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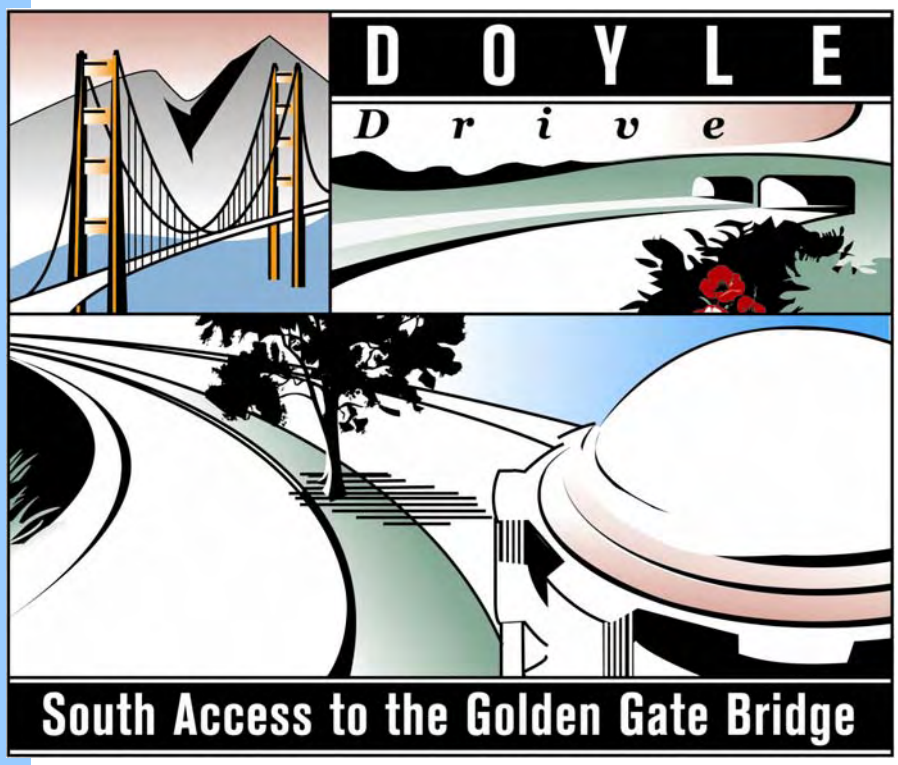

FINAL
NATURAL ENVIRONMENTAL STUDY
July 2005

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SECTION 1.0: SUMMARY OF FINDINGS AND CONCLUSIONS

1.1 HISTORY OF THIS NATURAL ENVIRONMENTAL STUDY

A first draft of the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project) NES was produced in 2002, addressing a different set of alternatives. Its content was reviewed by all project team members, and responses provided by the preparers. At meetings held in 2002, 2003 and prior to the current draft in 2005, staff of the National Park Service (NPS) and the Presidio Trust (the Trust) expressed varying degrees of concern about the potential effect of the project on future restoration efforts in the study area, especially Tennessee Hollow, which they felt had not been adequately addressed in the analysis at that time.

Following additional review and discussion with Caltrans, it was decided that a *Revised NES* would be prepared. The *Revised NES* would incorporate and/or respond to the following set of issues:

1. Clarification of Natural Resource presence with respect to location within either the project study area or work area. This includes an overview of existing conditions within the project work area (construction corridor);

2. Mitigation for each resource impact identified will be included in the resource impact discussion within the *Revised NES*;

3. All temporary and permanent impacts to each resource category (Important Natural Communities, and Special-Status Plants and Animals) will be listed for each alternative in the form of a table and described in detail within the document text;

4. Identified impacts to natural resources will be revised to include avoidance and minimization measures. These measures include, Environmentally Sensitive Area (ESA) fencing, Best Management Practices (BMP's), Stormwater Pollution Prevention Plan (SWPPP), dust control, and pre-construction surveys for nesting birds;

5. The discussion of the Tennessee Hollow Restoration Project and the Crissy Field Marsh Expansion will be removed from the NES and addressed in the land-use planning section of the Draft Environmental Impact Statement/Report and as an addendum to the Community Impacts Assessment;

6. The Biological Assessment (BA) will be renamed as a Biological Report of Species of Concern (see Appendix D) because a BA is not required for discussions with USFWS concerning recovery plans (Don Hankins, USFWS, pers. comm. November 2004). No Federally proposed or listed species will be affected by the proposed Doyle Drive Project.

The purpose of the *Revised NES* is to respond to the elements listed above and provide information necessary to support ongoing environmental analysis under state and federal law, i.e., CEQA and NEPA. Consistent with these laws, the NES is not intended to be a complete inventory of plants and animals, nor a catalogue of all imaginable impacts.

1.2 PROJECT STUDY AREA

The Doyle Drive Project study area is located in the northern part of the City and County of San Francisco within the Presidio, a component of the National Park System and part of the Golden Gate National Recreation Area (GGNRA). The project study area encompasses the Doyle Drive construction corridor

(i.e., No-Build and construction limits of two build alternatives[1]) as well as an area extending 229 meters (750 feet) outside the Doyle Drive construction corridor in the Presidio. The San Francisco Bay borders the northern perimeter of the project study area and urban development, landscaped with ornamental trees and introduced, non-native forests, occurs to the south as well as to the east. Coastal bluffs border the western perimeter.

1.3 EXISTING CONDITIONS WITHIN THE PROJECT STUDY AREA

Many of the native plant communities in the Presidio are remnant populations of communities that were once extensive along the coast of California. These native plant communities have been displaced by urban development or non-native plants that rapidly colonize disturbed open areas. Ten plant communities occur within the project study area. Based on the Holland (1986) classification system and field observations, these plant communities include non-native introduced forest and ornamental wildlife habitat and ornamental landscape, coast live oak woodland, riparian scrub (including central coast arroyo willow scrub, blackberry, and associated wetlands), mixed serpentine chaparral, non-native grassland, northern coastal scrub (including coastal scrub in understory and on sandy and serpentinite soils), northern coastal bluff scrub, northern foredune, and restored tidal marsh and associated wetlands. Of these plant communities, restored tidal marsh, coast live oak woodland, riparian scrub, mixed serpentine chaparral, northern coastal bluff scrub, serpentine bunchgrass grassland and northern foredune are considered important plant communities by the National Park Service (NPS) and Presidio Trust (the Trust) because they support a high diversity of native plants and special status plant species, or have limited distribution in the Presidio (NPS, 1999a).

The non-native introduced forest and ornamental wildlife habitat is primarily composed of blue gum eucalyptus (*Eucalyptus globulus*), Monterey cypress (*Cupressus macrocarpa*), and Monterey pine (*Pinus radiata*). These species comprise the Historic Forest.2

One hundred thirty-four (134) plant and animal species at any level of state or federal concern were evaluated; 51 animals and 17 plants were removed from the analysis due to: (1) absence established as a result of past surveys; (2) the known range of the species falling outside the project study area; (3) very low occurrence potential in project study area or project vicinity; or (4) lack of suitable habitat in the project study area. Additional species were eliminated when it was determined that these species could possibly be present in the project study area, *but not in the construction corridor*, and that these species would not be subject to either direct or indirect impacts under any of the construction build alternatives. The remaining special status animals and plants were further analyzed in the Biological Report of Species of Concern (Appendix D) and within the NES.

The project study area supports 7.07 hectares (17.46 acres)[3] of U.S. Army Corps of Engineers (ACOE) jurisdictional waters of the U.S. and 0.97 hectares (2.40 acres) of NPS/Trust “Cowardin” wetlands protected by the NPS or Trust.

The NPS and Trust define wetlands using the *Cowardin et al.*, classification system, which defines a wetland as having *at least* one or more of the following attributes:

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[1] In addition to the No-Build Alternative, the two build alternatives include (1) Replace and Widen No-Detour and Replace and Widen with Detour (Alt 2 Detour and Alt 2 No Detour), and (2) Presidio Parkway Diamond or Circle Loop Ramp with the Merchant Street slip ramp, and without the slip ramp; and Presidio Parkway Diamond or Circle Hook ramp with the Merchant Street slip ramp, and without the slip ramp.

[2] As designated by the National Park Service and Trust, and mapped in Figure 4-2. Refer to the cultural resources report (Findings of Effects) for an analysis of trees in the Historic Management Zone.

[3] Area of ACOE jurisdictional waters of the U.S. includes flow found in a culvert in Tennessee Hollow in its existing state within the Doyle Drive construction corridor.

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);

2. The substrate is predominantly undrained hydric soil; or

3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin definition, therefore, includes more habitat types than the wetland definition (33 CFR 328.3) and delineation manual used by the ACOE. The 1987 "Corps of Engineers Wetlands Delineation Manual" requires all three of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for a habitat to be considered a wetland. The Cowardin wetland definition includes such wetlands, but also adds some habitats that, though lacking vegetation or soils, are still saturated or shallow inundated environments that support aquatic life.

1.4 EXISTING CONDITIONS WITHIN THE DOYLE DRIVE PROJECT SITE

Doyle Drive is a freeway located in the Presidio of the City of San Francisco, in the northern part of the City at the southern approach to the Golden Gate Bridge. Doyle Drive is within the Golden Gate National Recreation Area (GGNRA). The Presidio has been part of the National Park System since 1972 and a National Historic Landmark since 1962. Doyle drive is one and one-half (1.5) miles long with six traffic lanes. It has been the primary artery to access the two military bases that have until recently been active. A number of buildings and complexes line Doyle Drive, primarily east of Park Presidio Blvd (State Hwy. 1). The San Francisco National Cemetery is located adjacent to Doyle Drive, as is the Commissary, the Post Exchange and a complex of residences once used by the military staff. The Doyle Drive freeway and local roads provide an urban road system that is heavily used by all types of motor vehicles.

Urban development in the Presidio has reduced open space, limiting large expanses of most of the natural communities. Smaller species such as reptiles, amphibians, and invertebrates are often restricted to certain communities and can persist in small fragmented habitat patches. However, a diversity of interconnected natural communities is an important consideration for animals whose home ranges encompass several habitats, or which migrate along the Pacific Flyway through San Francisco Bay. These wildlife travel corridors must be viewed in a larger context. In spite of the limited habitat quality *in situ*, the portion of the Presidio adjacent to the Doyle Drive Project, Crissy Marsh, and the rest of the Bayfront, constitute such a corridor and is considered an important natural asset of the Presidio.

Essentially, the existing conditions represent an urban environment that is largely composed of roadways, parking areas, buildings, other paved areas and some open space that is vegetated with a composition of landscape and native vegetation. As noted earlier, there are remnant populations of native plant communities within the Presidio. However, the remnant native populations are largely located outside of the Doyle Drive construction corridor, and therefore the Doyle Drive Project would have minor impacts to sensitive communities. The build alternatives largely affect what is already built on, either previously disturbed, or colonized by non-native vegetation.

1.5 IMPACT SUMMARY

Remnant populations of native plant communities exist within the Presidio; these remnant native populations are largely located outside of the construction corridor. There are, therefore, only minor impacts to sensitive communities. The build alternatives largely affect what is already built on, either previously disturbed, or colonized by non-native vegetation.

1.5.1 Wetlands

Construction of all build alternatives would permanently remove or temporarily disturb the same amount of ACOE jurisdictional waters of the U.S: 0.22 hectares (hectares) or 0.55 acres (acres) of permanent

impact, and 0.06 hectares (0.15 acres) of waters temporarily disturbed at Tennessee Hollow. Each build alternative would affect additional area of wetlands protected by the NPS/Trust under Executive 11990 as defined by U.S. Fish and Wildlife Service Cowardin classification system (NPS/ Trust jurisdictional Cowardin wetlands). Permanent impacts to these additional areas vary between 0.07 hectares (0.17 acres) for the Replace and Widen alternatives (Alt 2 Detour and Alt 2 No Detour), and 0.08 hectares (0.19 acres) for the Presidio parkway alternatives. Temporary impacts could occur to an additional 0.01 hectares (0.02 acres) of wetlands for the Alt 2 Detour and No Detour options. These permanent and temporary effects on wetlands are listed and discussed in Section 6.0 *Project Impacts* and in Appendix B.

Areas that are apparently fed by upgradient groundwater flow support wetland communities (i.e., central coast arroyo willow and California blackberry) on the northern bluff face. However, given the age of existing drainage pipes in the area, some of the groundwater may be coming from surface runoff that enters drainage inlets up stream of the northern bluff face and infiltrates the ground through pipe leakage. Construction of a tunnel upgradient of the bluff face could potentially result in an indirect impact, disrupting the flow of groundwater in the fractures and potentially increasing or decreasing the flow rate and/or volume of groundwater flow that supports the wetland vegetation growth. If major changes in the character of these areas occurred, these in turn could affect plant communities, and subsequently wildlife habitat on the bluff. However, facilities are proposed around the tunnel to maintain underground flow and are described elsewhere in this text. Based on the wetland delineations as well as ACOE and Caltrans observations, no surface water has been observed at these locations of the bluff face. Groundwater (subsurface) flow likely supports riparian vegetation found on the bluff face. Direct and indirect impacts to ACOE jurisdictional wetlands or NPS/ Trust jurisdictional Cowardin wetlands will vary in accordance with the related improvement or construction activity. Therefore, any consideration of the severity of the impact needs to be measured by the magnitude and duration of change. There would be no wetland impacts on Tennessee Hollow in its existing condition due to the project build alternatives. However, the existing Tennessee Hollow may be temporarily affected (0.06 hectares, 0.15 acres) if the flow is redirected, the piping is modified or if discharge enters the stream. Important biological resources, including wetlands and sensitive plant communities, located immediately adjacent to the project work areas, will be designated as ESAs during project construction. The ESAs will be off-limits to all construction activities and personnel in order to protect and preserve the adjacent biological resources.

1.5.2 Vegetation

There will be temporary and permanent effects on common vegetation, especially non-native vegetation, due to construction-related activities under the build alternatives. The NPS and the Trust consider all native plant communities that are biologically intact and diverse as important (sensitive) natural communities (NPS, 1999a). Construction of the build alternatives could potentially result in some level of temporary disturbances on important plant communities due to possible soil runoff during the rainy season, dust during demolition activities, and other normal construction activities. However, indirect impacts to adjacent important biological resources due to dust and runoff will be reduced to minor impacts with the planned implementation of Caltrans Special Provisions, Caltrans Stormwater Handbook guidelines, the Stormwater Pollution Prevention Program (SWPPP) measures including Best Management Practices (BMPs), and the Bay Area Air Quality Management District's (BAAQMD) basic dust control procedures. In addition, areas temporarily disturbed during construction will be revegetated. In addition, construction access corridors will be limited to the minimum amount needed to facilitate materials and equipment.

Construction of the build alternatives would result in permanent and temporary effects on important natural upland communities; these are northern coastal scrub on sandy soil, and northern coastal scrub on sandy soil with serpentine inclusions. The permanent impacts on both these vegetation types are relatively minor, and vary little between alternatives. Alt 2 Detour and No Detour would take up to 0.20 hectares (0.50 acres) for permanent impacts to these two types of northern coastal scrub communities; the Presidio Parkway (Alt 5) alternatives could affect between 0.20 hectares (0.49 acres) and 0.37 hectares (0.91 acres). Temporary impacts for all alternatives on northern coastal scrub will be minimal, ranging from 0.01 hectares (0.02 acres) for the Presidio Parkway alternatives to 0.04 hectares (0.11 acres) for Alt 2 and Alt 2 Detour. Impacts to northern coastal scrub with serpentine inclusions show

greater variation, ranging from 0.06 hectares (0.16 acres) for Alt 2 Detour and Alt 2 No Detour, to 0.3 hectares (0.73) and to 0.35 hectares (0.87) for the Presidio Parkway (Alt 5) alternatives.

1.5.3 Special-Status Plant and Animal Species

Construction of all build alternatives could indirectly affect federal special concern plant species in the project study area near the construction corridor; however, as mentioned above, dust and erosion control measures have been incorporated in the Doyle Drive Project to minimize any potential impact to these species. However, all of the build alternatives could result in direct removal or disturbance to skunkweed, a federal species of local concern, and San Francisco gumplant, a federal species of concern, if these species cannot be avoided. Skunkweed is along the road to Battery Blaney within the construction corridor. San Francisco gumplant is north of the Merchant Road on-ramp, about 50 meters south of Building 1258 within the construction corridor, and two individuals have been found within the construction corridor at Building 1258 (Barstow, NPS, personal communication, 2004).

Construction of the build alternatives could potentially result in the disturbance to tree lupine moth (*Grapholita edwardsiana*), and nesting special status raptors and other bird species (including California yellow warbler [*Dendroica petechia brewsteri*]) that are protected by California Fish and Game Code 3503 and 3503.5, and the Migratory Bird Treaty Act (MBTA). Additionally, construction of all build alternatives could temporarily disrupt a primary segment of the urban wildlife movement corridor, which could result in disturbance to, or direct mortality of, common wildlife species. Impacts on tree lupine moth, common wildlife, and wildlife movement corridor are locally adverse, but considered minor. Potential impacts on nesting birds could be considered adverse if construction occurs in the proximity of nesting birds. Mitigation measures, including pre-construction bird surveys, have been included to reduce this potential impact. The relatively small permanent habitat losses would not be considered adverse.

SECTION 2.0: ALTERNATIVES DESCRIPTION

This report presents results of the Natural Environmental Study (NES) conducted for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). The report addresses potential biological resource impacts from the Doyle Drive Project. The findings of this study will be incorporated into the environmental document prepared for the Doyle Drive Project, as required to meet National Environmental Policy Act of 1969 (NEPA) and California Environmental Quality Act of 1970 (CEQA) standards.

2.1 OVERVIEW

Doyle Drive is a roadway located in the Presidio of San Francisco (the Presidio); in the northern part of the City of San Francisco at the southern approach to the Golden Gate Bridge (see Figure 2-1). The US Army transferred jurisdiction of the Presidio to the National Park Service (NPS) in 1994 and it then became part of the National Park system within the Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), which is the agency responsible for oversight of 80 percent of the Presidio (delineated as Area B in Figure 2-1); and the NPS, which is responsible for management of the coastal portions of the park (delineated as Area A in Figure 2-1). Doyle Drive lies primarily within the Area B lands managed by the Trust with a small portion at the western end located in Area A on land operated by the Golden Gate Bridge Highway and Transportation District (GGBHTD). The Presidio has also been designated a National Historic Landmark District (NHLD) since 1962, with the Doyle Drive roadway determined to be a contributing element to that landmark.

Doyle Drive is the southern approach of US 101 to the Golden Gate Bridge and is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps that connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one at the intersection of Richardson Avenue and Lyon Street; and one where Park Presidio Boulevard (State Route 1) merges into Doyle Drive approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach (see Figure 2-1). Doyle Drive passes through the Presidio on an elevated concrete viaduct (low-viaduct) and transitions to a high steel truss viaduct (high-viaduct) as it approaches the Golden Gate Bridge Toll Plaza.

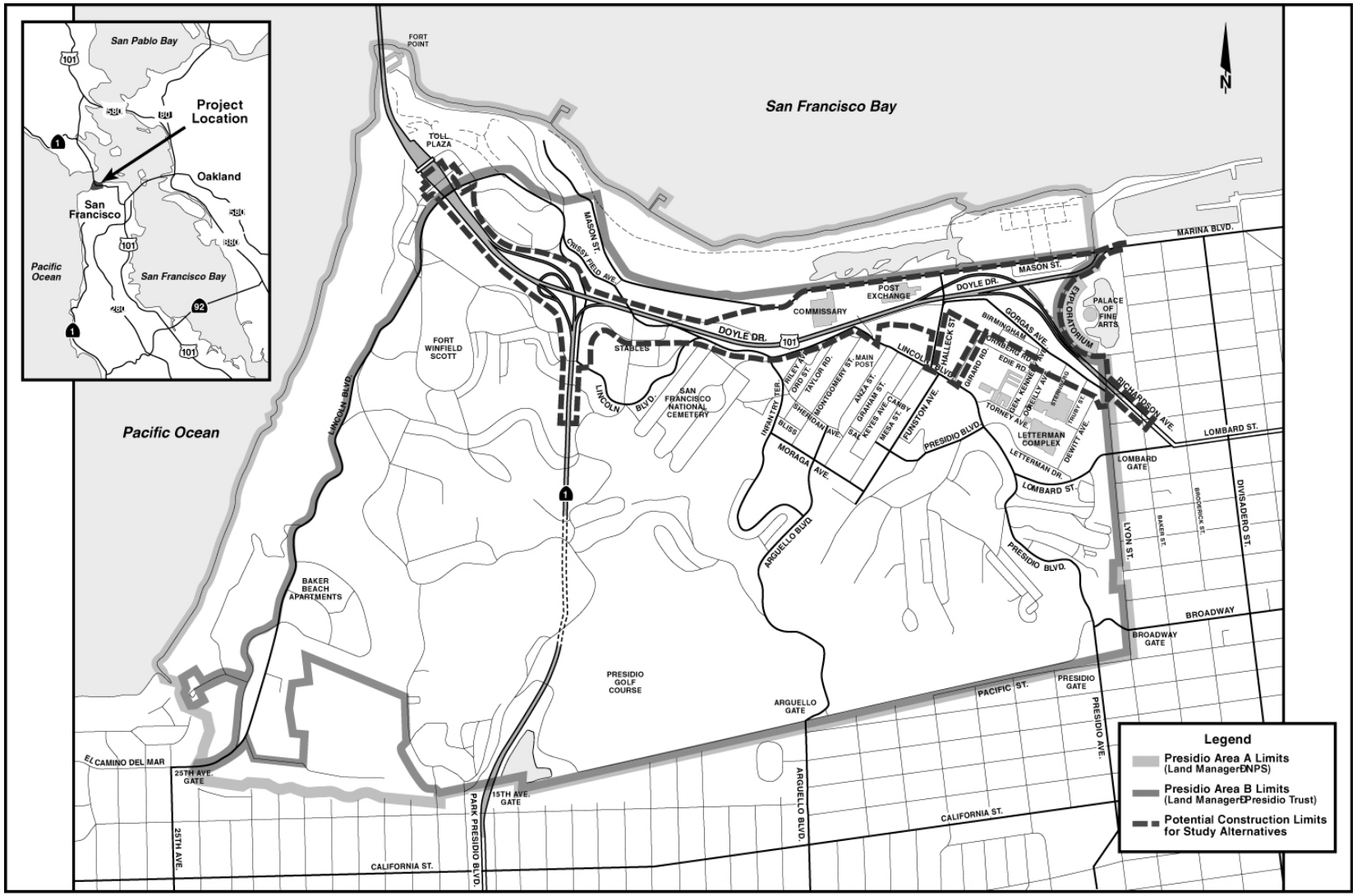
Doyle Drive is nearly 70 years old and is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic and exposure to salt air will cause the structures to become seismically and structurally unsafe in the coming years. In addition, the eastern portion of the aging roadway is located in a potential liquefaction zone identified on the State of California Seismic Hazard Zones map dated August 2000.

Currently, Doyle Drive has nonstandard design elements, including travel lanes from 2.9 to 3.0 meters (9.5 to 10.0 feet) in width, no fixed median barrier, no shoulders and exit ramps that have tight turning radii. During peak traffic hours, plastic pylons are moved manually to provide a median lane as well as to reverse the direction of traffic flow of several lanes (Project Study Report: Doyle Drive Reconstruction, 1993).

2.2 PROJECT PURPOSE

The purpose of the South Access to the Golden Gate Bridge - Doyle Drive Project is to replace Doyle Drive in order to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its purpose as a National Park.

FIGURE 2-1
PROJECT LOCATION



2.3 ALTERNATIVES THAT ARE BEING CONSIDERED

This section describes the Doyle Drive Project design alternatives in terms of physical and operating characteristics. During the screening process, all alternatives were evaluated for their ability to meet the Project's Purpose and Need statement (see Section 2.2). Alternatives that did not meet the Purpose and Need statement were removed from further analysis: Alternatives 3 and 4 were considered earlier and have since been withdrawn from consideration. They were withdrawn due to their more extensive environmental impacts and high costs. A public meeting was held in early 2004 in which the withdrawal of these alternatives was presented and Alternative 5 was introduced. Alternatives 1, 2 and 5 have been retained and are included in this NES. Detailed drawings showing the plan and profile of each alternative in addition to the various design options can be found in Appendix C.

2.3.1 Alternative 1: No-Build Alternative

The No-Build Alternative represents future conditions if no other actions are taken in the study area beyond what is already programmed by the year 2020. The No-Build Alternative provides the baseline for existing environmental conditions and future travel conditions against which all other alternatives are compared.

Doyle Drive would remain in its current configuration, with six traffic lanes ranging in width from 2.9 to 3.0 meters (9.5 to 10 feet) and an overall facility width of 20.4 meters (67 feet) (see Figure 2-2). There are no fixed median barriers or shoulders. The lane configuration is changed by manually moving plastic pylons to increase the number of lanes in the peak direction of traffic. The facility passes through the Presidio on a high steel truss viaduct and a low elevated concrete viaduct with lengths of 463 meters (1,520 feet) and 1,137 meters (3,730 feet), respectively.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. At the eastern end of Doyle Drive, Presidio access would be provided by the slip ramp from westbound Richardson Avenue to Gorgas Avenue, which is currently under construction.

This alternative does not satisfy the Project's Purpose and Need to improve the seismic, structural, or traffic safety of the roadway.

2.3.2 Alternative 2: Replace and Widen Alternative

The Replace and Widen Alternative includes two options for construction staging. The two options below will result in different potential impacts on biological resources and, as such, both options have been analyzed separately.

The Replace and Widen Alternative would replace the 463-meter (1,520-foot) high-viaduct and the 1,137-meter (3,730-foot) low-viaduct with wider structures that meet the most current seismic and structural design standards (see Figure 2-3). The new facility would be replaced on the existing alignment and widened to incorporate improvements for increased traffic safety.

