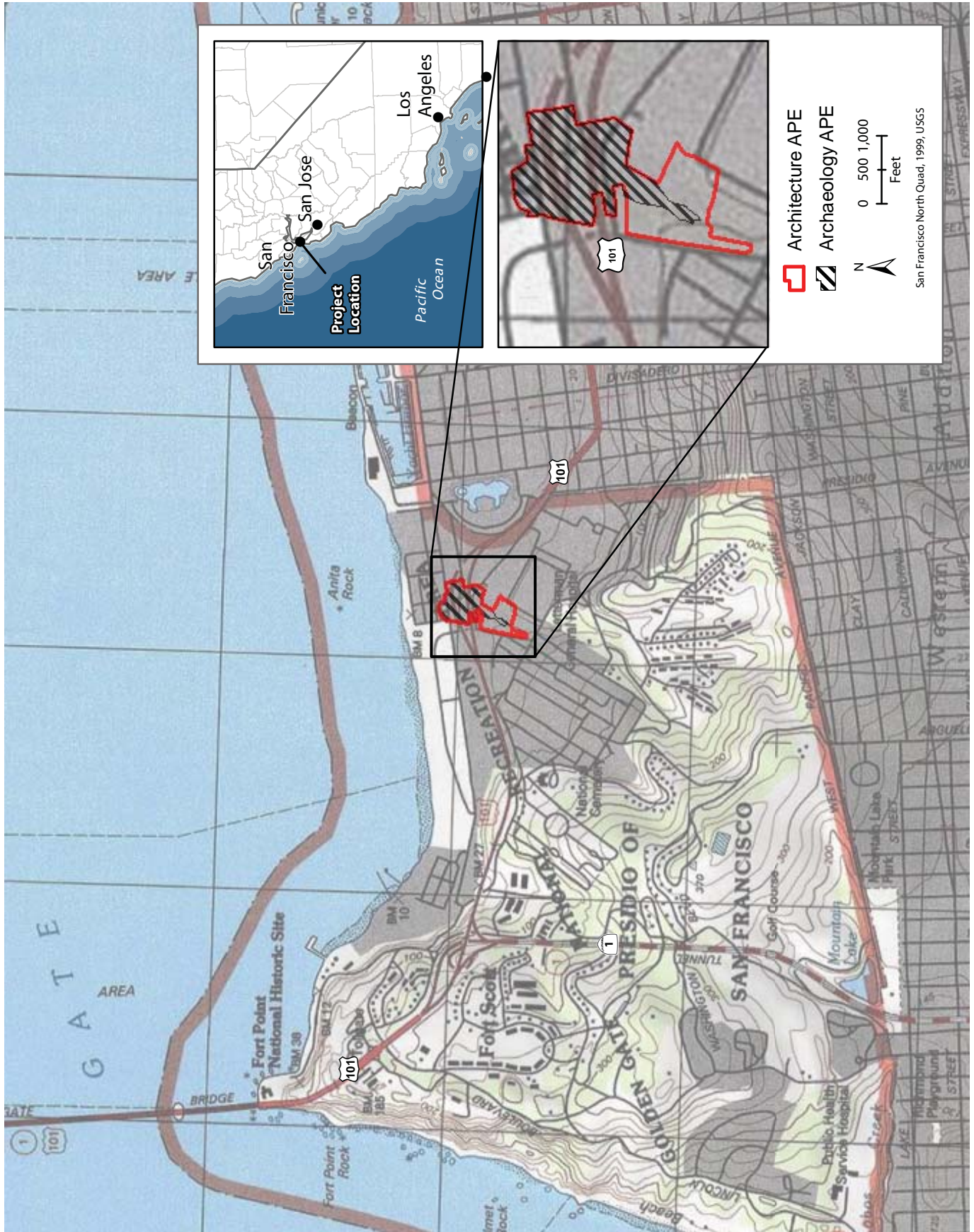
### **Known and Predicted Archaeological Features**

Both known and potential archaeological resources are within the project site. The proposed archaeological APE is comprised of the entire project site, and the architectural APE is comprised of the entire project site plus all buildings within 200 feet of the project site (Figure 8).

The Presidio of San Francisco was designated a National Historic Landmark (NHL) in 1962. In 1993, the NPS updated the 1962 NHL documentation to take into account knowledge gained subsequent to the original designation.



# 8 ARCHAEOLOGICAL AND ARCHITECTURAL AREA OF POTENTIAL EFFECT



Recognition of archaeological resources as contributing elements to the landmark was new to the update. In the NHL update, archival research was used to identify areas of past land use. From this information, a series of polygons was developed that predicted the locations of potential archaeological resources. The forms were updated again in 2008.

Historic archaeological features predicted within the project site delineated in the 1993 NHL update include the Quartermaster's Dump (Holman & Associates 1999). The Presidio's historic-era Quartermaster's Dump possibly extends into the northwest corner of the APE. Test-phase investigations revealed the presence of a large deposit of material relating to the Presidio's organized system of dumping from the 1880s to 1912, when the area was covered with dredged bay sands in preparation for construction of buildings for the Panama-Pacific International Exposition of 1915. Based on the findings of the test excavations, several areas within Crissy Field north of Mason Street were evaluated as potentially contributing to the Presidio's NHL District, and data recovery excavations were undertaken (Ambro and Clark 2003). Over 500,000 artifacts, representing a variety of military and domestic activities, were recovered. It is possible that a portion of the Quartermaster's Dump exists within this portion of the project APE.

Rough grading and construction activities associated with the Doyle Drive project will have disturbed, destroyed, and/or removed any archaeological deposits associated with the Quartermaster's Dump or other archaeological resources prior to the implementation of the Quartermaster Reach project. Any archaeological resources identified during the Doyle Drive project ground disturbance would be treated according to the Doyle Drive PA and Archaeological Treatment Plan (ATP).

Prehistoric sites at the Presidio are not identified as contributing to the NHL District because they are not associated with the military history that

forms the basis of Landmark designation. However, the 1993 and 2008 updates included "areas of known or predicted prehistoric archaeological potential." A number of cultural resource investigations conducted within the Presidio helped refine the archaeological sensitivity map contained in the 2008 NHL update, including archival review and ongoing research. The revised map maintained by the Presidio's Archaeology Laboratory represents the current delineation of known and suspected archaeological resources in the Presidio and is reflected in Figure 16 (Potential Archaeological Resources) of the PTMP Final EIS.

Although no known prehistoric archaeological resources exist within the Quartermaster Reach APE, the figure does reflect that the entire Quartermaster Reach APE is considered an area where suspected prehistoric remains may exist. It should also be noted that the boundaries of archaeological sites CA-SFR-6 and CA-SFR-26 (now considered one site) and CA-SFR-129 are nearby and adjacent to the Quartermaster Reach APE, with CA-SFR-129 being immediately adjacent to the north end of the APE. These sites are situated within the former marsh area of Crissy Field. The character of sites CA-SFR-6/26 and CA-SFR-129 is also consistent with Jones's (1992) interpretation of late prehistoric settlement patterns, which implies the Presidio marshlands were used only logistically over the last 1,000 years or primarily for the procurement of shellfish and plant resources rather than for extended residential stays. If the mouths of freshwater creeks and adjacent bluff margins, the slough corridor, and dunes were good places for aboriginal occupation, it is possible that prehistoric sites buried deep within the Quartermaster Reach APE may occur south of CA-SFR-129 along the former creek margins. It is also possible that other smaller logistical use sites occur near CA-SFR-129. However, due to rough grading of the project site and construction associated with the replacement and rebuilding of Doyle Drive, all but

the most deeply buried prehistoric archaeological resources would already have been disturbed.

## **ENVIRONMENTAL CONSEQUENCES**

### **Stream Alternative**

Under this alternative, the minimal ground-disturbing or other construction activities or site enhancements proposed would be within the areas previously disturbed by the Doyle Drive project. The stream corridor would connect to Crissy Field Marsh through the existing 72-inch pipe culvert under Mason Street, thus there would be no impact to Mason Street or other known historic resources in the APE. Interpretation of cultural resources in the area would remain at the current limited level, consisting primarily of occasional ranger- or docent-led walks.

*CONCLUSION: Because ground-disturbing activities would be limited to areas previously disturbed by the Doyle Drive project and the existing culvert under Mason Street would not be modified, the Stream Alternative would have no adverse effect on cultural resources. There would also be no benefits from research or identification of unknown sites that would be associated with these activities or from interpretative enhancements.*

### **Wetland Alternative**

Under this alternative, construction of the culverts would impact approximately 40 linear feet of the rail line beneath Mason Street that would remain following utility trenching related to the Doyle Drive project. This feature is currently considered to be eligible for contributing to the Presidio NHL, but the portion remaining within the project site following the Doyle Drive work would lack integrity. Mason Street, a contributing feature of the Presidio NHL, would also be impacted by culvert construction due to trenching and possible grading at its northern and southern edges within the project site. Prior to excavating Mason Street in order to create the culvert channel, the street alignment would be documented so that it could be reestablished following the installation of the culverts. Removal of the remaining portions of the

rail line would be limited to the culvert channel, so that the overall integrity of the larger features east of the project site could be retained. The Doyle Drive project is currently preparing a finding of effect for the utility trenching work and rail line removal, including a proposed mitigation measure that would include preparation of a Historic American Engineering Record (HAER) for the feature as well as the development of an associated interpretive program for the rail line.

As part of this alternative, missing cultural landscape features (as identified in the 2007 CLA) would be included as interpretive features that would be constructed as feasible according to final designs for the Doyle Drive project. The features, including a new trail, interpretive spur, target range abutments, and building footprints, would be designed to ensure maximum compatibility with the habitat restoration objectives of the project in terms of materials, configuration, and management of user access to sensitive habitat areas.

It is also possible that ground-disturbing activities associated with this alternative could affect unknown prehistoric and historic archaeological sites, though the likelihood is small due to rough grading and construction associated with Doyle Drive. Historic archaeological resources in the northern end of the APE, which was not subject to previous ground disturbance associated with the Doyle Drive project, may be impacted. The alternative is designed to avoid the known boundaries of archaeological site CA-SFR-129, located outside the APE, but there is the potential that other smaller logistical use sites occur near CA-SFR-129 and may be within the APE. All ground-disturbing activities within the APE would be subject to the requirements of the Trust's PTPA (Stipulations XII and XIII), and require an Archaeological Management Assessment and Monitoring Plan to determine whether subsurface coring or trenching and/or test excavations are needed before ground disturbance. Any additional excavation in the area beyond that undertaken for the Doyle Drive project, as well as

excavation in any new areas would be subject to the PTPA. Ground-disturbing activities and construction would be closely monitored in accordance with the Monitoring Plan.

There would be an indirect effect to Building 227, a contributor to the NHL, by construction of the proposed retaining wall to protect its foundations and an associated parking area. The construction of the retaining wall would alter the setting, feeling, and association of Building 227. This indirect effect would be lessened by designing the retaining wall using the Secretary of the Interior's Standards so that the wall would be in keeping with the historic character and design of Building 227. The historic stone retaining wall north of Buildings 228 and 229 and its foundations would be protected during construction so as to avoid any impacts.

If it appears that a previously unidentified property that could be eligible for inclusion in the National Register or that could contribute to the NHL District might be affected, or a known historic property might be affected in an unanticipated manner, the Trust would take all reasonable measures to avoid or minimize harm to the property and, as necessary, notify and consult with parties to the PTPA.

Introduction of interpretive landscape features to an area that has lost nearly all of its integrity would have a beneficial effect to the remaining buildings and cultural landscape within the APE because interpretive enhancements would increase public awareness of the Presidio's cultural resources. These changes would replace elements of a historic setting that did not exist previously in their proposed form, but are more in keeping with what would have historically existed in the area during the period of significance for the NHL (1776-1945). Reintroduction of expressions of the historic use of the Quartermaster Reach into the landscape has a beneficial effect to the buildings and cultural landscape within the APE.

*CONCLUSION: The Wetland Alternative may disturb a known historic property and also has the*

*potential to disturb additional unknown archaeological resources. Impacts to remaining portions of the rail line would not be considerable due to the low level of integrity of the resource within the project site. Impacts to Mason Street would be lessened through documentation of the resource prior to disturbance, replacement of the roadway alignment and sensitive design of the side profiles after the construction of the culvert connection. The Wetland Alternative would also indirectly affect Building 227 by the construction of retaining wall, but this impact would be lessened through project design. Additionally, proposed interpretive enhancements and the reintroduction of expressions of the historic use of the Quartermaster Reach into the landscape would be in keeping with the historic character of the Quartermaster Reach, and would have a beneficial effect on the cultural landscape.*

#### **Lagoon Alternative**

Under this alternative, the approximately 275-foot long bridge over Mason Street would remove the remaining portions of the rail line along Mason Street within the project site, a feature eligible for contributing to the NHL, and alter the appearance of that portion of Mason Street, a contributing feature to the NHL. It is also possible that ground-disturbing activities associated with this alternative could affect unknown, deeply buried, prehistoric and historic archaeological sites. This risk can be assumed to be greater than the Wetland Alternative because a larger amount of ground disturbance would take place to connect the lagoon to the existing Crissy Field Marsh. Although there are no other known archaeological sites, the northern end of the APE would not be subject to previous ground disturbance associated with the Doyle Drive project. The Lagoon Alternative is designed to avoid the known boundaries of archaeological site CA-SFR-129, located outside the APE, but there is the potential that the site extends within the APE. All ground-disturbing activities within the APE would be subject to the requirements of the PTPA (Stipulations XII and XIII), and require an

Archaeological Management Assessment and Monitoring Plan to determine whether subsurface coring or trenching and/or test excavations are needed before ground disturbance. Any additional excavation in the area beyond that undertaken for the Doyle Drive project, as well as excavation in any new areas would be subject to the PTPA. Ground-disturbing activities and construction monitored in accordance with the Monitoring Plan

As under the Wetland Alternative, there would be an indirect effect to Building 227, a contributor to the NHL, by the construction of a retaining wall to protect its foundations and an associated parking area under the Lagoon Alternative. This indirect effect would be lessened through project design. The historic stone retaining wall north of Buildings 228 and 229 and its foundations would be protected during construction as under the Wetland Alternative.