This alternative would include either six 3.6-meter (12-foot) lanes with a moveable median barrier and overall facility width of 30.3 meters (99 feet) or six 3.6-meter (12-foot) lanes and a 3.6-meter (12-foot) auxiliary lane with a fixed median barrier for an overall facility width of 33.0 meters (108 feet). The fixed median barrier

FIGURE 2-2
ALTERNATIVE 1: NO-BUILD

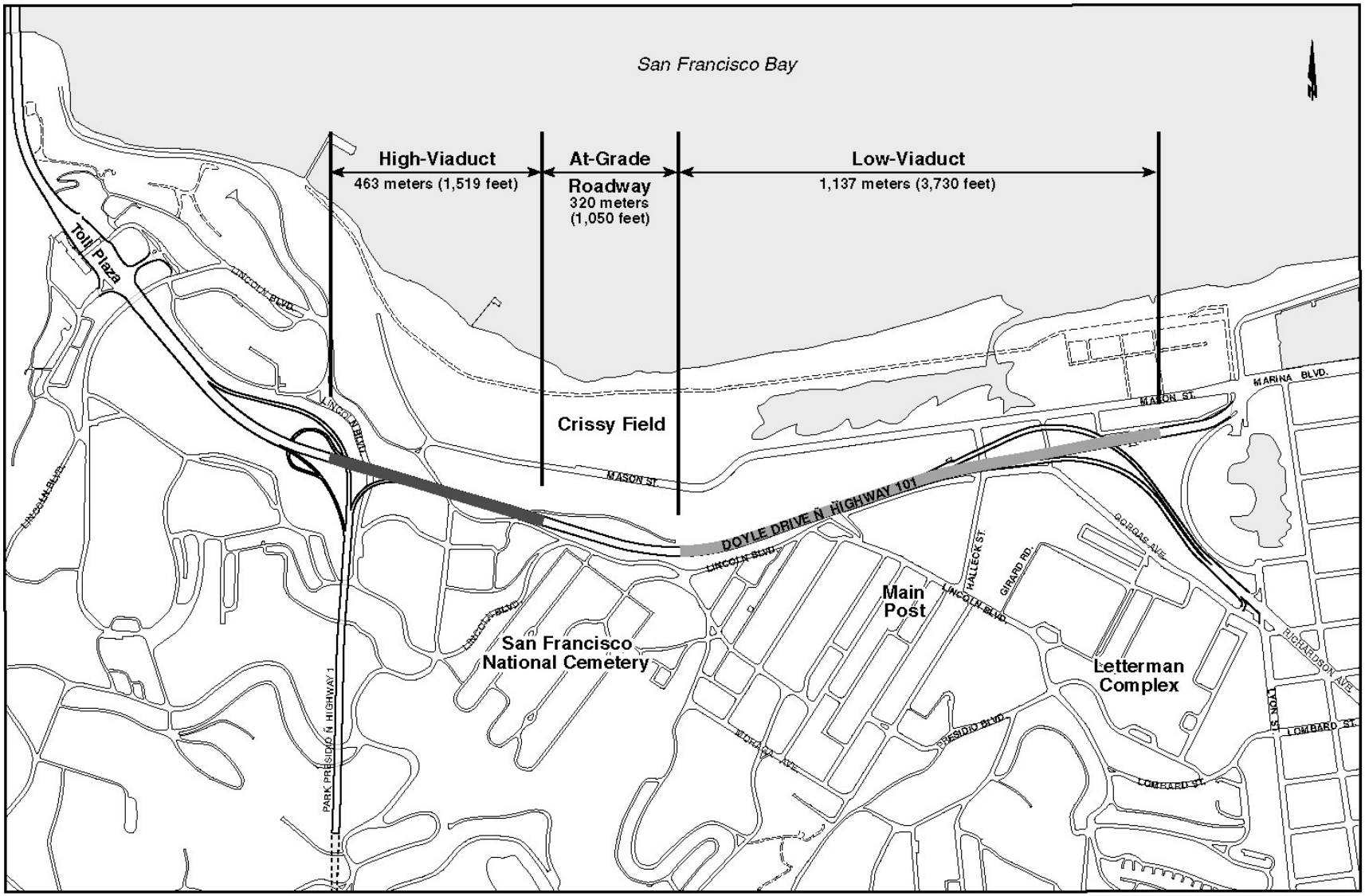
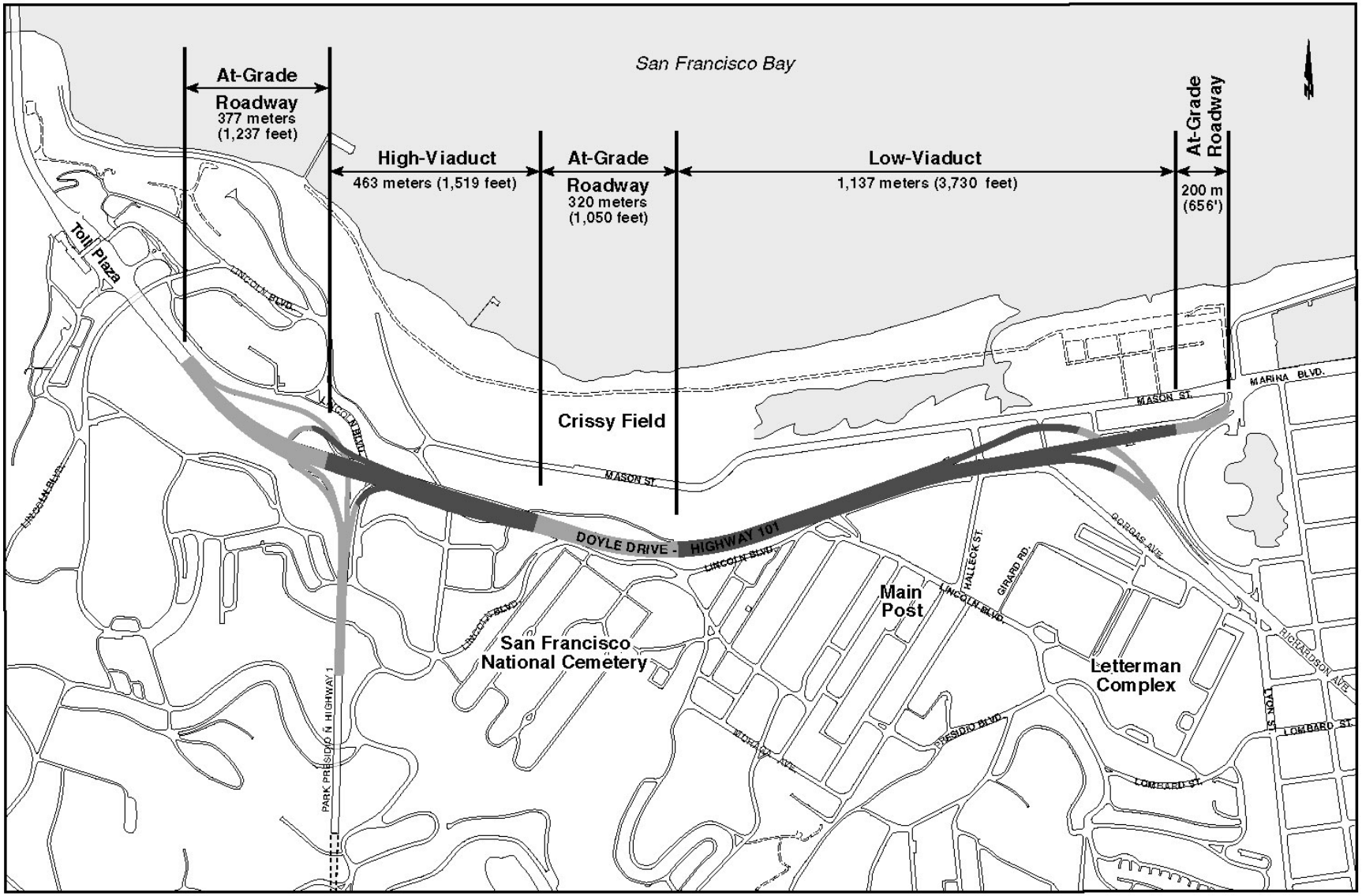


FIGURE 2-3
ALTERNATIVE 2: REPLACE AND WIDEN



option would require localized lane width reduction to 3.3 meters (11 feet) to avoid impacts to the historic batteries and Lincoln Boulevard, reducing the facility width to 30.9 meters. Both options would include continuous outside shoulders along the facility. At the Park Presidio interchange, the two ramps connecting eastbound Doyle Drive to Park Presidio Boulevard would be reconfigured to accommodate the wider facility. The Replace and Widen Alternative would operate similar to the existing facility except that there would be a median barrier and shoulders to accommodate disabled vehicles.

Alt 2 Detour[4] (*Detour Option)* – A 20.4-meter (67-foot) wide temporary detour facility would be constructed to the north of the existing Doyle Drive to maintain traffic through the construction period. Access to Marina Boulevard during construction would be maintained on an elevated temporary structure south of Mason Street. On and off ramps to the mainline detour facility would be located near the Post Exchange (PX) building.

Alt 2 No Detour (*No Detour Option*) – The widened portion of the new facility would be constructed on both sides and above the existing low-viaduct and would maintain traffic on the existing structure. Traffic would be incrementally shifted to the new facility as it is widened over the top of the existing structure. Once all traffic is on the new structure, the existing structure would be demolished and the new portions of the facility would be connected. To allow for construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

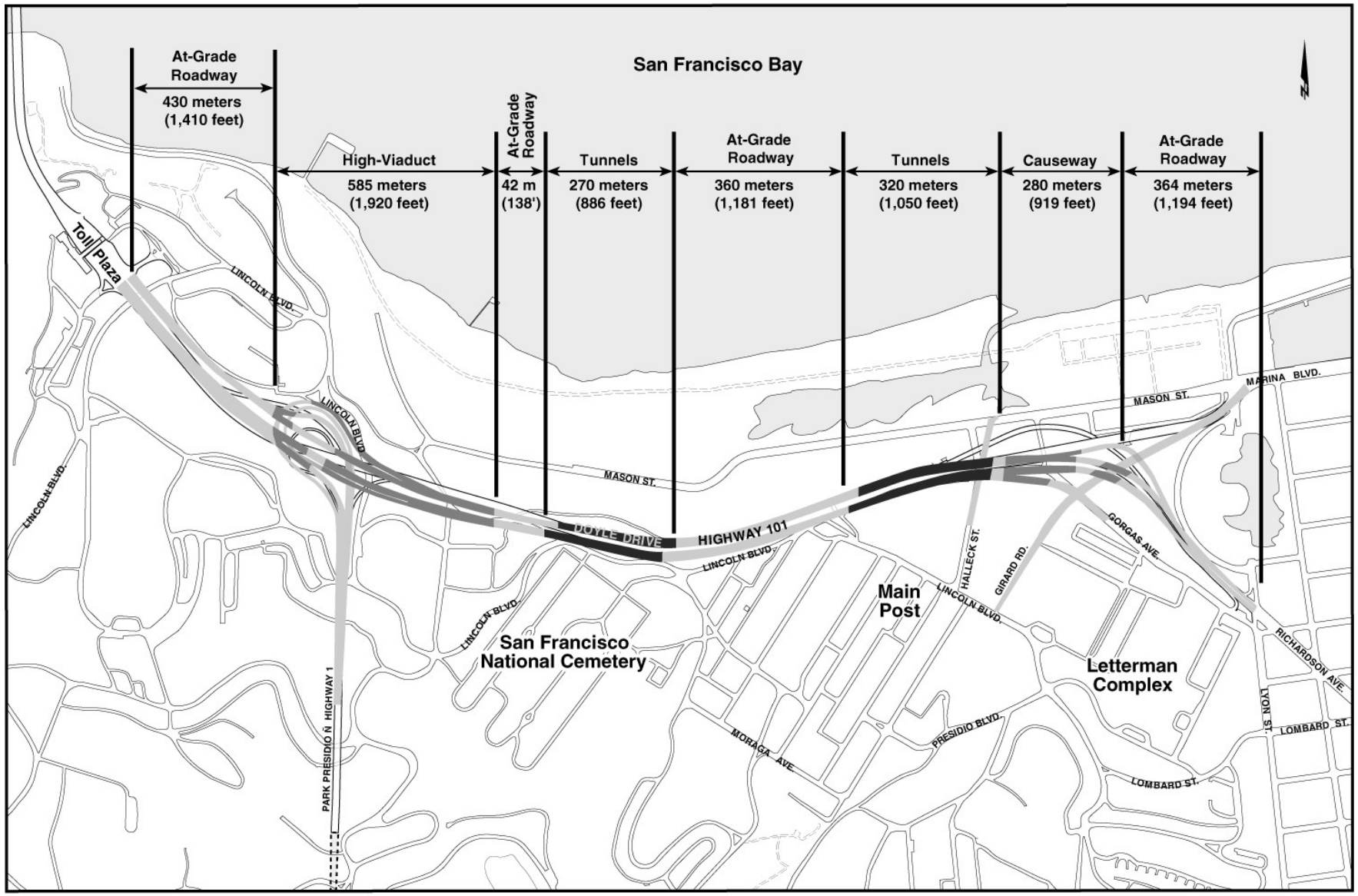
2.3.3 Alternative 5: Presidio Parkway Alternative

The Presidio Parkway Alternative would replace the existing facility with a new six-lane facility and an eastbound auxiliary lane, between the Park Presidio interchange and the new Presidio access at Girard Road (see Figure 2-4). The new facility would have an overall width of up to 45 meters (148 feet), and would incorporate wide landscaped medians and continuous shoulders. To minimize impacts to the park, the footprint of the new facility would include a large portion of the existing facility's footprint east of the Park Presidio interchange. A 450-meter (1,476-foot) high-viaduct would be constructed between the Park Presidio interchange and the San Francisco National Cemetery. Shallow cut-and-cover tunnels would extend 240 meters (787 feet) past the cemetery to east of Battery Blaney. The facility would then continue towards the Main Post in an open depressed roadway with a wide heavily landscaped median. Cut-and-cover tunnels up to 310 meters long (984 feet) would extend from Building 106 (Band Barracks) to east of Halleck Street. The facility would then rise slightly on a low-level causeway 160 meters (525 feet) long over the site of the proposed Tennessee Hollow restoration and a depressed Girard Road. East of Girard Road the facility would return to its existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The Park Presidio interchange would be reconfigured due to the realignment of Doyle Drive to the south. The exit ramp from eastbound Doyle Drive to southbound Park Presidio Boulevard would be replaced with standard exit ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit ramp to southbound Park Presidio Boulevard would be improved to provide standard exit ramp geometry. The northbound Park Presidio Boulevard connection to westbound Doyle Drive would be realigned to provide standard entrance ramp geometry.

[4] Shorthand in bold text will be the convention used to describe such options throughout this NES.

FIGURE 2-4
ALTERNATIVE 5: PRESIDIO PARKWAY



There are two options for the northbound Park Presidio Boulevard ramp to an eastbound Doyle Drive connection:

> *Option 1: Loop Ramp* – Replace the existing ramp with a loop ramp to the left to reduce construction close to the Cavalry Stables and provide standard entrance and exit ramp geometry.
>
> *Option 2: Hook Ramp* – Rebuild the ramp with a similar configuration as the existing ramp with a curve to the right and improved exit and entrance geometry (Figure 2-5 and 2-6).

The Presidio Parkway Alternative includes two options for direct access to the Presidio and Marina Boulevard at the eastern end of the project:

Diamond Option – Direct access to the Presidio and Marina Boulevard in both directions is provided by the access ramps from Doyle Drive connecting to a grade-separated interchange at Girard Road. East of the new Letterman garage, is Gorgas Avenue, a one-way street that connects to Richardson Avenue with access to Palace Drive via a signalized intersection at Lyon Street.

> *Circle Drive Option* – The Circle Drive option provides direct access to the Presidio and Marina Boulevard for eastbound traffic by access ramps connecting to a grade-separated interchange of Girard Road. Westbound traffic from Richardson Avenue would access the Presidio and Palace Drive through a jug handle intersection with Gorgas Avenue.

Additionally, the Presidio Parkway Alternative includes a design option for a Merchant Road Slip Ramp, just east of the toll plaza.

> *Merchant Road Slip Ramp Option* - The Merchant Road Slip Ramp option would provide an additional new connection from westbound Doyle Drive to Merchant Road. This ramp would provide direct access to the Golden Gate Visitors' Center and alleviate the congested weaving section where northbound Park Presidio Boulevard merges into Doyle Drive.

Impacts to biological resources under both the Diamond and Circle Drive options are the same, therefore this NES combines the Diamond and Circle Drive options in its analysis. Subsequently, the following options are analyzed under the Alternative 5: Presidio Parkway Alternative:

Alt 5 Diamd/Circle/Loop[5] (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Loop Ramp option)*– Access to the Presidio and Marina Boulevard is designed using either Diamond or Circle access ramps with a loop exit ramp onto Doyle Drive (Figure 2-4).

Alt 5 Diamd/Circle/Loop/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Loop Ramp option, and a Merchant Road Slip Ramp*)-Access to the Presidio and Marina Boulevard is designed using either Diamond or Circle access ramps with a loop exit ramp onto Doyle Drive and a slip ramp onto Merchant Street (Figure 2-5).

Alt 5 Diamd/Circle/Hook (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Hook Ramp option)*– Access to the Presidio and Marina Boulevard is designed using either Diamond or Circle access ramps with a hook exit ramp onto Doyle Drive (Figure 2-6).

Alt 5 Diamd/Circle/Hook/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Hook Ramp option, and a Merchant Road Slip Ramp*)-Access to the Presidio and

[5] Shorthand in bold text will be the convention used to describe such options throughout this NES.

Marina Boulevard is designed using either Diamond or Circle access ramps with a hook exit ramp onto Doyle Drive and a slip ramp onto Merchant Street (Figure 2-6).

2.4 GENERAL PROJECT CONSERVATION MEASURES

This section includes standard conservation measures, some of them also referred to as "Best Management Practices (BMPs)" and routinely applied by Caltrans, which can reduce habitat impacts to all biological resources during the construction of the Doyle Drive Project. The measures discussed here are common to all project alternatives. Other impacts are unique to certain resource categories, for example, those affecting bats and birds, and resource-specific mitigation measures are included in the appropriate sections of the NES.

Effective mitigation relies on effective implementation programs. This section provides a discussion of measures common to all biological resources. A biological monitoring program, which will monitor the general mitigation measures, as well as resource-specific measures detailed later in the NES, is discussed in Section 8.0 *Mitigation Measures*. Caltrans will provide detailed BMPs for the NPS and the Trust to review during the pre-construction phase of the Doyle Drive Project. These BMPs may include measures already identified in the Doyle Drive Air Quality Technical Report and the Noise and Vibration Study Technical Report. They may be redundant with the measures stated herein; however, these mitigation measures will be monitored as part of the biological monitoring program.

Generally, BMPs focus on prevention and containment. This is achieved by controlling the generation of source pollutants and then capturing and containing source pollutants that are generated. For example, application of temporary erosion control materials to unfinished slopes can control a source of sediment deposition. Silt fence can also be deployed to capture sediments that are generated. Deploying both source and sediment control measures provides an efficient and manageable method for addressing erosion. Other examples include locating equipment and material staging areas in existing disturbed areas within construction limits, limiting fueling and maintenance of equipment to areas not containing sensitive resources (e.g., serpentine plant communities, potential raptor breeding habitat); establishing fueling zones at least 30 meters (100 feet) from wetlands, or as designated by a qualified biologist.[6] Standard water pollution control procedures such as sandbagging, use of hay bales, diversion ditches, and desilting ponds will also be employed. The project applicant will employ feasible engineering methods during construction to avoid and minimize fugitive dust, erosion and sedimentation, and hazardous materials spills.

All mitigation activities, including implementation of BMPs for biological resources, will be completed based on a cooperative, right-of-way, or other type of agreement negotiated between the Doyle Drive Project lead agency, Caltrans, the NPS, and the Trust. All mitigation activities will be coordinated with and approved by all appropriate permitting agencies and land managers, including the NPS and the Trust.

The overall mitigation goal is to avoid or minimize construction-related project impacts on biological resources, using generally accepted and practicable mitigation measures through the deployment of BMPs and the designation of Environmentally Sensitive Areas (ESAs).

2.4.1 Permits and Consultations Required

Prior to the issuance of any authorization to proceed, the following agencies will be consulted for actions resulting in unavoidable impacts on biological resources:

[6] A "qualified biologist," as the term is used here, means any person who has completed at least four years of university training in wildlife or plant biology or a related science, and/or has demonstrated field experience in the identification and life history of the species potentially present.

- San Francisco District Army Corps of Engineers (ACOE)
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (USFWS)
- San Francisco Bay Regional Water Quality Control Board (RWQCB)
- National Park Service (NPS)
- Presidio Trust (the Trust)

The appropriate permits and/or agreements will be obtained from the aforementioned agencies and the terms of the documents strictly observed. The Doyle Drive Project is outside of the jurisdiction of the Bay Conservation and Development Commission (BCDC).

2.4.2 Schedule

Except where noted, mitigation and compensation measures will be initiated concurrent with, or immediately following, construction of the Doyle Drive Project.

2.4.3 Best Management Practices for Biological Resources

2.4.1.1 Staking of Boundaries and Environmentally Sensitive Areas

Prior to construction, the construction manager will identify, clearly mark on maps and stake boundaries of project construction activities, mitigation implementation zones, and ESAs within the Doyle Drive Project site. ESAs will be (1) clearly marked on the contract project plans, (2) marked in the field by orange, plastic fences or other appropriate material under the direction of a qualified biologist (Biological Monitor) prior to construction activities, (3) the first Order of Work to be carried out by the Contractor, and (4) off limits to all construction activities and personnel. In some cases, resources may need to be fenced using materials other than the orange, plastic fence described in (2) above, such as silt-fencing or heavy duty construction fencing, or may need to be otherwise protected from direct or indirect impacts.

2.4.1.2 Erosion Control and Soil Stabilization

The construction manager and contractors will implement Caltrans Stormwater Quality Handbook guidelines and a Stormwater Pollution and Prevention Program (SWPPP) as required under Section 402 of the Clean Water Act. The SWPPP would include BMPs for construction activities similar to those included in the Caltrans Stormwater Quality Handbook. The BMPs include measures guiding the management and operation of construction sites to control and minimize the potential contribution of pollutants to storm runoff and prevent the inadvertent introduction of non-native invasive plant species into construction areas. These measures address procedures for controlling erosion and sedimentation and managing all aspects of the construction process to ensure control of potential water pollution sources and restrictions on the use of non-native plant species. Erosion and sedimentation control practices typically include:

- Developing short-term and long-term approved erosion control strategies;

- Limiting construction to the dry-weather months to the greatest extent practical;

- Installing construction fencing, and using filter material for runoff and erosion control that is unlikely to introduce invasive species, rice straw mulch or bales, check dams, geofabrics, sand bag dikes, or straw wattle wherever deemed appropriate.; and

- Stabilizing soil, including contour grading where feasible, and restoring areas with natural appearing conforms contiguous to existing topography.

- If work is completed in the wet season within or in the vicinity of sensitive areas, measures will be employed to reduce soil compaction.

2.4.1.3 Noise Control

Construction contractors will employ standard noise attenuation equipment on construction equipment and further reduce daytime noise and potential disturbance of wildlife species due to construction through implementation of the following measures:

- Equipment and trucks used for construction will utilize the best available noise control techniques to the extent practicable. Standard sound attenuation equipment (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) will be used. Construction vehicles will be properly maintained and equipped with exhaust mufflers that meet state standards.

- Impact tools (e.g., jackhammers and pavement breakers) used for construction will be necessary for demolition related work. Where use of pneumatic tools is unavoidable, sound attenuating equipment will be used where feasible and practicable. Noise levels will be attenuated in conformance with construction standards. Other alternatives for reducing noise impacts are to modify or limit activities during time frames where noise impacts are less bothersome and/or performing work outside of breeding periods.

2.4.1.4 Dust Control

To protect plants from construction-related indirect effects, standard construction practices reviewed and approved by the Bay Area Air Quality Management District (BAAQMD) and designed to minimize airborne dust and particles from drift onto vegetation (see also Air Quality report) will be implemented. Measures to minimize such impacts include:

- Water all active construction areas where soil is exposed to control dust frequency, depending on type of operation and wind exposure;

- Install rock surfacing over active construction corridors where feasible.

- Designate a person or persons to oversee the implementation of a comprehensive dust control program and to increase watering, as necessary;

- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer) in accordance with Section 23114 of the California Vehicle Code during transit to and from the site; and

- Cover inactive storage piles.

2.4.1.5 Other Measures for Biological Resource Protection

- Runoff into wetland areas and other construction related activities that could alter hydrology or water quality will be controlled to remove, filter, or trap sediments, as will be prescribed in the SWPPP (yet to be prepared).

- ESAs will be delineated by orange, plastic fencing in coordination with a qualified biologist. For impact areas within the construction work area, the following measures will be used:

- Stabilize disturbed soil areas affected by construction areas as soon as they are no longer being actively worked on to reduce the potential for sediments entering adjacent ESAs and discourage colonization by invasive, non-native species;
- Install heavy duty perimeter control fencing adjacent to ESAs when the construction activity requires special attention;
- Prepare and implement stormwater control measures specific to construction activities throughout the duration of construction; and
- Conduct regular inspections of control measures to ensure proper maintenance and efficiency.

SECTION 3.0: STUDY METHODOLOGY

3.1 STUDIES REQUIRED

The preparation of this Natural Environmental Study (NES) follows the California Department of Transportation's (Caltrans') 2004 *Guidance for Consultants: Procedures for Completing the Natural Environmental Study and Related Biological Reports*. Biological resource mapping, botanical and wildlife surveys, and a wetland delineation were completed for the proposed Doyle Drive Project. A detailed shade analysis for the future Tennessee Hollow subarea was carried out in 2004 by others and has not been verified by Caltrans (included in the appendices of the DEIS/DEIR in association with the Land Use Planning Section).

Plant communities, wetlands and special-status species within the limits of construction (Doyle Drive construction corridor), which encompasses the no build and two proposed build alternatives, were mapped, as well as an area extending 229 meters (750 feet) outside the Doyle Drive construction corridor. The Doyle Drive construction corridor and the 229-meter extension area define the limits of the project study area. Refer to Figure 3-1[7] (Special Status Plants in Project Study Area), Figure 3-2 (Native Vegetation in Project Study Area), Figure 3-3 (Non-native Introduced Forest and Ornamental Wildlife Habitat in Project Study Area), and Figure 3-4 (Water-Associated Features in Project Study Area).

Vegetation classification followed *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986). The NPS and the Trust manage the non-native forest within the project study area as a cultural resource as part of the Historic Forest Management Zone. This document calculates the area of the non-native forest because it provides habitat for wildlife species. Please refer to the Section 106 Findings of Effect (FOE) report (cultural resources section) for an analysis of trees in the Historic Management Zone.

A wetland delineation was conducted within the project study area and was verified by the ACOE. This document is on file as part of the administrative record and is available at the San Francisco County Transportation Authority. A future conditions map completed by Urban Watershed Project and wetland delineation reports prepared by Castellini (1999, 2001) were reviewed and incorporated as appropriate. This NES summarizes the results of the verified wetland delineation and provides a map of jurisdictional wetlands. Additionally, this NES provides a map and description of wetlands (Cowardin wetlands) protected by the NPS and the Trust (Figure 3-4).

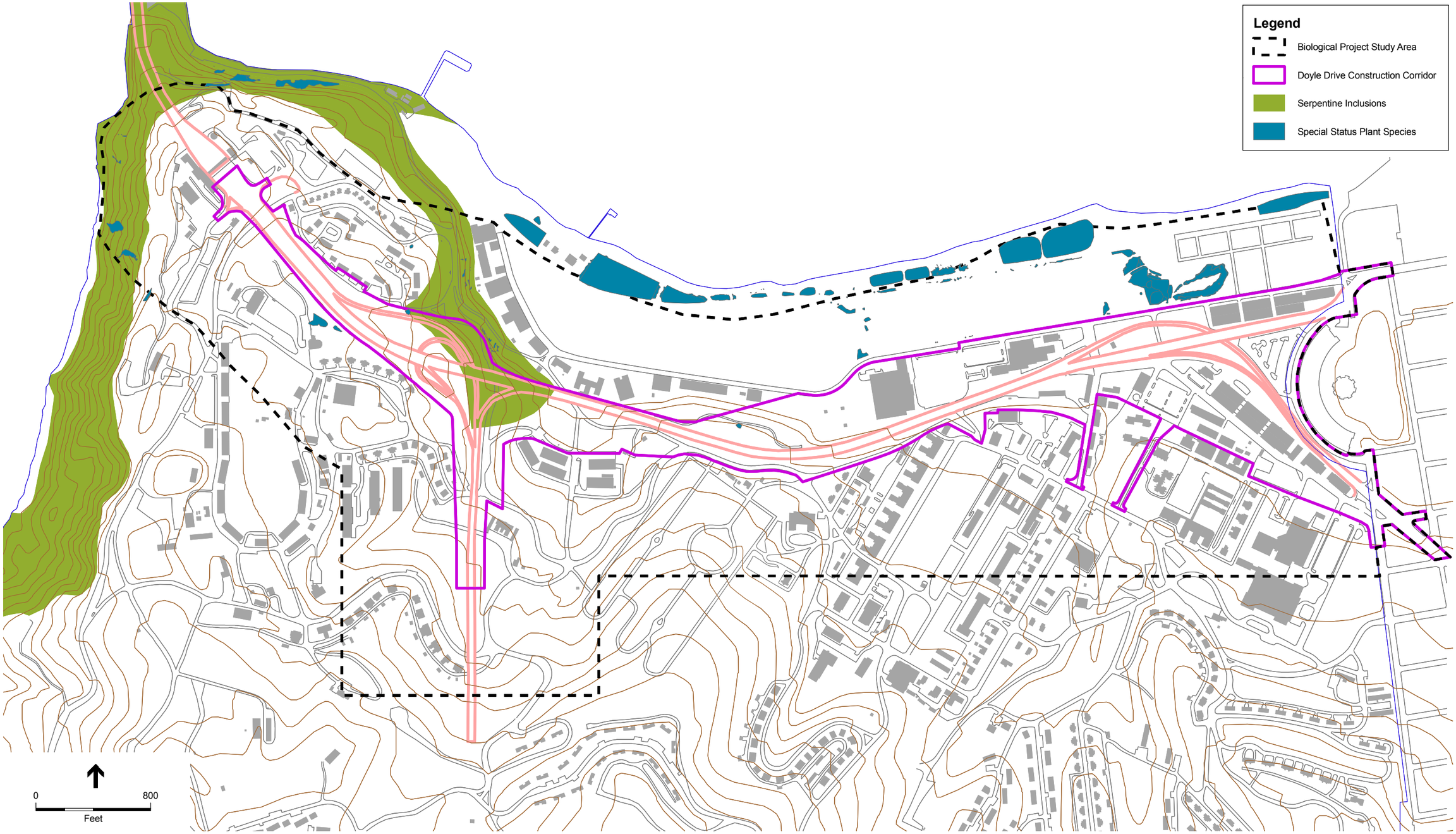
A detailed analysis of shade and the project's impacts on vegetation for the future Tennessee Hollow subarea was approached using three methods: 1) estimating the shading influence under the different construction alternatives (see Appendix B); 2) directly examining the shading influence of viaducts and bridges in the Bay Area; and 3) incorporating the results of a recently available Master's Thesis (SanClements, 2003), which is one of the few existing studies to conduct controlled field observations in an analogous context. This study is found in the appendices of the DEIS/DEIR in association with the Land Use Planning Section.

Environmental Science Associates ecologists conducted field reconnaissance surveys within the limits of construction and the project study area to gather information on plant communities, wildlife habitats, and potential presence of special-status plant and animal species based on existing habitat conditions. For the purposes of this report, in order to avoid any confusion with the term Environmentally Sensitive Areas (ESAs), Environmental Science Associates will be referred to by their complete title instead of their common

[7] This figure generalizes the extent of serpentine inclusions and bedrock. Discrete locations of serpentine bedrock is shown in Appendix B-1.

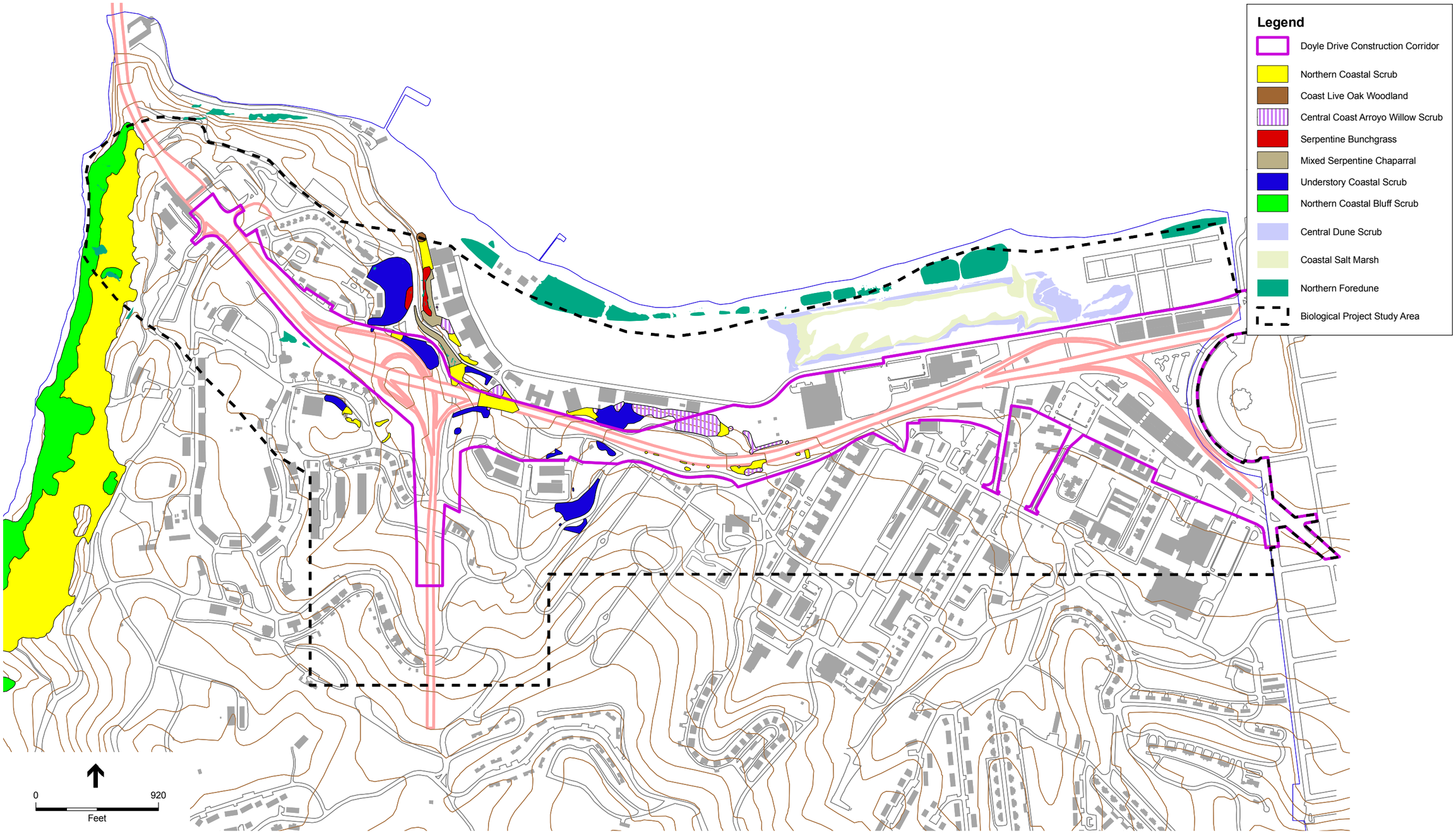
acronym, ESA. All references to ESA in this report, with the exception of Table 5-2 and Appendix B, will refer to Environmentally Sensitive Areas.

The California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) (CDFG, 2004) was consulted for information concerning sensitive botanical and wildlife resources in the Doyle Drive Project vicinity (see Appendix A). The CNDDB was searched for documented occurrences of



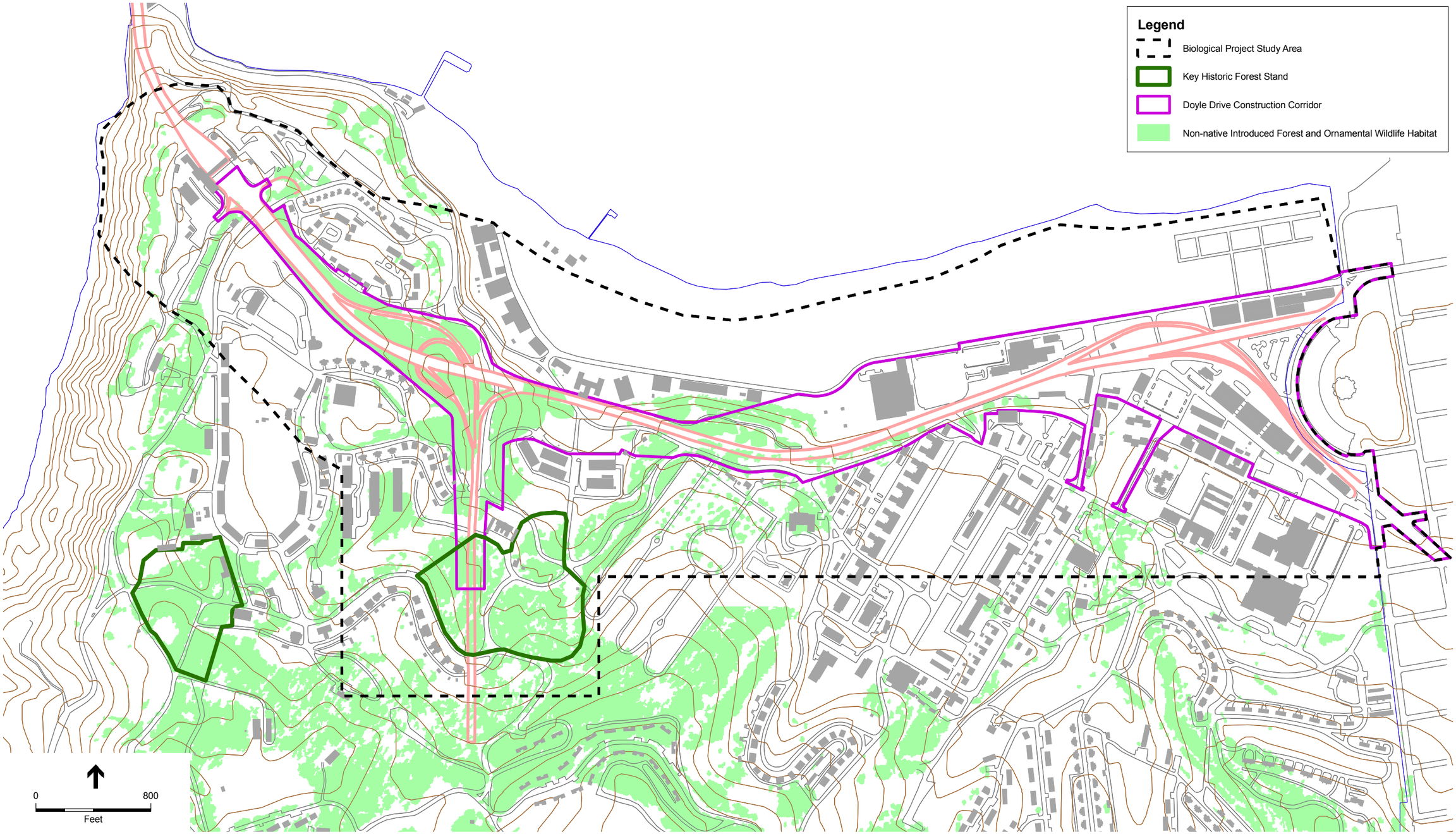
Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2004.
Notes: Location of Biological Resources are conceptual and not drawn to scale.

FIGURE 3-1
SPECIAL STATUS PLANTS IN PROJECT STUDY AREA



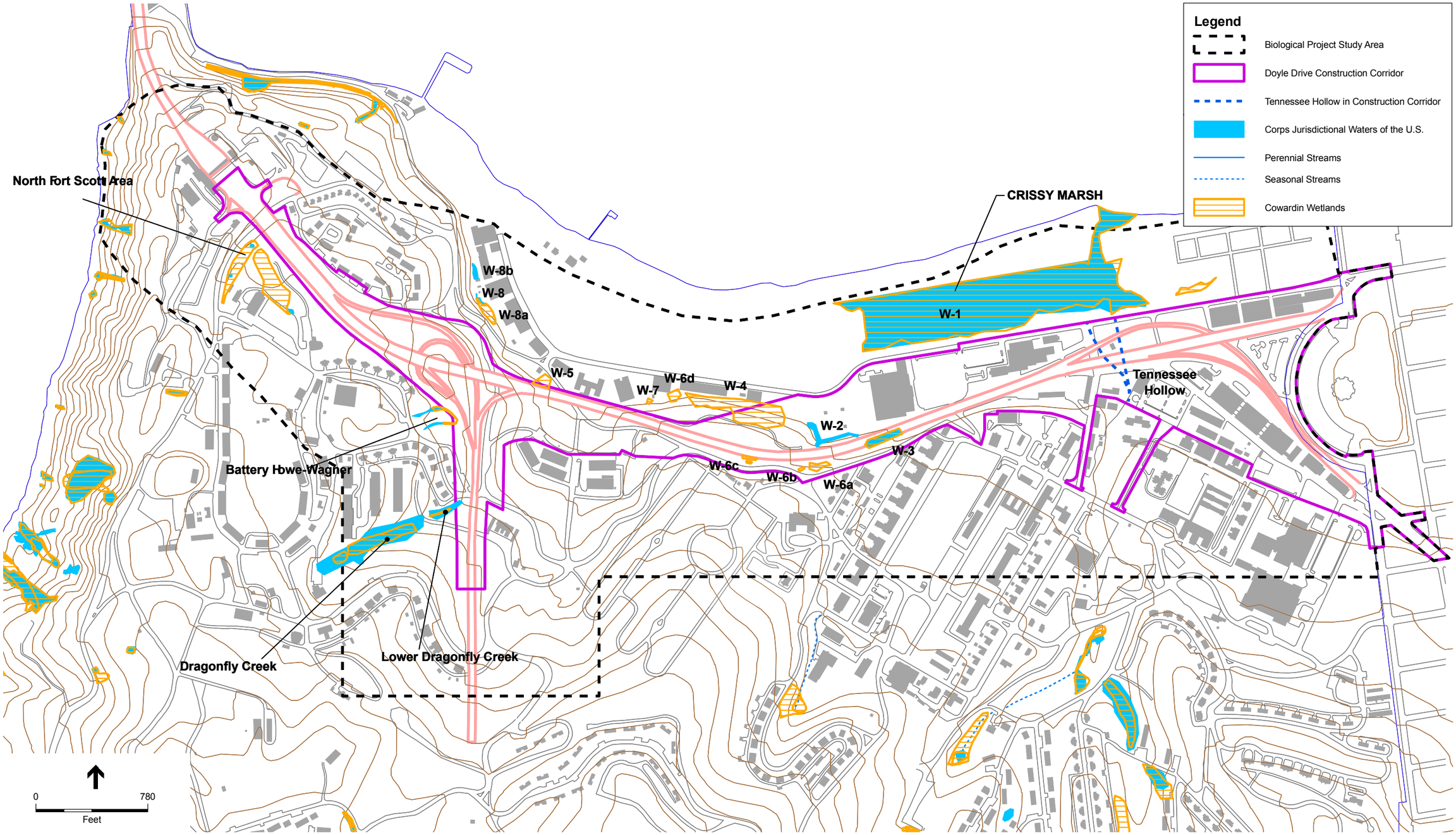
Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2001.

FIGURE3-2
NATIVE VEGETATION IN PROJECT STUDY AREA



Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2001; The Presidio Trust, 2001.

FIGURE 3-3
NON-NATIVE INTRODUCED FOREST AND ORNAMENTAL WILDLIFE HABITAT IN PROJECT STUDY AREA



Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2001.

FIGURE 3-4
WATER-ASSOCIATED FEATURES IN PROJECT STUDY AREA

special-status species and habitats within the U.S. Geological Survey (USGS) San Francisco North 7½-minute quadrangle.

A list of special-status species potentially present in the project vicinity was requested from the U.S. Fish and Wildlife Service (USFWS), and the agency response is presented in Appendix A. In addition, Appendix A contains the California Native Plant Society's (CNPS) Electronic Inventory (CNPS, 2003) list for special-status plants within the USGS San Francisco North 7½-minute quadrangle. Further consultation was conducted with NPS personnel (P. Brastow, August 3 and 4, 2004 and the Trust staff (S. Farrell, July 21, 2000) in regards to special-status species locations and other biological resources (wetlands and wildlife) present in the study area. Results from previous special-status species surveys conducted by NPS (1999b) and Jones and Stokes (1997) were used to determine the potential presence or absence of special-status species within the project study area. NPS also provided Geographic Information Systems (GIS) digital information on known occurrences of special-status species within the project study area.

3.2 SURVEY DATES AND PERSONNEL

A biological survey of the project area was conducted by Environmental Science Associates ecologists, Yolanda Molette and Mark Fogiel on July 25, 2000. Yolanda Molette and Thomas Roberts re-assessed field conditions on June 2, 2004. A wetland delineation was conducted by Yolanda Molette, Laura Castellini (NPS) and John Krause (Caltrans) on November 28, 2000. The wetland delineation was verified by the ACOE on August 29, 2001.

On June 17, 2001 a Certified Wildlife Biologist (Thomas Roberts) conducted a bird survey of all wetland habitat sites potentially affected (i.e., either within or adjacent to) the Doyle Drive project area. On April 12, 2002 bat specialist Greg Tatarian and Thomas Roberts surveyed the project study area (potential bat roosts and wetland habitat sites). Methodologies for these surveys are provided in Appendix B.

On July 21 and 22, 2004 Thomas Roberts and Martha Lowe, an Environmental Science Associates staff botanist, conducted a separate study of wetland vegetation in shaded areas adjacent to bridges analogous to the Doyle Drive Project components where Doyle Drive would be elevated over the future planned improvements for Tennessee Hollow.

In preparation for field surveys, Environmental Science Associates reviewed aerial photographs (1"=1000', dated 1993), and vegetation, rare plant and wetland maps of the Presidio provided by the NPS. Species descriptions in recognized manuals and floras (Munz and Keck, 1970; Jepson, 1993) to note key distinguishing characteristics of similar species were also reviewed. Based on information from CNDDB (2004), USFWS (2004), and CNPS (2003), Environmental Science Associates compiled a list of special-status plant and animal species potentially occurring in the general project vicinity (see Section 5.0, *Important Biological Resources*). Evaluations of habitat suitability for special-status species were based on field observations, previous data and reports, knowledge of species' range and habitat requirements, and digital survey results in GIS format for special-status plants provided by the NPS (summarized in Appendix B).

3.3 PROBLEMS ENCOUNTERED AND LIMITATIONS THAT MAY INFLUENCE RESULTS

The field reconnaissance surveys conducted in July 2000 focused on habitat for special-status plant and wildlife species. Field reconnaissance surveys were conducted at the end of the survey periods for a number of plant species. The surveys were based on the presence of soil type and specific habitat requirements for each plant species, which are readily identifiable. The results of detailed-level special-status species surveys completed by the NPS in 1999, 2000 and 2003 were used to supplement field reconnaissance survey results. Thus, there are no limitations or problems that could influence the results.

3.4 DEFINITIONS OF PROJECT-RELATED LOCAL, STATE, AND FEDERAL LAWS, PLANS, AND POLICIES

3.4.1 Vegetation

The San Francisco General Plan contains policies and objectives in the Environmental Protection Element that apply to the eastern portion of the project outside the boundaries of the Presidio. Relevant policies applicable to the project include:

- Policy 1.1: Conserve and protect the natural resources of San Francisco.
- Policy 1.3: Restore and replenish the supply of natural resources.
- Policy 3.2: Promote the use and development of shoreline areas consistent with the Master Plan and the best interest of San Francisco.
- Policy 8.2: Protect the habitats of known plant and animal species that require a relatively natural environment.
- Policy 8.3: Protect rare and endangered species.

The San Francisco Department of Public Works (DPW) maintains street trees on Richardson Avenue between Lombard and Lyon streets and requires a permit for removing street trees. DPW requires tree replacement or an in-lieu planting fee.

3.4.2 Sensitive Communities Identified in National Park Service Plans

The NPS and the Trust consider all native plant communities that are biologically intact and diverse as important natural communities (NPS, 1999c). Plant communities on serpentine substrates, i.e., Crissy Field dune community, mixed serpentine chaparral, serpentine bunchgrass, and northern coastal bluff scrub, or those communities that are biologically intact and diverse have been identified as Special Ecological Areas (SEAs) by resource managers of the Golden Gate National Recreation Area [GGNRA] (NPS, 1999c).

3.4.3 Invasive Species

Executive Order 13112 was issued in 1999 "…to prevent the introduction of invasive species[8] and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause…"

3.4.4 Wetlands

Wetlands and other waters of the United States, e.g., rivers, streams and natural ponds, are a subset of waters of the United States and receive protection under Section 404 of the Clean Water Act (CWA). The regulations and policies of the ACOE and U.S. Environmental Protection Agency (EPA) mandate that the filling of wetlands be avoided to the extent practicable. The ACOE has primary federal responsibility for

[8] "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

administering regulations that concern waters and wetlands within the project sites. In this regard, the ACOE acts under two statutory authorities, the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in “navigable waters,” and the Clean Water Act (Section 404), which governs specified activities in “waters of the United States,” including wetlands. Navigable waters of the United States are defined as those waters that are a subject to the ebb and flow of the tide or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

The ACOE and EPA define wetlands as “Those areas that are saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for the life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

The term "waters of the United States" as defined in the Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]) includes:

(1) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (1) through (4);

(6) Territorial seas; and

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).[9]

3.4.4.1 San Francisco Bay Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, regulates waters of the state under the Porter-Cologne Act. Under Section 401 of the CWA, the RWQCB has review authority of Section 404 permits. The RWQCB has a policy of no-net-loss of wetlands in effect and typically requires mitigation for all impacts to wetlands before it will issue a water quality certification. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the State, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of Porter-Cologne.

[9] Based on the Supreme Court ruling (SWANCC) concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters based solely on the use of such waters by migratory birds are no longer defined as waters of the United States. Jurisdiction of non-navigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the Unites States, or interstate or foreign commerce. Jurisdiction over such other waters should be analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters should be analyzed on analyzed on a case-by-case basis.

3.4.4.2 San Francisco Bay Conservation and Development Commission

The San Francisco BCDC requires a Development Permit if any person or public agency is proposing to fill, extract materials, or change the use of water, land, or structures in or around San Francisco Bay. BCDC's permit jurisdiction includes San Francisco Bay, a shoreline band that extends 30.5 meters (100 feet) inland from the upland edge of BCDC's Bay jurisdiction, salt ponds, managed wetlands, and certain named waterways that empty into the Bay. The lateral extent of the BCDC's Bay and certain waterways jurisdictions extends up to Mean High Water in areas that are not tidal marsh and up to 1.5 meters (5.0 feet) Above Mean Sea Level in areas of tidal marsh. The project site is not within BCDC jurisdiction.

3.4.4.3 Executive Order 11990

Executive Order 11990 was issued "…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…" Wetlands are defined as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." This order directs the NPS to: (1) provide leadership and to take action to minimize the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands.

The NPS and the Trust define wetlands using the *Cowardin et al.*, classification system, which defines a wetland as having at least one or more of the following, attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);

2. The substrate is predominantly undrained hydric soil; or

3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin definition, therefore, includes more habitat types than the wetland definition (33 CFR 328.3) and delineation manual used by the ACOE. The 1987 "Corps of Engineers Wetlands Delineation Manual" requires all three of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for a habitat to be considered a wetland. The Cowardin wetland definition includes such wetlands, but also adds some habitats that, though lacking vegetation or soils, are still saturated or shallow inundated environments that support aquatic life.

3.4.5 Special-status Species

A number of species known to occur at or near the Presidio are accorded "special-status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these species are listed and receive specific protection defined in federal or state endangered species legislation. Other species have not been formally listed as threatened or endangered, but have designations as fully protected, rare, sensitive, or species of local concern based on adopted policies and expertise of state resource agencies, organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts with local conservation objectives. These species are referred to collectively as "special-status species" in this NES, following a convention that has developed in practice but has no official sanction. For the purposes of this document, special-status species are defined by the following sources:

- California Native Plant Protection Act (Fish & Game Code § 1900 *et seq*.) protects endangered and "rare" species, subspecies, and varieties or plants;

- California Endangered Species Act lists plants and wildlife as threatened or endangered (Fish & Game Code § 2070);

- Federal Endangered Species Act, the Secretary of Commerce, and the Secretary of the Interior list plants and wildlife as threatened or endangered (16 USC. § 1533[a]; 16 USC § 1533 [a] [2]; 16 USC § 1533 [c] [1]);

- California Environmental Quality Act (CEQA) Guidelines, Section 15380, includes plants and wildlife that may be considered rare or endangered if the species meets certain specified criteria;

- CNPS lists plants as "rare," threatened, or endangered with designations as List 1 and List 2, as well as lists plants about more information is needed and plants with limited distributions with designations as List 3 and List 4;

- Migratory Bird Treaty Act (16 USC, Sec. 703, Supp. I, 1989) (MBTA) prohibits killing, possessing, or trading of migratory non-game birds;

- CDFG designates plants and wildlife as "species of special concern" and prohibits the destruction of nests and eggs of any bird (Fish & Game Code Section 3503);

- California Fish & Game Code (Fish & Game Code Sections 3511 [birds], 5050 [reptiles and amphibians], and 4700 [mammals]) designates listed certain wildlife species as Fully Protected in California;

- California Fish & Game Code (Fish & Game Code Section 3503.5, 1992) protect birds of prey from unlawful take, possession, or destruction of any birds in the order Falconiformes or Strigiformes or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto; and

- "Special Animals" and "Special Plants" are general terms that refer to all taxa that the CDFG Natural Heritage Division tracks, regardless of their legal or protection status. These terms do not offer further protection beyond the legal or protection status that may apply.

- Species defined as rare by the NPS include those that have no other status (either state or federal), but have extremely limited distributions in the park and may represent relict populations from past climatic or topographic conditions, may be at the extreme extent of their range in the park, or represent changes in species genetics.

3.5. NATIONAL PARK SERVICE AND PRESIDIO TRUST PLANS AND POLICIES

Several documents identify relevant goals, objectives and policies for the Presidio of San Francisco. These documents are briefly described below.

- **Final General Management Plan Amendment** (NPS, 1994) describes NPS' proposal for the future of the Presidio within the context of the GGNRA and provides guidelines for management, use, and development of the Presidio for the next ten to fifteen years. Applicable principles and concepts for biological resources include native habitat enhancement (including special-status species), wildlife protection, and wetland and riparian protection.

- **Presidio Trust Management Plan (PTMP)** (Presidio Trust, 2002) describes the Trust's land use policies within its jurisdictional area (Area B). Policies applicable to biological resources include:

1. Identify, protect, enhance, restore, and expand the Presidio's ecosytems. Protect, establish, and manage areas of native vegetation (Policy 6 of PTMP).

2. Identify, monitor, and protect sensitive wildlife species, and restore and maintain their habitats (Policy 7 of PTMP).

3. Rehabilitate and enhance natural water resources. Manage on-site water resources to protect ground and surface water, natural wetland and riparian habitat, and water supplies for the Presidio community. Protect important native geologic and soil components. The natural and beneficial values of wetlands will be preserved and enhanced to the extent feasible…Future planning will pursue no net loss of existing wetland area… (Policy 8 of PTMP).

Ecological restoration activities proposed under the PTMP and the Vegetation Management Plan (VMP) within the project study area include selective removal of non-native trees and vegetation, possible re-introduction of locally extinct plant species, restoring existing coastal scrub, serpentine grassland and scrub communities, areas suitable for rare plant communities, and areas where remnant native plant communities and wetland areas can be enhanced or enlarged (such as Tennessee Hollow and along the bluffs north of Doyle Drive).

The NPS and the Trust plan to restore the Tennessee Hollow creek system and associated riparian corridor to its natural state as discussed in the 1994 General Management Plan Amendment (GMPA) and the 2002 Final Environmental Impact Statement for the PTMP. The Trust is preparing the Tennessee Hollow Watershed Project Environmental Assessment. The project features a range of alternatives each with an emphasis on restoring the Tennessee Hollow creek system. The existing Tennessee Hollow creek system located within the Doyle Drive Corridor consists of an underground pipe, part of which is located under a paved parking lot. This portion of Tennessee Hollow within the Doyle Drive Corridor is not within the boundaries of the Tennessee Hollow Watershed Project Environmental Assessment, but is part of Crissy Marsh Expansion Project, which has no approved project alternatives yet. The Trust and NPS completed the Crissy Marsh Technical Study, which examined the health and function of the marsh. The Trust and NPS will evaluate a full range of alternatives for the long-term health and viability of the marsh, including the area of Tennessee Hollow within the Doyle Drive corridor. The discussion of Tennessee Hollow/Crissy Marsh Restoration is addressed in the land-use planning section of the Draft Environmental Impact Statement/Report and as an addendum to the Community Impacts Assessment. Proposed vegetation within the Doyle Drive corridor for the Tennessee Hollow Creek system would include brackish marsh species, such as willows (*Salix* sp.), sedges (*Carex* sp.), rushes (*Juncus* sp.) and other flowering herbaceous wetland species.

- **Natural Resources Section of the Resources Management Plan** (NPS, 1999c) is an updated management plan for the entire GGNRA that addresses various types of management issues. Applicable project statements address vegetation, wildlife, restoration, pests, prescribed fire, SEAs and wetlands.

- **Presidio Vegetation Management Plan and Environmental Assessment (VMP)** (NPS and Trust, 1999a) was developed as a joint effort by NPS and the Trust to provide management guidance for native and introduced vegetation in the Presidio. Applicable management concerns include enhancement and restoration of native plant communities, and protection and enhancement of wildlife habitat, native plant communities and special-status species habitat.

  According to the VMP, the only ecological restoration activities within the Doyle Drive construction corridor include restoring Tennessee Hollow Creek Corridor that exists now as an underground pipe. Of interest are three areas immediately adjacent that are proposed for restoration and preservation of native plant communities (including possible re-introduction of locally extinct plant species) are immediately adjacent to the construction corridor.

- **National Park Service Management Policies** (NPS, 2001) contain policy guidelines for managing national parks and monuments, superseding the 1988 edition. This document is the highest of the three levels of guidance documents in the NPS Directive system. Chapter 4 (Natural Resource Management)

consists of applicable management policies addressing native plant and animal species, threatened or endangered plant and animal species, natural landscapes, exotic species, pests, wildland fires, floodplains, wetlands and watersheds.

- **NPS-12 National Environmental Policy Act (NEPA) Compliance Guideline** (NPS, 2001c) is the National Park Service's guidance for implementing the requirements of NEPA.

- **NPS-77 Natural Resource Management Guidelines** (NPS, 1991) establish the basic principles and objectives for natural resource management. Applicable management issues include vegetation, native wildlife, freshwater resources, fire, pest, endangered, threatened and rare species and exotic species. Director's Order and Procedural Manual #77-1 (Wetland Protection) and #77-2 (Floodplain Management) requires general policies, requirements, and standards as follows:

  – No net loss of wetlands and a long-term goal of net wetland gain;

  – Park-wide wetland inventories using "Classification of Wetlands and Deepwater; Habitats of the United States (USFWS/OBS-79/31; Cowardin et al., 1979);

  – Restoration and enhancement of degraded wetland habitats;

  – Planning and siting in a sequence to avoid, minimize and compensate for unavoidable adverse impacts to wetlands;

  – Restoration of degraded wetlands as compensation for adverse effects to wetlands;

  – Compliance with federal environmental regulations; and

  – All NPS actions with the potential to have adverse impacts on wetlands, as defined by Cowardin et al. (1979), must comply with Director's Order #77-1. Those actions that involve placing dredged or fill material in wetlands or other waters of the United States, as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]) must comply with Section 404 of the Clean Water Act.

SECTION 4.0: ENVIRONMENTAL SETTING

The Doyle Drive Project study area is located in the Presidio of San Francisco (the Presidio). The Presidio is managed by the the Trust and NPS, and is part of the Golden Gate National Recreation Area (GGNRA). The Presidio has been part of the National Park System since 1972 and a National Historic Landmark since 1962. Doyle Drive provides the southern approach to the Golden Gate Bridge and is one and one-half (1.5) miles long with six traffic lanes. It has been the primary access artery for the military base that has, until recently, been active at the Presidio. A number of buildings and complexes line Doyle Drive, primarily east of Park Presidio Blvd (State Hwy. 1). The San Francisco National Cemetery is located adjacent to Doyle Drive, as is the Commissary, the Post Exchange and a complex of residences once used by the military staff. The Palace of Fine Arts is located east of the Doyle Drive construction corridor. Doyle Drive and local roads provide an urban road system that is heavily used by all types of motor vehicles.