Construction of the bridge would alter the character of Mason Street, remove any remaining portions of the rail line, and disturb a larger area of both features than under the other alternatives. If it appears that a previously unidentified property that could be eligible for inclusion in the National Register or that could contribute to the NHL might be affected, or a known historic property might be affected in an unanticipated manner, the Trust would take all reasonable measures to avoid or minimize harm to the property and, as necessary, notify and consult with parties to the PTPA.

Reintroduction of expressions of the historic use of the Quartermaster Reach into the landscape would be a change from the existing condition, but have a beneficial effect to the buildings and cultural landscape within the APE because interpretive enhancements would increase public awareness of the Presidio's cultural resources. These changes would reference a historic setting that did not exist previously, but is more in keeping with what would have historically existed in during the period of significance for the NHL District (1776-1945). Reintroduction of

expressions of the historic use of the Quartermaster Reach into the landscape would have a beneficial effect to the buildings and cultural landscape within the APE.

*CONCLUSION: Similar to the Wetland Alternative, the Lagoon Alternative would disturb a known historic property (Mason Street) and portions of an eligible property (rail lines) and also has the potential to disturb additional unknown archaeological resources. Unlike the Wetland Alternative, larger areas of both Mason Street and the rail line would be impacted. The character of a portion of Mason Street would be altered by the construction of a bridge, but the impact to the resource as a whole would not be considerable. The Lagoon Alternative would indirectly affect Building 227 by the construction of retaining wall, but this effect would be lessened through project design. The Lagoon Alternative would be subject to the existing protocols and practices stipulated in the PTPA for ground disturbing activities at the Presidio as well as project-specific mitigation measures. Similar to the Wetland Alternative, proposed interpretive enhancements and the reintroduction of expressions of the historic use of the Quartermaster Reach into the landscape under the Lagoon Alternative would be in keeping with the historic character of the Quartermaster Reach, and would have a beneficial effect to the cultural landscape within the APE.*

## **MITIGATION MEASURES**

The following measures would be implemented to mitigate the adverse effect to the NHL District, including the cultural landscape and known and potential archaeological resources:

*QR-1 PTMP FINAL EIS AND PTPA CULTURAL RESOURCES AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES:* The following measures detailed in the PTMP Final EIS and PTPA will be implemented as necessary:

- CR-7 Compliance with Standards for Building and Cultural Landscape Rehabilitation

- CR-8 (and PTPA Stipulation XII) *Archeological Management Assessment and Monitoring Program*
- CR-9 *Ground Disturbing Activities*
- CR-11 *Excavation Permits*
- CR-13 *Curation of Archaeological Collections*
- CR-14 (and PTPA Stipulation XIII) *Discoveries*
- CR-15 *Treatment of Discoveries*

**QR CR-2 DESIGN OF RETAINING WALL FOR BUILDING 227:** The retaining wall to be constructed next to Building 227 will be designed using the Secretary of the Interior’s Standards and will be in keeping with the historic character and design of Building 227.

**QR CR-3A DOCUMENTATION OF MASON STREET AND DESIGN OF CULTURAL LANDSCAPE FEATURES (WETLAND ALTERNATIVE ONLY):** Prior to any ground disturbance in the vicinity of Mason Street, the Trust will establish documentation protocols for recording the location, dimensions, and materials of the roadway, and methods for returning disturbed elements into place after the installation of the culverts. Design review for the reestablishment of Mason Street and other new elements including cultural landscape features will be conducted in

consultation with the NPS, the SHPO and consulting parties to the PTPA, and in collaboration with Doyle Drive project-led efforts.

**QR CR-3B DOCUMENTATION OF REMAINING PORTIONS OF THE MASON STREET RAIL LINE (LAGOON ALTERNATIVE ONLY):** Because Mason Street and the remaining portions of the rail line would be disturbed over the 275-foot length of the new bridge, and could not be replaced after the creation of the hydrologic connection, prior to any ground disturbance in the vicinity of Old Mason Street additional mitigations may be required. Design review for the Mason Street bridge and other cultural landscape features will be conducted in consultation with the NPS, the SHPO and consulting parties to the PTPA, and in collaboration with Doyle Drive project-led efforts.

**QR CR-4 PROTECTION OF STONE WALL NORTH OF BUILDING 228:** The stone wall north of Building 228 will be protected and stabilized to maintain its structural and historical integrity. Grading along the base of the wall should be minimal and not compromise the integrity of the wall. Any additional retaining walls required adjacent or near to the historic stone wall to stabilize the slope in accordance with the stream restoration should be a new material and be clearly distinguished from the historic stone wall.

### 3.4 OTHER RESOURCES

#### STREAM ALTERNATIVE

All other impacts were determined to be minor and would require no further analysis.

#### WETLAND ALTERNATIVE

All other impacts were determined to be minor and would require no further analysis.

#### LAGOON ALTERNATIVE

All other impacts were determined to be minor and would require no further analysis.

The following impacts were determined to be either minor or to be mitigated through measures included in the project. Much of the information has been covered in previous NEPA analyses, including the PTMP Final EIS and the Supplement to the Draft Supplemental EIS for the PTMP Main

Post Update (Trust 2009), which are incorporated by reference in this section. The discussion is provided for informational purposes (i.e., to show why more study is not warranted), and to support the finding of no significant impact in Appendix A.

## LAND USE PLANS, POLICES, AND CONTROLS

The NEPA requires a discussion of possible conflicts between a proposed action and the objectives of land use plans, policies, and controls for the area concerned. The Presidio Trust Management Plan (PTMP or Plan) is the Trust's formally adopted statement of land use policy.

Other land use control mechanisms for the Presidio are embodied in the Vegetation Management Plan (VMP), the Presidio Trails and Bikeways Master Plan (Trails Plan), the Final General Management Plan Amendment (GMPA), and the Crissy Field Plan.<sup>16</sup>

### Presidio Trust Management Plan

The PTMP provides an interrelated set of planning principles and policies, which taken together guide the Trust's decision-making and actions for Area B of the Presidio. The PTMP makes clear that "should principles come into conflict, care will be taken to balance competing values, and to seek overall conformance to the policy framework established by this Plan" (Preserving and Enhancing Park Resources, page 2).

Furthermore, the PTMP is intended to be programmatic, rather than prescriptive, to allow consideration of alternative or changed uses, when appropriate.

The proposed action would complete the northernmost (downstream) reach of restoration in the Tennessee Hollow watershed, which is identified in the PTMP as an "important component of the Presidio's natural and cultural history" and as a "vibrant ecological corridor and a unique backdrop to the developed environment" to be restored and protected (PTMP, Open Space/Vegetation/Views, page 84). The proposed action would expand natural habitats in the corridor as envisioned in the PTMP, with the primary goal of habitat restoration to "restore both natural processes and function" (PTMP, Natural Resources, page 15). Tennessee Hollow

restoration as proposed and as specifically called for in the PTMP would "expand riparian habitats and allow for an integrated system of freshwater streams and freshwater, brackish, and tidal marsh, re-establishing a connection to Crissy Marsh" (Tennessee Hollow, page 19).

Restoration of the corridor would be coordinated with planning for the Main Post, Crissy Field (Area B), Doyle Drive, and the Letterman district as encouraged by PTMP guidelines to "ensure that the corridor provides an ecologically rich and complex buffer between planning districts" (PTMP, Guidelines for Open Space/Vegetation/Views, page 84).

### Vegetation Management Plan

The VMP provides a management framework for protecting, enhancing, restoring, and rehabilitating the native and planted vegetation of the Presidio, and guides the actions affecting the park's vegetation resources. The VMP establishes three broadly defined vegetation management zones for the park (historic forest, native plant communities, and landscape vegetation) and develops goals, objectives, and strategies for each. The Tennessee Hollow drainage lies entirely within the native plant communities zone<sup>17</sup> and is designated as a "proposed restoration area" (VMP, Restore Native Plant Communities, page 35). Native plant community restoration under the proposed action would be guided by the general restoration concepts and methods identified in the VMP (VMP, Restoration Concepts and Process, pages 36, 37). The proposed action would be consistent with VMP objectives for management of the native plant communities zone by restoring and enlarging native plant communities through "reclaiming habitat from past development" and by protecting and enhancing wildlife habitat through "expanding habitat for native plants" (VMP, Objectives for Management of Native Plant Communities, pages 31, 32).

<sup>16</sup> The GMPA and Crissy Field Plan apply to Area A of the Presidio only.

<sup>17</sup> The zone includes both existing native plant communities and areas that will be restored to native plant communities.

### **Presidio Trails and Bikeways Master Plan**

The Trails Plan guides the establishment of a coherent network of trails and bikeways to enhance connections among key features of the Presidio, generally increase universal accessibility, improve visitor safety, and make the use of alternative transportation within the Presidio more convenient for the public. The Trails Plan proposes a new “Tennessee Hollow Corridor,” developed in coordination with Tennessee Hollow restoration plans, to connect recreational areas at the south side of the Presidio (e.g., Julius Kahn Playground) through the Tennessee Hollow watershed to Crissy Field Marsh. The Tennessee Hollow Corridor provides for a pedestrian trail through the project site, spur trails with overlooks to view wetland and riparian environments, and a trailhead off Mason Street (Trails Plan, Tennessee Hollow Corridor, page 47). The proposed action would incorporate proposed Trails Plan improvements and complete the Tennessee Hollow Corridor connection from Lincoln Avenue to Mason Street.

### **NPS Final General Management Plan Amendment**

The GMPA guides visitor use, cultural and natural resource management, development, and operation of the coastal area (Area A) of the Presidio. The proposed action in Area A would be consistent with the GMPA’s goals to expand remnant natural habitat (GMPA, Native Habitat Enhancement, page 36) and to restore wetlands through fill removal, storm drain removal, and stabilization with native species (GMPA, Water Resource Management, page 40).

### **Crissy Field Plan**

The Crissy Field Plan implemented development of Crissy Field (Area A) consistent with the planning area concept and actions described for Crissy Field (Area A) in the GMPA. The Crissy Field Plan provided for restoration of a 20-acre tidal marsh at Crissy Field, with the assumption and public commitment by the NPS that the marsh should be expanded to a minimum of 30 acres. All three alternatives under consideration would be

consistent with the Crissy Field Plan Objective 2 to enhance and expand natural resource values by “providing for connection of the future restored riparian corridor to the marsh...” (Crissy Field Plan, page 1-7). Both the Wetland Alternative and the Lagoon Alternative would advance Objective 2 by “allowing for future expansion of the marsh south of Mason Street” (Crissy Field Plan, page 1-7). Only the Lagoon Alternative addresses an increase in tidal prism; however, the incremental increase would not be sufficient to achieve “an ecologically self-sustaining tidal marsh requiring a minimum of human intervention...” (Crissy Field Plan, page 1-7).

### **VISITOR USE AND RECREATION**

The proposed action would include a pedestrian trail, spur trail, overlook, and trailhead, which would increase recreational and educational use of the site, but not to a degree that could impact the improved physical environment. The proposed improvements would be designed to enhance and complement the restored natural habitat areas. Completion of the pedestrian trail from Lincoln Avenue to Mason Street would improve the continuity and connectivity of the Presidio trail system by providing a direct connection from the park’s uplands to Crissy Field and the bay front.

### **VISUAL RESOURCES**

The proposed action includes the removal of visually distracting elements, such as deteriorated surfaces, debris, and asphalt paving. These site changes, as well as the creation of native habitat and the reintroduction of missing historic features, would enhance existing views by improving the site’s natural character and revealing the historic nature of the project site while, at the same time, opening up new views of and within the site. New trail connections, overlooks, and interpretive areas would improve the scenic character and increase opportunities for scenic viewing within the project site for visitors. Restoration of the project site to an ecological corridor would help to visually link the



Presidio and San Francisco Bay by creating a smooth and more natural transition of open space.

## **TRANSPORTATION**

Mason Street and Halleck Street are the two major roadways in the project site vicinity. Mason Street is an east-west street with one vehicular lane and one Class II bike lane in each direction, and extends from the Marina Boulevard gate westward to provide access to all of Crissy Field. Mason Street also has a Class I multi-use path on the north side of the street. Halleck Street includes one vehicular lane in each direction and is one of two roadways connecting Crissy Field with the Main Post. Two minor roadways, Marshall Street and a portion of Gorgas Avenue, are also in the project site vicinity. Marshall Street is 370 feet long and runs parallel to Halleck, connecting Mason Street to Gorgas Avenue. Gorgas Avenue extends eastward from Halleck to the Gorgas gate where it intersects Richardson Avenue (US 101).

The transportation network in the project site vicinity would be modified substantially following reconstruction of Doyle Drive and the Quartermaster Reach restoration. The northern portion of Halleck Street would be reconfigured to align with the portion of Halleck south of Gorgas Avenue. A portion of Gorgas Avenue would be removed, and Marshall Street would be removed. The Doyle Drive project will extend Girard Road to intersect with Marina Boulevard. Marshall Street and the portion of Gorgas Avenue removed are redundant minor roadways. The removal of these roadways would divert more traffic onto Mason Street and Halleck Street, but the volume of traffic diverted would not be enough to substantially increase traffic congestion on Mason and Gorgas Streets.

## **PARKING**

Three areas in the project site vicinity are currently used for parking. In the Main Post district, an unstriped paved area east of Halleck and south of Gorgas provides parking for

approximately 30 spaces. Parking occupancy is relatively low, since there are few nearby uses to generate parking demand. In the Crissy Field (Area B) district, a 108-space striped parking lot is located north of Doyle Drive between Halleck and Marshall Streets, and an unstriped paved area is located east of Marshall Street and west of the Mason Street warehouses with capacity for approximately 90 vehicles.

Doyle Drive reconstruction and restoration of the Quartermaster Reach would remove a considerable number of parking spaces in the Crissy Field (Area B) and Letterman districts. The PTMP Final EIS described the removal of approximately 400 parking spaces in the Crissy Field (Area B) district and relocation of remaining parking supply to coincide with locations of parking demand. The proposed action would remove 138 spaces in the Crissy Field (Area B) district, including all of the 108 spaces east of Halleck Street and west of Marshall Street and approximately 30 spaces east of Marshall Street. Reconstruction of Doyle Drive would add approximately 190 parking spaces immediately south of the Mason Street warehouses, but would eliminate approximately 280 spaces in the Letterman district. After mitigation identified by the Doyle Drive project (the provision of replacement parking for the Letterman district), the remaining parking supply would be adequate to accommodate average future demand in both the Mason Street warehouses area and in the Thornburgh and Gorgas area of the Letterman district.

## **PEDESTRIAN ACCESS AND SAFETY**

The pedestrian network in the project site vicinity is currently discontinuous and through undefined paved areas. A sidewalk is located on the west side of Girard Road north of Lincoln, but it ends near Building 1030. A pedestrian walkway is located along the west side of Halleck Street. The walkway is comprised of a concrete sidewalk in most locations, but near Building 201, it is an elevated dock on the east face of the building.

Pedestrian connections would be improved with a direct pedestrian trail connecting the Main Post and Letterman districts with Crissy Field through the Tennessee Hollow corridor. Under the Stream Alternative, this trail would split as it extends north. One leg would connect directly to the parking area adjacent to the Mason Street warehouses as with the other alternatives, and another leg would extend to intersect Mason Street where an existing trail (extending north to the East Beach area) intersects Mason Street. Under the Wetland Alternative and Lagoon Alternative, the trail would intersect Mason Street at a slightly different location. Although these alternatives would provide a somewhat less direct pedestrian connection between East Beach and the Letterman and Main Post districts, the alignment under all alternatives would not substantially alter pedestrian circulation patterns or create a safety issue.

#### **AIR QUALITY**

The proposed action would not substantially increase vehicle emissions or emissions of other air pollutants, or generate objectionable nuisance dust or odors. Respirable particulate matter (PM<sub>10</sub>) and fine particulate matter (PM<sub>2.5</sub>) emissions would result from a variety of construction activities, including excavation, vehicle travel, and vehicle and equipment exhaust, but would be short term in duration and localized. Feasible Bay Area Air Quality Management District (BAAQMD) control measures for fugitive dust emissions would be implemented to minimize adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces. In addition, construction contractors would implement U.S. Environmental Protection Agency (EPA) recommendations and meet EPA Tier 4 emissions standards to reduce nitrogen oxides (NOx) and particulate matter emissions during construction (EPA 2006). These measures require that all construction equipment used at construction sites would:

- not idle for more than ten minutes;
- not be altered to increase engine horsepower;
- include particulate traps, oxidation catalysts and other suitable control devices;
- use ultra low sulfur diesel fuel with a sulfur content of 15 parts per million (ppm) or less;
- be tuned to the engine manufacturer's specifications in accordance with a defined maintenance schedule; and
- not be unnecessarily operated or staged near occupied residences, lodging, schools, or childcare facilities.

#### **SHADING**

A detailed analysis of shade and the proposed Doyle Drive viaduct's impacts on vegetation and wildlife for the project site was conducted for the Doyle Drive project (San Francisco County Transportation Authority 2005b). The analysis was approached using three methods: 1) estimating the shading influence under the different construction alternatives; 2) directly examining the shading influence of viaducts and bridges in the Bay Area; and 3) incorporating the results of a recently available master's thesis, which is one of the few existing studies to conduct controlled field observations in an analogous context. The analysis determined that the Doyle Drive viaducts would increase the width of roadway structures in the project site at a lower height than existing conditions. Direct observations made for the analysis suggested that shade effects would be restricted to the area immediately under the structures. The reduced height of the structures would result in approximately 5 percent less full shade on the Quartermaster Reach ecological corridor than existing conditions. Due to the low average height/width ratio of the structures, it is believed that only shade tolerant plants would establish under the causeway in a 0.926-acre area. During design of the Doyle Drive causeway, the heights of the causeways over the Quartermaster Reach

project site were raised to the maximum height feasible within the constraints of the overall roadway project. The new viaducts would potentially comprise an impediment to vegetation establishment and to wildlife using the restored Quartermaster Reach for movement to and from the existing Crissy Marsh. However, assuming that the corridor under the viaducts is designed with natural features such as logs and rocks, the analysis concluded that the structures would not constrain the use of the project site as a wildlife corridor for terrestrial wildlife, although some birds would be unlikely to pass through.

Because most of the impacts from shade occur from the Doyle Drive project, the effect of shade on vegetation establishment is essentially the same among the alternatives for the Quartermaster Reach project. During detailed design for the Quartermaster Reach project, shade appropriate plants would be selected for areas impacted by shade, or areas will be designed to be unvegetated to serve as mudflat habitat. By their nature of being enclosed, the culverts' crossing Mason Street for either the Stream Alternative or Wetland Alternative would likely be unvegetated. For the Marsh Alternative, the bridge would likely provide some daylight underneath the bridge, but like the Doyle Drive causeways, vegetation establishment may be minimal. Overall, the project would provide improvement to the natural habitat of the area, even with the effects of shading.

## **NOISE**

Earthmoving, construction, and hauling activities during construction would increase noise levels in the project site vicinity. Construction/demolition noise could at times be distinctive and disruptive to park users and other people within close proximity of the activity.<sup>18</sup> The types of construction equipment to be used would typically generate noise levels of 70 to 80 dBA (A-weighted

decibels) at a distance of 100 feet while the equipment is operating. Construction equipment operations would vary from intermittent to fairly continuous, with multiple pieces of equipment operating concurrently. Such noise levels, however, would not be continuous throughout the day and would be restricted to daytime hours. During construction, contractors and other equipment operators would need to comply with the Trust-enforced San Francisco Noise Ordinance (Article 29 of the San Francisco Police Code),<sup>19</sup> which prescribes working times, types of construction equipment to be used, and permissible noise emissions, to minimize noise disturbance in the vicinity of construction/demolition activity. Nearby housing residents would be informed of the work schedules to minimize inconveniences to these residents.

## **GEOLOGY AND SOILS**

The proposed action would remove and replace or regrade soils and is thus not expected to substantially influence the geologic/seismic hazard levels at the sites or expose people and/or structures to adverse impacts related to geologic and seismic hazards. As only artificial fill that was deposited by the U.S. Army is expected to be removed, the proposed action would not directly or indirectly destroy any unique geologic or physical features of the site. Approximately 62,400 cubic yards of non-native material would be excavated on the project site during reconstruction of Doyle Drive (Barnaal 2009). Soils excavated in one location may be reused as fill in another location to the extent possible. Unsuitable materials such as contaminated soils would be handled in accordance with all applicable state and federal laws and requirements, and appropriately disposed of offsite. The proposed action would not result in substantial soil erosion or loss of topsoil, as a

<sup>18</sup> Residences (Buildings 1029 and 1030) are located near the southern tip of the project site.

<sup>19</sup> The San Francisco Noise Ordinance can be viewed at <http://www.municode.com/Resources/gateway.asp?pid=14140&sid=5>.

Storm Water Pollution Prevention Program (SWPPP) would be implemented and best management practices (BMPs) would be followed during construction, and the site would be revegetated. Temporary slope protection to stabilize cut slopes, and temporary shoring structures during excavation along Halleck Street (for the Presidio Parkway tunnels) would be implemented. A Presidio Trust excavation permit is required and would be obtained prior to the start of excavation activities. After site excavation is complete, the site would be graded to approximate pre-landfill native soil elevation contours.

### **HAZARDOUS MATERIALS**

The assessment and clean-up activities related to hazardous substances, pollutants, and contaminants related to historic U.S. Army operations on the Presidio are being conducted by the Trust with oversight by the California Department of Toxic Substances Control (DTSC) and the RWQCB. This program involves extensive investigation, analysis, reporting, and if necessary remedial design and remedial action strategies.<sup>20</sup> Three sites associated with hazardous materials are within and/or adjacent to the project site:

#### **Building 207/231 Area**

Buildings 207 and 231 were former gasoline service stations on Halleck Street. Building 207 was located immediately north of Doyle Drive; Building 231 is located immediately south of Doyle Drive. Other buildings located within the area are Building 228, a former dry cleaner, Building 208, a former car wash, Building 230, a warehouse, and Building 38, a former oil station/garage located along a former railroad spur. Underground

storage tanks were removed from the Building 207 site in 1996; several tanks (including a waste oil tank) were removed from Building 231 from 1988 through 1996 and three Stoddard solvent tanks along the north side of Building 228 were removed in 1993. Some contaminated soil and free-phase petroleum product were removed during the tank excavations. The RWQCB approved the Trust's Corrective Action Plan (CAP) in 2007. The Trust prepared and submitted the remedial design in October 2008 that includes the following components: *in-situ* soil and groundwater cleanup south of Building 231 and mass excavation of impacted soil to the extent possible. Land use controls will be imposed in some areas. Groundwater monitoring will be conducted for one to three years following the cleanup. The work will be coordinated with the Doyle Drive construction. The Trust proposes to perform the corrective actions in 2010. However, this schedule may be modified to accommodate the Doyle Drive schedule.

#### **Fill Site 6B**

This site is a portion of a former U.S. Army landfill, which contains construction debris and soil from demolition of buildings in the Letterman Complex. In the late 1990s, the U.S. Army began the Remedial Investigation phase at this site, which will continue through 2010. Information from the investigations will be used to prepare a Feasibility Study (FS) and Remedial Action Plan (RAP), which will be subject to DTSC approval. Remedial action, if required, is expected to be performed in 2011 to 2012 in accordance with an approved RAP.

#### **Former Firing Range/DEH Firing Range**

Historic maps dating between 1880 and 1890 show a rifle range extending generally in a north-south direction through the area. The southern end of the firing range (the 500-foot firing line) was formerly located immediately north of Lincoln Boulevard, between Halleck Street and Girard Road. The target butt at the northern end of the range was formerly located in the current Crissy Field parking and picnic area for East Beach. The

<sup>20</sup> *The characterization of contaminated sites, exposure pathways, and potential health risks associated with reuse and redevelopment at the Presidio are addressed under regulatory controls separate from the NEPA process. Detailed information about hazardous waste contamination at the Presidio and the Trust's overall cleanup activities can be obtained by contacting the Trust's Environmental Remediation Department at (415) 561-2720.*

target butt was approximately 600 feet in length from east to west and approximately 50 feet wide. Five earthen berms used as firing lines and spaced at 100-foot intervals were located from 100 to 500 feet south of the target butt. From the alignment shown on maps, shots would have been fired in a northerly direction, toward San Francisco Bay. The majority of the firing range was covered with fill by the U.S. Army after 1890. The target butt area, identified as the DEH Firing Range in remediation documents, was within the remediation site known as East of Mason Area. The U.S. Army performed extensive investigations of the target butt area during the Remedial Investigation and performed excavations at the East of Mason Area. No ammunition artifacts or contamination associated with firing range use were found. The lack of ammunition and contamination at the target butt suggests that the range identified on maps was not extensively used. The Trust has requested a No Further Action (NFA) certification from DTSC for the DEH Firing Range (target butt). The former locations of the 400- and 500-foot firing lines were within the former remediation site known as Fill Site 6A. This area was remediated by the Trust in 2005; no firing range artifacts were uncovered during the remediation. The Trust has requested a NFA certification from DTSC for Fill Site 6A. The remaining firing lines (100-, 200-, and 300-foot), if existing, would be present beneath fill comprising Fill Site 6B. However, as discussed above, the lack of ammunition and contamination observed at the target butt, which is expected to have the greatest impacts, suggests that the firing range was not extensively used. Thus, impacts from the former firing lines are not expected in the area and do not require remediation.

The three remediation sites above do not have the potential to affect the proposed action based on the extent of contamination defined in the investigations and the status of remedial actions. There is the potential that hazardous materials would be encountered during the construction period and would require appropriate disposal.

Any hazardous materials encountered during construction of the proposed action would be handled in accordance with state and federal regulations, and applicable Trust protocols for construction at and near hazardous materials sites. Because remedial actions would be protective of human health and the environment and would expedite and enhance the beneficial reuse of identified contaminated areas, potential impacts on human health, safety, and the environment following remediation would not be significant.

## UTILITIES

As previously discussed, the proposed action would alter the existing drainage pattern of the Quartermaster Reach, as storm water would be daylighted and would flow in a restored creek system all the way across the site and would discharge into Crissy Field Marsh. No new water, sewage, and electrical services would be required during or following construction.

## ENVIRONMENTAL JUSTICE

The proposed action would not have disproportionately high and adverse human health or environmental effects on low-income and minority populations. Rather, restoration of the site to native habitat would provide valuable opportunities for public access and education for these communities, as well as for the general population.

## CUMULATIVE IMPACTS<sup>21</sup>

Activities at ecological restoration sites within the watershed, including selective removal of non-native materials and vegetation, native plant

<sup>21</sup> "Cumulative impact" is defined in CEQ's NEPA regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions ..." (40 CFR 1508.7). This discussion of cumulative impacts is tiered from the cumulative impact analysis conducted for the PTMP Final EIS (Trust 2002) and the Supplement to a Draft Supplemental EIS for the PTMP Main Post Update (Trust 2009), which are summarized and incorporated by reference herein.

propagation, revegetation, re-introduction of lost species and monitoring, would cumulatively contribute to an increase in native species richness, the reintroduction and expansion of sensitive species populations, the perpetuation of individual species (by providing food and shelter for residents and migrants), and an increase in the extent of native plant communities and wetland resources. These actions would also cumulatively enhance existing native habitats by filling in gaps between habitats and creating larger contiguous areas of native plant habitat, allowing wildlife to move freely between areas.

### **Water Resources**

Cumulative actions within the watershed would not result in substantial changes in groundwater levels and surface water flows. There would also be no material change in the watershed's freshwater contributions to Crissy Field Marsh as long as underlying subsurface and groundwater flow conditions are not altered. While there may be site-specific changes in groundwater levels and localized changes in surface flows, the effects would be localized and would not impact downstream hydrologic conditions or implicate future restoration activities. Individual actions would be conditioned by the best management practices established in existing NEPA documents for the PTMP, Tennessee Hollow, and Doyle Drive. These measures would help individually mitigate potential construction-related impacts on water quality. Over time, the restoration of the creek system and upland areas would have cumulative beneficial effects on basin water quality. Natural creek channels increase infiltration and help attenuate storm flows. The associated vegetation acts as a natural filter, improving the quality of the water as it flows downstream. Reducing impervious surfaces also reduces runoff and pollutant loads. Overall, daylighting and restoring the creek system in the Presidio's largest watershed would improve the quality of the water entering Crissy Field Marsh and San Francisco Bay. The Quartermaster Reach project would contribute cumulatively to this beneficial effect.