The project study area for biological resources encompasses the east-west Doyle Drive construction corridor (i.e., footprint and construction limits of the no action and the two build alternatives) as well as an area extending 229 meters (750 feet) outside the Doyle Drive construction corridor, considered as a zone of potential indirect impact. The total area of the Doyle Drive construction corridor is 47.25 hectares (116.75 acres), the majority of which are considered non-habitat areas (total 34.86 hectares (86.14 acres)) composed of ornamental landscape areas (lawn, isolated trees and shrubs), buildings, paved areas, and roadways. Many of the plant communities that are in the remainder of the project study area , such as northern coastal bluff scrub, are not disturbed solely by human activities but are also subject to natural environmental disturbances, e.g., salt spray, wind, and sun exposure. Therefore, disturbance of northern coastal scrub within the Doyle Drive construction corridor is considered a combination of both human and natural events. The project area is very open and is subject to eroding soils as evidenced by existing erosion control mats in the sandy hills beneath the existing footprint of Doyle Drive, which were placed in response to past failures of the Doyle Drive storm drain system.

The understory of the non-native introduced forest (understory scrub) and riparian scrub (including central coast arroyo willow scrub and blackberry) within the project study area are highly disturbed, based on the presence of certain invasive plant species (i.e., cape ivy [*Delaria odorata*], English ivy (*Hedera helix*), and cotoneaster (*Cotoneaster* sp.). Invasive plant species colonize open disturbed areas and typically indicate a high level of disturbance. Cape ivy, a highly invasive plant, is also present approximately 30 meters (100 feet) north of the Doyle Drive construction corridor; along with wild radish (*Raphanus sativus*), a moderately invasive species, which occurs on the northern coastal bluffs.

The San Francisco Bay borders the northern perimeter of the project study area, and urban development, landscaped with ornamental trees and introduced, non-native forests, occurs to the south and east of the project study area. Coastal bluffs border the western perimeter.

4.1 VEGETATION COMMUNITIES

Many of the plant communities in the Presidio are remnant populations of native communities that were once extensive along the coast of California. Urban development and non-native invasive plant species that rapidly colonize disturbed open areas have displaced native plant communities. Based on the Holland (1986) classification system and field observations, the project study area supports ten wetland and upland plant communities, including Non-native introduced forest and ornamental wildlife habitat, coast live oak woodland, riparian scrub (central coast arroyo willow scrub, California blackberry and associated wetlands), mixed serpentine chaparral, non-native grassland, serpentine bunchgrass grassland, northern coastal scrub (including coastal scrub in on sandy soils and on sandy soil with serpentinite soils), northern coastal bluff

scrub, northern foredune, and restored tidal marsh and associated wetlands (Figure 3-4).[10] Wetland plant communities are further described in Section 5.0 *Important Biological Resources*.

Restored tidal marsh (coastal salt marsh), coast live oak woodland, riparian scrub, mixed serpentine chaparral, northern coastal bluff scrub, serpentine bunchgrass grassland, northern coastal scrub, and northern foredune are considered important plant communities by the NPS and the Trust because they support a high diversity of native plants and/or special status plant species, or have limited distribution in the Presidio (NPS 1999a).

The Doyle Drive construction corridor contains plant communities including non-native introduced forest and ornamental wildlife habitat (Figure 3-3), and northern coastal scrub (including coastal scrub on sandy soils and on sandy soils with serpentinite inclusions). Table 4-1 lists the number of hectares and acres of each plant community within the project study area and the Doyle Drive construction corridor.

4.1.1 Non-native Introduced Forest and Ornamental Wildlife Habitat

Non-native introduced forest and ornamental wildlife habitat covers approximately 32.42 hectares (80.10 acres) within the Doyle Drive Project study area and approximately 9.95 hectares (24.59 acres) in the Doyle Drive construction corridor (Figure 3-3). The non-native introduced forest is primarily composed of blue gum eucalyptus (*Eucalyptus globulus*), Monterey cypress (*Cupressus macrocarpa*), and Monterey pine (*Pinus radiata*). Monterey cypress and Monterey pine are species native to the Monterey Peninsula of California, but are invasive throughout the rest of California. Blue gum eucalyptus grows rapidly and is native to southeast Australia. In some areas, these species comprise part of the Historic Forest Management Zone (HFMZ) and are designated as a cultural resource in the Vegetation Management Plan (VMP) (NPS and Trust, 1999a). The historic forest was planted over a period that extended from the late 1800s to the early 1940s. The current extent of the Historic Forest is depicted from a 1935 aerial photograph (NPS, 1999a). Please refer to the FOE cultural resources section for a discussion of trees in the HFMZ. The discussion of Historic Forest trees and Key Historic Stands are included in this report because they provide wildlife habitat. This report collectively refers to these trees as non-native introduced forest.

The canopy of blue gum eucalyptus, Monterey pine, and Monterey cypress offer perching and roosting sites for a variety of avian species, as well as potential nest sites for raptors (birds of prey), such as red-shouldered hawk (*Buteo lineatus*) and red-tailed hawk (*Buteo jamaicensis*). Blue gum eucalyptus trees can offer quality wildlife habitat for some species and typically attract hummingbirds (*Selasphorus* spp.), kinglets (*Regulus* spp.), American robin (*Turdus migratorius*), warblers (*Dendroica* spp.), black-headed grosbeak (*Pheucticus melanocephalus*), and orioles (*Icterus* spp.). Monterey pine and Monterey cypress offer a seed source and typically attract American robin, chestnut-backed chickadees (*Parus rufescens*), and pygmy nuthatches (*Sitta pygmaea*) as well as arboreal mammals such as fox squirrel (*Sciurus niger*). The lack of understory growth, particularly under blue gum eucalyptus, does not provide substantial habitat for insects and reptiles that prey upon them, or for mammals, except for cover and resting areas. Raptors also use these forest trees for roosting at night.

As part of the proposed Tennessee Hollow Restoration and Crissy Marsh Expansion Projects, Gardali (2003) surveyed a 2.43-hectare (6-acre) site to be restored east of Halleck Street. It contained a channel and supported grasses, coast redwood (*Sequoia sempervirens*), black acacia (*Acacia melanoxylon*), blue gum eucalyptus, and Himalayan blackberries (*Rubus discolor*). Although the plot is bordered by structures, a total of 17 bird species were detected.

Primary vegetative cover in the Doyle Drive construction corridor consists of ornamental landscape areas; these are discussed in order to quantify an approximate percentage and describe wildlife habitat value.

[10] Figure 3-4 excludes marsh plant communities at Crissy Field Marsh, which are located outside the Doyle Drive construction corridor, and foredunes that occur north of the project study area.

Ornamental areas are made up of landscaping ornamental shrubs and trees such as Monterey pine, bottlebrush (*Callistemon rigidus*) and black acacia. These landscape ornamental shrubs and trees lie outside of the boundary of the HFMZ, and are analyzed collectively with the non-native introduced forest.

TABLE 4-1 EXISTING PLANT COMMUNITIES IN PROJECT STUDY AREA AND DOYLE DRIVE CONSTRUCTION CORRIDOR

Plant Community	Number of Hectares* (Acres) in Project Study Area	Number of Hectares (Acres) in Doyle Drive Construction Corridor
Non-native Introduced Forest and Ornamental Wildlife Habitat	32.42 (80.10)	9.95 (24.59)
Coast Live Oak Woodland	0.01 (0.04)	None
Riparian Scrub (arroyo willow and blackberry)	1.08 (2.64)	0.59 (1.46)
Mixed Serpentine Chaparral	0.42 (1.06)	None
Non-native Grassland	0.05 (0.13)	0.05 (0.13)
Northern Coastal Scrub on sandy soils	6.33 (15.65)	0.30 (0.73)
Northern Coastal Scrub on sandy soils and with serpentinite inclusions	Included with northern coastal scrub totals above	0.71 (1.76)
Serpentine Bunchgrass Grassland	0.19 (0.47)	None
Northern Coastal Bluff Scrub	1.21 (3.00)	None
Northern Foredune	1.04 (2.58)	None
Restored Tidal Marsh and Associated Wetlands	Approx. 6 (15)	None
TOTAL AREA	**48.75 (120.67)**	**11.60 (28.67)**

Source: Environmental Science Associates, July 2004.
* Areas of plant communities were calculated using ArcGIS 9.0.

Area of Doyle Drive Construction Corridor is 47.25 hectares (116.75 acres)

Non-habitat areas comprised of ornamental landscape areas (lawn, isolated trees and shrubs), buildings, paved areas, and roadways total 34.86 hectares (86.14 acres).

A number of bird species are typically seen in urbanized areas with ornamental plants, including northern mockingbird (*Mimus polyglottos*), black phoebe (*Sayornis nigricans*), lesser goldfinch (*Carduelis psaltria*), European starling (*Sturnus vulgaris*), California towhee (*Pipilo crissalis*), common raven (*Corvus corax*), mourning dove (*Zenaida macroura)*, Brewer's blackbird (*Euphagus cyanocephalus*), and rock dove (*Columba livia).* These species often nest in ornamental shrubs and trees, feeding on insects and in nearby vegetation.

The Doyle Drive construction corridor is a highly used roadway artery that contains remnant native vegetation in a heavily disturbed area that is conducive to non-native plant growth, in addition to the non-native forest landscape that surrounds it. Due to the highly disturbed qualities of the corridor, habitat value is not considered high. Smaller animals such as small mammals, reptiles, invertebrates and birds use this habitat primarily for foraging and movement purposes (primarily birds).

In general, the non-native introduced forest within the Doyle Drive construction corridor is considered low quality wildlife habitat. However, as described above, portions of this forest are considered moderate-to-high quality habitat for wildlife, including raptors and woodpeckers. The quality[11] of wildlife habitat is dependent on the type of trees present. Low quality wildlife habitat includes tree species, such as black acacia and Monterey pine, or vegetation structures that support low wildlife diversity, e.g., small (less than 0.4 hectare [1 acre]) isolated even-aged stands, usually managed as landscaping, or open areas that are subject to disturbance or regular human use. Moderate quality wildlife habitat includes tree species, such as Monterey pine and Monterey cypress intermixed with eucalyptus, or vegetation structures that support moderate wildlife diversity, e.g., intermediate sized (0.4 to 2 hectares [1 to 5 acres]), even-aged stands with limited understory, or open areas with native vegetation. Moderate quality habitat can provide potential nesting sites for raptors, such as red-shouldered hawk and red-tailed hawk, as well as roosting sites for large avian species.

High quality wildlife habitat includes tree species supporting high wildlife diversity, e.g., large (2 hectares [5 acres] or greater) multistoried stands with herbaceous or shrub understory; large stands contiguous with those stands; stands near water; or known habitat for special status wildlife species. Gardali (2002) studied birds on the Presidio in a variety of habitats, including at a point east of Park Presidio at the ecotone of a stand of Monterey cypress and eucalyptus. It had impressive species diversity (6.46 in a range of 2.4 to 7.8)[12] among the 27 stations monitored.

4.1.2 Coast Live Oak Woodland

Coast live oak woodland occurs in moist sites in the Doyle Drive Project study area and totals approximately 0.01 hectares (0.04 acres). This vegetation type is not present within the Doyle Drive construction corridor. Coast live oak (*Quercus agrifolia*) is the dominant species in this plant community, and associated species include poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and California coffeeberry *(Rhamnus californica*). The NPS and the Trust consider coast live oak woodland an important plant community, since this community can provide high habitat value for wildlife and so little of this community remains in the Presidio.

Coast live oak woodland attracts several insectivorous birds. Bark gleaners, such as Hutton's vireo (*Vireo huttoni*), eat insects inside the bark of trees, as well as catch insects in flight. Spotted towhee (*Pipilo maculatus*) and California towhee glean insects from foliage on the ground, under leaf litter and plants. Other wildlife species often associated with coast live oak woodland include black-throated gray warblers (*Dendroica nigrescens*) and chipping sparrows (*Spizella passerina*).

4.1.3 Riparian Scrub (including Central Coast Arroyo Willow Scrub, California blackberry, and Associated Wetlands)

Riparian scrub covers 1.08 hectares (2.64 acres) and occurs on hillside slopes with perennial, or at least intermittent, water flows in three areas of the project study area. A total of 0.59 hectares (1.46 acres) of riparian scrub is present in the Doyle Drive construction corridor.

Arroyo willow (*Salix lasiolepis*) is the primary species in riparian scrub. California blackberry (*Rubus ursinus*) intermixes with arroyo willow in one area of the Presidio. The NPS and the Trust consider riparian scrub an

[11] Although the NES makes habitat quality distinctions to provide a basis for comparison, it acknowledges that a diversity of interconnected natural communities, even degraded patches of natural communities, is an important consideration for animals whose home ranges encompass several habitats, or that migrate along the Pacific Flyway through San Francisco Bay. See also the discussion of Important Biological Resources in Section 5.0.

[12] Species diversity was measured using a modification of the Shannon-Wiener index.

important plant community, since this community can provide high habitat value for wildlife and so little of this community remains in the Presidio. The most significant and richest stand of riparian scrub occurs in the riparian zone at Lobos Creek and El Polin Springs (Trust, July 2001).

Riparian scrub habitats north of the cemetery represent about 17% of similar habitats on the Presidio and are, as noted above and in Section 5.2.3 for all habitats, relatively valuable. However, they are considered in this NES to have low to moderate intrinsic value for wildlife because they are small and fragmented. They exist in four or five discreet patches, and total 0.59 ha (1.46 ac), as opposed to approximately 1.6 hectares (4 acres) of continuous, and clearly important, habitat at Lobos Creek.[13] Nonetheless, this habitat typically supports detritivores[14] and larvae found in damp litter that feed on insects and other small animals, which, in turn, support a complex food web. This habitat is also typically an important breeding habitat for amphibians. The physical structure of arroyo willow trees provide a protected travel corridor between aquatic and upland habitat types, and is an important feeding and resting place for resident and migratory birds. Birds typically associated with riparian scrub habitat include warblers, flycatchers, sparrows, grosbeaks and vireos. Brush rabbit (*Sylvilagus bachmani*) is typically found in riparian scrub.

4.1.4 Mixed Serpentine Chaparral

Mixed serpentine chaparral covers 0.42 hectares (1.06 acres) within the project study area but does not occur in the Doyle Drive construction corridor. The NPS and the Trust consider mixed serpentine chaparral an important plant community due to its limited extent within the Presidio and the fact that it frequently supports several special status plant species.

This community occurs on shallow serpentinite soils and supports primarily coyote brush (*Baccharis pilularis*), toyon, and blue blossom ceanothus (*Ceanothus thyrsiflorus*). Within the project study area, mixed serpentine chaparral on the coastal bluffs supports several special status plant species, including coast rock cress (*Arabis blepharophylla*), a federal species of local concern and California Native Plant Society (CNPS) List 4 species; Franciscan thistle (*Cirsium andrewsii*), a federal special concern and CNPS List 4 species; and San Francisco wallflower (*Erysium franciscanum*), a federal special concern and CNPS List 4 species. San Francisco gumplant (*Grindelia hirsutula var. maritima*), a federal special concern and CNPS List 1B species, occurs approximately 91 meters (300 feet) north of the Doyle Drive construction corridor within the project study area (NPS, 2003). San Francisco gumplant is also located immediately north of the construction corridor below Lincoln Boulevard at the Park Presidio Interchange. Two individuals were found in the construction corridor south of Building 1258. Wildlife species typically associated with mixed serpentine chaparral are also found in northern coastal scrub habitat in the Presidio.

4.1.5 Non-native Grassland

There is a small area of non-native grassland, 0.05 hectares (0.13 acres), present within the project study area, all of which is located within the Doyle Drive construction corridor. These grasses include annuals such as bromes (*Bromus* spp.), wild oats (*Avena fatua*), and ruderal vegetation. The wildlife habitat value of non-native grassland is low.

4.1.6 Northern Coastal Scrub

Northern coastal scrub, including coastal scrub in the understory of trees (understory scrub on sandy soil and sandy soil with serpentinite inclusions), totals 6.33 hectares (15.65 acres) within the project study area. In the Doyle Drive construction corridor, northern coastal scrub comprises 1.01 hectares (2.49 acres).

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[13] Gardali (2002) found the bird species diversity along Lobos Creek to be the highest recorded in his survey.

[14] Organisms that feed on dead plant and animal materials.

Dominant species in northern coastal scrub that were observed in the project study area included coyote brush and yellow bush lupine (*Lupinus arboreus*). Northern coastal scrub in the Doyle Drive construction corridor is an open community with sparsely distributed plants, and has low plant species diversity. Northern coastal scrub occurs on sandy soil as well as sandy soil with serpentinite inclusions. Understory scrub within the construction corridor is primarily composed of non-native species, including cotoneaster, black acacia, blue gum eucalyptus, English ivy, and non-native annual grasses. A very small area (less than 0.1 hectares) of understory scrub is located on the north-facing slope of the Presidio Interchange and is composed of native species, including poison oak, monkey flower (*Mimulus aurantiacus*) and stinging nettle (*Urtica dioica*). The sandy soil in this area has serpentinite inclusions.

Northern coastal scrub is a common plant community in northern California and is not typically considered sensitive by California Department of Fish and Game (CDFG) or by the NPS. However, at the Presidio, since northern coastal scrub is a remnant plant community in an urbanized environment, it is an important plant community and is considered locally rare by the NPS and the Trust.

The sandy soils often associated with coastal scrub habitat provide ideal burrowing habitat for reptiles, such as western fence lizard (*Sceloporus occidentalis*). Northern coastal scrub habitat, often interspersed with other habitats, provides foraging and nesting areas for species that are attracted to community edges, including California quail (*Callipepla californica*), mourning dove, California towhee and spotted towhee. These birds forage for invertebrates among the leaf litter. Avian species that use the scrub canopy for catching insects include Wilson's warbler (*Wilsonia pusilla*) and wrentit (*Chamaea fasciata*). Flowering scrub vegetation (e.g., *Ceanothus* sp.) attracts nectar feeders such as Anna's hummingbird (*Calypte anna*). Gardali (2002), cited above, found high bird species diversity here as well, (6.6 in a range of 2.4 to 7.8) among the 27 stations monitored. Mammals, including striped skunk (*Mephitis mephitis*), use this habitat for protection and foraging grounds, feeding on new plant shoots. Small mammals that typically occur within coastal scrub include Botta's pocket gophers (*Thomomys bottae*) and deer mouse (*Peromyscus maniculatus*). Feral cats (*Felis domesticus*) are also commonly seen in coastal scrub as well as other plant communities.

4.1.7 Serpentine Bunchgrass Grassland

Serpentine bunchgrass grassland totals approximately 0.19 hectares (0.47 acres) in the study area and primarily consists of herbaceous perennial bunchgrasses. Serpentine bunchgrass grassland occurs approximately 91 meters (300 feet) north of the Doyle Drive construction corridor. This plant community does not occur in the Doyle Drive construction corridor.

This grassland type is primarily composed of purple needlegrass (*Nassella pulchra*), California oatgrass (*Danthonia californica*), and foothill needlegrass (*Nassella lepida*). The NPS and the Trust consider serpentine grassland a sensitive plant community.

Grassland habitat typically attracts reptiles such as western fence lizard, which feeds on invertebrates found within and underneath grass tussocks. This habitat also attracts avian seed eaters, such as California quail and mourning dove, as well as insect eaters, such as scrub jay (*Aphelocoma californica*) and northern mockingbird. Mammals, such as the California vole (*Microtus californicus*) and deer mouse, forage and nest within grasslands. Small rodents attract raptors such as red-tailed hawk and American kestrel (*Falco sparverius*).

4.1.8 Northern Coastal Bluff Scrub

The composition of dominant species in northern coastal bluff scrub is similar to northern coastal scrub. The main difference between these two communities is that northern coastal bluff scrub occurs on steeper slopes and is exposed to harsher environmental conditions (e.g., salt spray, wind and sun exposure), than northern coastal scrub. Northern coastal bluff scrub comprises about 1.21 hectares (3 acres) and occurs on the western perimeter of the project study area. Northern coastal bluff scrub does not occur in the Doyle Drive construction corridor. Wildlife species typically associated with northern coastal scrub are similar to those found in coastal bluff scrub habitat in the Presidio.

4.1.9 Northern Foredune

The northern foredune community comprises 1.04 hectares (2.58 acres) of the project study area and occurs at Crissy Field, north of the Doyle Drive construction corridor, however, this community does not occur within the construction corridor.

Northern foredune is subject to harsh environmental conditions resulting in an open community with sparsely distributed low-growing herbs and subshrubs. Dominant species in this community include sand-verbena (*Abronia* spp.), beach primrose (*Camissonia cheiranthifolia*), silvery beachweed (*Ambrosia chamissonis*), and coastal sagewort (*Artemisia pycnocephala*). The NPS and the Trust have identified the Crissy Field dune community as a SEA. In the Presidio wildlife species typically associated with northern foredune are those also found in northern coastal scrub habitat.

4.1.10 Restored Tidal Marsh and Associated Wetlands

Coastal salt marsh was restored as part of the larger 40.5-hectare (100-acre) Crissy Field Restoration Project. Within the project study area, the dominant salt marsh species include Pacific cordgrass (*Spartina foliosa*), pickleweed (*Salicornia virginica*), salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), san-spurrey (*Spergularia* sp.), fleshy jaumea (*Jaumea carnosa*), and marsh rosemary (*Limonium californicum*). Northern foredune, central dune scrub, and freshwater wetland communities are also present in the approximately 6-hectare (15-acre) Crissy Marsh area. These communities occur outside of the Doyle Drive construction corridor, but within the project study area.

The saline emergent wetland habitat and adjacent tidal marshlands of the project study area support a variety of resident and migratory wildlife species. Over the course of a single day, the vegetated upland areas and the flooded tidal reaches of Crissy Marsh may each support dozens of waterfowl, shorebirds, songbirds, and other species that pass through this area. These include several species of grebes, cormorants, egrets, ducks, shorebirds, gulls, raptors, and some songbirds. Some of the more common resident birds using the marshlands are double-crested cormorant (*Phalacrocorax auritus*), snowy and great egrets (*Egretta thula* and *Ardea alba*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), northern harrier (*Circus cyaneus*), red-tailed hawk, American kestrel, willet (*Catoptrophorus semipalmatus*), yellowlegs (*Tringa sp*.), sanderling (*Calidris alba*), western sandpiper (*Calidris mauri*), Heermann's gull (*Larus heermanni*), California gull (*Larus californicus*), Caspian tern (*Sterna caspia*), Forster's tern (*Sterna forsteri*), song sparrow (*Melospiza melodia*), and marsh wren (*Cistothorus palustris*). Other wildlife species that use upland habitats near the emergent wetlands may include western fence lizard, California ground squirrel (*Spermophilus beecheyi*), western harvest mouse (*Reithrodontomys megalotis*), Norway rat, and raccoon (*Procyon lotor*), gophers (*Thomomys* spp.), coyote (*Canis latrans*) and gray fox (*Urocyon cinereoargenteus*).

SECTION 5.0: IMPORTANT BIOLOGICAL RESOURCES

Section 5.0 discusses the important vegetative and wildlife resources occurring within the Doyle Drive Project study area and the Doyle Drive construction corridor. A number of special-status species occur within the Doyle Drive construction corridor and the project study area, as well as common flora and fauna. Due to the location of the site, a number of endemic species, primarily plants, occur only in this area or in very few other areas in California. A number of species that have the potential to occur in the project study area do not occur within the Doyle Drive construction corridor and these will be discussed as well. Other important biological resources include wetlands, which will also be quantified in this section.

5.1 IMPORTANT NATURAL BIOLOGICAL COMMUNITIES

The NPS and the Trust consider all native plant communities that are biologically intact and diverse as important natural communities (NPS, 1999a). Plant communities on serpentine substrates, i.e., Crissy Field dune community, mixed serpentine chaparral, serpentine bunchgrass grassland, and northern coastal bluff scrub, as well as those communities that are biologically intact and diverse have been identified as Special Ecological Areas (SEAs) by resource managers of the GGNRA (NPS, 1999a; NPS, 1999c).

5.1.1 Project Study Area

There are eight native plant communities in the project study area, including coast live oak woodland, riparian scrub, mixed serpentine chaparral, serpentine bunchgrass grassland, northern coastal scrub, northern coastal bluff scrub, northern foredune, and coastal salt marsh (a component of restored tidal marsh and associated wetlands). The NPS and the Trust consider all of these plant communities important plant communities because they support a high diversity of common native plants and/or special-status plant species, or have limited distribution in the Presidio (NPS, 1999a). Important native plant communities occurring within the construction corridor include riparian scrub and northern coastal scrub (occurring on sandy soil or on sandy soil with serpentine inclusions).

Mixed serpentine chaparral, serpentine bunchgrass grassland, northern foredune, and central coast arroyo willow scrub communities are also considered rare by California Department of Fish and Game (CDFG) because of their limited distributions either locally or regionally.

The NPS and the Trust define trees within the boundaries of the HFMZ and certain stands designated as Key Historic Forest Stands as cultural resources (NPS, 1999a). Please refer to the FOE cultural resources section for a discussion of trees within the HFMZ and Key Historic Forest Stands. This report collectively refers to these trees as non-native introduced forest. The introduced non-native forest is comprised primarily of blue gum eucalyptus, Monterey cypress, and Monterey pine, which provide potential suitable habitat for nesting birds protected by the Migratory Bird Treaty Act and California Fish and Game Code 3503 and 3503.5. These trees occupy approximately 32.42 hectares (80.10 acres) in the project study area.

5.1.2 Doyle Drive Construction Corridor

Doyle Drive is located in the Presidio of the City of San Francisco, in the northern part of the City at the southern approach to the Golden Gate Bridge. Doyle Drive is within the GGNRA. The Presidio has been part of the National Park System since 1972 and a National Historic Landmark since 1962. Doyle Drive is one and one-half (1.5) miles long with six traffic lanes. It has been the primary access artery for the two military bases that have until recently been active at the Presidio. A number of buildings and complexes line Doyle Drive, primarily east of Park Presidio Blvd (State Hwy. 1). The San Francisco National Cemetery is located adjacent to Doyle Drive, as is the Commissary, the Post Exchange and a complex of residences once used by military staff. The Palace of Fine Arts is located east of the Doyle Drive construction corridor.

Urban development in the Presidio has reduced open space, limiting large expanses of most of the natural communities that once occurred there. Smaller species such as reptiles, amphibians, and invertebrates are often restricted to certain communities and can persist in small habitat patches. However, a diversity of interconnected natural communities is an important consideration for animals whose home ranges encompass several habitats, or which migrate along the Pacific Flyway through San Francisco Bay. These wildlife travel corridors must be viewed in a larger context. In spite of the limited habitat quality *in situ*, the portion of the Presidio adjacent to the project, Crissy Marsh, and the rest of the Bayfront constitute such a corridor and this is considered an important natural asset of the Presidio. Non-native introduced trees and ornamental landscape occupy approximately 9.95 hectares (24.59 acres) with 100 to 200 individual trees in the Doyle Drive construction corridor. Habitat within the Doyle Drive construction corridor is generally considered low quality for wildlife (see Section 4.0 *Environmental Setting*). Tree species such as black acacia and Monterey pine, or vegetation structures supporting low wildlife diversity, e.g., small (less than 0.4 hectare [1 acre]), isolated, even-aged stands usually managed as landscaping, or open areas that are subject to disturbance or regular human use, do not typically maintain the full suite of species associated with more natural or extensive vegetation stands. Moderate quality habitat is present in vegetation structures that support intermediate size (0.4-2 hectares [1–5 acres]) stands, a distinct understory, or open areas with native vegetation. Moderate quality habitat serves as potential nesting sites for raptors, such as red-shouldered hawk and red-tailed hawk, and for larger passerine species.

5.2 SPECIAL-STATUS SPECIES

Special-status[15] species have varying degrees of legal protection under both federal and California Endangered Species Acts (FESA and CESA), and recognition under NEPA and CEQA. The USFWS and CDFG share regulatory responsibility for the protection of biological resources. Under separate state and federal legislation, each agency conducts a detailed review of any project that could affect special-status plant or animal species. If a species listed as endangered or threatened may be affected, the lead agency must initiate a formal consultation with the USFWS and/or CDFG, as applicable under federal or state law. Species of special concern are not subject to the same consultation requirements as listed endangered, rare, or threatened species. The USFWS and CDFG recommend that species proposed for listing and species of special concern also be considered in informal consultation during a project's environmental review. This is recommended because, in the event that a species were to be listed during the design or construction phases of a project (i.e., before occupancy), new studies and restrictions might be imposed.

The legal framework and authority for the state's program to conserve plants and animals is woven from various legislative sources, including CESA, the California Native Plant Protection Act, CEQA, the Natural Communities Conservation Planning Act, the Migratory Bird Treaty Act, and various sections of the Fish & Game Code.

Also included in this analysis are plants listed by the CNPS as rare, threatened, endangered, or of limited distribution. These species have no legal status (either state or federal), but have extremely limited distributions in the Presidio, may represent relic populations from past climatic or topographic conditions, may be at the extreme extent of their range in the park, or represent changes in species genetics. These species are included in this analysis because they could be affected (due to proximity to human use zones, or susceptibility of individual plants or populations to loss from natural or unnatural events), and their existence is considered when evaluating consequences for actions associated with the proposed project. In addition, CDFG encourages consultation for these species because their listing status may be elevated prior to completion of the environmental review process.

[15] Throughout this document, the term “special-status” is used as defined in Section 3.4.5. In the Biological Report associated with this NES, the term is also used to describe species listed as threatened or endangered under state and federal law, or those not currently listed but which might be listed before the project is complete.