### **Biological Resources**

Ecological restoration efforts consistent with the goals and objectives of the VMP would increase native plant habitats by approximately 32.7 acres, including approximately 9.5 acres at the Quartermaster Reach, an identified ecological corridor and site proposed for restoration. The Quartermaster Reach project would contribute to these restoration projects by increasing habitat adjacent to existing native plant communities, allowing for an integrated natural system (i.e., freshwater streams, and brackish and tidal marsh), and re-connecting now fragmented resources (i.e., the Thompson Reach and Crissy Field Marsh). Increasing the amount of contiguous open space within the drainage would improve wildlife habitat and help create a corridor for animal movement within the Presidio.

### **Historic Resources**

While this project contributes to the overall transformation of the shoreline area of the Presidio NHL (along with the rehabilitation of Crissy Field and Doyle Drive), the changes are not adverse due to the low level of integrity of resources in the area. Restoring natural systems within the project site would not contribute to adverse cumulative impacts on historic resources because no contributing resources would be removed. On the contrary, returning and/or reinforcing historic character-defining elements that have been removed or have deteriorated over time as part of the project's design would strengthen the historic landscape and the association, setting, and feeling of the larger historic area.

### **Archaeological Resources**

Ground-disturbing activities associated with cumulative restoration actions (including native habitat restoration under the proposed action) could adversely affect archaeological sites that contribute to the National Historic Landmark district. The cumulative actions could also adversely affect unknown sites that may be identified through future research or an unanticipated discovery. Archeological review would be required before undertaking or permitting

ground-disturbing activities. Any ground-disturbing activities that may affect potential or known archeological sites would be evaluated and subject to a range of requirements including, but not limited to, avoidance of the sites, monitoring, coring or trenching, and testing and/or data recovery. All

artifacts found would be cataloged, appropriately treated, and properly stored or displayed according to applicable federal standards and the Trust's Archeological Collections Management Policy. These requirements would help avoid or mitigate potential adverse effects.

# 4 AGENCY CONSULTATION AND PUBLIC INVOLVEMENT

The following describes the process used by the Trust to: 1) consult with agencies to identify issues and seek their advice and expertise, and 2) to encourage the participation of the public prior to preparation of the EA.

## 4.1 AGENCY REVIEW

The Trust coordinated with the following agencies for their review of the project and to ensure compliance with any substantive environmental requirements, including consultation under the National Historic Preservation Act.

### **NATIONAL PARK SERVICE (NPS)**

The Presidio Trust Act, as amended, describes the statutory framework for the relationship between the Trust and the NPS. The NPS manages Area A of the Presidio, including Crissy Field north of Mason Street, and that portion of the project (0.5 acres) that lies in this area. The NPS is also a signatory party to the Programmatic Agreement (PTPA) for Area B of the Presidio, and is a cooperating agency for the EA. To facilitate early coordination with the NPS in the Trust's NEPA process, Trust staff presented the Quartermaster Reach project at the NPS Project Management and the NPS Project Review Committee meetings on October 14, 2009, and at the NPS "5x" meeting on December 12, 2009. At the meetings, NPS staff took the opportunity to make specific recommendations (see Section 4.2 below) and to discuss schedule, staff participation needs, their role as a cooperating agency under NEPA, and their own decisions related to the project. During the course of EA preparation, the Trust invited NPS staff to attend all critical meetings, including to kickoff the project, and to

provide input on issues related to Area A. The Trust also provided draft technical sections and then a final draft version of the EA for review and comment before it was circulated to the public.

### **CALIFORNIA STATE HISTORIC PRESERVATION OFFICER (SHPO)**

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires the Trust to take into account the effect of its undertakings on historic and cultural resources, including the NHL. As a result of the consultation for the PTMP, the Trust entered into a Programmatic Agreement (PTPA) with the SHPO, the ACHP, the NPS (signatory parties), and the National Trust for Historic Preservation and the Presidio Historical Association (concurring parties) that applies to the proposed undertaking. The PTPA provides a framework for reviewing the project effects internally and for consulting with other parties under certain circumstances.

Consistent with the PTPA and ACHP regulations that suggest early integration of Section 106 compliance with NEPA and other agency processes, the Trust notified the PTPA parties of the undertaking, and initiated consultation on the Quartermaster Reach project according to Stipulation X of the PTPA on October 6, 2009, which included providing a consultation package (project information) and requesting early input.<sup>22</sup> The Trust held a consultation meeting with the signatory parties to seek consensus that the undertaking would not adversely affect historic

<sup>22</sup> *At the advice of the ACHP, the Trust elected to complete consultation on the Quartermaster Reach project through Stipulation VII.B of the Presidio Trust Programmatic Agreement (PTPA), rather than Stipulation X.*



properties in the Presidio NHL prior to execution of the finding of no significant impact. The Trust submitted the EA to all PTPA parties as a supplemental consultation package along with a summary of comments gathered during public scoping, a draft Area of Potential Effect (APE), a cultural resource inventory report, a preliminary finding of effect, and a request for review and comment pursuant to the PTPA.

### **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

Recognizing that the nation's coastal and ocean resources are under increasing pressure from population growth and development, Congress enacted the Coastal Zone Management Act (CZMA) in 1972. The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance resources of the nation's coastal zone such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using these habitats.

The linchpin of coastal zone management is federal consistency. Federal agency activities must be consistent to the maximum extent practicable with the enforceable policies of approved management programs, and this consistency must be documented and coordinated with the applicable state agency. By definition, federal property is excluded from the states' coastal zones, but regardless of location (i.e., on the Presidio) any federal activity that affects any natural resources, land uses, or water uses in the coastal zone will be subject to the consistency requirement.

The Trust made a consistency determination with respect to the PTMP and coordinated this finding with the BCDC (PTMP Final EIS, pages 390-392). In October 2009, scoping materials on the proposed action at the Quartermaster Reach were forwarded by the Trust to BCDC staff. These materials included the information contained in Section 3.4 which outlines how the proposed action is consistent with the PTMP. Likewise, the

proposed action and the alternatives analyzed will be consistent to the maximum extent practicable with the enforceable policies of the BCDC's coastal zone management program.

## **4.2 PUBLIC PARTICIPATION AND RESPONSES TO SCOPING COMMENTS**

The Trust announced the beginning of public scoping for the Quartermaster Reach EA through a notice on its website at [www.presidio.gov](http://www.presidio.gov) on October 8, 2009, and in the October 2009 Presidio e-news, the Trust's monthly electronic update of news and events in the park that is emailed to approximately 3,000 subscribers. The notice referred interested parties to the Trust's web site for more information, which included the need for the project and the alternatives under consideration in the EA. As part of the scoping process, the Trust also invited the public to an informational open house to meet with knowledgeable Trust staff, learn more about the project, and provide suggestions on the issues and alternatives to be considered in the EA. Twelve participants attended the open house, which was held on October 26, 2009 at the now relocated Presidio Archaeology Lab (230 Gorgas Avenue). By the close of the 54-day public scoping period for the project that ended December 1, 2009, the Trust received 9 letters and emails from the following public agencies, community organizations, and interested individuals<sup>23</sup>:

#### ***PUBLIC AGENCIES:***

United States Department of the Interior, National Park Service, Golden Gate National Recreation Area, Division of Planning (2) (NPS)

<sup>23</sup> Scoping letters are available for public review at the Presidio Trust Library, 34 Graham Street, and constitute part of the formal public record.

*COMMUNITY ORGANIZATIONS:*

Golden Gate Audubon Society (GGAS)

Presidio Environmental Council (PEC)

Presidio Historical Association (PHA)

*INDIVIDUALS:*

Jan Blum (JB)

Gretchen C. Coffman, PhD

John E. Shea

Sharon Tsiu (ST)

In general, all the letters and emails received expressed support for the Trust's preferred alternative. Almost all offered helpful input and suggestions on project design details, such as the Mason Street creek crossing and trail placement, and ways to increase visitor use and enjoyment, protect and enhance habitat value, and interpret historic elements. A summary of public comments received at the open house and in writing with responses to the key issues and concerns raised are as follows:

*COMMENT:* Avoid impacts to the historic railroad tracks along Mason Street due to proposed work in the right-of-way (NPS).

*RESPONSE:* The majority of the single line of track remaining from the once extensive system of railroad tracks that ran parallel with Mason Street (ca. 1900-1976) within the project site will be removed to relocate utilities as part of the Doyle Drive project. The impact of their removal, along with treatment recommendations and mitigations, are described in a finding of effect prepared by Caltrans in June 2010.

*COMMENT:* Verify the location of the AT&T fiber optic cable that runs along Mason Street and avoid disruption of the utility (NPS).

*RESPONSE:* The location of the fiber optic cable is shown on the as-built plans for Crissy Field. The Trust will coordinate with AT&T regarding any potential impacts to the cable.

*COMMENT:* Construct a bridge across Mason Street to minimize the impedance of natural

processes, maximize the connective habitat corridor, and to make the crossing more aesthetically pleasing and attractive to visitors (JB, GGAS, PEC, PHA). If a bridge is not feasible, culverts should be large enough and oriented in a manner that will optimize natural water flow, light penetration and wildlife movement (JB).

*RESPONSE:* During initial project planning, the Trust and NPS undertook an extensive analysis of various options for the Mason Street crossing, ranging from retaining the existing culvert (as evaluated in the Stream Alternative) to constructing a 270-foot span bridge (as analyzed in the Lagoon Alternative) (Trust 2010). Each option was analyzed and ranked against a number of criteria, including performance, effects on cultural and natural resources, construction feasibility, and costs. The three large (34-foot) culverts option was preferred (as analyzed in the Wetland Alternative) over the bridge option because it satisfied all technological criteria at a fraction of the costs, while avoiding impacts to groundwater and historic resources.

*COMMENT:* Construct an elevated, natural-looking footbridge for the creek pedestrian crossing where the Quartermaster Reach meets the Thompson Reach so as to minimize impedance of water flow, maximize the connective wildlife corridor, and limit visitor impacts on critical resources (JB, GGAS).

*RESPONSE:* The design for the pedestrian crossing (east-west) will include a bridge, elevated above the stream, with no impedance to water flow. To further reduce impacts to the Thompson Reach and the restored stream, only one east-west pedestrian crossing over the stream is envisioned.

*COMMENT:* Retain major pedestrian paths between Areas A and B to the extent feasible (NPS). Eliminate the north-south pedestrian trail because it severely degrades wildlife habitat (ST). Otherwise, minimize the width and size of trails to limit imposition on and disturbance to habitat

areas. Restrict bicycles from pedestrian trails. Adopt the steward on trails system used at Lands End to help visitors use the site and to answer general questions (JB).

*RESPONSE:* The Tennessee Hollow Corridor pedestrian-only trail will be built as shown in the Presidio Trails and Bikeways Master Plan applying design guidelines and best management practices provided in the plan. The trail will be managed in a fashion similar to other trails throughout the Presidio trail network.

*COMMENT:* Manage the Quartermaster Reach as a wildlife protection area and make provisions to minimize adverse impacts from park visitors. Use low fencing and gates such as those around Crissy Field Marsh, or similarly protective methods. Do not allow domestic pets within the project site as they can negatively impact wildlife and native vegetation, especially in areas that are being revegetated (JB, GGAS, PEC, ST). Do not add artificial lighting (ST).

*RESPONSE:* The project objectives include maximizing habitat and enhancing public access while protecting natural resources. Fencing around the native habitat areas, similar to other restoration areas in the Presidio, will be incorporated into the design of the project to deter human movement into the restoration area. No night lighting is proposed.

*COMMENT:* Maximize the wildlife value of the adjoining uplands. Use native plants in landscape-designated areas in such a way that maximize their value as upland habitat (JB, GGAS, PEC).

*RESPONSE:* During detailed design planning for the landscape area, the Trust will evaluate the feasibility of using native plants, however, a visual distinction between the native restored habitat and landscaped uplands may be desired. Chosen plants will comply with Trust protocols to ensure that species are not invasive and will not expand into the habitat areas. Plant species that complement wildlife use, such as flowering and

fruiting species, and a variety of layers if practical to the site will be considered.

*COMMENT:* Encourage visitor enjoyment. Provide opportunities that accommodate passive recreation such as wildlife viewing and photography, while protecting the immediately surrounding habitat areas. The overlooks at the west terminus of the historic firing ranges are one such opportunity (GGAS, PEC).

*RESPONSE:* The pedestrian trails incorporated into the project will provide opportunities for walking, wildlife viewing, photography, historic interpretation, education, and other activities appropriate to the site. Re-creating the historic firing ranges as an overlook will be further explored during project design.

*COMMENT:* Develop and locate signage to adequately interpret the site's important natural and cultural features. Utilize new technology to inquire about historic or related information on demand (JB, GGAS).

*RESPONSE:* A comprehensive interpretive program, including signage and designed landscape features, which addresses historic and natural resource themes will be developed for the project site. On-demand interpretive technology will be considered as an element of the interpretive program.

*COMMENT:* Employ effective management strategies that account for the many ways visitors can have an adverse impact on the habitat. For example, manage trash to eliminate the potential for adverse impacts to wildlife and the landscape (GGAS, PEC).

*RESPONSE:* Wildlife permeable fencing around the site will deter human and pet intrusion into the restoration area. If placed on the site, trashcans will be wildlife-proof and be regularly maintained. Interpretive signs identifying the sensitive nature of the site may be incorporated along the trail.

*COMMENT:* Complete further inventorying to identify additional historic features in the area,

including but not limited to the railroad tracks, cobble wall remains, and a Post Garden. Consider interpreting the State Belt Railroad of California (that ran from the Ferry Building, around the Embarcadero and into the Presidio). Following the further identification work, propose a plan that addresses the treatment of the additional identified historical resources (NPS).

*RESPONSE:* Design planning will take into account the NPS' suggestions, as well as design treatments for the historic rail line corridors, building footprints, stream channels and earthworks features within the site as recommended in the cultural landscape analysis prepared for the project.

*COMMENT:* Ensure that the armoring around CA-SFR-129 will not be damaged due to anticipated change in tidal flow (NPS).

*RESPONSE:* The project will not impact the existing armoring around CA-SFR-129. The project will be designed to ensure low velocity of water and minimal scour in the immediate area of the Mason Street crossing, and will not alter existing conditions (water flow, velocity, scour) in the vicinity of CA-SFR-129.

*COMMENT:* Continue the work with the Ohlone begun during development of Crissy Field Marsh to install indigenous plants, informed by Traditional Ethnobotanical Knowledge (TEK) (NPS).

*RESPONSE:* The Trust will work with the NPS Native American liaison to determine the appropriate level of involvement of Ohlone, or other groups, in the selection of plants or other interpretive features in the project design.

*COMMENT:* Deconstruct such structures as Buildings 230, 201, and 204 that will be demolished for Doyle Drive to construct (using salvaged elements of historic value) similar but new forms from these buildings to assist in interpreting the historic landscape. For example, preserve the loading dock from the eastern side of

Building 230 and construct a covered and elevated viewing platform (or dock) along the proposed trail and historic railroad interpretation (PHA).

*RESPONSE:* NHL-contributing Buildings 230 and 204 will be entirely deconstructed and salvaged, and NHL contributing Building 201 will be partially deconstructed, temporarily relocated, and replaced in its current alignment along Halleck Street under the Doyle Drive project. These measures are described in the Built Environment Treatment Plan (February 2009), which was developed as a mitigation for impacts to cultural resources brought about by the Doyle Drive project. Incorporation of interpretive elements such as building footprints, elevated platforms, or other features associated with the buildings will be considered where feasible according to constraints imposed by final Doyle Drive designs and the natural resource enhancement emphasis of the Quartermaster Reach project.

*COMMENT:* Create a thoughtful historic landscape that tells a coherent and meaningful story of the layers and elements of history represented at the site, also noting wounded soldiers that passed through the site on their way to treatment following battles in the Pacific (PHA).

*RESPONSE:* Transportation infrastructure, including roads, freeways, rails and warehouses, collectively relates a compelling history of the northeast corner of the Presidio, and how the site and vicinity served the post as a whole. The Trust will develop a cohesive interpretive program for the project that explains the site history, including Doyle Drive itself, the Mason Street rail lines, and other transportation systems.

*COMMENT:* Minimize inappropriate adjacent land uses. Examine reducing parking in the section adjacent to the project site to the northeast and adding more habitat value in the area. Manage storm water runoff in ways that minimize potential impacts on water quality and habitat (JB, PEC). Provide more detail on the proposed vegetated swales to address potential runoff (ST).

*RESPONSE:* The parking area between the Quartermaster Reach and the Mason Street warehouses has been reduced substantially in order to enlarge the project site and enhance the habitat value of the project. However, due to the parking impacts of the Doyle Drive project in the Letterman district, some of the parking immediately west of the Mason Street warehouses will be needed to serve the northern portion of the Letterman district. Parking analyses for both the western Letterman district and the Mason Street warehouses area indicate that the proposed limits of the Quartermaster Reach under all alternatives would provide sufficient parking supply to meet demand, but not so much as to encourage automobile use.

The proposed action will likely provide improvements to water quality in Tennessee Hollow Creek and Crissy Field Marsh. Daylighting the creek and the creation of a broader marshplain/ecological corridor will introduce water filtration benefits, reducing urban runoff constituent loading to Crissy Field Marsh and San Francisco Bay. Storm drain runoff directed into the Quartermaster Reach will be routed through low gradient, vegetation-lined swales outside of the proposed habitat restoration areas to better filter storm water runoff. The design of the vegetated swales would be similar to that constructed recently at Fort Scott and the Public Health Service Hospital. In response to the comment, a schematic representation of the vegetated swale is provided in Figure 9.

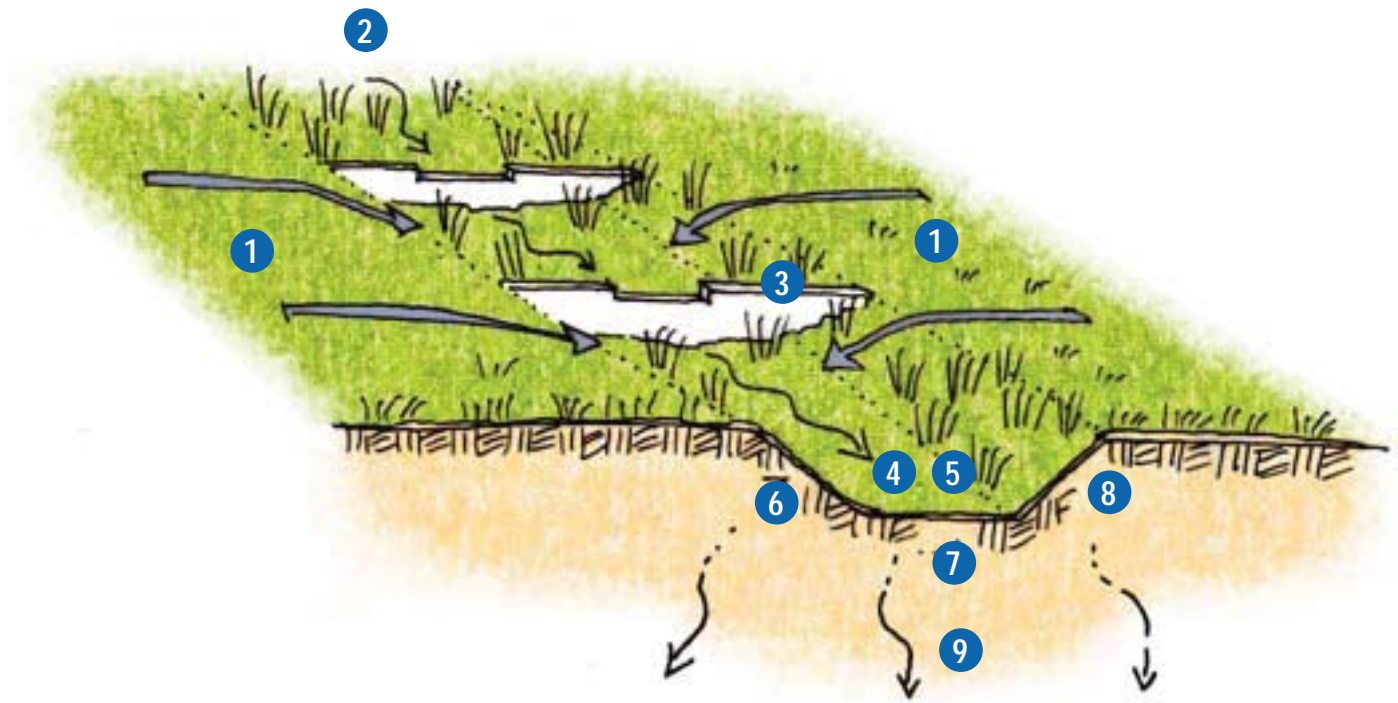
*COMMENT:* Consider and allow for the predicted effects of climate change and sea level rise. Wetlands may play an important part in reducing some of these effects, and that value should be considered (JB, PEC).

*RESPONSE:* The primary impact of climate change on the project is associated with ensuring adequate design of the Mason Street crossing and capacity of the project to accommodate potential increases in storms and sea level rise associated with climate change. Projected climate change was incorporated into modeling for design of the culverts and bridge. Wetlands themselves help mitigate impacts of sea level rise due to climate change. Because wetlands are able to absorb large quantities of water during storm events, they provide buffer areas to adjacent developed sites. The diversity of wetland habitats, with different elevation levels, proposed under the Wetland Alternative is well suited to adapt to sea level rise. Vegetation species and wildlife species may be affected over time with climate change. However, the presence of a natural area may provide a refuge for some species.

*COMMENT:* Address maintenance requirements (NPS).

*RESPONSE:* The project will be maintained on an ongoing basis consistent with other Trust natural resource projects, and similar to the Thompson Reach. Monitoring and maintenance details will be developed as part of site-specific design plans.

## 9 VEGETATED SWALE



- 1 Stormwater Runoff
- 2 Maximum 5% Channel Slope
- 3 Check Dams Recommended for Slopes Over 5%
- 4 6-inch Grass Height Recommended
- 5 Maximum Treatment Depth  $\frac{2}{3}$  of Grass Height
- 6 Trapezoidal Form
- 7 10-foot Maximum Channel Bottom Width
- 8 3:1 Maximum Channel Bank Slope
- 9 Infiltration

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# A FINDING OF NO SIGNIFICANT IMPACT

This finding of no significant impact (FONSI) provides the basis for the Presidio Trust's (Trust) determination that "daylighting" an approximately 850-foot length of stream, currently running through a subsurface culvert that ultimately discharges to Crissy Field Marsh, in order to restore (create) wetland habitat in the Quartermaster Reach site of the Presidio, as analyzed in the attached environmental assessment (EA), will not have a significant effect on the human environment and does not require the preparation of an environmental impact statement (EIS). A description of the preferred alternative and its environmental consequences are contained in the EA, which is incorporated by reference into this FONSI.

## ALTERNATIVES CONSIDERED

Three alternatives were analyzed in the Quartermaster Reach EA as summarized below.

### STREAM ALTERNATIVE (NO ACTION)

This alternative would allow for stream restoration along the Quartermaster Reach as contemplated under the Presidio Trust Management Plan (PTMP). Following completion of the elevated roadway structure that would be undertaken as part of the Doyle Drive project, the stream would be daylighted from a culverted drainage to an open natural channel and associated ecological corridor capable of supporting wildlife habitat and seasonal and tidal water movements. The stream would be restored with native vegetation (riparian, coastal scrub and dune scrub) similar to the Thompson Reach. A new pedestrian trail would follow the alignment of a former railroad line and would complete the north/south connection

between Lincoln and Mason streets as envisioned for the Tennessee Hollow Corridor in the Presidio Trails and Bikeways Plan. The upland elevations of the project site would be an open grassy area and/or landscaped with new ornamental plantings as part of the site's overall design.

### WETLAND ALTERNATIVE (PREFERRED ALTERNATIVE)

This alternative would feature restoring the project site to a diverse wetland system following completion of the Doyle Drive roadway structure. Existing storm water culverts would be removed and additional storm water from Watershed B would be directed into the site to increase outflows. The restored ecosystem would consist of upland scrub riparian, freshwater dune swale, brackish marsh, and salt marsh. Former and existing historic site elements, including former rail corridors, would be incorporated into the design and/or interpreted to aid in the understanding of the historic landscape. A primary north/south trail (Tennessee Hollow Corridor) would complete the connection between the Main Post (Lincoln Boulevard) and Crissy Field (Mason Street). A spur east/west trail would link Girard Road to Halleck Street. A retaining wall would be constructed to protect the foundations of Building 227 and associated parking. Parking for 40 cars would be made available for the adjacent developed Thornburgh area.

### LAGOON ALTERNATIVE

The Lagoon Alternative would maximize the increase in tidal prism in the project site to enhance continuous tidal action to Crissy Field Marsh; the increase in tidal prism from the project is not anticipated to be sufficient to keep the

mouth of Crissy Field Marsh open without continued mechanical breaching. The lagoon would consist primarily of open water surrounded by a narrow border of vegetation to create a transitional intertidal marsh. Plantings above the tidal zone would be progressively more upland in character to maximize buffering between the lagoon, marsh, and landscaped areas. A bridge over Mason Street would provide for water movement between the lagoon and Crissy Field Marsh with storms and tides. Piers through the lagoon would interpret historic features such as the curved part of the former railroad line and the firing ranges. A boardwalk following the rail line would mark its historic location. A trail alignment around the lagoon to the east would facilitate pedestrian movement on this side. An additional trail to the west would cross the lagoon in the southern area of the site and head north to Crissy Field Center (Building 603). Parking for 40 cars would be reserved for the adjacent developed Thornburgh site.

## ENVIRONMENTALLY PREFERRED ALTERNATIVE

While not required by Trust regulations on environmental quality (36 CFR 1010), the Trust has determined that the environmentally preferred alternative from the range of alternatives considered is the Wetland Alternative. The Wetland Alternative best promotes NEPA's environmental sustainability goals (Section 101), and best protects natural and cultural resources. Neither the Stream Alternative nor the Lagoon Alternative is as biologically rich and diverse as the Wetland Alternative, and furthermore, the Lagoon Alternative would impact groundwater resources.

## SELECTED ALTERNATIVE

The Trust will implement the Wetland Alternative identified as the preferred alternative in the Quartermaster Reach EA issued on July 1, 2010. The selected alternative would expand natural

habitats in the project site as envisioned in the PTMP, with the primary goal of habitat restoration to "restore both natural processes and function." During the planning process for the Quartermaster Reach, the Trust established objectives that were used as a framework for evaluating potential new uses and site improvements within the project site. The basis for the decision to select the Wetland Alternative is its ability to best fulfill the Trust's vision for this site of the Presidio. This is accomplished by the selected alternative's meeting of all of the following objectives:

- The selected alternative daylights the stream and provides increased tidal exchange between Crissy Field Marsh and the Quartermaster Reach;
- The selected alternative maximizes habitat and creates a connected wildlife corridor from the Thompson Reach to Crissy Field Marsh, providing improved passage and habitat conditions for fish and other wildlife;
- The selected alternative provides a rich diversity of riparian, brackish marsh, and other native plant habitats that require minimal long term intervention;
- The selected alternative re-establishes natural processes to the extent possible;
- The selected alternative protects groundwater resources;
- The selected alternative avoids excessive scour in stream and marsh channels;
- The selected alternative provides capacity for storm water runoff from Watershed B;
- The selected alternative enhances public use, access, and experience of the project site while maintaining visitor safety and protecting natural resources;
- The selected alternative reintroduces and/or interprets missing historic elements to enhance the now deteriorated association, setting, and

feeling of the site's historic setting consistent with other objectives of the project; and

- The selected alternative is feasible to implement concurrent with the Doyle Drive project.