5.2.1 Sensitive Species

The NPS (1999c) identifies mydas fly (*Mydas clavatus*) and black-headed grosbeak as sensitive. These species do not have any other designation indicating concern for species viability. These species are discussed briefly below. All other species that have any degree of agency concern or protection are considered "special-status" and are treated in Sections 5.2.1 and 5.2.2, below and listed in Table 5-1.

Mydas fly occurs in sand dunes, and has a very low potential to occur in the non-native introduced forest of the project study area. This insect was observed in 1994 in the Presidio (Jones and Stokes, 1997). The mydas fly has no federal or state legal status, but is considered locally rare by GGNRA, since species accounts are only located in the Presidio.

Black-headed grosbeak is generally considered a riparian species, but may nest a considerable distance from open water (Zeiner et al., 1990). This species is an NPS "Species of Conservation Priority" and was observed in the construction corridor on June 17, 2001.

5.2.2 Special-Status Plant Species

Based on data gathered from the NPS (2003), USFWS (2004), CNPS Electronic Inventory (2003), and CDFG (2004), a total of 45 special-status plant species were considered in this analysis. These special-status plants are presented in Table 5-1.

5.2.2.1 Special-Status Plant Species Removed from Analysis

Of these 45 originally-considered special-status plant species, 17 species were removed from the analysis due to their demonstrated absence as a result of past surveys (Jones and Stokes, 1997; NPS, 1999b; NPS, 2000b; NPS 2003), the known distribution of the species, or lack of suitable habitat in the project study area. Refer to the Biological Report on Species of Concern in Appendix D for detailed information on why these species were removed from consideration.

5.2.2.2 Special-Status Plant Species Retained in Analysis

Of the 45 originally-considered special-status plant species evaluated for the Doyle Drive Project, the remaining 28 special-status plants are retained in this analysis because these species either (1) are known to occur in the Presidio, or (2) have suitable habitat within the project study area or construction corridor. Special-status species that are known to occur within the project study area are depicted in Figure 3-1. However, due to their vulnerability, the specific locations of 11 of these special-status plant species in the Presidio are not provided to the public. These species are:

- Franciscan thistle (*Cirsium andrewsii*)
- San Francisco lessingia (*Lessingia germanorum*)
- San Francisco campion (*Silene verecunda* ssp. *verecunda*)
- San Francisco gumplant (*Grindelia hirsutula* var. *maritima*)
- San Francisco owl's clover (*Triphysaria floribunda*)
- San Francisco spineflower (*Chorizanthe cuspidata* var. *cuspidata*)
- San Francisco wallflower (*Erysimum franciscanum*)
- coast rock cress (*Arabis blepharophylla*)
- dune gilia (*Gilia capitata* ssp. *chamissonis*)
- dune tansy (*Tanacetum camphoratum*)
- Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*).

TABLE 5-1
PLANT SPECIAL STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name Scientific Name	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification
FEDERAL AND STATE LISTED AND CANDIDATE SPECIES					
Plants					
Presidio manzanita *Arctostaphylos hookeri* ssp. *ravenii*	FE/CE/1B	Chaparral, coastal prairie and coastal scrub; rocky serpentine slopes	**Absent.** Former San Francisco area endemic; limited in wild to one plant and clones on serpentine bluff above Baker's beach.	**Absent**. Minimal potential habitat in Doyle Drive construction corridor. Not detected in construction corridor during past Presidio surveys (NPS, 1999b).	February-March
Marsh sandwort *Arenaria paludicola*	FE/CE/1B	Marshes and swamps. Grows up through dense mats of typha, juncus and scirpus	**Absent.** Possibly extirpated from the Presidio and San Francisco County (USFWS, 2000; Holloran, 2002). Not detected in project study area during past Presidio surveys (NPS, 1999b).	**Absent.** Possibly extirpated from San Francisco County (USFWS, 2000). Not detected in project study area during past Presidio surveys (NPS, 1999b).	May-August
Presidio clarkia *Clarkia franciscana*	FE/CE/1B	Serpentine outcrops in coastal scrub or valley and foothill grassland	**Low potential.** Occurrences and habitat noted near project study area. Not detected in project study area during past Presidio surveys (NPS, 1999b).	**Very Low potential.** Serpentine soil inclusions occur in construction corridor. Not detected in construction area during past Presidio surveys (NPS, 1999b). Serpentine habitat occurs in construction (NPS, Peter Brastow, scoping comments, August 23, 2001)	May-July
Marin dwarf flax *Hesperolinon congestum*	FT/CT/1B	Chaparral and valley/foothill grassland; serpentinite soils	**Low potential.** Known to occur in dry, serpentine scrub and grassland slopes in the Presidio.	**Very Low potential.** Serpentine soil inclusions occur in construction corridor (NPS, Peter Brastow, scoping comments, August 23, 2001)	April-July
Beach layia *Layia carnosa*	FE/CE/1B	Coastal dunes	**Absent.** Possibly extirpated from San Francisco County (USFWS 2000). Not detected in project study area during past Presidio surveys (NPS, 1999b, Holloran, 2002).	**Absent.** No quality habitat occurs within the project area. Possibly extirpated from San Francisco County (USFWS 2000). Not detected in project study area during past Presidio surveys (NPS, 1999b; Holloran, 2002).	May-July

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San Francisco lessingia *Lessingia germanorum*	FE/CE/1B	Open sandy soils of remnant dunes in coastal scrub	**Present.** Known to occur on open sandy soils and is only known from San Francisco and San Mateo counties. Occurs at Crissy Marsh.	**Absent.** Suitable habitat not found in construction area. Not detected in construction corridor during past Presidio surveys (NPS, 1999b; NPS, 2000b).	June-November
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE/CE/List 1B	Open dry rocky slopes and grassland, often on soils derived from serpentinite.	**Absent.** While a small amount of suitable habitat exists in the project study area, species not found in recent surveys at the Presidio (Holloran, 2002). Currently known only from one location in San Mateo County (CNPS, 2004).	**Absent.** Not detected in project study area during past Presidio surveys (NPS, 1999b).	March-May
Greene's (= San Francisco) popcorn flower *Plagiobothrys reticulatus* var. *rossianorum* *(=P. diffusus)*	FSC/CE/1B	Coastal prairie; grassland with marine influence	**Absent.** Recorded from Presidio in 1933, presumed extirpated from San Francisco County (CDFG, 2000; Holloran, 2002). Not detected in project study area during past Presidio surveys (NPS, 1999b).	**Absent.** No suitable habitat. Not detected in project study area during past Presidio surveys (NPS, 1999b).	April-June
Adobe sanicle *Sanicula maritima*	FSC/CR/1B	Occurs in meadows and seeps. Generally associated with clayey or ultramafic soils	**Absent.** No quality habitat occurs within the project area; possibly extirpated from area (USFWS, 2000). Not detected in project study area during past Presidio surveys (NPS, 1999b).	**Absent.** No quality habitat occurs within the project area; possibly extirpated from area (USFWS, 2000). Not detected in project study area during past Presidio surveys (NPS, 1999b).	April-May
California seablite *Suaeda californica*	FE/--/1B	Margins of coastal saltmarshes.	**Present.** Recently reintroduced to Crissy Marsh by NPS; population introduced by NPS is roughly 50 feet from Mason Street.	**Absent.** No suitable habitat in construction corridor.	July- October
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN					
Plants					
Pink sand-verbena *Abronia umbellata* ssp. *umbellata*	SLC/--/List 1B	Sandy, dry and sunny habitat; Sonoma and Contra Costa, Counties and Baja, CA.	**Present.** Occurs in dune habitat at Crissy Field. (NPS, 2004)	**Absent.** Not observed in the construction corridor.	June-October

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Coast rock cress *Arabis blepharophylla*	SLC/--/List 4	Broadleafed upland forests, coastal prairie, coastal scrub; often in rocky places	**Present.** Observed during 1999 and 2000 past survey in project study area on coastal bluffs (NPS, 1999b; NPS 2003).	**Absent.** Not observed in construction corridor.	February-April
Franciscan manzanita *Arctostaphylos hookeri* ssp. *franciscana*	FSC/--/List 1A	Serpentine outcrops in chaparral and serpentinite coastal scrub.	**Absent.** Former San Francisco area endemic; currently limited to cultivation. Not detected in project study area during past Presidio surveys (NPS, 1999b; NPS 2003).	**Absent.** Not detected during past surveys (Jones and Stokes, 1997; NPS, 1999b; NPS 2003).	February-April
Nuttall's milk-vetch *Astragalus nuttallii* var. *virgatus*	SLC/--/List 4	Open bluffs, dunes, and sandy areas	**Present.** Recently reintroduced at Crissy Field. (NPS, 2004)	**Absent.** Not observed in the construction corridor.	January-November
Alkali milk-vetch *Astragalus tener* var. *tener*	FSC/--/List 1B	Low ground, alkali flats, and flooded lands	**Absent.** No quality habitat occurs within the project study area.	**Absent.** No quality habitat occurs within the construction corridor.	March-June
California saltbush *Atriplex californica*	FSC/--/--	Salt marsh	**Present.** Recently reintroduced at Crissy Marsh. (NPS, 2004)	**Absent.** No habitat occurs in the construction corridor.	April-November
Coast Indian paintbrush *Castilleja affinis* ssp. *affinis*	SLC/--/--	Chaparral and coastal scrub.	**Present.** Documented as occurring at the Presidio (Holloran, 2002) and the project study area (Brastow, NPS, pers. comm., 2004).	**Very Low potential**. Disturbed and fragmented habitat.	February-September
Salt marsh owl's clover *Castilleja ambigua* ssp. *ambigua*	SLC/--/List 1B	Salt marshes	**Present.** Occurs at Crissy Marsh (P. Brastow, NPS, personal communication, 2004).	**Absent.** No suitable habitat occurs in the construction corridor.	May-August
California goosefoot *Chenopodium californicum*	SLC/--/--	Generally open sites; sandy to clay soils.	**Present.** Recently reintroduced at Crissy Marsh. (NPS, 2004)	**Very Low potential**. Disturbed and fragmented habitat.	March-June
San Francisco spineflower *Chorizanthe cuspidata* var. *cuspidata*	FSC/--/List 1B	Sandy terraces and slopes of coastal bluff scrub, coastal dunes, coastal prairie and coastal scrub	**Present.** A small area of marginal coastal scrub habitat is found in the project study area. All Presidio records are from the southern portion of the park. Recently reintroduced at Crissy Field.	**Very Low potential**. Disturbed and fragmented habitat.	April-August

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Franciscan thistle *Cirsium andrewsii*	FSC/--/List 1B	Coastal bluff scrub, serpentine habitats in moist sites	**Present.** Observed in project study area in 1999 on coastal bluffs (NPS, 1999b).	**Low potential.** Occurs more than 91 m (300 ft) outside of Doyle Drive construction corridor. Not found in Doyle Drive construction corridor during monitoring survey in 1999 (NPS, 1999b; NPS 2003). Serpentine habitat occurs in construction corridor (NPS, Peter Brastow, scoping comments, August 23, 2001).	June-July
Davy's clarkia *Clarkia davyi*	SLC/--/--	Coastal grassland and bluffs	**Low potential.** Limited amount of suitable habitat occurs in the project area. Not noted as occurring at the Presidio in recent surveys (Holloran, 2002).	**Absent.** No suitable habitat occurs in the construction corridor.	April-June
Round-headed collinsia *Collinsia corymbosa*	FSC/--/List 1B	Coastal dunes and coastal prairie	**Absent.** Seeded at Crissy Marsh area in winter of 2003 (NPS, 2003), but did establish (NPS 2005).	**Absent.** Suitable habitat does not occur in construction corridor.	April-June
Point Reyes bird's-beak *Cordylanthus maritimus* ssp. *palustris*	FSC/--/List 1B	Upper zones of coastal salt marsh	**Present.** Recently reintroduced at Crissy Marsh (NPS, 2004).	**Absent.** Salt marsh habitat does not occur in the construction corridor.	May-September
California croton *Croton californicus*	SLC/--/--	Sandy soils, dunes and washes.	**Present.** Recently reintroduced in dune habitat at Crissy Field (NPS, 2004).	**Absent.** Suitable habitat does not occur in the construction corridor.	June-September
San Francisco wallflower *Erysimum franciscanum*	FSC/--/List 4	Northern foredune, northern coastal scrub, northern coastal bluff scrub, central dune scrub	**Present.** Observed in project study area in 1999 on coastal bluffs and Crissy Field (NPS, 1999b; NPS, 2000b).	**Very Low potential**. Disturbed and fragmented habitat.	March-June
Fragrant fritillary *Fritillaria liliacea*	FSC/--/ List 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland; clayey soils, often serpentinite.	**Absent.** Nearest records are from Potrero Hills and Bernal Heights; last seen in these areas in 1896. Not detected in project study area during past Presidio surveys (NPS, 1999b).	**Absent.** Not detected during past Presidio surveys (NPS, 1999b; NPS 2003).	February-April

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Dune gilia *Gilia capitata* ssp. *chamissonis*	FSC/--/ List 1B	Coastal sand dunes and openings of coastal dune scrub	**Present.** Occurs at Crissy in dune habitat at Crissy Field (NPS, 2004).	**Absent.** No suitable habitat occurs in the construction corridor.	May-July
San Francisco gumplant *Grindelia hirsutula* var. *maritima*	FSC/--/ List 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland; slopes with sandy or serpentinite soils	**Present.** Observed in project study area in 1999 on coastal bluffs (NPS, 1999b).	**Low Potential.** Various populations occur near construction corridor and about 50 meters south of Building 1258. Two individuals were found in the construction corridor at Building 1258. (P. Brastow, NPS, personal communication, August 2004). Serpentine habitat occurs in construction (P. Brastow, NPS scoping comments, August 23, 2001).	August-September
Kellogg's horkelia *Horkelia cuneata* ssp. *sericea*	FSC/--/ List 1B	In openings of closed-coned coniferous forest, coastal scrub, maritime chaparral; sandy or gravelly soils	**Absent.** Reintroduced in the Presidio in 2001 outside the project study area (P. Brastow, NPS, personal communication, 2004).	**Absent.** Not detected in past Presidio surveys (NPS, 199b).	April-September
Large-flowered linanthus *Leptosiphon (= Linanthus) grandiflorus*	FSC/--/List 4	Open grassy flats, generally in sandy soils	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002).	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002).	April-August
Rose linanthus *Leptosiphon (=Linanthus) rosaceus*	FSC/--/List 1B	Coastal bluff scrub	**Absent.** Historically documented from the area but currently thought to be extirpated from the San Francisco North quadrangle (CNPS, 2004). Not documented as occurring at the Presidio in recent surveys (Holloran, 2002).	**Absent.** Historically documented from the area but currently thought to be extirpated from the San Francisco North quadrangle (CNPS, 2004). Not documented as occurring at the Presidio in recent surveys (Holloran, 2002).	April-June

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Marsh microseris *Microseris paludosa*	SLC/--/List 1B	Wet areas in a variety of habitats, including coastal scrub and valley and foothill grassland	**Absent.** Limited suitable habitat present in project study area. However, not documented as occurring in previous surveys at the Presidio (Holloran, 2002). Thought to be extirpated in San Francisco County (CNPS, 2004).	**Absent.** Limited suitable habitat present in project study area. However, not documented as occurring in previous surveys at the Presidio (Holloran, 2002).	April-June
Curly-leaved monardella *Monardella undulata*	FSC/--/List 4	Dunes, sandy soils in sagebrush scrub; Contra Costa and San Francisco Counties	**Absent.** Limited suitable habitat present in project study area. However, not documented as occurring in previous surveys at the Presidio (Holloran, 2002).	**Absent.** Limited suitable habitat present in project study area. However, not documented as occurring in previous surveys at the Presidio (Holloran, 2002).	May-September
Skunkweed *Navarretia squarrosa*	SLC/--/--	Open, wet, gravelly flats and slopes or dune upland habitat.	**Present.** Reintroduced at in dune habitat at Crissy Field. Documented as occurring in ruderal and scrub habitat at the Presidio (Holloran, 2002)	**Present.** Located along the road to Battery Blaney (P. Brastow, NPS, personal communication, 2004).	June-August
California broomrape *Orobanche californica* ssp. *californica*	SLC/--/--	Sandy or heavy soils of coastal bluffs	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002).	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002).	August-September
Coast rein-orchid *Piperia elegans*	SLC/--/List 1B	Generally dry, open sites, shrubland, and coniferous forest.	**Present.** Documented as occurring at the Presidio (Holloran, 2002) and the project study area (Brastow, NPS, pers. comm., 2004).	**Low potential.** Suitable habitat in the form of introduced non-native coniferous forest and coastal scrub occurs in the construction corridor. Not detected during surveys (NPS 2003).	May-September
Choris's popcorn-flower *Plagiobothrys chorisianus* var. *chorisianus*	SLC/--/List 1B	Chaparral, coastal prairie, coastal scrub, on mesic sites	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002).	**Absent.** Occurred historically at the Presidio but thought to be extirpated (Holloran, 2002). Only a small amount of coastal scrub occurs within the construction corridor.	March-June

TABLE 5-1
PLANT SPECIAL STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name Scientific Name	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification
Marin checkerbloom *Sidalcea hickmanii* ssp. *viridis*	FSC/--/ List 1B	Chaparral (serpentinite)	**Absent.** Known to occur in Marin County (Munz 1970). Not detected during past surveys in project study area (Jones and Stokes, 1997; NPS, 1999b).	**Absent.** Not detected during past surveys in project study area (Jones and Stokes, 1997; NPS, 1999b).	June
San Francisco campion *Silene verecunda* ssp. *verecunda*	FSC/--/ List 1B	Coastal habitats (scrub, prairie, bluff scrub), grassland and chaparral; sandy to mudstone or shale soils	**Present.** Occurs in coastal dune scrub. Occurs at Crissy Field in project study area NPS, 2004).	**Low potential.** Not detected in project study area during past Presidio surveys (NPS, 1999b; NPS 2003). Potential habitat near construction corridor (NPS, P. Brastow, scoping comments, August 23, 2001).	March-August
Pacific cordgrass *Spartina foliosa*	SLC/--/--	Salt marshes	**Present.** Reintroduced at Crissy Marsh (NPS, 2004).	**Absent.** Suitable habitat not present in construction corridor.	June-October
Dune tansy *Tanacetum camphoratum*	SLC/--/--	Coastal dunes	**Present.** Reintroduced at Crissy Field (NPS, 2004).	**Absent.** Suitable habitat not present in construction corridor.	June-September
San Francisco owl's clover *Triphysaria floribunda*	FSC/--/ List 1B	Coastal prairie and scrub, valley and foothill grassland; often on serpentinite soils	**Present.** Found in Fort Scott area in 2000 (Chasse, 2001; NPS, scoping comments, Peter Brastow, 8/23/01).	**Low potential.** Preferred habitat not in Doyle Drive construction corridor. Native vegetation is highly disturbed. Occurs near construction corridor.	April-June
California triquetrella moss *Triquetrella californica*	SLC/--/List 1B	Coastal bluff scrub, coastal scrub	**Low potential.** Suitable habitat exists for the species but it is not noted in recent surveys of the Presidio (Holloran, 2002).	**Low potential.** Suitable habitat exists for the species but it is not noted in recent surveys of the Presidio (Holloran, 2002).	Winter-Spring
SPECIES ON OTHER LISTS					
PLANTS					
San Francisco collinsia *Collinsia multicolor*	--/--/List 1B	Closed-cone coniferous forests, coastal scrub, sometimes on serpentinite derived soils	**Absent.** Only occurs at Bayview Hill outside of the Presidio (CNPS, 2003).	**Absent.** Potential habitat in non-native coniferous plantations and coastal scrub. Not noted as occurring at the Presidio (Holloran, 2002).	March-May

TABLE 5-1
PLANT SPECIAL STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name Scientific Name	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification

Status Codes:

Federal Categories (U.S. Fish and Wildlife Service)	State Categories (California Department of Fish and Game)	California Native Plant Society (CNPS)
FE = Listed as Endangered by the Federal Government FT = Listed as Threatened by the Federal Government FSC = Federal Species of Concern SLC = Federal Species of Local Concern FD = Delisted; status monitored for five years FC = Federal Candidate -- No listing status	CE = Listed as Endangered by the State of California CT = Listed as Threatened by the State of California CR = Listed as Rare by the State of California CSC = California Species of Special Concern	List 1A = Plants presumed extinct in California List 1B = Plants rare, threatened, or endangered in California and elsewhere List 2 = Plants rare, threatened, or endangered in California but more common List 3 = Plants about which more information is needed List 4 = Plants of limited distribution

Sources: Ward, K. NPS, Personal Communication, 2005; Brastow, P., NPS, Personal Communication, 2004; CDFG 2004; Clark, 2002; CNPS 2004; Goals Project 2000; D. Hatch, NPS, Personal Communication, 2004; Holloran, 2002; Jones And Stokes Associates 1996, 1997; Munz 1970; NPS, 1999b; NPS 2000b; SFFO, 2001; USFWS 2004.

Federal and State Listed Plant Species

Five of the 28 special-status plants retained in the analysis are federally and/or state listed plants. All of these listed species are present at the Presidio and are described below. These species are:

- Presidio manzanita (*Arctostaphylos hookeri* ssp. *ravenii*)
- Presidio clarkia (*Clarkia franciscana*)
- Marin dwarf flax (*Hesperolinon congestum*)
- San Francisco lessingia
- California seablite (*Suaeda californica*)

Two of these species are present in the Doyle Drive Project study area. None of the five listed plants is present in the construction corridor (Jones and Stokes, 1997; NPS, 1999a; NPS, 2000b; NPS, 2003). San Francisco lessingia was reintroduced at Crissy Marsh and is present in the project study area. Within the construction corridor, open sandy areas of coastal scrub are highly disturbed and are not suitable for supporting San Francisco lessingia. California seablite was reintroduced at Crissy Marsh within the project study area. There is no coastal salt marsh habitat in the construction corridor to support California seablite. The serpentine soil located in the northwestern portion of the project study area does not support Presidio manzanita, Presidio clarkia or Marin dwarf flax. These three species are not present in the construction corridor or the project study area.

Presidio manzanita (also commonly known as **Raven's manzanita**) grows on open, rocky serpentine slopes in coastal scrub, chaparral, and coastal prairie and blooms February through March. Only one wild individual is known, and it occurs in the Presidio. The NPS transported numerous cuttings from this individual plant to other locations in the Presidio. This species does not occur in the project study area or construction corridor. Non-native species, and a substantial loss of habitat as well as a decline in species numbers threaten this species (NPS, 1999c). Presidio manzanita is a federally and state endangered, and CNPS List 1B species.

Presidio clarkia grows in serpentine scrubs and grasslands as an erect or sprawling plant, which blooms May through July. This species does not occur in the project study area or construction corridor. This species has a very restricted range in the Presidio and is threatened by habitat degradation, including mowing, trampling, roadside maintenance, and presence of non-native plants (NPS, 1999c; CDFG 2000). Presidio clarkia is a federally and state endangered, CNPS List 1B species.

Marin dwarf flax is a herbaceous annual species that occurs in dry, serpentine scrub, and grassland slopes in the Presidio. This species grows from one to four decimeters tall and produces rose to white flowers from May to June. The potential range for this species is from Marin to San Mateo Counties. This species does not occur in the project study area or construction corridor. Non-native species and a substantial loss of habitat threaten this species (NPS, 1999c). Marin dwarf flax is a federally and state threatened, CNPS List 1B species.

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 occurs at Crissy Field within the project study area. This species occurs within the project study area, but does not occur within the Doyle Drive construction corridor. An area near Lobos Creek and on the western side of Lincoln Boulevard above Baker Beach is under consideration by the NPS as a Special Management Zone for enhancement of San Francisco lessingia habitat. Non-native species and a change in the natural disturbance regime threaten this species (NPS, 1999c). San Francisco lessingia is a federally and state endangered, and CNPS List 1B species.

California seablite is a succulent-leafed, perennial shrub that that blooms July through October. The NPS reintroduced this species to Crissy Marsh. Prior to its reintroduction, Morro Bay supported the only surviving

population within coastal salt marsh habitat. This species occurs within the project study area, but does not occur in the construction corridor. California seablite is a federally endangered and CNPS List 1B species.

Federal Species of Concern and Federal Species of Local Concern

Ten of the 28 special-status plants retained in the analysis are federal species of concern, including:

- California saltbush (*Atriplex californica*)
- San Francisco spineflower
- Franciscan thistle
- round-headed collinsia (*Collinsia corymbosa*)
- Point Reyes bird's-beak
- San Francisco wallflower
- dune gilia
- San Francisco gumplant
- San Francisco campion
- San Francisco owl's clover

Thirteen of the 28 special-status species retained in the analysis are federal species of local concern, including:

- pink sand-verbena (*Abronia umbellata* ssp. *umbellata*)
- coast rock cress
- Nuttall's milk-vetch (*Astragalus nuttallii* var. *virgatus*)
- coast Indian paintbrush (*Castilleja affinis* ssp. *affinis*)
- salt marsh owl's clover (*Castilleja ambigua* ssp. *ambigua*)
- California goosefoot (*Chenopodium californicum*)
- Davy's clarkia (*Clarkia davyi*)
- California croton (*Croton californicus*)
- skunkweed (*Navarretia squarrosa*)
- coast rein-orchid (*Piperia elegans*)
- Pacific cordgrass (*Spartina foliosa*)
- dune tansy (*Tanacetum camphoratum*)
- California triquetrella moss (*Triquetrella californica*)

All of these federal species of concern and federal species of local concern are present or have the potential to occur at the Presidio (Holloran, 2002; Jones and Stokes, 1997; NPS, 1999b; NPS, 2000b, NPS, 2003; NPS, 2004). Detailed information on each of these species can be found in the Biological Report on Species of Concern in Appendix D. With the exception of Davy's clarkia and California triquetrella moss, these species are known to occur in the project study area since most of the remaining species were reintroduced at Crissy Field (see Section 5.5.3 of Appendix D). Potential habitat for Davy's clarkia and California triquetrella moss occurs at Crissy Marsh and the coastal bluffs within the project study area, although the potential for occurrence of these species is low.

The quality of northern coastal scrub within the Doyle Drive construction corridor is marginal because it is highly disturbed. This community is not likely to support plant species such as San Francisco campion, San Francisco spineflower, coast rock cress, Franciscan thistle, Davy's clarkia, coast Indian paintbrush, California triquetrella moss, and dune gilia. Similarly, the serpentine soil in the construction corridor does not support fragrant fritillary or San Francisco owl's clover. Except for skunkweed and San Francisco gumplant, no special-status plant species are known to occur in the Doyle Drive construction corridor (Holloran, 2002; Jones and Stokes, 1997; NPS, 1999b; NPS, 2000b, NPS 2003; NPS, 2004), and their potential occurrence is low within the construction corridor. Skunkweed occurs along the road to Battery Blaney within the construction corridor (Brastow, NPS, personal communication, 2004), and less than 100 individuals were observed within the construction corridor in 2003). San Francisco gumplant occurs south of Building 1258, with two individuals within the construction corridor.

San Francisco owl's clover occurs within the project study area, immediately south of the construction corridor at Fort Scott (NPS, 2003). San Francisco wallflower, San Francisco gumplant and Franciscan thistle are approximately 91 meters (300 feet) north of the Doyle Drive construction corridor within the project study area (NPS, 2003). San Francisco gumplant also occurs immediately north of the construction corridor below Lincoln Boulevard at the Park Presidio Interchange. Two individuals are found within the construction corridor near Building 1258.

5.2.3 Special-Status Animal Species

Many of the existing wildlife habitats in the Presidio are isolated, fragmented, disturbed and dominated by non-native plants. However, the Presidio supports remnant wildlife habitat within the urbanized environment of San Francisco; thus, all habitats in the Presidio are relatively valuable. Native habitats and the introduced Historic Forest at the Presidio are also important for migratory birds.

Based on data gathered from the NPS, the USFWS and California Natural Diversity Database, a total of 90 special-status animal species (including raptors) were considered in this analysis. These special-status animals are presented in Table 5-2 and more detailed information about these species can be found in the Biological Report on Species of Concern in Appendix D.

A total of 43 special-status bird taxa have been observed at the Presidio (Jones and Stokes, 1997). Most of these special-status birds have been sighted as rare, seasonal visitors or uncommon migrants flying over the Presidio. However, several raptor species (i.e., red-shouldered hawk, red-tailed hawk, and American kestrel) are known to breed in the Presidio.

The red-shouldered hawk and the red-tailed hawk have both been observed in the project area and have a moderate potential to nest in the Historic Forest within the Doyle Drive construction corridor.

The American kestrel has been observed (uncommon to rare breeder) in the project area with a moderate potential to nest in the Historic Forest within the Doyle Drive construction corridor.

5.2.3.1 Special-Status Animal Species Removed from Analysis

Ninety special-status wildlife species were initially considered in this analysis. Fifty-three were removed due to (1) absence determined on the basis of past surveys (Jones and Stokes, 1997); (2) their known range does not include the Presidio; (3) low nesting potential at the Presidio or in the Doyle Drive Project vicinity; or (4) lack of suitable habitat in the Presidio. Please refer to Table 5-2 and the Biological Report on Species of Concern in Appendix D for a comprehensive list of species considered in this analysis as well as detailed information on species removed from analysis.