## **DISPOSITION OF SIGNIFICANT ENVIRONMENTAL EFFECTS**

Based upon the EA, the Trust determines that the selected alternative will not have direct, indirect, or cumulative significant impacts on the human environment. The analysis supporting this conclusion is presented in Section 3 (Environmental Impact of the Alternatives) of the EA. The following summarizes factors considered in this determination.

### **WATER RESOURCES**

The selected alternative would have no adverse impacts on surface water flow, groundwater conditions, or water quality. Over the long term, flood water attenuation and filtration by the restored wetland may provide improvements to water quality, in both the Quartermaster Reach and the receiving Crissy Field Marsh. Short term, construction-related impacts pose the greatest potential impacts to water quality. During and immediately post-construction, construction best management practices would be implemented to maintain appropriate erosion and siltation controls.

### **BIOLOGICAL RESOURCES**

The selected alternative would largely affect areas that are already built on, previously disturbed, or colonized by non-native vegetation. In the long term, restoration activities would prove beneficial to biological resources in the project site and vicinity by expanding native habitat, including habitat types rare to the Presidio, and improving habitat connectivity between the Thompson Reach and Crissy Field Marsh. Habitat restoration could also have a beneficial effect on special-status plant species by increasing the

amount and diversity of habitat available for colonization by the species. The impact on special-status plant individuals at the interface between the project site and Crissy Field Marsh during construction would be minor because native plants would be salvaged prior to grading. Erosion control measures in place during construction would minimize sediment delivery to Crissy Field Marsh and impacts on aquatic flora and fauna species present in the marsh. As the selected alternative would be designed to reduce scour and water velocities, scour from increased flow velocities through the project site that could otherwise negatively impact aquatic species in Crissy Field Marsh would also be minimized. Dust controls would reduce the level of impact on flora and fauna to minimal levels.

### **CULTURAL RESOURCES**

The selected alternative has the potential to disturb known and unknown cultural resources and would be subject to existing protocols and practices to minimize or avoid potential adverse effects. There would be an indirect effect to Building 227 from the construction of a retaining wall to protect its foundation and associated parking, but this adverse effect would be mitigated through project design. Proposed interpretive enhancements would increase public awareness of the Presidio's cultural resources and have a beneficial effect.

### **CUMULATIVE IMPACTS**

Activities at ecological restoration sites, including selective removal of non-native materials and vegetation, native plant propagation, revegetation, re-introduction of lost species and monitoring, would continue to protect and enhance existing native plant communities and their remaining habitats. Ecological restoration efforts consistent with the goals and objectives of the Vegetation Management Plan (VMP) would increase native plant habitats by approximately 32.7 acres, including approximately 9.5 acres at the Quartermaster Reach, an identified riparian corridor and site proposed for restoration. The

Quartermaster Reach project would contribute to these restoration projects by increasing habitat adjacent to existing native plant communities, allowing for an integrated natural system (i.e., freshwater streams, and brackish and tidal marsh), and re-connecting now fragmented resources (i.e., the Thompson Reach and Crissy Field Marsh). Increasing the amount of contiguous open space within the drainage would improve wildlife habitat and help create a corridor for animal movement within the Presidio.

### **OTHER RESOURCES**

No other environmental issues were determined to warrant further environmental analysis to support the comparisons of alternatives, or to be relevant and necessary to inform decision-making on the proposed action.

### **COMMENTS ON THE ENVIRONMENTAL ASSESSMENT**

The Trust announced the availability of the Quartermaster Reach EA through a notice on its website at [www.presidio.gov](http://www.presidio.gov) on July 1, 2010, and in the July 2010 Presidio e-news, the Trust's monthly electronic update of news and events in the park that is emailed to approximately 3,000 subscribers. By the close of the 30-day review period for the EA that ended August 1, 2010, the Trust received 5 letters and emails<sup>1</sup>, all in support of the selected alternative, from the following community organizations and interested individuals:

Presidio Environmental Council (PEC)  
Presidio Historical Association (PHA)  
Corny Foster, Volunteer, Presidio Park Stewards  
John Holding, Volunteer, Presidio Park Stewards  
Sharon Tsiu (ST), Volunteer, Presidio Park Stewards

<sup>1</sup> *Comment letters are available for public review at the Presidio Trust Library, 34 Graham Street, and constitute part of the formal public record.*

The Trust fully assessed all issues raised by the comments received during the review period. The comments do not give rise to new issues or circumstances relevant to environmental concerns and bearing on the selected alternative or its impacts that would warrant the Trust to modify the selected alternative, revise the EA text, or to reconsider the conclusions reached in Section 3 of the EA. A summary of and responses to these comments are provided in Attachment 1.

### **MEASURES TO AVOID OR MINIMIZE POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS**

The Trust will implement, as necessary, all mitigation measures identified in the EA to avoid or minimize environmental impacts that could result from the selected alternative, and will coordinate with other public agencies as necessary. Mitigation commitments contained in the EA will be implemented and monitored in accordance with the monitoring and enforcement program (MEP) provided in Attachment 2. The Trust's Project Manager will be responsible for monitoring compliance with the MEP.

### **SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT (NHPA)**

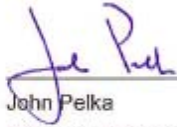
The Trust afforded signatory and consulting parties an opportunity to comment on the project and its effects, and has taken into account the effects of the project on historic properties in compliance with 36 CFR Part 800 and according to the terms of the Programmatic Agreement. The Trust will carry out measures agreed upon through consultation to ensure that historic properties will not be adversely affected, and that cumulative effects to the National Historic Landmark will not be adverse. These measures include ongoing consultation on the design of interpretive landscape features, and compliance with Trust protocols for archaeological monitoring and discoveries.

## FINDING

The Trust has considered the information and analyses in the environmental assessment and supporting environmental documentation, the comments of agencies and the public, and the project's administrative record. Based on Trust regulations on environmental quality (36 CFR 1010), PTMP policies, monitoring, and experience, including prior significance determinations documented in previous NEPA decisions, it is the determination of the Trust that the selected alternative is not a major federal action having the potential to significantly affect the quality of the human environment. There are no significant direct, indirect or cumulative effects on public health or safety, sites listed on the National Register of Historic Places, or other unique characteristics of the region. The selected alternative is neither scientifically nor publicly controversial. Implementation of the selected

alternative will not involve unique or unknown risks, cause loss or destruction of noteworthy park resources, or violate any federal, state, or local law. Implementation of the selected alternative is not precedent-setting nor will it automatically trigger other actions which may require environmental impact statements. Pursuant to Executive Order 11990, and taking the above information into account, there is no practicable alternative to such action in a wetland and the selected alternative includes all practicable measures to minimize harm to wetlands that may result. Therefore, in accordance with the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality, an environmental impact statement will not be prepared. The Trust will implement the selected alternative, restoration of a wetland within the Quartermaster Reach site, at the earliest possible time.

### RECOMMENDED:



John Pelka  
Compliance Manager, Presidio Trust

9-21-10

Date

### APPROVED:



Craig Middleton  
Executive Director, Presidio Trust

9-21-10

Date

## ATTACHMENT 1 RESPONSES TO COMMENTS

A summary of public comments received on the Quartermaster Reach Environmental Assessment with responses to the key issues and concerns raised are as follows:

*COMMENT:* Consider a smaller (i.e., 100-foot) bridge with the number of pilings reduced as much as possible. If culverts must be used, make every effort to allow for maximum daylight penetration to avoid a “dead zone” for wildlife (Presidio Environmental Council, Presidio Historical Association).

*RESPONSE:* The three large (34-foot) culverts option is being considered over the bridge option because it satisfies all technological criteria and minimizes environmental impacts at a substantially reduced cost for the project (see Section 3.1, Water Resources, for discussion of criteria). A smaller (150-foot) bridge was considered during the evaluation of alternatives, but was not selected due to impacts to groundwater (similar to the larger size bridge). On balance, among the 16 options analyzed for the Mason Street crossing, the three large culverts best met the project objectives, minimizing impacts to both environmental and cultural resources, and being feasible to implement. While daylight will not be able to penetrate the culverts through Mason Street, they are designed to be the minimum north-south distance.

*COMMENT:* Prohibit domestic pets in the wildlife area. Take measures, including signage, fencing and enforcement, to keep pets and feral animals out of the wildlife area (PEC).

*RESPONSE:* As with other Trust natural resource restoration projects, the Quartermaster Reach project will include fencing around the native habitat restoration area to deter pets. A sign at either end of the trail will be placed requiring that

dogs be on leash and remain on the trail. This restriction is consistent with the Trust’s regulations that pets must be on leash or otherwise physically confined at all times.

*COMMENT:* Limit the proposed parking west of the warehouses to the maximum extent possible, as the parking lot covers what could be one of the best locations to interpret the historic firing range (PEC).

*RESPONSE:* The number of parking spaces west of the warehouses is the result of careful consideration of the substantial effect of the Doyle Drive project on parking supply not just near the warehouses, but also in the nearby Gorgas Avenue and Thornburgh areas of the Letterman district. The Trust is committed to providing only as much parking as necessary to serve surrounding uses, and minimizing the amount of parking needed with its Transportation Demand Management program. The proposed parking spaces west of the warehouses allow the overall parking supply in the area to balance the demand of the warehouses and uses in the nearby Letterman district.

Physical re-creation of the historic firing range may not be feasible due to the constraints imposed by the new elevated roadway (Doyle Drive), and the project’s emphasis on natural resource habitat values. Interpretation of this historic landscape feature may instead be accomplished through other methods, such as wayside signage. As designs for the new elevated roadway are refined, the Trust will continue to work with interested agencies and other parties to accomplish a comprehensive interpretive plan for the project area.

*COMMENT:* Provide more detail on the historic elements envisioned, including the historic railroad and firing range, to tell a coherent and meaningful story of the historic landscape (PHA, Sharon Tsiu).

*RESPONSE:* Preliminary design concepts for the interpretation of lost historic elements in the Quartermaster Reach project area is based on the Cultural Landscape Assessment (CLA) (Barton 2007) prepared for the project. The CLA identified the area's former railroad alignments, firing ranges, and building footprints as possible elements of the cultural landscape that could be highlighted as part of an interpretive landscape design. Since 2007, designs for the reconstructed Doyle Drive have evolved, along with plans for the restored wetland. Based on the final designs for Doyle Drive, and the culmination of the environmental review process for the Quartermaster Reach project, the Trust will be able to proceed with detailed designs for the interpretive landscape as well as develop supporting interpretive information (such as wayside signs or brochures).

*COMMENT:* If feasible, salvage the rails proposed to be removed from Mason Street and integrate an appropriate stretch of rails into the historic trail adjacent to a public viewing platform. Reusing and integrating the actual rails into a portion of the trail could provide an interesting and stimulating historical element (PHA). Short of actually rebuilding the resource, discourage its physical representation. A look at the Crissy Field airfield re-creation shows that a physical representation does a poor job of representing a cultural resource (ST).

*RESPONSE:* Preliminary investigations of the Mason Street rail line suggest that its materials may not be salvageable due to their deteriorated condition. Should salvageable materials be recovered, the Trust will consider incorporating them into any new site features, including the new trail. With the exception of the Mason Street rail line, all railroad infrastructure was removed from

the project site during the U.S. Army's tenure at the Presidio. While the new trail will follow a historic north/south rail alignment, it will not be a reconstruction of the rail line itself. The feasibility of incorporating a viewing platform will be determined based on final Doyle Drive designs, and consideration of the habitat values of the restored wetland.

*COMMENT:* Clarify why a boardwalk would be built that is at or below water level. If an elevated boardwalk is not possible, a ground-level trail would not be acceptable as it would degrade the habitat potential of the wetland. Also provide more details on the design and materials to be used for the boardwalk (ST).

*RESPONSE:* It is possible that head-height clearance beneath the new Doyle Drive low viaduct may require portions of the trail to be at or below water level, which itself may be variable due to tidal levels. Detailed designs, including materials and final elevations of all new interpretive landscape features, will be based on final Doyle Drive designs and will avoid compromising the habitat values of the newly restored wetland.

*COMMENT:* Invite and incorporate public input as more information becomes available and more detailed plans are developed, such as those for the upland areas surrounding the wetlands, as well as the various plans for interpretation of the natural and cultural resources (PEC).

*RESPONSE:* The Trust intends to continue involving the National Park Service and other interested parties through workshops and/or follow up meetings as landscape and interpretive design features are refined.



## ATTACHMENT 2 MITIGATION MONITORING AND ENFORCEMENT PROGRAM<sup>1</sup>

MITIGATION MEASURE	IMPLEMENTATION TIMING	PERSON/PARTY RESPONSIBLE	COMPLIANCE VERIFICATION MECHANISM	REFERENCE
<b>WATER RESOURCES</b>				
QRWR-1 <i>EROSION CONTROL DURING CONSTRUCTION</i> : Provide for best management practices (BMPs) to control erosion, runoff, and sediment transport.	Construction	Presidio Trust / Contractor	Storm water pollution prevention plan to include BMPs	EA Section 3.1  Doyle Drive ROD
QRWR-2 <i>CREEK CHANNEL BANK EROSION CONTROL</i> : Develop appropriately sized, aligned, and stable channels. Conduct special analyses and design considerations for fixed points along the creek alignment (e.g., culverts) where bank instabilities most commonly develop. Design optimal floodplain and marshplain design to attenuate peak flows and trap sediment delivered to the wetland. Direct channel revegetation efforts to stabilize earthen banks. Give special attention to protecting sensitive cultural areas bordering restoration channels. Monitor post-channel construction conditions to identify and adaptively manage channel bank conditions.	Design, pre-construction, construction, and post construction	Presidio Trust	Project plans to include hydraulic analyses	EA Section 3.1  Tennessee Hollow FONSI
QRWR-3 <i>TRAIL CREATION</i> : Minimize disruption to soil and slopes susceptible to erosion during placement and construction of new trails. Include measures to avoid or reduce interference with natural flow dynamics for trails and boardwalks that intersect natural surface water. Construct and maintain trails and boardwalks in a manner consistent with the BMPs established in the Presidio Trails and Bikeways Master Plan.	Design	Presidio Trust	Project plans to include trail features	EA Section 3.1  Tennessee Hollow FONSI
QRWR-4 <i>CULVERT OUTFALLS ARMORING</i> : Place armoring as warranted at the entrance and exit points of culverts to mitigate scouring should flood flows exceed 3 ft/s and/or tidal scour exceed 1.5 ft/s. Extend armoring sufficient distances to address all areas potentially exposed to scour, including approach and exit channel alignments. Limit armoring to the minimum needed, and design to maintain benthic habitat to the maximum extent possible.	Design	Presidio Trust / NPS	Project plans to include culvert outfall features	EA Section 3.1
QRWR-5 <i>STORM WATER MANAGEMENT AND TREATMENT</i> : In order to address potential erosion, turbidity and pollutants in storm water inflow to the project, incorporate vegetated swales into the receiving areas of storm drains. To the maximum extent possible, create vegetated swales outside of the proposed habitat restoration areas. Design the low-relief vegetated channels to dissipate high flow energy and filter out sediment and pollutants from discharge. Bio-swales should then feed into properly vegetated constructed wetlands to additionally filter storm water runoff in the same fashion.	Design	Presidio Trust	Project plans to include storm water management features	EA Section 3.1

<sup>1</sup> These mitigation measures were established in the Quartermaster Reach Environmental Assessment (EA) or during its review and will be adopted and implemented by the Trust as part of the decision. Refer to Section 3 (Environmental Impact of the Alternatives) of the EA for a background discussion of the mitigation measures.

## ATTACHMENT 2 MITIGATION MONITORING AND ENFORCEMENT PROGRAM<sup>1</sup>

MITIGATION MEASURE	IMPLEMENTATION TIMING	PERSON/PARTY RESPONSIBLE	COMPLIANCE VERIFICATION MECHANISM	REFERENCE
<b>BIOLOGICAL RESOURCES</b>				
<p>QRBR-1 <i>WILDLIFE, NATIVE PLANT COMMUNITIES, AND SPECIAL STATUS SPECIES AVOIDANCE AND MINIMIZATION MEASURES</i>: Implement measures as appropriate in accordance with established Trust practices, procedures, and protocols to avoid and minimize short term construction-related impacts and long term project impacts to natural communities. Select measures that promote and enhance habitat restoration and success to the greatest extent practicable addressing: construction access, staging and heavy equipment use; basic dust control; backfill soils; contractor training; control of invasive plant species; plant selection, propagation, salvaging and revegetation; erosion and siltation control; signage and interpretive materials; access restrictions; nonnative animal species control; fencing and protective barriers; plant buffers; protection of nesting birds and bats; use of irrigation, fertilizers and herbicides; trail alignment and construction; noise attenuation; and night light intrusion.</p>	Design, pre-construction, construction, and post construction	Presidio Trust / Contractor	Design and construction documents to include appropriate measures	EA Section 3.2  Presidio VMP FONSI  PTMP Biological Opinion and PTMP ROD  Doyle Drive ROD
<p>QRBR-2 <i>VEGETATION RESTORATION AND MANAGEMENT</i>: Develop a plan that outlines procedures for restoration, revegetation, site stewardship and management, and monitoring in accordance with the Presidio Vegetation Management Plan and standard Trust restoration practice.</p>	Pre-construction	Presidio Trust	Vegetation restoration and management plan	EA Section 3.2  Presidio VMP FONSI
<b>CULTURAL RESOURCES</b>				
<p>QRRCR-1 <i>PTMP FINAL EIS AND PTPA CULTURAL RESOURCES AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES</i>: Implement the following measures detailed in the PTMP Final EIS and PTPA as necessary:</p> <ul style="list-style-type: none"> <li>• CR-7 <i>Compliance with Standards for Building and Cultural Landscape Rehabilitation</i></li> <li>• CR-8 (and PTPA Stipulation XII) <i>Archeological Management Assessment and Monitoring Program</i></li> <li>• CR-9 <i>Ground Disturbing Activities</i></li> <li>• CR-11 <i>Excavation Permits</i></li> <li>• CR-13 <i>Curation of Archeological Collections</i></li> <li>• CR-14 (and PTPA Stipulation XIII) <i>Discoveries</i></li> <li>• CR-15 <i>Treatment of Discoveries</i></li> </ul>	Design, pre-construction, and construction	Presidio Trust / Contractor	Design and construction documents to include appropriate measures	EA Section 3.3  PTPA and PTMP ROD
<p>QRRCR-2 <i>DESIGN OF RETAINING WALL FOR BUILDING 227</i>: Design the retaining wall to be constructed next to Building 227 using the Secretary of the Interior's Guidelines for Design and in keeping with the historic character and design of Building 227.</p>	Design	Presidio Trust	Project plans to include retaining wall features	EA Section 3.3

## ATTACHMENT 2 MITIGATION MONITORING AND ENFORCEMENT PROGRAM<sup>1</sup>

MITIGATION MEASURE	IMPLEMENTATION TIMING	PERSON/PARTY RESPONSIBLE	COMPLIANCE VERIFICATION MECHANISM	REFERENCE
<p>QRCR-3 <i>DOCUMENTATION OF MASON STREET AND DESIGN OF CULTURAL LANDSCAPE FEATURES:</i> Prior to any ground disturbance in the vicinity of Mason Street, establish documentation protocols for recording the location, dimensions, and materials of the roadway, and methods for returning disturbed elements into place after the installation of the culverts. Conduct design review for the reestablishment of Mason Street and other new elements or cultural landscape features in consultation with the NPS, the SHPO and consulting parties to the PTPA, and in collaboration with Doyle Drive project-led efforts.</p>	Pre-construction	Presidio Trust / NPS	Project file to include documentation	EA Section 3.3
<p>QRCR-4 <i>PROTECTION OF STONE WALL NORTH OF BUILDING 228:</i> Protect and stabilize the stone wall north of Building 228 to maintain its structural and historical integrity. Minimize grading along the base of the wall so as not to compromise its integrity. Use new material clearly distinguished from the historic stone wall for any additional retaining walls required adjacent or near to the historic stone wall to stabilize the slope in accordance with the stream restoration.</p>	Construction	Presidio Trust	Project plans to include protection measures	EA Section 3.3

## B-1 SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE/CNPS	HABITAT REQUIREMENTS	HABITAT PRESENT / ABSENT	LIKELIHOOD TO OCCUR WITHIN PROJECT SITE <sup>B</sup>
Pink sand-verbena <i>Abronia umbellata</i>	--/--/1B	Disturbed sandy areas, coastal dunes and scrub below 330 feet	Present at Crissy Field*	Moderate
Coast rock cress <i>Arabis blepharophylla</i>	--/--/4	Broadleaved upland forest, coastal bluff scrub, coastal prairie, coastal scrub	Absent	Low
Franciscan manzanita <i>Arctostaphylos hookeri</i> ssp. <i>franciscana</i>	--/--/1A	Coastal scrub on serpentinite below 990 feet	Absent	Low
Presidio manzanita <i>Arctostaphylos hookeri</i> ssp. <i>Ravenii</i>	E/E/1B	Chaparral, coastal prairie and coastal scrub; rocky serpentine slopes	Absent	Low
San Bruno Mountain manzanita <i>Arctostaphylos imbricata</i>	--/E/1B	Chaparral and coastal scrub on rocky outcrops	Absent	Low
Pacific manzanita <i>Arctostaphylos pacifica</i>	SC/E/--	Coastal scrub, on sandstone ridge associated with <i>Arctostaphylos imbricata</i> and <i>Erysium franciscanum</i> v. <i>franciscanum</i>	Absent	Low
Pallid manzanita <i>Arctostaphylos pallida</i>	T/E/1B	Northern maritime chaparral, mixed evergreen forest; slopes and ridges on siliceous shales, sands, or gravels	Absent	Low
Marsh sandwort <i>Arenaria paludicola</i>	E/E/1B	Marshes and swamps. Grows up through dense mats of typha, juncus, and scirpus	Absent	Low
Nuttall's milk-vetch <i>Astragalus nuttallii</i> var. <i>virgatus</i>	--/--/4	Open bluffs, dunes, and sandy areas	Present at Crissy Field*	Low
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	--/1B	Low ground, alkali flats, and flooded lands	Absent	Low
Tiburon mariposa-lily <i>Calochortus tiburonensis</i>	T/T/1B	Serpentinite grassland	Absent	Low
Tiburon paintbrush <i>Castilleja affinis</i> ssp. <i>neglecta</i>	E/T/1B	Serpentinite grassland	Absent	Low
Salt marsh owl's clover <i>Castilleja ambigua</i> ssp. <i>ambigua</i>	--/1B	Salt marshes	Absent	Low

## B-1 SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE/CNPS	HABITAT REQUIREMENTS	HABITAT PRESENT / ABSENT	LIKELIHOOD TO OCCUR WITHIN PROJECT SITE <sup>B</sup>
San Francisco spineflower <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	-/-/1B	Coastal sand dunes and coastal dune scrub	Present at Crissy Field*	Low
Robust spineflower <i>Chorizanthe robusta</i> var. <i>robusta</i>	E/--/1B	Coastal bluff scrub, coastal dunes openings in cismontane woodland, on sandy soil	Absent	Low
Franciscan thistle <i>Cirsium andrewsii</i>	-/-/1B	Moist areas in coastal prairie, coastal scrub, and mixed evergreen forest, sometimes on serpentinite at 0 to 440 feet	Absent	Low
Presidio clarkia <i>Clarkia franciscana</i>	E/E/1B	Serpentine outcrops in coastal scrub or valley and foothill grassland	Absent	Low
San Francisco collinsia <i>Collinsia multicolor</i>	--/--/1B	Closed-cone coniferous forests, coastal scrub, sometimes on serpentinite derived soils	Absent	Low
Point Reyes bird's beak <i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	--/--/1B	Coastal salt marsh and coastal dune/scrub interface	Present at Crissy Field*	Low
San Francisco wallflower <i>Erysimum franciscanum</i>	-/-/4	Northern foredune, northern coastal scrub, northern coastal bluff scrub, central dune scrub	Present at Crissy Field*	Low
Fragrant fritillary <i>Fritillaria liliacea</i>	--/--/4	Coastal bluff scrub, coastal scrub, valley and foothill grassland; clayey soils, often serpentinite	Absent	Low
Dune gilia <i>Gilia capitata</i> ssp. <i>chamissonis</i>	--/--/1B	Coastal sand dunes and openings of coastal dune scrub	Present at Crissy Field*	Low
San Francisco gumplant <i>Grindelia hirsutula</i> var. <i>maritima</i>	--/--/1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland; slopes with sandy or serpentinite soils	Absent	Low
Marin dwarf flax <i>Hesperolinon congestum</i>	T/T/1B	Chaparral, serpentinite grassland	Absent	Low
Santa Cruz tarplant <i>Holocarpha macradenia</i>	T/E/1B	Coastal terrace grasslands on lightly sandy to sandy clay soils below 300 feet	Absent	Low
Kellog's horkelia <i>Horkelia cuneata</i> ssp. <i>sericea</i>	-/-/1B	Openings of closed-coned coniferous forest, coastal scrub, maritime chaparral; sandy or gravelly soils	Absent	Low
Beach layia <i>Layia carnos</i>	E/E/1B	Coastal dunes	Absent	Low

## B-1 SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE/CNPS	HABITAT REQUIREMENTS	HABITAT PRESENT / ABSENT	LIKELIHOOD TO OCCUR WITHIN PROJECT SITE <sup>B</sup>
Large-flowered linanthus <i>Leptosiphon</i> (=Linanthus) <i>grandiflorus</i>	--/1B	Open grassy flats, generally in sandy soils	Absent	Low
Rose linanthus <i>Leptosiphon</i> (=Linanthus) <i>rosaceus</i>	--/1B	Coastal bluff scrub	Absent	Low
San Francisco lessingia <i>Lessingia germanorum</i>	E/E/1B	Open sandy soils of remnant dunes in coastal scrub	Present at Crissy Field Marsh*	Low
White-rayed pentachaeta <i>Pentachaeta bellidiflora</i>	E/E/1B	Open dry rocky slopes and grassland, often on soils derived from serpentinite	Absent	Low
Choris's popcorn-flower <i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	--/1B	Chaparral, coastal prairie, coastal scrub, on mesic sites	Absent	Low
Greene's (= San Francisco) popcorn flower <i>Plagiobothrys reticulatus</i> var. <i>rossianorum</i> (=P. <i>diffusus</i> )	-/E/1B	Coastal prairie; grassland with marine influence	Absent	Low
North Coast semaphore grass <i>Pleuropogon hooverianus</i>	--/R/1B	Moist grassy sometimes shaded areas, in broadleaved upland forest, meadows, North Coast coniferous forest, vernal pools	Absent	Low
Hickman's cinquefoil <i>Potentilla hickmanii</i>	E/E/1B	Freshwater marshes, seeps, and small streams in open areas in coastal scrub or coniferous forest	Absent	Low
Adobe sanicle <i>Sanicula maritima</i>	--/R/1B	Meadows and seeps. Generally associated with clayey or ultramafic soils	Absent	Low
Marin checkerbloom <i>Sidalcea hickmanii</i> ssp. <i>viridis</i>	--/1B	Chaparral (serpentinite)	Absent	Low
San Francisco campion <i>Silene verecunda</i> ssp. <i>verecunda</i>	--/1B	Coastal habitats (scrub, prairie, bluff scrub), grassland and chaparral; sandy to mudstone or shale soils	Present at Crissy Field Marsh*	Low
Tiburon jewel-flower <i>Streptanthus niger</i>	E/E/1B	Serpentinite grassland	Absent	Low
California seablite <i>Suaeda californica</i>	E/-/1B	Margins of coastal saltmarshes	Absent	Low

## B-1 SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE/CNPS	HABITAT REQUIREMENTS	HABITAT PRESENT / ABSENT	LIKELIHOOD TO OCCUR WITHIN PROJECT SITE <sup>B</sup>
San Francisco owl's clover <i>Triphysaria floribunda</i>	-/-1B	Coastal prairie and scrub, valley and foothill grassland; often on serpentinite soils	Absent	Low
California triquetrella moss <i>Triquetrella californica</i>	-/-1B	Coastal bluff scrub, coastal scrub	Absent	Low

\* National Park Service

<sup>A</sup> Status Explanations:

Federal

*E* = listed as endangered under the federal Endangered Species Act.