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
FEDERAL AND STATE LISTED AND CANDIDATE SPECIES					
Animals					
Invertebrates					
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT/--	Native grasslands on serpentine soils in San Francisco Bay area. Host plants: *Plantago erecta* (primary); *Castilleja densiflorus* and *C. exserta*	**Absent.** Only one record in San Francisco area- a colony at Twin Peaks which disappeared in the 1970's. Not detected during 1994 Presidio surveys (Jones and Stokes, 1997).	**Absent.** No suitable habitat. Host plants absent in construction area.	March-May
White abalone *Haliotis sorenseni*	FE/--	Found on rocky substrate at water depths from 25 to 60 meters near a rock/sand interface. Currently only population known from Channel Islands.	**Absent.** Suitable habitat does not occur within the study area. Project not expected to impact suitable habitat.	**Absent**. Suitable habitat does not occur within the construction corridor. Project not expected to impact suitable habitat.	Year-around (adults)
Black abalone *Haliotis cracherodii*	FC/--	Inhabit tidal pools in rocky intertidal habitat. Found on Channel Islands and inaccessible portions of central and northern California.	**Absent.** Suitable habitat does not occur within the study area. Project not expected to impact suitable habitat.	**Absent.** Suitable habitat does not occur within the construction corridor. Project not expected to impact suitable habitat.	Year-around (adults)
Mission blue butterfly *Icaricia icarioides missionensis*	FE/--	Grasslands and coastal scrub with larval food plants (*Lupinus albifrons*, *L. variicolor* and *L. formosus*)	**Low potential.** Primarily known from San Mateo County, but occurs at Twin Peaks in San Francisco, and at the north end of Golden Gate Bridge in Marin County. Not detected in past 1994 surveys (Jones and Stokes, 1997).	**Absent.** No suitable habitat occurs in the construction corridor.	March-June (adults)

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WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
San Bruno elfin butterfly *Incisalia mossii bayensis*	FE/--	Coastal scrub and bunchgrass grassland habitats, with larval foodplant, *Sedum spathulifolium*; adults nectar on L*omatium utriculatum, Achillea millefolium, Arabis blepharophylla, Erysimum franciscanum, Ranunculus californicus,* and *Fragaria californica*	Absent. All known populations from San Mateo County (Arnold, 1983). No nearby sightings. Not detected in past 1994 surveys (Jones and Stokes, 1997).	Absent. All known populations from San Mateo County (Arnold, 1983); no nearby sightings; no larval food plants identified. Not detected in past 1994 surveys (Jones and Stokes, 1997).	March-April
Fish					
Green sturgeon *Acipenser medirostris*	FC/--	Spawns in the Sacramento River and the Klamath River; known to range in nearshore marine waters from Mexico to the Bering Sea	**Low potential.** Migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Tidewater goby *Eucyclogobius newberryi*	FE/CSC	Brackish waters from Del Norte Co. to San Diego Co.	**Absent.** All known populations are associated with low salinity coastal wetlands (lagoons) (50 CFR Part 17). No habitat for this species occurs in the project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Delta smelt & Critical Habitat *Hypomesus transpacificus*	FT/CT	Confined to the upper Sacramento-San Joaquin River estuary in shallow waters near the entrapment zone	**Low potential.** Migrating individuals may occasionally move through bay waters near the project site. Do not occur in this portion of San Francisco Bay.	**Absent**. No suitable habitat occurs in the construction corridor.	Year-round
Coho salmon, Central California Coast ESU & Critical Habitat *Oncorhynchus kisutch*	FT/CE	Central and northern California coastal rivers and streams	**Low potential.** Project study area outside of designated ESU range. Do not occur in this portion of San Francisco Bay.	**Absent.** No suitable habitat occurs in the construction corridor.	Primarily late summer, early fall.
Steelhead, Central California Coast ESU; Critical Habitat vacated 2002 *Oncorhynchus mykiss*	FT/--	Drainages of San Francisco and San Pablo bays, central Calif. Coastal rivers	**Low potential.** Migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	October-June

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Central Valley Chinook salmon-spring-run ESU; Critical Habitat vacated 2002 *Oncorhynchus tshawytscha*	FT/CT	Central and northern California coastal rivers and streams	**Low potential.** Project study area outside of designated ESU range, but migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	Spring
Chinook Salmon, Sacramento River Winter-run ESU & Critical habitat *Oncorhynchus tshawytscha*	FE/CE	Bay waters	**Low potential.** Project study area outside of designated ESU range, but migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	Winter
Central Valley Chinook Salmon, fall/late fall run *Oncorhynchus tshawytscha*	FC/CSC	Spawns in the Sacramento and San Joaquin Rivers and their tributaries	**Low potential.** Project study area outside of designated ESU range, but migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	Fall
Amphibians					
California red-legged frog *Rana aurora draytonii*	FT/CSC	Breed in stock ponds, pools, and slow-moving streams	Low potential. Historically known to occur at Mountain Lake (CDFG, 2004); Not detected during 1994 surveys (Jones and Stokes, 1997) or ESA 2002 habitat assessment survey (see Appendix B).	Absent. No suitable habitat occurs in the construction corridor. Not detected during 1994 surveys (Jones and Stokes, 1997) or ESA 2002 habitat assessment survey (see Appendix B).	May-August
Birds					
Marbled murrelet *Brachyramphus marmoratus*	FT/CE	Nests in dense, old growth forests along coast	**No nesting potential.** Uncommon winter transient (Jones and Stokes, 1997).	**No nesting potential.** Uncommon winter transient (Jones and Stokes, 1997).	Year-round
Western snowy plover *Charadrius alexandrinus nivosus*	FT/CSC	Sandy beaches on marine and estuarine shores - requires sandy, gravely, or friable soils for nesting	**No nesting potential.** Uncommon winter visitor to Crissy Marsh and beach (D. Hatch, NPS, personal communication 2004).	**No nesting potential**. No suitable habitat. Salt ponds and edges are only known breeding areas in San Francisco Bay (Goals Project, 2000).	Year-around

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Short-tailed albatross *Diomedea albatrus*	FE/	A pelagic species that spends most of its time at sea and returns to land only for breeding purposes.	**No nesting potential.** Breeds only at one or two sites off the coast of Japan, occasional visitor to California coast (Erlich et al., 1998).	**No nesting potential.** Breeds only at one or two sites off the coast of Japan, occasional visitor to California coast.	
Little willow flycatcher *Empidonax traillii brewsteri*	FSC/--	Nests and forages in dense riparian cover	**Low nesting potential.** No suitable habitat. Willow riparian not extensive enough. Not known to breed in San Francisco (SFFO, 2002). Not known from past Presidio bird surveys (Clark, 2002).	**Low nesting potential.** No suitable habitat. Willow riparian not extensive enough. Not known to breed in San Francisco (SFFO, 2002).	May-August
Willow flycatcher *Empidonax traillii extimus* (nesting)	--/CE	Large willow riparian forest along rivers and streams	**Very Low nesting potential.** Uncommon spring and fall migrant at Lobos Creek and Mountain Lake (Jones and Stokes, 1997). Willow riparian not extensive enough in project study area. No suitable habitat. Not known to breed in San Francisco (SFFO, 2002).	**Very Low nesting potential.** No suitable habitat. Willow riparian not extensive enough.	Spring and fall
American peregrine falcon *Falco peregrinus anatum*	FD/CE	Nests in cliffs and outcrops usually adjacent to lakes	**No nesting potential**. Uncommon nonbreeding resident in project study area; forages throughout Presidio (Jones and Stokes, 1997).	**No nesting potential**. Uncommon nonbreeding resident (Jones and Stokes, 1997).	Year-round
Bald eagle *Haliaeetus leucocephalus* (nesting and wintering)	FE[16]/CE	Nests and forages on inland lakes, reservoirs, and rivers	**No nesting potential.** Rare fall migrant potentially in project study area (Jones and Stokes, 1997).	**No nesting potential.** No suitable nesting substrates present.	Fall
California black rail *Laterallus jamaicensis coturniculus*	FSC/CT	Nests and forages in tidal emergent wetland with pickleweed	**No nesting potential.** No suitable habitat present.	**No nesting potential.** No suitable habitat present.	Year-round

[16] Proposed for delisting July 6, 1999, likely to be delisted by end of 2004.

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WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name *Scientific Name*	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification
Brown pelican *Pelecanus occidentalis californicus*	FE/CE	Forages in open water – roosting in flatlands such as berms and islands	**No nesting potential.** Regular visitor in shore areas of Presidio, especially on ocean side (Jones and Stokes, 1997). Roosts, bathes and forages at Crissy Marsh (D. Hatch, NPS, personal communication, 2004).	**No nesting potential.** Do not breed in San Francisco Bay (Goals Project, 2000).	Winter
California clapper rail *Rallus longirostris obsoletus*	FE/CE	Nests and forages in emergent wetland with pickleweed, cordgrass, and bulrush	**Absent.** No suitable habitat present.	**Absent.** No suitable habitat present in construction corridor.	Year-round
Bank swallow *Riparia riparia*	FSC/CT	A colonial nester. Nests in vertical banks of dirt or sand near water.	**No nesting potential.** No suitable nesting habitat present. In San Francisco known only to nest at Fort Funston (SFFO, 2002).	**Absent.** No suitable habitat occurs in the construction corridor.	
California least tern *Sterna antillarum browni* (nesting colony)	FE/CE	Nests along the coast from San Francisco Bay south to northern Baja California - colonial breeder on bare or sparsely vegetated flat substrates including sand beaches, alkali flats, land fills, or paved areas	**No nesting potential.** Rare nonbreeding fall transient. Nests across the bay at the Alameda Naval Air Station (Jones and Stokes, 1997). Species not known to breed on the San Francisco Peninsula (Goals Project, 2000).	**Absent.** No suitable habitat occurs in the construction corridor.	Fall
Mammals					
Guadalupe fur seal *Arctocephalus townsendi*	FT/CT	Pacific Coast from San Nicolas Island, CA, southward	**Absent.** Breeding population centered on Isla de Guadalupe west of Baja, California. Project study area out of range of species.	**Absent.** Breeding population centered on Isla de Guadalupe west of Baja, California. Project study area out of range of species.	February-May
Sei whale *Balaenoptera borealis*	FE/--	Atlantic and Pacific Oceans	**Low potential.** Individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round

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Blue whale *Balaenoptera musculus*	FE/--	Atlantic and Pacific Oceans; common near pack ice	**Low potential.** Individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Finback whale *Balaenoptera physalus*	FE/--	Atlantic and Pacific Oceans	**Low potential.** Individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Pacific right whale *Eubalaena glacialis*	FE/--	Pacific Ocean	**Low potential.** Individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Winter
Steller (northern) sea lion *Eumetopias jubatus*	FT/--	Pacific Coast south to Santa Rosa Island, CA.	**No breeding potential.** Migrating individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent** No suitable habitat occurs in the construction corridor.	Year-round
Sperm whale *Physeter macrocephalus*	FE/--	Atlantic and Pacific coasts	**Low potential.** Migrating individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Humpback whale (*Megaptera novaeangliae*)	FE/--	Inhabits all major ocean basins	**Low potential.** Migrating individuals may occasionally move through Pacific Ocean outside of the project site. Unlikely to be found at any time of year in project study area.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Salt marsh harvest mouse *Reithrodontomys raviventris raviventris*	FE/CE	Saline emergent marsh with dense pickleweed	**Absent.** No suitable habitat present in project study area.	**Absent.** No suitable habitat present in Doyle Drive construction corridor.	Year-round

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN					
Animals					
Invertebrates					
Opler's longhorn moth *Adella oplerella*	FSC/--	Serpentine bunchgrass grassland	**Low potential**. No known occurrences in Presidio. Not detected during past surveys (Jones and Stokes, 1997).	**Absent.** No suitable habitat occurs in the construction corridor.	Spring
Sandy beach tiger beetle *Cicindela hirticollis gravida*	FSC/--	Sandy areas around non-brackish water; larva live in burrows in sand along sea beaches, creeks, seepages, and lake shores.	**Low potential.** Potential habitat at Crissy Marsh in project study area, outside Doyle Drive construction corridor.	**Absent.** No suitable habitat occurs in the construction corridor.	January-July
Globose dune beetle *Coelus globulus*	FSC/--	Northern foredune, coastal dune scrub with herbaceous plants in sandy soils	**Low potential.** Potential habitat at Crissy Marsh in project study area, outside Doyle Drive construction corridor; Not detected in 1994 surveys (Jones and Stokes, 1997).	**No potential.** Potential habitat at Crissy Marsh in project study area, outside Doyle Drive construction corridor; Not detected in 1994 surveys (Jones and Stokes, 1997).	Spring
Ricksecker's water scavenger beetle *Hydrochara ricksecker*i	FSC/--	Found in freshwater ponds, shallow water of streams marshes and lakes	**Absent**. No suitable habitat in project area.	**Absent.** No suitable habitat.	January-July
San Francisco forktail damselfly *Ischnura gemina*	FSC/--	Wetlands with emergent vegetation	**Present.** Potential and occupied habitat at Mountain Lake, Lobos Creek, and Fort Point in Presidio outside project study area (Castellini, 1999; Presidio Trust, 2001).	**Absent.** No suitable habitat occurs in the construction corridor.	April-October
Bumblebee scarab *Lichnanthe ursina*	FSC/--	Open coastal sand dunes	**Absent.** Not detected during 1994 survey, most specimens collected in San Francisco early this century (Jones and Stokes, 1997).	**Absent.** No suitable habitat. Open coastal dunes absent in construction corridor.	Unknown

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Fish					
Sacramento splittail *Pogonichthys macrolepidotus*	FSC/CSC	Backwater slough areas in the lower Delta. Prefer low-salinity, shallow-water habitat	**Low spawning potential.** Project study area is outside known habitat for this species.	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Longfin smelt *Spirinichus thaleichthys*	FSC/CSC	Moderately saline waters in major bays and estuaries from San Francisco northward	**Low potential.** Project study area outside of range, but migrating individuals may occasionally move through bay waters near the project site.	**Absent.** No suitable habitat occurs in the construction corridor.	year-round
Amphibians					
Foothill yellow-legged frog *Rana boylii*	FSC/CSC	Fast-moving streams and rivers in chaparral, forests, and woodlands	**Absent.** Not detected during 1994 amphibian surveys (Jones and Stokes, 1997). No suitable habitat.	**Absent.** Not detected during 1994 amphibian surveys (Jones and Stokes, 1997). No suitable habitat.	March-June
Reptiles					
Silvery legless lizard *Anniella pulchra pulchra*	FSC/CSC	Areas with sandy or loose loamy soils under open vegetation near beaches, chaparral, or pine-oak woodland	**Low potential.** Extirpated from Presidio (Jones and Stokes, 1997). Project study area does not provide suitable habitat for this species.	**Absent.** No suitable habitat occurs in the construction corridor.	April-September
Western pond turtle *Clemmys marmorata marmorata*	FSC/CSC	Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands	**Absent**. Species not identified from project site; no upland habitat suitable for this species occurs on the project site.	**Absent**. Species not identified from project site; no upland habitat suitable for this species occurs on the project site.	Year-round
Southwestern pond turtle *Clemmys marmorata pallida*	FSC/CSC	Slow moving streams with open areas for basking	**Low potential.** Historical occurrences at Mountain Lake but not detected during surveys in past 1994 surveys (Jones and Stokes, 1997).	**Absent.** No suitable habitat occurs in the construction corridor.	
California horned lizard *Phrynosoma coronatum frontale*	FSC/CSC	Sandy open areas in riparian woodland, grassland, coastal scrub, mixed chaparral, and oak woodland	**Absent.** No known occurrences on Presidio according to past surveys (Jones and Stokes, 1997).	**Absent.** No known occurrences on Presidio according to past surveys (Jones and Stokes, 1997).	April-September
Birds					

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Tricolored blackbird *Agelaius tricolor*	FSC/CSC	Nests in freshwater marshes with dense stands of cattails or bulrushes, occasionally in willows, thistles, mustard, blackberry brambles, and dense shrubs and grains	**Low potential.** Suitable habitat too fragmented. Not detected during past Presidio surveys (Jones and Stokes, 1996; Jones and Stokes, 1997).	**Low potential.** Suitable habitat too fragmented.	Year-round
Bell's sage sparrow *Amphispiza belli belli*	FSC/CSC	Nests and forages in chaparral in the inner Coast Ranges	**Low potential.** The project area does not provide suitable habitat for this species. Not known from previous studies of Presidio (Clark, 2002; Gardali, 2002; Gardali, 2003)	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Black turnstone *Arenaria melanocephala*	FSC/--	Rocky shores and sand beaches, rarely on mudflats.	**Low nesting potential.** Present in rocky shore habitat at the Presidio during the non-breeding season (Clark, 2000). Do not breed locally (SFFO, 2002; Sibley, 2000).	**Absent.** No suitable habitat occurs in the construction corridor.	Fall-Spring
Western burrowing owl *Athene cunicularia hypugaea*	FSC/CSC	Nests in mammal burrows in open, sloping grasslands	**Low potential.** Not known from previous studies of Presidio (Clark, 2002; Gardali, 2002; Gardali, 2003).	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round
Ferruginous hawk *Buteo regalis*	FSC/CSC	Forages in grassland, agricultural lands, and pastures (wintering only)	**Low potential**. Uncommon seasonal migrant.	**Low potential**. Uncommon seasonal migrant.	September-April (wintering only)
Red knot *Calidris canutus*	FSC/--	Sandy mudflats of bays and lagoons in central and southern California, also salt marshes, rocky shorelines and breakwaters	**No nesting potential.** May winter locally or pass through during migration, do not breed locally. Not known from previous studies of Presidio (Clark, 2002; Gardali, 2002; Gardali, 2003)	**No nesting potential.** May winter locally or pass through migration, do not breed locally. Not known from previous studies of Presidio (Clark, 2002; Gardali, 2002; Gardali, 2003)	Winter
Vaux's swift *Chaetura vauxi*	FSC/CSC	Nests in hollow, burned-out tree trunks in large conifers	**No nesting potential.** Rare to uncommon seasonal migrant (Clark, 2002), does not breed locally.	**No nesting potential.** Rare to uncommon seasonal migrant (Clark, 2002), does not breed locally.	Fall/Spring

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Black swift *Cypseloides niger*	FSC/CSC	Colonial breeders using cliffs in deep canyons	**No nesting potential.** Not known to breed locally (SFFO, 2002). Not known from previous studies of Presidio (Clark, 2002; Gardali 2002; Gardali, 2003)	**No nesting potential.** Not known to breed locally (SFFO, 2002). Not known from previous studies of Presidio (Clark, 2002; Gardali 2002; Gardali, 2003)	Fall/Spring
California yellow warbler *Dendroica petechia brewsteri*	--/CSC	Nests in riparian areas dominated by willows, cottonwoods, sycamores, alders, or mature chaparral; may use urban areas near waterways	**Low nesting potential.** Uncommon seasonal migrant; not known to breed at Presidio (Jones and Stokes, 1997; Clark, 2002.). Slight possibility of occurrence in arroyo willow areas in project study area.	**Low nesting potential.** Uncommon seasonal migrant; not likely to breed in construction corridor. Slight possibility of occurrence in arroyo willow areas in construction corridor.	April-June
White-tailed kite *Elanus leucurus*	FSC/3511[17]	Nests near wet meadows and open grasslands, dense oak (Quercus sp.), willow or other large tree stands.	**Low potential.** Suitable foraging habitat not present. Not noted in Presidio bird surveys (Clark, 2002; Gardali, 2002; Gardali, 2003). Not noted as breeding in San Francisco (SFFO, 2002).	**Very Low potential**. Disturbed and fragmented habitat.	Year-around
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	FSC/CSC	Nests in fresh and saltwater marshes, needs thick continuous cover down to water surface for foraging	**Low nesting potential**. Uncommon resident and possible breeder at Mountain Lake (Jones and Stokes, 1997) outside of project study area.	**Absent**. No suitable habitat occurs in the construction corridor.	April-July
Black oystercatcher *Haematopus bachmani*	FSC/--	Rocky shores, primarily coastal but known to occur in SF Bay occasionally.	**No nesting potential.** Uncommon visitor at Presidio (Clark, 2002) but no nesting habitat in project study area. Only known local nesting sites at Alcatraz Island, on rocks near Cliff House, and at Farallones Islands (SFFO, 2002).	**No nesting potential.** Uncommon visitor at Presidio (Clark, 2002) but no nesting habitat in project study area. Only known local nesting sites at Alcatraz Island, on rocks near Cliff House, and at Farallones Islands (SFFO, 2002).	Year-around

[17] White-tailed kite is protected under Section 3511 of the California Fish and Game Code.

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Harlequin duck *Histrionicus histrionicus*	FSC/CSC	Nests along shores of swift shallow montane rivers	**Low nesting potential.** Rare winter visitor. No suitable nesting habitat present.	**Absent.** No suitable habitat occurs in the construction corridor.	Fall-Winter
Loggerhead shrike *Lanius ludovicianus*	FSC/CSC	Nests in shrublands and forages in open grasslands	**Low potential.** Not noted in Presidio bird surveys (Clark, 2002; Gardali, 2002; Gardali, 2003). Although a possible breeder in San Francisco not confirmed (SFFO, 2002).	**Very Low potential**. Disturbed and fragmented habitat.	Year-round
California gull *Larus californicus* (nesting colony)	--/CSC	Colonial nester on islets in large interior lakes either fresh or strongly alkaline	**Low nesting potential.** Common nonbreeding visitor in fall, winter and spring; occurs along the shorelines of Mountain Lake (Jones and Stokes, 1997).	**No nesting potential.** Common nonbreeding visitor.	Fall-Spring
Marbled godwit *Limosa fedoa*	FSC/--	Forage on tideflats, roost in nearby lower marshes and salt ponds, also ocean beaches and plowed fields	**Low nesting potential.** Common nonbreeding visitor in fall, winter and spring (Clark, 2002); does not breed locally (SFFO, 2002; Sibley 2000).	**No nesting potential.** Common nonbreeding visitor in fall, winter and spring (Clark, 2002); does not breed locally (SFFO, 2002; Sibley 2000).	Fall-Spring
Lewis's woodpecker *Melanerpes lewis*	FSC/--	Open woodlands in interior foothills and valleys	**Low potential.** Not noted in Presidio bird surveys (Clark, 2002; Gardali, 2002; Gardali, 2003). Occasional Bay Area fall or winter visitor (Clark, 2002). Not known to breed in San Francisco (SFFO, 2002).	**Very Low potential**. Disturbed and fragmented habitat.	Fall-Winter
Long-billed curlew *Numenius americanus*	FSC/CSC	Breeds in upland shortgrass prairies and wet meadows in northeastern California in gravelly soils	**No nesting potential.** Uncommon winter visitor to sandy beaches and mudflats.	**No nesting potential.** Uncommon winter visitor to sandy beaches and mudflats.	Winter
Whimbrel *Numenius phaeopus*	FSC/--	Beaches, mudflats, rocky shores, salt marshes, breakwaters. Freshwater marshes and lake margins during migration.	**No nesting potential.** Fairly common at Presidio from fall through spring (Clark, 2002). Does not breed locally (Sibley 2000.	**No nesting potential.** Fairly common at Presidio from fall through spring (Clark, 2002). Does not breed locally (Sibley 2000. No suitable foraging or roosting habitat in project corridor.	Fall-Spring

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WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

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Ashy storm-petrel *Oceanodrama homochroa*	FSC/CSC	Coastal/oceanic habitats. Nests on islands with natural cavities or provided burrows.	**Low potential.** Not noted in Presidio bird surveys (Clark, 2002; Gardali, 2002; Gardali, 2003). Nearest known nesting locations are on the Farallones Islands (SFFO, 2002).	**Absent.** No suitable habitat occurs in the construction corridor.	
Double-crested cormorant *Phalacrocorax auritus* (rookery site)	--/CSC	Forages in a variety of habitats and nests in riparian forests or on protected islands.	**No nesting potential.** Common nonbreeding resident (Jones and Stokes, 1997).	**No nesting potential.** Common nonbreeding resident (Jones and Stokes, 1997).	Year-around
Black skimmer *Rynchops niger*	FSC/--	Requires shallow, calm water for foraging, and sand bars, beaches, or dikes for roosting and nesting.	**Low potential**. Not noted in Presidio bird surveys (Clark, 2002; Gardali, 2002; Gardali, 2003). Rare visitor to Bay Area (Sibley, 2000). Does not breed locally (SFFO, 2002; Sibley 2000).	**Absent**. No suitable habitat occurs in the construction corridor.	Spring-Summer
Rufous hummingbird *Selasphorus rufus*	FSC/--	Forests, woodland edges, thickets	**No nesting potential.** Not known to breed in San Francisco, the Presidio, or California (SFFO, 2002; Clark, 2002; Sibley 2000). Uncommon visitor during spring and fall migrations (Clark, 2002).	**No nesting potential.** Not known to breed in San Francisco, the Presidio, or California (SFFO, 2002; Clark, 2002; Sibley 2000). Uncommon visitor during spring and fall migrations, more common in fall (Clark, 2002).	Spring and Fall
Allen's hummingbird *Selasphorus sasin*	FSC/--	Brush and woodlands	**Present.** Known to nest at the Presidio (Clark, 2002).	**High potential.** May nest in scrub or woodland habitat within the Doyle Drive construction corridor.	Winter -Summer
Elegant tern *Sterna elegans* (nesting colony)	FSC/CSC	Nests on dikes between salt ponds in association with Caspian tern	**No nesting potential.** Only known breeding colony in the U.S. located in the salt work dikes at the south end of San Diego bay (CDFG, 2004). Roosting occurs at Crissy Marsh, but no suitable nesting habitat present (D. Hatch, NPS, personal communication, 2004). Occasional visitor during fall migration (Clark, 2002).	**No nesting potential.** Only known breeding colony in the U.S. located in the salt work dikes at the south end of San Diego bay (CDFG, 2004). No suitable nesting habitat present within the construction corridor.	Fall

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name *Scientific Name*	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification
Mammals					
Pallid bat *Antrozous pallidus*	--/CSC	Day roosts are mainly in caves, crevices and mines; also found in buildings and under bark. Forages in open lowland areas	**Low potential**. Occurrence at Presidio is unlikely.	**Bat surveys negative**. Occurrence at Presidio is unlikely.	February-August
Greater western mastiff bat *Eumops perotis californicus*	FSC/CSC	Needs rock crevices, grassland, coastal scrub; may use urban areas	**Low potential**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	**Bat surveys negative**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	February-August
Long-eared myotis *Myotis evotis*	FSC/--	Roosts in buildings, crevices, under bark, snags, and in forests. Caves are the primary night roost	**Low potential**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	**Bat surveys negative**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	February-August
Fringed myotis *Myotis thysanodes*	FSC/--	Roosts in caves, old buildings and under bark	**Low potential**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	**Bat surveys negative**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	February-August
Long-legged myotis *Myotis volans*	FSC/--	Roosts in rock crevices, buildings, tree bark, snags, mines and caves. Trees are perhaps the most important daytime roosts for this species.	**Low potential**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	**Bat surveys negative**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	February-August
Yuma myotis *Myotis yumanensis*	FSC/CSC	Roosts in caves, old buildings and under bark. Forms maternity colony in the spring.	**High potential.** Observed during past survey (Jones and Stokes, 1997). Suitable roosting habitat potentially in Historic Forest trees in project study area.	**Bat surveys negative.** Observed during past survey (Jones and Stokes, 1997). Suitable roosting habitat limited in construction corridor. No evidence of bat use observed.	August – October, January – February
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	FSC/CSC	Forests with moderate canopy cover and brushy understory	**Low potential.** Not detected during past Presidio surveys (Jones and Stokes, 1997).	**Absent.** No suitable habitat occurs in the construction corridor.	Year-round

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WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Townsend's big-eared bat *Corynorhinus (=Plecotus) townsendii townsendii*	FSC/CSC	Roosts in caves, mines, buildings or other human-made structures for roosting. Forages in open lowland areas	**Low potential**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	**Bat surveys negative**. Roosting habitat considered poor; occurrence at Presidio is unlikely (Jones and Stokes, 1997).	February-August
Salt marsh vagrant shrew *Sorex vagrans halicoetes*	FSC/CSC	Inhabits tidal salt marshes dense with pickleweed around south San Francisco Bay	**Absent.** Collected in 1940 probably located between Fort Point and Crissy Marsh (Jones and Stokes, 1997). No suitable habitat in project study area.	**Absent.** Collected in 1940 probably located between Fort Point and Crissy Marsh (Jones and Stokes, 1997). No suitable habitat in project study area.	Year-round
SPECIES ON OTHER LISTS					
ANIMALS					
Invertebrates					
Monarch butterfly *Danaus plexippus*	--/*	Eucalyptus groves (winter sites)	**Low potential.** Nearest known wintering habitat is Rob Hill in the Presidio (Trust, S. Farrell, scoping comments, August 5, 2001).	**Low potential.** Nearest known wintering habitat is Rob Hill in the Presidio (Presidio Trust, S. Farrell, scoping comments, August 5, 2001).	Winter
Tree lupine moth *Grapholita edwardsiana*	--/--	Coastal sand dunes typically associated with its larval host plant *Lupinus arboreus* (yellow bush lupine)	**High potential.** Common throughout Presidio where host plant available; observed during 1994 surveys (Jones and Stokes, 1997). Host plant observed in project study area.	**Low/Moderate potential.** Potential habitat in coastal scrub within Doyle Drive Construction Corridor. Two yellow bush lupine plants observed in coastal scrub.	Spring
Birds					
Cooper's hawk *Accipiter cooperi*	--/-3503.5[18]	Deciduous, coniferous, or riparian woodlands or forests. Nests in large conifers or deciduous trees.	**Present.** Known to nest at the Presidio (Clark, 2002).	**Moderate potential.** Potentially nests in Historic Forest within Doyle Drive construction corridor.	Year-round

[18] Nesting raptors (hawks, falcons, and owls) are protected under California Fish and Game Code Section 3503.5

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name ***Scientific Name***	**Listing Status USFWS/CDFG/CNPS**	**Habitat Requirements**	**Potential Species Occurrence In Project Study Area**	**Potential Species Occurrence In Doyle Drive Construction Corridor**	**Period of Identification**
Great horned owl *Bubo virginianus*	--/3503.5	Coniferous or deciduous forests and woodlands, parks. Often uses stick nests abandoned by corvids or other raptors. Nests in large trees, including eucalyptus and pines.	**Present.** Known to nest at the Presidio (Clark, 2002).	**Moderate potential.** Potentially nests in Historic Forest within Doyle Drive construction corridor.	Year-round
Red-tailed hawk *Buteo jamaicensis*	--/3503.5	Open stands of deciduous and coniferous forests; frequents croplands and pastures	**Present.** Potentially nests in Historic Forest within project study area.	**Moderate potential.** Potentially nests in Historic Forest within Doyle Drive construction corridor.	Year-around
Red-shouldered hawk *Buteo lineatus*	--/3503.5	Dense riparian woodland, hardwood-conifer habitats adjacent to swamps, marshes, and wet meadows	**Present.** Potentially nests in Historic Forest within project study area.	**Moderate potential.** Potentially nests in Historic Forest within project study area.	Year-around
American kestrel *Falco sparverius*	--/3503.5	Generally nests in cavities in large snags or on cliffs. Requires open to semi-open habitat for foraging.	**Present.** Uncommon to rare breeder at the Presidio (Clark, 2002).	**Moderate potential.** May nest in Historic Forest within Doyle Drive construction corridor.	Year-around
Western screech-owl *Otus kennicottii*	--/3503.5	Woodland, especially oak and riparian, and scrub habitats. Cavity nester, generally in snags.	**Present.** Last known San Francisco population occurs at Presidio, breeding not confirmed (Clark, 2002).	**Moderate potential.** May nest in Historic Forest within Doyle Drive construction corridor.	