*T* = listed as threatened under the federal Endangered Species Act.

*PE* = proposed for federal listing as endangered under the federal Endangered Species Act.

*PT* = proposed for federal listing as threatened under the federal Endangered Species Act.

*C* = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.

*SC* = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

- = no listing.

State

*E* = listed as endangered under the California Endangered Species Act.

*T* = listed as threatened under the California Endangered Species Act.

*R* = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

*CE* = candidate species for listing as endangered under the California Endangered Species Act.

*SSC* = species of special concern in California.

- = no listing.

California Native Plant Society

*1A* = List 1A species: presumed extinct in California.

*1B* = List 1B species: rare, threatened, or endangered in California and elsewhere.

*2* = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

*3* = List 3 species: plants about which more information is needed to determine their status.

*4* = List 4 species: plants of limited distribution.

- = no listing.

\* = known populations believed extirpated from that county.

? = population location within county uncertain.

<sup>B</sup> Definitions of Levels of Occurrence Likelihood:

High = Known occurrence of plant in region from Natural Diversity Data Base, or other documents in the vicinity of the project, and presence of suitable habitat conditions.

Low = Plant not known to occur in the region from the Natural Diversity Data Base, or other documents in the vicinity of the project, and suitable habitat absent.

## B-2 SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE	CALIFORNIA DISTRIBUTION	HABITATS	POTENTIAL FOR OCCURRENCE IN PROJECT SITE <sup>B</sup>
<b>INVERTEBRATES</b>				
Sandy beach tiger beetle <i>Cicindela hirticollis grvida</i>	SC/--	Limited to sandy beaches of the Pacific Ocean from northern Mexico to southern California	Sandy areas around non-brackish water; larvae live in burrows in sand along sea beaches, creeks, seepages, and lake shores	None – Inappropriate habitat in the project area
Bay checkerspot butterfly <i>Euphydryas editha bayensis</i>	T/--	Vicinity of San Francisco Bay	Native grasslands on outcrops of serpentine soil; California plantain and owl's clover are host plants	None – Inappropriate habitat in the project area
White abalone <i>Haliotis sorenseni</i>	E/--	Channel Islands	Rocky substrate at water depths from 25 to 60 meters near a rock/sand interface	None – Inappropriate habitat in the project area
Mission blue butterfly <i>Icaricia icarioides missionensis</i>	E/--	San Bruno Mountain, San Mateo County; Twin Peaks, San Francisco County	Grasslands and coastal scrub with larval food plants ( <i>Lupinus albifrons</i> , <i>L. variicolor</i> , and <i>L. formosus</i> )	None – Inappropriate habitat in the project area
San Bruno elfin butterfly <i>Incisalia mossii bayensis</i>	E/--	San Mateo County	Coastal scrub and bunchgrass grassland habitats, with larval foodplant, <i>Sedum spathulifolium</i>	None – Inappropriate habitat in the project area
San Francisco forktail damselfly <i>Ischnura gemina</i>	SC/--	Endemic to San Francisco Bay Area; extant populations in Marin County south to Santa Cruz County	Wetlands with emergent vegetation	None – Inappropriate habitat in the project area
Bumblebee scarab <i>Lichnanthe ursine</i>	SC/--	Sonoma County south to San Mateo County; inland Los Angeles County	Open coastal sand dunes	None – Inappropriate habitat in the project area
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	E/--	San Bruno Mountain, San Mateo County, and a single location in Alameda County	Open hillsides where wild pansy ( <i>Viola pendunculata</i> ) grows	None – Inappropriate habitat in the project area
<b>FISH</b>				
Tidewater goby <i>Eucyclogobius newberryi</i>	E/SC	From Del Norte County to San Diego County	Brackish waters. All known populations are associated with low salinity coastal wetlands	None – Inappropriate habitat in the project area



## B-2 SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE	CALIFORNIA DISTRIBUTION	HABITATS	POTENTIAL FOR OCCURRENCE IN PROJECT SITE <sup>B</sup>
Coho salmon, Central CA coast ESU <i>Oncorhynchus kisutch</i>	T/E	Central and northern California	Coastal rivers and streams	None – Project area outside of designated ESU range
Steelhead, Central CA coast ESU <i>Oncorhynchus mykiss irideus</i>	T/--	San Francisco and San Pablo bays, central California	Coastal rivers, streams, and bays	None – Inappropriate habitat in the project area
Chinook salmon, Central Valley spring-run ESU <i>Oncorhynchus tshawytscha</i>	T/T	Central and northern California	Coastal rivers and streams	None – Inappropriate habitat in the project area
Chinook salmon, Sacramento River winter-run ESU <i>Oncorhynchus tshawytscha</i>	E/E	Sacramento River and its tributaries	Sacramento River and its tributaries, including bay waters	None – Inappropriate habitat in the project area
<b>AMPHIBIANS</b>				
California tiger salamander <i>Ambystoma californiense</i>	T/SSC	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to Santa Barbara County	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	None – Inappropriate habitat in the project area
California red-legged frog <i>Rana aurora draytonii</i>	T/SSC	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehema County to Fresno County	Permanent and semi-permanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods	None – Inappropriate habitat in the project area
Foothill yellow-legged frog <i>Rana boylei</i>	SC/SSC,FSS,LPSE	Occurs in the Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada ranges up to approximately 6,000 feet	Creeks or rivers in woodlands or forests with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby	None – Inappropriate habitat in the project area

## B-2 SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE	CALIFORNIA DISTRIBUTION	HABITATS	POTENTIAL FOR OCCURRENCE IN PROJECT SITE <sup>B</sup>
<b>REPTILES</b>				
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	T/T	Restricted to Alameda and Contra Costa Counties	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging	None – Inappropriate habitat in the project area
San Francisco garter snake <i>Thamnophis sirtalis tetrataenia</i>	E/E	Northern San Mateo County southward along the coast and the eastern slope of the Santa Cruz Mountains to the Santa Cruz County line	Favors ponds, lakes, and marshy areas containing abundant vegetation for cover	None – Inappropriate habitat in the project area
<b>BIRDS</b>				
Cooper's Hawk <i>Accipiter cooperii</i>	--/SSC	Throughout California except high altitudes in the Sierra Nevada. Winters in the Central Valley, southeastern desert regions, and plains east of the Cascade range	Nests in a wide variety of habitat types, from riparian woodlands and digger pine-oak woodlands through mixed conifer forests	Moderate – Some potentially viable habitat in the project area
Marbled murrelet <i>Brachyramphus marmoratus</i>	T/E	Nesting sites from the Oregon border to Eureka and between Santa Cruz and Half Moon Bay; winters in nearshore and offshore waters along the entire California coastline	Nests in dense, old growth forests along coast	None – Inappropriate habitat in the project area
Western snowy plover, coastal populations <i>Charadrius alexandrinus nivosus</i>	T/SC	Population defined as those birds that nest adjacent to or near tidal waters, including all nests along the mainland coast, peninsulas, offshore islands, and adjacent bays and estuaries	Coastal beaches above the normal high tide limit in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent	Low – Low foraging potential in project site. No nesting potential in project site
Saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	SC/SSC	Found only in the San Francisco Bay Area in Marin, Napa, Sonoma, Solano, San Francisco, San Mateo, Santa Clara, and Alameda Counties	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover	Low – Very minimal viable habitat in the project area
California black rail <i>Laterallus jamaicensis coturniculus</i>	SC/T	Permanent resident in the San Francisco Bay and eastward through the Delta in Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations	None – Inappropriate habitat in the project area. Required pickleweed growth absent*

## B-2 SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE	CALIFORNIA DISTRIBUTION	HABITATS	POTENTIAL FOR OCCURRENCE IN PROJECT SITE <sup>B</sup>
Brown pelican <i>Pelecanus occidentalis californicus</i>	--/E	Present along the entire coastline, but does not breed north of Monterey County; extremely rare inland	Typically in littoral ocean zones, just outside the surf line; nests on offshore islands	Low – Foraging known to occur in project vicinity, but not at project site. No nesting potential in project site
California clapper rail <i>Rallus longirostris obsoletus</i>	E/E	Marshes around San Francisco Bay and east through the Delta to Suisun Marsh	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickleweed; feeds on mollusks removed from the mud in sloughs	None – Inappropriate habitat in the project area. Rails require cordgrass ( <i>Spartina</i> spp.) habitat of sufficient patch size that is not represented at Crissy and unlikely to be post-project
Bank swallow <i>Riparia riparia</i>	SC/T	Occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	None – Inappropriate habitat in the project area
California least tern, nesting colony <i>Sterna antillarum browni</i>	E/E	Nests on beaches along San Francisco Bay and along the southern California coast from southern San Luis Obispo County south to San Diego County	Nests on sandy, upper ocean beaches, and occasionally uses mudflats; forages on adjacent surf line, estuaries, or the open ocean	None – Inappropriate nesting habitat in project site
<b>MAMMALS</b>				
Pallid bat <i>Antrozous pallidus</i>	--/SSC	Occurs throughout California except the high sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California	Low – Minimal viable habitat in the project area. Previous bat surveys negative*
Fringed myotis <i>Myotis thysanodes</i>	SC/--	Occurs throughout California except the southern deserts and the Central Valley	Roosts in caves, old buildings, and under bark	Low – Minimal viable habitat in the project area Previous bat surveys negative*
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	SC/SSC	West side of Mount Diablo to coast and San Francisco Bay	Present in chaparral habitat and in forest habitats with a moderate understory	None – Inappropriate habitat in the project area

## B-2 SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT SITE AND VICINITY

COMMON AND SCIENTIFIC NAME	LEGAL STATUS: <sup>A</sup> FEDERAL/STATE	CALIFORNIA DISTRIBUTION	HABITATS	POTENTIAL FOR OCCURRENCE IN PROJECT SITE <sup>B</sup>
Salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	E/E	San Francisco, San Pablo, and Suisun Bays; the Delta	Salt marshes with a dense plant cover of pickle-weed and fat hen; adjacent to an upland site	None – Inappropriate habitat in the project area
Salt marsh vagrant shrew <i>Sorex vagrans halicoetes</i>	SC/SSC	Restricted to southern and northwestern San Francisco Bay	Mid-elevation salt marsh habitats with dense growths of pickleweed; requires driftwood and other objects for nesting cover	None – Inappropriate habitat in the project area

\*San Francisco County Transportation Authority 2005a

<sup>A</sup> Status Explanations:

*Federal*

*E* = listed as endangered under the federal Endangered Species Act.

*T* = listed as threatened under the federal Endangered Species Act.

*PT* = proposed for federal listing as threatened under the federal Endangered Species Act.

*D* = delisted as threatened/endangered under the federal Endangered Species Act.

*C* = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

*SC* = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

*State*

*E* = listed as endangered under the California Endangered Species Act.

*T* = listed as threatened under the California Endangered Species Act.

*FP* = fully protected under the California Fish and Game Code.

*SSC* = species of special concern in California.

– = no listing.

<sup>B</sup> Potential Occurrence in the Project Area:

*High* = Known occurrences of the species within the project area or California Natural Diversity Database, or other documents, records the occurrence of the species on-site or within a 1-mile radius of the project area. Suitable habitat is present within the project area.

*Moderate* = Known occurrences of the species within the project area or California Natural Diversity Database, or other documents, records the occurrence of the species within a 10-mile radius of the project area. Suitable habitat is present within the project area.

*Low* = California Natural Diversity Database, or other documents, records the known occurrence of the species within a 10-mile radius of the project area, but poor quality suitable habitat is present within the project area. — Or — California Natural Diversity Database, or other documents, does not record the occurrence of the species within a 10-mile radius of the project area but suitable habitat is present within the project area.



## United States Department of the Interior

NATIONAL PARK SERVICE  
Golden Gate National Recreation Area  
Fort Mason, San Francisco, California 94123

IN REPLY REFER TO:

L76 (GOGA-PLAN)

SEP - 2 2010

Dear Friends of the GGNRA:

The National Park Service (NPS) is a Cooperating Agency to the Quartermaster Reach Environmental Assessment. A portion of the project occurs on NPS land and requires NPS approval to be implemented. As a Cooperating Agency the NPS will adopt the Environmental Assessment (EA), and then issue its own decision to allow the portion of project that occurs on NPS land to be implemented. The EA supports the conclusion that the project will not result in any significant effects that will require the preparation of an Environmental Impact Statement. Given this, the NPS will prepare a Finding of No Significant Impact (FONSI).

Golden Gate National Recreation Area (GGNRA) has been working cooperatively with the Presidio Trust and supports the objectives of the project. GGNRA manages the Crissy Field Marsh and believes the hydrologic connection that will be made between the marsh and Thompson Reach will have many natural resource benefits.

GGNRA will post the FONSI on its Planning, Environment and Public Comment (PEPC) website as follows:

<http://parkplanning.nps.gov/goga>

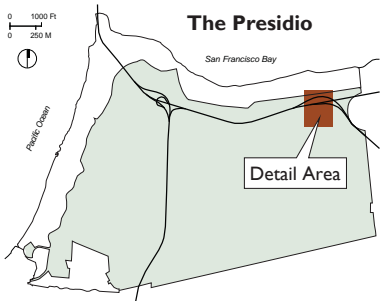
*(Click on the Quartermaster Reach EA in the projects list)*

If you have questions about NPS participation in this project, or would like a copy of the FONSI, please email us at [goga\\_planning@nps.gov](mailto:goga_planning@nps.gov), or contact Larry Miranda at (415) 561-2842.

Sincerely,

Frank Dean  
Acting General Superintendent

# QUARTERMASTER REACH BUILDINGS SITE MAP



The Presidio Trust is Dedicated to Preserving  
the Presidio as an Enduring Resource for All Americans