TABLE 5-2
WILDLIFE SPECIAL-STAUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

Common Name *Scientific Name*	Listing Status USFWS/CDFG/CNPS	Habitat Requirements	Potential Species Occurrence In Project Study Area	Potential Species Occurrence In Doyle Drive Construction Corridor	Period of Identification

Status Codes:

Federal Categories (U.S. Fish and Wildlife Service)	State Categories (California Department of Fish and Game)	California Native Plant Society (CNPS)
FE = Listed as Endangered by the Federal Government	CE = Listed as Endangered by the State of California	
FT = Listed as Threatened by the Federal Government	CT = Listed as Threatened by the State of California	
FSC = Federal Species of Concern	CR = Listed as Rare by the State of California	
SLC = Federal Species of Local Concern	CSC = California Species of Special Concern	
FD = Delisted; status monitored for five years	* = California Natural Diversity Database Special Animals List	
FC = Federal Candidate		
-- No listing status		

Sources: Brastow, P., NPS, personal communication, 2004; CDFG 2004; Clark, 2002; CNPS 2004; Goals Project 2000; D. Hatch, NPS, personal communication, 2004; ESA (Environmental Science Associates), 2002; Holloran, 2002; Jones and Stokes Associates 1996, 1997; Munz 1970; NPS, 1999b; NPS 2000b; SFFO, 2001; USFWS 2004.

5.2.3.2 Special-status Animal Species Retained in Analysis

A total of 37 special-status animals are retained for detailed consideration in this analysis because these species either (1) are known to occur in the Presidio; (2) have suitable habitat in the Presidio; or (3) could be potentially affected (directly or indirectly) by the proposed action. These species are listed below and are discussed further in this section. Please refer to Table 5-2 and the Biological Report on Species of Concern in Appendix D for a comprehensive list of species considered in this analysis and more detailed information on species not known to or expected to occur within the project footprint.

<u>Federal and State Threatened and Endangered Species</u>

Invertebrates

- Bay checkerspot butterfly (*Euphydryas editha bayensis*)
- Mission blue butterfly (*Icaricia icarioides missionensis*)
- San Bruno elfin butterfly (*Incisalia mossii bayensis*)

Amphibians

- California red-legged frog (*Rana aurora draytonii*)

Birds

- marbled murrelet (*Brachyramphus marmoratus*)
- western snowy plover (*Charadrius alexandrinus*)
- willow flycatcher (*Empidonax traillii extimus*)
- little willow flycatcher (*Empidonax traillii brewsteri*)
- American peregrine falcon (*Falco peregrinus anatum*)
- bald eagle (*Haliaeetus leucocephalus*)
- California brown pelican (*Pelecanus occidentalis californicus*)
- California least tern (*Sterna antillarum browni*)

<u>Federal and State Special Concern Species</u>

Invertebrates

- tree lupine moth (*Graphiolita edwardsiana*)
- sandy beach tiger beetle (*Cicindela hirticollis gravida*)
- San Francisco forktail damselfly (*Ischnura gemina*)

Birds

- Cooper's hawk (*Accipiter cooperi*)
- black turnstone (*Arenaria melanocephala*)
- great horned owl (*Bubo virginianus*)
- red-tailed hawk (*Buteo lineatus*)
- red-shouldered hawk (*Buteo jamaicensis*)
- ferruginous hawk (*Buteo regalis*)
- Vaux's swift (*Chaetura vauxi*)
- California yellow warbler (*Dendroica petechia brewsteri*)
- American kestrel (*Falco sparverius*)
- saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)

- black oystercatcher (*Haematopus bachmani*)
- harlequin duck (*Histrionicus histrionicus*)
- California gull (*Larus californicus*)(nesting colony)
- marbled godwit (*Limosa fedoa*)
- long-billed curlew (*Numenius americanus*)
- whimbrel (*Numenius phaeopus*)
- western screech-owl (*Otus kennecottii*)
- double-crested cormorant (*Phalacrocorax auritus*)(rookery site)
- rufous hummingbird (*Selasphorus rufus*),
- Allen's hummingbird (*Selasphorus sasin*)
- elegant tern (*Sterna elegans*) (nesting colony)

Mammals

- Yuma myotis (*Myotis yumanensis*)

No species listed as threatened or endangered pursuant to FESA or CESA are known to breed in the Presidio. Bay checkerspot butterfly and Mission blue butterfly have not been recently observed in the Presidio and are not likely to occur there. All known populations of San Bruno elfin butterfly are located in San Mateo County (Arnold, 1983) and this species has not been detected during past surveys (Jones and Stokes, 1997). However, potential habitat for this species exists at the Presidio. Peregrine falcon is known to be an uncommon non-breeding resident of the Presidio but is not known to nest there. Most of the remaining listed bird species are rare or uncommon seasonal visitors at the Presidio during the non-breeding season and do not nest there. Brown pelican, for example, is a regular visitor along the shores of the Presidio but nests islands off the coast and forages in open bay and ocean waters.

The most recent document that evaluates suitable habitat for the California red-legged frog is the *Recovery Plan* for the species (USFWS, 2002b). This document describes the frog as breeding in a variety of aquatic habitats, from deep pools to marshes and sag ponds, and in shallow sections of streams with and without riparian vegetation. Since larvae typically metamorphose between July and September, features incapable of holding water into this period would be unlikely to support successful reproduction; moreover, since egg masses (deposited between November and April) need to be laid in water, some ponding of a depth sufficient to float egg masses must be present during this period to even attract frogs to breed at the site.

The wetland sites within and adjacent to the limits of construction are not the result of ponded water at any time of year. The largest and most diverse sites are on the northern hillside slope that allows some water to accumulate at the toe of the slope, but a concrete drainage channel conducts this water away. Where the channel is absent, water is briefly held but not collected: there is a strip of saturated soil which supports a few cattails (*Typha* sp.) but no defined bank or bed (see Appendix B)

Tree lupine moth, California yellow warbler, Allen's hummingbird, saltmarsh common yellowthroat, red-tailed hawk, red-shouldered hawk, Cooper's hawk, American kestrel, and western screech-owl, and great-horned owl are known or suspected to breed in the Presidio. These species are briefly described below.

Tree lupine moth is a federal special concern species. The moth's larval host plant, yellow bush lupine, is typically associated with coastal sand dunes. Tree lupine moth occurs at several locations south of the Golden Gate Bridge (Jones and Stokes, 1997).

California yellow warbler breeds between April and August, with a peak in June, and utilizes riparian deciduous habitats throughout California with the exception of deserts and the Central Valley. Yellow warblers have been observed at Crissy Marsh. Allen's hummingbird frequents brush and woodlands and is known to breed at the Presidio (Clark, 2002). Saltmarsh common yellowthroat is an uncommon resident that may breed in the Presidio at Mountain Lake (Jones and Stokes, 1997).

Red-tailed hawk, red-shouldered hawk, Cooper's hawk, American kestrel, great-horned owl, and western screech owl are protected in California under California Fish & Game Code §3503.5. All of these species use either dead or living large trees, located in forest or woodland habitat, to nest in, including conifers and eucalyptus. All of these species have been observed, and are known or suspected to nest, in the Presidio and all may potentially use trees within the construction corridor for nesting.

Potential habitat for San Francisco forktail damselfly is present in a seep behind Building 926 (the Trust, 2001). This species has been observed along Marine Drive at Fort Point outside the project study area and construction corridor (the Trust, 2001).

A number of special-status birds have been observed at the Presidio. The majority of these are rare to uncommon seasonal migrants that do not breed at the Presidio or in the state. For example, double crested-cormorant is a common non-breeding resident. California gull is a common visitor to the Presidio but also does not breed there. Ferruginous hawk, Vaux's swift, harlequin duck, and long-billed curlew are among the uncommon seasonal migrants that do not breed at the Presidio.

5.3 WATER-ASSOCIATED FEATURES

Water-associated features in the Doyle Drive Project study area for biological resources include: (1) ACOE jurisdictional waters of the U.S. protected under Section 404 of the Clean Water Act and Executive Order 11990; and (2) wetlands defined by USFWS using the Cowardin classification system that are protected under Executive 11990 by the NPS/Trust. Water-associated features in the project study area for biological resources are depicted in Figure 3-4 and summarized in Table 5-3.

5.3.1 ACOE Jurisdictional Waters of the U.S.

Wetlands and other waters of the U.S. (e.g., rivers, streams and natural ponds) receive protection under Section 404 of the Clean Water Act (CWA) and Executive Order 11990. A total of 13 soils pits were examined and 13 water-associated features were delineated on July 25, 2000 and November 28, 2000 within and adjacent to the Doyle Drive construction corridor. Other water-associated features in the project study area were delineated by Castellini (2001), including North Fort Scott, Battery Howe-Wagner, Dragonfly Creek and Lower Dragonfly Creek, which is a subset of Dragonfly Creek.

All of these features were incorporated into a wetland delineation that was verified by the ACOE August 29, 2001.

Of the total number of water-associated features delineated, the ACOE verified seven (i.e., W-2, W-3, W-8, W-8b, Battery Howe-Wagner, Lower Dragonfly Creek, and Tennessee Hollow) as jurisdictional waters of the U.S. under Section 404 of the CWA on August 29, 2001. In Castellini (2001), North Fort Scott and Crissy Marsh (W-1) were identified as jurisdictional waters of the U.S. in the project study area.

TABLE 5-3
SUMMARY OF ACOE JURISDICTIONAL WATERS OF THE U.S. AND NPS/TRUST COWARDIN WETLANDS IN THE PROJECT STUDY AREA

Map Symbol	Type	Jurisdictional Waters of the U.S. in Project Study Area		Jurisdictional Waters of the U.S. in Doyle Drive Construction Corridor	
		Hectares	Acres	Hectares	Acres
ACOE Jurisdictional Waters of the U.S.					
W-1	Restored tidal marsh (Crissy Marsh) and associated wetlands	6.56	16.20	0	0
W-2	Arroyo willow scrub	0.10	0.25	0.10	0.25
W-3	Seasonal wetland	0.11	0.28	0.11	0.28
W-8	Freshwater wetland	0.01	0.03	0	0
W-8b	Seasonal wetland	0.03	0.07	0	0
Lower Dragonfly Creek	Perennial stream with freshwater wetland	0.11	0.26	0.01	0.03
North Fort Scott	Freshwater wetland	0.02	0.06	0	0
Battery Howe-Wagner	Perennial stream with seasonal wetland	0.06	0.16	0.01	0.02
Tennessee Hollow (in construction corridor)	Seasonal stream (underground)	0.06	0.15	0.06	0.15
Total		**7.07**	**17.46**	**0.30**	**0.73**
COWARDIN WETLANDS UNDER THE PROTECTION OF THE NPS OR THE TRUST					
W-4	Arroyo willow scrub	0.71	1.74	0.40	1.00
W-5	Arroyo willow scrub	0.06	0.16	0.01	0.02
W-6a	California blackberry wetland	0.05	0.12	0.05	0.12
W-6b	California blackberry wetland	0.01	0.02	0.01	0.02
W-6c	California blackberry wetland	0.02	0.05 (0.04 + 0.01)	0.02	0.05
W-6d	California blackberry wetland	0.04	0.11	0	0
W-7	Arroyo willow scrub	0.004	0.01	0	0
W-8a	Arroyo willow scrub	0.08	0.19	0	0
Total		**0.97**	**2.40**	**0.49**	**1.21**

Source: Environmental Science Associates, NPS, Trust 2001.

Excepting those features determined jurisdictional in Castellini (2001), the ACOE determined that the remaining water-associated features within the Doyle Drive construction corridor were non-jurisdictional.

Jurisdictional waters of the U.S. identified in the Doyle Drive Project study area total 7.07 hectares (17.46 acres), of which 0.30 hectares (0.73 acres) lie within the Doyle Drive construction corridor.

5.3.2 NPS- and Trust-Protected Cowardin Wetlands

The NPS and Trust define wetlands using the *Cowardin* classification system (Cowardin et al., 1979), which defines a wetland as having *at least* one or more of the following attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);

2. The substrate is predominantly undrained hydric soil; or

3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin definition, therefore, includes more habitat types than the wetland definition (33 CFR 328.3) and delineation manual used by the ACOE. The 1987 "Corps of Engineers Wetlands Delineation Manual" requires all three of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for a habitat to be considered a wetland. The Cowardin wetland definition includes such wetlands, but also adds some habitats that, though lacking vegetation or soils, are still saturated or shallow inundated environments that support aquatic life.

As defined by the Cowardin classification system (Cowardin et al., 1979) a total of 0.97 hectares (2.40 acres) of Cowardin wetlands located in the project study area are protected by the NPS or the Trust as palustrine scrub-shrub (see Table 5-3). Because the NPS and the Trust also protect ACOE wetlands, the total number of Cowardin and ACOE wetlands protected by the NPS and the Trust is 8.03 hectares (19.86 acres) within the project study area. Excluding ACOE jurisdictional wetlands, NPS or the Trust protect a total of 0.49 hectares (1.21 acres) of Cowardin wetlands within the Doyle Drive construction corridor, including W-4, W-5, W-6a, W-6b, and W-6c. These wetlands are not within the ACOE jurisdiction under Section 404 of the Clean Water Act as waters of the U.S. because the soil criterion was not met. These wetlands are protected under Executive Order 11990 by NPS and the Trust, and NPS' and Trust's policies.

Wetland features within the Doyle Drive construction corridor primarily lie adjacent to concrete culverts that convey stormwater runoff, or in fracture flows or seeps of hillside slopes. These wetland sites previously supported northern coastal scrub or coastal dune scrub vegetation. Hydric soil characteristics have not developed at the locations of Cowardin wetlands protected by the NPS or the Trust. The dominant species in these wetlands consist of arroyo willow and/or California blackberry, referred to collectively as riparian scrub. The riparian scrub Cowardin wetlands also support Algerian ivy (*Hedera helix*) and cape ivy, which are non-native, invasive species. The California Exotic Pest Plant Council includes them in the group of the "most invasive and damaging wildland pest plants species."

In a regional context, most of these Cowardin wetlands protected by the NPS or the Trust and ACOE jurisdictional wetlands have low to moderate value as an aquatic resource because they have low species diversity and lack canopy structure suitable for most breeding wildlife species. However, relative to the surrounding urban environment, these wetlands may be considered by the NPS and the Trust as high value since they may serve an aesthetic function in a recreational park, are the only water-associated features with well-established plants in the northern portion of the Presidio and may provide habitat for wildlife species.

Each Cowardin wetland protected by the NPS or the Trust located within the project study area is discussed below.

5.3.2.1. Cowardin Arroyo Willow Scrub and Associated Wetlands (Map Symbol Locations W-4, W-5, W-7, W-8A in Table 5-3])

Cowardin arroyo willow scrub (W-4, W-5, W-7, W-8a) is found along the steep hillside slopes north of Doyle Drive at four locations in the project study area. Prior to the construction of Doyle Drive, these arroyo willow scrub areas previously supported coastal dune scrub vegetation (Jones and Stokes, 1997), which is considered upland vegetation but can include swales and seeps. Under new normal circumstances, wetlands W-4, W-5, W-7 and W-8a receive stormwater runoff from the above Doyle Drive roadway and/or water seepage through fractures.

These four wetlands cover a total of 0.85 hectares (2.10 acres) in the project study area (see previous Table 5-3). The dominant vegetation consists of arroyo willow in all of these locations; however, California blackberry is a co-dominant species in wetland W-4. Soil observations were conducted at W-4 and W-5. Since the vegetation at W-7 was consistent with the vegetation at W-4 and W-5, soil observations were not necessary at W-7 and W-8a. The soil is sandy and does not exhibit organic streaking, layering or mottles (10 YR 3/2); thus, reducing conditions were not evident. Hydric soil indicators are obscured due to past disturbance of the area or have not developed. The soil at wetlands W-4, W-5, W-7 and W-8a is mapped as Sirdrak sand (USDA, 1991). Wetlands W-4, W-5, W-7 and W-8a are not within the ACOE jurisdiction under Section 404 of the Clean Water Act as wetland waters of the U.S. since the soil criterion was not met. However, these would be classified as palustrine scrub-shrub using the Cowardin system.

5.3.2.2. California Blackberry and Associated Wetlands (Map Symbols W-6a, W-6b, W-6c and W-6d in Table 5-3)

California blackberry (W-6a, W-6b, W-6c, W-6d) is found along the gentle hillside slopes between Doyle Drive and Lincoln Boulevard at four locations in the project study area. California blackberry dominant wetlands cover a total of 0.12 hectares (0.30 acres) in the project study area. These hillside slopes supported northern coastal scrub (Jones and Stokes, 1997) prior to the construction of Doyle Drive. Under new normal conditions, these areas (W-6a, W-6b and W-6c) receive stormwater runoff from the above Lincoln Boulevard roadway. Wetland W-6d receives stormwater runoff from Doyle Drive roadway as well as from fracture flows. The dominant vegetation is California blackberry at each of these locations.

Soil observations were made at W-6b and W-6a. The soil is sandy and does not exhibit organic streaking, layering or mottles. Soil observations in California blackberry indicated a low chroma (10 YR 2/1). However, soil observations in an adjacent upland area at W-6b, which supported ripgut brome (*Bromus diandrus*), a facultative upland species [FACU] [19], black mustard (*Brassica nigra*) and upland species [UPL] [20] and wild oat (*Avena barbata*) [UPL], indicated similar soil results (10 YR 3/1). Hydric soil indicators are obscured due to past disturbance of the area or have not developed. The soil is mapped as Sirdrak sand (USDA, 1991). Wetlands W-6a, W-6b, W-6c and W-6d are not within the ACOE jurisdiction under Section 404 of the Clean Water Act as wetland waters of the U.S. since the soil criterion was not met. These California blackberry wetlands would be classified as palustrine scrub-shrub in the Cowardin system. California Blackberry and associated wetlands and Cowardin Arroyo Willow Scrub and associated wetlands are collectively referred to throughout this document as riparian scrub.

5.4 CONCLUSIONS

One hundred thirty-four (134) plant and animal species at all levels of state or federal concern were evaluated. Most were removed from the analysis due to (1) absence established as a result of past surveys,

[19] Facultative Upland (FACU) are plants that occur more often in non-wetlands (>67% to 99%) of the time;

[20] Upland (UPL) plants that occur almost always in non-wetlands (>99%) of the time in natural conditions.

(2) the known range of the species falling outside the project study area, (3) very low occurrence potential in project study area or project vicinity, or (4) lack of suitable habitat in the project study area. Other special-status plant and animal species were further eliminated when the preparers of the Biological Report concluded that species are possibly present in the project study area, *but not in the construction corridor*. As will be discussed in greater detail in Section 6.0 *Project Impacts*, impacts to the remaining four plant and eleven animal species are possible and are described in the Biological Report (Appendix D), but none of these species are listed as threatened or endangered.

Eight upland plant communities that are considered important natural biological communities occur within the study area: coast live oak woodland, riparian scrub, mixed serpentine chaparral, serpentine bunchgrass grassland, northern coastal scrub, northern coastal bluff scrub, northern foredune, and coastal salt marsh (a component of restored tidal marsh and associated wetlands) (see previous Table 4-1 and Figure 3-2). Of these, only two occur within the construction corridor: riparian scrub and northern coastal scrub (occurring on sandy soil or on sandy soil with serpentine inclusions). These consist of small areas, with a total of 0.58 hectare (1.44 ac) and 1.01 hectares (2.49 acres) respectively.

Both ACOE-delineated wetlands and wetlands meeting the definition of Cowardin wetlands occur within the study area and the construction corridor (see Table 5-3 and Figure 3-4). A total of 0.30 hectare (0.73 acre) of ACOE wetlands, and 0.49 hectares (1.21 acres) of Cowardin wetlands occur in the construction corridor.

SECTION 6.0: PROJECT IMPACTS

6.1 IMPACT ASSESSMENT METHODOLOGY

A first draft of this document was produced in 2002, addressing a different set of alternatives. Its contents were reviewed by all project team members, and responses provided by the preparers. At meetings held in 2002, 2003 and prior to the current draft in 2004, staff of the NPS and the Trust expressed varying degrees of concern about the potential effect of the project on future restoration efforts in the study area, especially Tennessee Hollow, which they felt had not been adequately addressed in the analysis at that time.

The purpose of this NES is to provide information necessary to support ongoing environmental analysis under state and federal law, i.e., CEQA and NEPA. Consistent with these laws, the NES is not intended to be a complete inventory of plants and animals, nor a catalogue of all imaginable impacts. For example in a CEQA document, analysis of environmental effects need not be exhaustive, but is judged in the light of what is reasonably feasible (CEQA Guidelines Section 15151). Moreover, as CEQA Guidelines Section 15125 states, the description of the environment is “as it exists before the commencement of the project,” not in a hypothetical future state possible only if the area is restored. However, NEPA requires addressing existing conditions as well as future conditions, which includes continuation of the current course of action, such as road maintenance.

In general, the methodology for assessing impacts to natural resources follows the Caltrans’ 2004 *Guidance for Consultants: Procedures for Completing the Natural Environmental Study and Related Biological Reports*. As directed in that report, thresholds of significance are not identified in the NES. Permanent impacts for the NES were derived from GIS and refined by using best professional judgment. The “footprint” of each alternative and its associated options were overlaid onto each habitat area to determine areas of permanent impacts. For assessment of temporary impacts to biological resources which occur within the construction corridor but outside the area of permanent effects (footprint), these areas were calculated based on the extent of the construction footprint in the Doyle Drive Corridor.

Temporary impact areas were defined based on the following parameters.

- Clearances, as measured from the maximum outside limit of the combination of permanent facility, temporary detour, and existing structures for demolition:
  - A 3.6 m clear workspace from the limit of a structure (such as a foundation, retaining wall, bridge, tunnel). At the National Cemetery, 0.9 m workspace was assumed.
  - A 1.0 m clear workspace from the limit of construction for at-grade local roads and project conforms
- Where a protected resource exists adjacent to but outside these limits, the resource will be protected with ESA fencing (orange, plastic fencing material).
- Areas without protected resources should be made available to the contractor where possible to increase the working area.
- Staging areas are primarily paved/built areas. Trees within staging areas could be protected.
- The construction footprint identified is the minimum area required, and should be expanded where possible.

6.2 IMPACT ANALYSIS

6.2.1 Alternative 1: No-Build Alternative

The No-Build Alternative represents the existing conditions as well as the future conditions if no other actions are taken beyond what is projected by the year 2020. Under the No-Build Alternative, only routine maintenance and repair would occur and no seismic, structural or traffic safety improvements would be made to Doyle Drive. The project study area would continue to support 7,07 hectares (17.46 acres) of ACOE jurisdictional waters of the U.S. and 0.97 hectares (2.40 acres) of Cowardin wetlands[21] protected by the NPS or Trust, however, these wetlands may be expanded as a result of actions taken by the NPS or Trust by the year 2020. Additionally, the Doyle Drive Project would continue to support existing vegetation and wildlife habitats. Wetlands would continue to receive water from existing sources, including roadways, storm drains, seeps and groundwater table. Shading due to the overpass structure would remain an existing condition and would maintain its current level of impact on extant vegetation and the future restored wetlands.

6.2.2 Build Alternatives

This section discusses effects on biological resources for each alternative. ESAs will be designated for all adjacent important biological resources in the project study area that will be off-limits to all construction activities. The ESAs will be designated in order to protect and preserve the adjacent important biological resources in the project study area.

6.2.2.1 Effects on Waters and Wetlands

There are two types of wetlands at the Presidio, ACOE jurisdictional waters of the U.S., and Cowardin wetlands (referred to collectively as riparian scrub which includes central coast arroyo willow scrub and associated wetlands and blackberry and associated wetlands) protected by the NPS or the Trust. Waters of the U.S. include wetlands and other waters of the U.S., e.g., creeks, streams, and navigable waterways. For this document, the term wetland is used to include both waters of the U.S. and Cowardin wetlands.

Wetlands within the construction corridor for each alternative are shown in Figure 3-4 *Water-Associated Features in the Project Study Area*. Table 6-1 *Permanent Wetland Impacts* and Table 6-2 Temporary *Wetland Impacts* present a summary of the area of permanent effects on wetlands. Because of the hydrologic connection of wetlands, the entire wetland was assumed to be affected even if only a portion of the wetland is within the impact area. All alternatives would have the same permanent impact area.

Waters and Wetlands - Permanent Impacts

The project study area supports 7.07 hectares[22] (17.46 acres) of ACOE jurisdictional waters of the U.S. and 0.97 hectares (2.40 acres) of Cowardin wetlands protected by the NPS or the Trust. The construction corridor supports 0.30 hectares (0.73 acres) of ACOE wetlands, and 0.49 hectares (1.21 acres).

[21] Because the NPS and the Trust also protect ACOE wetlands, the total number of Cowardin and ACOE wetlands protected by the NPS or the Trust is 8.03 hectares (19.86 acres) within the project study area.

[22] Area of ACOE jurisdictional waters of the U.S. includes flow found in a culvert in Tennessee Hollow in its existing state within the Doyle Drive construction corridor.

TABLE 6-1
PERMANENT WETLAND IMPACTS BY ALTERNATIVE

	ACOE Jurisdiction Waters of the United States hectares/acres	**Cowardin Wetlands excluding ACOE [1] wetlands hectares/acres**
Total Wetland Area in Doyle Drive Construction Corridor	0.30 / 0.73	0.49/1.21
Impact Areas by Alternative		
Alt 2 Detour (*Detour Option)*	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)
Alt 2 No Detour (*No Detour Option*)	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)
Alt 5 Diamd/Circle/Loop (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Loop Ramp option)*	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)
Alt 5 Diamd/Circle/Loop/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Loop Ramp option, and a Merchant Road Slip Ramp*)-	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)
Alt 5 Diamd/Circle/Hook (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Hook Ramp option)*–	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)
Alt 5 Diamd/Circle/Hook/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Hook Ramp option, and a Merchant Road Slip Ramp*)-	0.22 / 0.55 (W-2, W-3, Battery Howe Wagner)	0.07 / 0.17 (W-6a, W-6c)

NOTE: Affected wetlands are given in parentheses and the locations of these wetlands are shown in Figure 3-4.

1. All ACOE wetlands also qualify as Cowardin wetlands.

As shown in Table 6-1, the permanent effects of Alternative 2 (Alt 2 detour and Alt 2 No Detour) and all Presidio Parkway (Alt 5) options on ACOE wetlands are expected to be identical; construction would potentially adversely affect a total of 0.22 hectares (0.55 acres) of ACOE jurisdictional waters of the U.S. The impacts to Cowardin wetlands protected by the NPS or the Trust for the Alternative 2 options are 0.07 hectares (0.17 acres). The Presidio Parkway (Alt 5) alternatives all have very slightly higher impacts of 0.08 hectares (0.19 acres) to Cowardin wetlands.

Because the NPS and the Trust protect both Cowardin wetlands and the ACOE wetlands, the total number of Cowardin and ACOE wetlands protected by the NPS or the Trust that Alt 2 Detour and Alt 2 No Detour may remove or substantially disturb is 0.29 hectares (0.72 acres), while the Presidio Parkway (Alt 5) options would all have slightly larger impacts at 0.30 hectares (0.74 acres).

Direct impacts to Cowardin wetlands protected by the NPS or Trust and ACOE jurisdictional waters of the U.S. due to project construction activities of the build alternatives as discussed above would conflict with the NPS' and Trust's natural resource management policies and the management actions stated in the VMP. Direct impacts on the identified Cowardin wetlands and ACOE jurisdictional waters of the U.S. would be localized.

TABLE 6-2
TEMPORARY WETLAND IMPACTS BY ALTERNATIVE

Alternative	ACOE Jurisdiction Waters of the United States hectares/acres	Cowardin Wetlands excluding ACOE wetlands hectares/acres
Total Wetland Area in Doyle Drive Construction Corridor	0.30 / 0.73	0.49 / 1.21
Impact Areas by Alternative		
Alt 2 Detour (*Detour Option)*	0.06 / 0.15	0.01 / 0.02
Alt 2 No Detour (*No Detour Option*)	0.06 / 0.15	0.01 / 0.02
Alt 5 Diamd/Circle/Loop (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Loop Ramp option)*	0.06 / 0.15	0.06 / 0.16
Alt 5 Diamd/Circle/Loop/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Loop Ramp option, and a Merchant Road Slip Ramp*)-	0.06 / 0.15	0.06 / 0.16
Alt 5 Diamd/Circle/Hook (*Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Hook Ramp option)–*	0.06 / 0.15	0.06 / 0.16
Alt 5 Diamd/Circle/Hook/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Hook Ramp option, and a Merchant Road Slip Ramp*)-	0.06 / 0.15	0.06 / 0.16

Note: All ACOE wetlands also qualify as Cowardin wetlands.

Waters and Wetlands - Temporary Impacts

As shown in Table 6-2, Alt 2 Detour and Alt 2 No Detour, and all Presidio Parkway (Alt 5) options, could temporarily affect the same amount of ACOE jurisdictional area for a total of 0.06 hectares (0.15 acres), at Tennessee Hollow (see *Effects on the Existing Tennessee Hollow* below). The Alt 2 Detour and No Detour alternatives could also have a minor temporary effect on Cowardin wetlands protected by the NPS or the Trust of 0.01 hectares (0.02 acres) to wetland W-6b. All options of Alt 5 could have a slightly greater potential impact on Cowardin wetlands of 0.06 hectares (0.16 acres) to wetland W-5. Because the NPS and the Trust also protect ACOE wetlands, the total number of Cowardin and ACOE wetlands protected by the NPS or the Trust that the Alternative 2 Replace and Widen Alternative may remove or substantially disturb is 0.07 hectares (0.17 acres). The Alt 5 options could remove or substantially disturb 0.12 hectares (0.31 acres). ESAs will be designated, so that no temporary impacts would occur to riparian scrub (central coast arroyo

willow and blackberry and wetland) and other ACOE wetlands located within or adjacent to the construction corridor, but outside the area of temporary effect. These communities are generally more susceptible to disturbance and need to be protected.

Indirect Tunneling Effects on Wetlands

As a result of implementing the Presidio Parkway Alternative, Baseline (2004) reported that tunneling upslope of the bluffs north of the cemetery "could alter or disrupt groundwater flows, potentially impacting existing plants that rely on emergent groundwater, [and] it should be noted that construction of a tunnel may increase flow to the seeps on the bluffs by increasing deep infiltration in the location of the existing Doyle Drive roadway."[23] However, special consideration has been given to collecting groundwater flow around the tunnel and directing the flows to the existing wetland areas. Figure 5 of the Hydrology and Water Resources Technical report illustrates groundwater flow in bedrock fractures. The intent is to accurately map the existing wetlands and then to capture and direct flows to the wetlands to sustain their viability. Adjustment of flow following construction can be achieved by incorporating equipment to increase or decrease flows. The following narrative describes potential effects to the wetlands commensurate to available water.

The soil conditions, and the nature, timing and duration of soil water moisture (i.e., submersion, flooding, or soil saturation) play an important role in the physiological impact on riparian species (USFWS 1977, U.S. Department of Agriculture [USDA], World Wide Web Accessed October 10, 2001). The physiological impact of changes in water moisture on riparian species depends on the species' ability to maintain its present root system in an active or dormant state and to produce adventitious roots[24] that may form from the root collar or on the trunk near the water surface. Species unable to either maintain normal roots or grow new ones can quickly die. In the worst case scenario, the longer riparian species are exposed to saturated soil conditions, the greater the potential for injury. While most riparian species can tolerate short periods of saturated soil conditions during the growing season, most can withstand only 1 to 4 months of water continuously over the soil surface (USDA, World Wide Web Accessed October 10, 2001).

Willow species are very tolerant to changes in soil water moisture if they are healthy (USFWS 1977, USFWS 1978). Depending on the current health of willows in Cowardin wetlands north of the cemetery (i.e., W-4, W-6d, W-7), these riparian species may not be substantially affected by a potential increase of water seepage from fracture flow, if the flows do not lead to saturated soil conditions for longer than four months. However, if increased flows to these areas are recurrent and keep the soil saturated or prevent recovery from previous disturbance, injuries to riparian species can accumulate and damage, disease (such as root-rot) or even death, may occur. Conversely, soil water deficits can affect the normal physiology and growth of plants during the growing season. Some immediate visible effects of soil water deficits may include wilting, scorch and some defoliation. Long-term symptoms may include dieback of branches and death of the plant as the plant's capacity to absorb water is damaged (Kujawski, 2000). Substantial uncertainty thus exists as to the potential effects of the Doyle Drive Project on subsurface water flows, and in turn on the health of these apparently groundwater supported wetlands.

Potential indirect impacts to the identified Cowardin wetlands protected by the NPS or the Trust and ACOE jurisdictional waters of the U.S. due to tunneling as a result of implementing the Presidio Parkway Alternative would conflict with the NPS' and Trust's natural resource management policies and the objectives of the management actions stated in the VMP. Potential indirect impacts on Cowardin wetlands would be localized under the Presidio Parkway Alternative (but not necessarily subject to the provisions of the Clean Water Act) if increased flows lead to saturated soil conditions for longer than about four months, or decreased flows lead to soil water deficits for longer than about 2 months during the growing season in the bluff areas supporting

[23] It should be noted, as discussed above, that no surface water has been observed at these locations, which appear to be groundwater-fed, and therefore the term "seep" as used in that report is not entirely correct when applied to these groundwater-fed areas.

[24] An adventitious root is any root that is not a lateral root or a radicle (the root portion of an embryo in a seed).

native riparian species. A post-construction monitoring program will be established to monitor potential changes to flows supporting these native riparian species, and mitigation measures will be implemented, as appropriate as agreed upon by all involved agencies.

Effects on the Existing Tennessee Hollow

Construction activities of the Doyle Drive Project alternatives would have no biological impacts on Tennessee Hollow in its existing condition, because although the drainage is included in the ACOE waters in the table, the drainage is contained in storm drain pipes within the construction corridor, and would be allowed to persist. However, the existing Tennessee Hollow may be temporarily affected (0.06 hectares, 0.15 acres) if the flow is redirected, the piping is modified or if discharge enters the stream. A permit from the ACOE would be required for these effects on Tennessee Hollow (Alvarez, V., Caltrans Liaison, personal communication October 1, 2001).

6.2.2.2 Effects on Vegetation

Permanent, direct construction-related effects on vegetation under all build alternatives would involve removal of or damage to three (3) different vegetation communities. The vegetation communities are non-native introduced forest and ornamental wildlife habitat, and northern coastal scrub on sandy soils and northern coastal scrub on sandy soils with serpentinite inclusions. All of the Presidio Parkway (Alt 5) alternatives also affect small amounts of non-native grassland. Table 6-3 displays permanent impacts to each vegetation community by alternative.

Common Vegetation

Temporary and permanent effects on common vegetation, especially non-native vegetation, due to construction-related effects under all build alternatives (including Alt 2 Detour and Alt 2 No Detour, and the Alt 5 options) would be minor (see Table 6-3).

Common Vegetation- Permanent Impacts

If not controlled, demolition, excavation and grading activities during the rainy season under all build alternatives could potentially cause sedimentation problems and result in effects on adjacent vegetation. However, incorporation of the SWPPP measures and Best Management Practices included as part of the proposed project, these effects on common vegetation would be minor. Refer to the 2004 Revised Hydrology and Water Resources Report for a discussion of implementing the SWPPP.

Under the Alt 2 Detour and No Detour Alternatives, there would be no permanent impacts to non-native grasslands. However, permanent impacts to non-native introduced forest and ornamental wildlife habitat under the Alt 2 Detour would result in a loss of 2.37 hectares (5.86 acres) of non-native vegetation. The Alt 2 No Detour would result in the loss of 2.57 hectares (6.35 acres) of non-native introduced forest and ornamental wildlife Habitat.

As shown in Table 6-3, the Alt 5 Diamnd/Circle/Loop alternative could result in permanent impacts to 4.56 hectares (11.27 acres) of non-native introduced forest and ornamental wildlife habitat and grasslands. The Alt 5 Diamnd/Circle/Hook option could result in the potential loss of a similar amount of non-native vegetation, at 4.61 hectares (11.39 acres). Adding in the Merchant option, resulting in the Alt 5 Diamnd/Circle/Loop/Merchant and the Alt 5 Diamnd/Circle/Hook/Merchant options, would increase impacts for each of these Presidio Parkway alternatives by an additional 0.47 hectares (1.15 acres) of non-native introduced forest and ornamental wildlife habitat.

Permanent effects on common non-native vegetation are considered minor. The eastern portion of all build alternatives on Richardson Avenue between Francisco and Lyon streets supports street trees maintained by San Francisco Department of Public Works. Although the build alternatives include a haul route along Richardson Avenue, effects on these street trees would be avoided since they occur away from the road.

TABLE 6-3
DIRECT PERMANENT IMPACTS TO PLANT COMMUNITIES OTHER THAN WETLANDS

	Non-native Introduced Forest and Ornamental Wildlife Habitat hectares / acres	**Northern Coastal Scrub on Sandy Soil** hectares / acres	**Northern Coastal Scrub with Serpentine Inclusions** hectares / acres	**Non-native Grassland** hectares / acres
Total Number of Hectares (acres) in Doyle Drive Construction Corridor	9.95 / 24.59	0.30 / 0.73	0.71 / 1.76	0.05 / 0.13
Alternative	**Impact Area**			
Alt 2 Detour	2.37 / 5.86	0.16 / 0.40	0.20 / 0.50	None
Alt 2 No Detour	2.57 / 6.35	0.17 / 0.43	0.20 / 0.50	None
Alt 5 Diamd/Circle/Loop *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Loop Ramp option)*	4.54 / 11.23	0.20 / 0.50	0.27 / 0.67	0.02 / 0.04
Alt 5 Diamd/Circle/Loop/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Loop Ramp option, and a Merchant Road Slip Ramp)-*	5.01 / 12.38	0.20 / 0.50	0.37 / 0.91	0.02 / 0.04
Alt 5 Diamd/Circle/Hook *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Hook Ramp option)–*	4.61 / 11.39	0.20 / 0.50	0.20 / 0.49	0.01 / 0.03
Alt 5 Diamd/Circle/Hook/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Hook Ramp option, and a Merchant Road Slip Ramp)-*	5.07 / 12.54	0.20 / 0.50	0.30 / 0.73	0.01 / 0.03
See Appendix B for details				

TABLE 6-4
DIRECT TEMPORARY IMPACTS TO PLANT COMMUNITIES OTHER THAN WETLANDS

	Non-native Introduced Forest and Ornamental Wildlife Habitat hectares / acres	**Northern Coastal Scrub on Sandy Soil** hectares / acres	**Northern Coastal Scrub with Serpentine Inclusions** hectares / acres	**Non-native Grassland** hectares / acres
Number of Hectares (acres) in Doyle Drive Construction Corridor	9.95 / 24.59	0.30 / 0.73	0.71 / 1.76	0.05 / 0.13
Alternative	**Impact Area**			
Alt 2 Detour	0.67 / 1.65	0.04 / 0.11	0.06 / 0.16	None
Alt 2 No Detour	0.59 / 1.45	0.02 / 0.06	0.06 / 0.16	None
Alt 5 Diamd/Circle/Loop *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Loop Ramp option)*	1.18 / 2.91	0.01 / 0.02	0.30 / 0.73	None
Alt 5 Diamd/Circle/Loop/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Loop Ramp option, and a Merchant Road Slip Ramp)-*	1.18 / 2.91	0.01 / 0.02	0.30 / 0.73	None
Alt 5 Diamd/Circle/Hook *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options and the Hook Ramp option)–*	1.22 / 3.02	0.01 / 0.02	0.35 / 0.87	None
Alt 5 Diamd/Circle/Hook/Merchant *(Alternative 5: Presidio Parkway Alternative with either Diamond or Circle Drive options, the Hook Ramp option, and a Merchant Road Slip Ramp)-*	1.22 / 3.02	0.01 / 0.02	0.35 / 0.87	None
See Appendix B for details				

Common Vegetation- Temporary Impacts

All of the build alternatives would require grading and removing a similar amount of vegetation. Temporary, direct, construction-related effects under all build alternatives would include trampling in the construction corridor areas resulting in minor effects on vegetation. Trampling effects could result in erosion, community fragmentation, soil and root compaction, and plant mortality at localized areas. Trampling effects could create more favorable conditions for introducing or spreading invasive non-native plant species, such as bull thistle (*Cirsium vulgare*) and non-native annual species. Invasive plant species could form monocultures and displace native plant species, and as a result, adversely modify species composition and diversity. Additionally, during and after construction and demolition activities, the build alternatives would result in soil disturbance that could create favorable conditions for introducing or spreading invasive non-native plant species. As stated previously, non-native vegetation is currently located throughout the construction corridor. These temporary impacts will be alleviated by implementing a revegetation plan in areas disturbed during construction, thereby minimizing erosion and establishment of invasive non-native species.

Demolition, excavation and grading activities during the dry season under all build alternatives would result in dust, which if left uncontrolled, could temporarily cover the leaves of plants in a localized area and reduce light and gas exchange. As identified in the 2004 Air Quality Report, “dust emissions from construction would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather.” Effects on common vegetation due to dust emissions during the dry season would be locally adverse, but minor. The Doyle Drive Project proponent would implement the Bay Area Air Quality Management District’s basic dust control procedures. Refer to the 2004 Air Quality report and the Caltrans Special Provisions for a description of measures that would avoid or minimize dust in the project study area, therefore minimizing impacts; with implementation of these measures and those identified in Section 2.4.3.4 *Dust Control* as part of the project, no adverse effects on plants would be expected from dust. Important Native Plant Communities

Important Native Plant Communities - Permanent Impacts

Construction of all build alternatives would result in localized permanent effects on northern coastal scrub on sandy soils and northern coastal scrub on sandy soils with serpentine inclusions. Effects on riparian plant communities, which are also considered important plant communities, are discussed above in Section 6.2.2.1 *Effects on Wetlands*.

The NPS and the Trust consider all native plant communities that are biologically intact and diverse as important (sensitive) natural communities (NPS, 1999a). Resource managers of the GGNRA have identified plant communities on serpentine substrates, i.e., mixed serpentine chaparral, serpentine bunchgrass, and northern coastal bluff scrub, or those communities that are biologically intact and diverse as Special Ecological Areas (SEAs) (NPS, 1999a; NPS, 1999c). There are no designated SEAs in the construction corridor. Plant communities occurring in the Doyle Drive construction corridor include northern coastal scrub on sandy soils, northern coastal scrub on sandy soils with serpentine inclusions, and non-native vegetation. There are other vegetation types with serpentine soil inclusions present in the construction corridor near the Park Presidio Interchange; however, these areas support only non-native plant communities and are accounted for within the non-native introduced forest and ornamental wildlife habitat.

Northern coastal scrub (primarily understory scrub) on sandy soil with serpentine inclusions occurs southeast as well as northwest of the Park Presidio Interchange. These communities are usually considered important plant communities since few patches remain within the Presidio or the City of San Francisco. Although northern coastal scrub is a common native plant community, the community of northern coastal scrub located beneath the Doyle Drive structure is disturbed, fragmented, has a low diversity of plant species, and is subject to eroding soils as evident of the existing erosion control mats. Additionally, understory northern coastal scrub is highly disturbed based on the presence of invasive plant species, including Himalayan blackberry, cape ivy, English ivy, and cotoneaster. Northern coastal scrub also occurs within the understory of non-native introduced tree stands (excluding the understory of northern coastal scrub located north of the Presidio Interchange that is discussed above) and would be directly affected by all build alternatives. In

accordance with the NPS and the Trust definition of sensitive natural communities, this community of northern coastal scrub would not be considered a highly sensitive plant community. Direct impacts to this type of northern coastal scrub on non-serpentine soil would be considered minor.

All of the build alternatives would result in permanent effects on important plant communities. The build alternatives would remove, damage or alter northern coastal scrub (on sandy soil and on sandy soil with serpentine inclusions). A total 0.71 hectares (1.76 acres) of northern coastal scrub on sandy soil with serpentine inclusions and 0.30 hectares (0.73 acres) of northern coastal scrub on sandy soil are within the Doyle Drive construction corridor (Table 6-3).

Of these amounts, project alternatives would disturb a larger proportion of the coastal scrub on sandy soils than of the scrub on sandy soils with serpentine inclusions. For northern coastal scrub on sandy soils, the impacts are similar between all alternatives, with the Alt 2 Detour and No Detour options disturbing 0.16 hectares (0.40 acres) and 0.17 hectares (0.43 acres), respectively. All Presidio Parkway (Alt 5) alternatives would disturb 0.20 hectares (0.50 acres) of scrub on sandy soils.

For the northern coastal scrub on sandy soil with serpentinite inclusions, the Alternative 2 options (Alt 2 Detour and No Detour) would both have the same area of disturbance at 0.20 hectares (0.50 acres). The Presidio Parkway (Alt 5) alternatives would disturb between 0.20 hectares (0.49 acres) and 0.37 hectares (0.91 acres) of northern coastal scrub on serpentine inclusions, depending on the Alt 5 alternative, as shown in Table 6-3. Inclusion of the Merchant Road slip ramp increases the disturbance area by 0.10 hectares (0.44 acres).

The eastern portion of the build alternatives does not support important plant communities. Much of the eastern area is developed and paved. There would be no effects on important plant communities in this area due to the build alternatives.

Permanent impacts on important plant communities due to implementing the build alternatives would conflict with the NPS' and the Trust's natural resource management policies and the objectives of the management actions stated in the VMP, and would be considered adverse as identified above.

Implementation of the Presidio Parkway (Alt 5) Alternatives would permit planting above the Main Post and Battery tunnels and allow revegetation with native plants. Implementation of the tunnels under the Presidio Parkway Alternative could constrain the rooting depth of certain plants and volume of soil due to the proposed elevation of the tunnels. The Main Post tunnels would constrain the volume of soil and rooting depths between 1.0 and 2.0 meters along a 2 percent west to east gradient. The Battery tunnels would allow up to 5.0 meters of soil depth. However, given the composition of shrubby coastal and scrub species, a 1 to 1.5 meter depth is minimally sufficient to provide a substrate volume for rooting.

Root architecture is primarily a function of soil moisture conditions and available space. Woody plants typically require soil moisture depth of less than three meters deep below the surface grade (Shafroth et al., 2000). The majority of roots of herbaceous annual plants are usually within the first one meter of soil, and the roots of perennial species are typically within 1.5 meters below the surface grade (Schenk and Jackson, 2002). Portions of the Main Post tunnels would restrict the types of plants to herbaceous species such as California poppy (*Eschscholzia californica*), and other ground cover native plants. As the volume of soil increases above the tunnels, perennial herbaceous species, such as California brome (*Bromus carinatus*) and purple needlegrass could establish. The eastern ends of the tunnels would allow the greatest rooting depth below the surface grade and a variety of annual and perennial species could establish in this area. Additionally, woody shrubs, such as coyote brush and coffeeberry could establish at the eastern ends.

Important Native Plant Communities - Temporary Impacts

The build alternatives would result in direct temporary impacts on important upland plant communities as shown in Table 6-4. For northern coastal scrub on sandy soils, these effects are minor, varying from 0.01 hectares (0.02 acres) for the Presidio Parkway (Alt 5) alternatives to 0.04 hectares (0.11 acres) for the Alt 2 Detour option. A slightly larger area of northern costal scrub on sandy soil with serpentinite inclusions would

be disturbed by the Alt 2 Detour and Alt 2 No Detour options, at 0.06 hectares (0.16 acres). With the Presidio Parkway alternatives, this amount increases to 0.30 hectares (0.73 acres) and 0.35 hectares (0.67 acres) for the Alt 5 Diamnd/Circle/Loop and Alt 5 Diamnd/Circle Hook alternatives, respectively. The same amount is disturbed whether or not the Merchant ramp is included. These communities would be revegetated in place to the extent feasible or restored elsewhere in suitable habitat conditions within the construction corridor (see Section 8.3 *Special-Status Plant Habitat Mitigation and Revegetation of Temporarily Disturbed Upland Vegetation*).

The build alternatives could result in temporary indirect effects on important plant communities. Temporary, indirect effects associated with the build alternatives would include soil runoff during the rainy season, dust (particularly during the dry season) and trampling. Important plant communities north of Lincoln Boulevard may be indirectly affected by soil runoff in the rainy season during excavation and grading activities for the high viaduct at the Presidio Interchange under all build alternatives, as well as construction of the Merchant Road option under the Presidio Parkway Alternative. Compliance with the Best Management Practices identified in the SWPPP, e.g., soil stabilization controls and silt fencing, would avoid these indirect effects on plant species of concern. Refer to the 2004 Revised Hydrology and Water Resources Report for a discussion of implementing the SWPPP.

Demolition, excavation and grading activities during the dry season under all build alternatives would result in dust, which could temporarily cover the leaves of plants within important plant communities north of the construction corridor within the project study area, including coastal salt marsh, serpentine bunchgrass, mixed serpentine chaparral, central coast arroyo willow scrub, northern coastal scrub (on sandy soil and sandy soil with serpentine inclusions), and northern foredune. The effects of dust would reduce light and gas exchange. Effects on important plant communities due to dust emissions during the dry season would be minor because BAAQMD's basic dust control procedures and Caltrans Special Provisions will be implemented as part of the proposed Doyle Drive Project. Refer to the 2004 Air Quality report and the Caltrans Special Provisions for a description of measures that would avoid or minimize dust in the project study area.

Plant Species of Concern

In the short-term, construction of all build alternatives could indirectly affect federal special concern plant species in the project study area near the construction corridor due to soil runoff during the wet season. Additionally, plant species that are of federal special concern are on the coastal bluffs adjacent to the Doyle Drive construction corridor, including coast rock cress, Franciscan thistle, San Francisco wallflower and San Francisco gumplant. These species are located on the downward north-facing slope approximately 91 meters (300 feet) north of the area of construction. San Francisco owl's clover is immediately south of the construction corridor in the Fort Scott area. San Francisco gumplant and skunkweed also both occur within the construction corridor.

These plants and their habitat could potentially be impacted by soil runoff in the rainy season during excavation and grading activities for the high viaduct at the Presidio Interchange build alternatives, as well as construction of the Merchant Road option under the Presidio Parkway Alternative; however, compliance with the SWPPP, e.g., soil stabilization controls and silt fencing, would avoid these indirect effects on plant species of concern. Refer to the 2004 Revised Hydrology and Water Resources Report for a discussion of implementing the SWPPP. These plants would also be fenced-off with orange fencing to designate them as an ESA in addition to the SWPPP BMPs.

Demolition, excavation and grading activities during the dry season under the build alternatives would result in dust, which could temporarily cover the leaves of plant species of concern within the project study, particularly plants at Crissy Marsh such as California seablite, and reduce light and gas exchange; however effects on plant species of concern due to dust emissions during the dry season would be minor because BAAQMD's basic dust control procedures and Caltrans Special Provisions identified in Section 2.4.3.4 *Dust Control* will be implemented as part of the proposed Doyle Drive Project. Refer to the 2004 Air Quality report and the Caltrans' Special Provisions for a description of measures that would avoid or minimize dust in the

project study area. With BAAQMD's dust control measures and ESA measures in place prior to and during construction, impacts to special-status plant species would be minimal.

Within the construction corridor near Battery Blaney, all of the build alternatives could result in direct removal or disturbance to skunkweed, a federal species of local concern, and San Francisco gumplant, a federal species of concern, if these species cannot be avoided. Skunkweed is on the road to Battery Blaney within the construction corridor. Effects on skunkweed would be limited to construction activities, such as excavation and grading for lane widening, retrofitting and activities for movement and/or installation of piers as part of the Replace and Widen Alternative (including No Detour and Detour options), and to trenching and excavation activities for the battery tunnels under the Presidio Parkway Alternatives (including Diamond and Circle Drive options). San Francisco gumplant is north of the Merchant Road on-ramp, about 50 meters south of Building 1258 within the construction corridor, and two individuals have been found within the construction corridor at Building 1258 (Barstow, NPS, personal communication, 2004). The eastern portion of all build alternatives does not support special-status plant species. Much of the eastern area is developed and paved, and provides no suitable habitat for special-status plant species. Therefore, there would be no effects on special-status species in this area due to the build alternatives, including implementation of the Presidio Parkway Diamond and Circle Drive options. With ESA measures in place prior to and during construction and implementation of measures identified in Section 8.3 *Special-Status Plant Habitat Mitigation and Revegetation of Temporarily Disturbed Upland Vegetation*, impacts to special-status plant species would be minimal.

6.2.2.3 Effects on Wildlife

Common Wildlife Species

Wildlife species, excepting special-status species, within the project study area are referred to as "common" because they are considered habitat generalists (not limited to a specific habitat type or area), they usually occur in large population numbers, and have high dispersal rates. During the construction phase, the Doyle Drive Project could result in disturbance to, or direct mortality of, common wildlife species. Direct impacts to wildlife species include both mortality of resident species and habitat loss and degradation. Mortality could include road kills and destruction of burrows and nests during the construction phase of the project. Temporary construction-related disturbances may include displacement of animals due to construction noise and loss of habitat. Such habitat losses may be permanent for certain burrowing mammals, whose populations could be eliminated due to habitat modification. Impacts on common wildlife species are considered minor.

Special-status Invertebrate Species

Dust generated by construction activities could indirectly affect plant vigor and survival, and cause plants to become unsuitable for potential perching, metamorphosis of nymphs (immature stage), or laying of eggs, or unpalatable for foraging invertebrates. Impacts to tree lupine moth habitat would be limited to clearing of the larval host plant, yellow bush lupine for construction of all build alternatives. Effects on special-status invertebrate species due to dust emissions during the dry season would be minor because BAAQMD's basic dust control procedures and Caltrans Special Provisions will be implemented as part of the proposed Doyle Drive Project. Refer to the 2004 Air Quality report and the Caltrans Special Provisions identified in Section *2.4.3.4 Dust Control* for a description of measures that would avoid or minimize dust in the project study area. Impacts to San Francisco forktail damselfly could occur if wetland emergent vegetation, such as at W-8 (see Figure 3-4) were removed within the construction corridor, potentially resulting in mortality of eggs and larvae. However, none of the build alternatives would directly affect W-8. The effect is minor for all build alternatives.

Avian Species – Temporary Loss of Nests and Habitat

Project construction activities of all build alternatives could result in the mortality, or disturbance resulting in reduced productivity, of potentially nesting raptors and other avian species, including yellow warbler,

protected under California Fish and Game Codes 3503 and 3503.5 and the Migratory Bird Treaty Act, within, and adjacent to, the Doyle Drive construction corridor due to impacts on suitable roosting and nesting habitat during the breeding season. Bird nest surveys will be conducted immediately prior to construction to determine the actual number of bird nests that could be affected by the proposed project and formulate appropriate mitigation measures; mitigation measures are further described in detail in Section 8.4 *Special-status Bird Mitigation*.

Project construction activities would include impacts to the non-native introduced tree forest and the arroyo willow wetland areas north of the cemetery due to:

- grading and tree removal for lane widening (Alt 2 Detour and Alt 2 No Detour);
- tunnel cutting and trenching (Alt 5, Diamnd/Circle/Loop and Alt 5 Diamnd/Circle/Hook);
- grading and movement and/or installation of piers at Park Presidio Interchange and Park Presidio Boulevard (all build alternatives); and
- staging areas and haul roads (all build alternatives).[25]

For all build alternatives, the loss of birds, their young, or active nests, would not be significant with mitigation measures planned as part of the proposed Doyle Drive Project.

Avian Species – Temporary Disturbance due to Construction Noise and Vibration

Many animals habituate to levels of regular disturbance (noise and human and mechanical activity). Raptors choosing to nest or forage near ongoing disturbance perceived as non-threatening are, for example, more prepared for human intrusion than those inhabiting more remote areas (White and Thurow [1985]; Bowles et al. [1991]). This suggests that there will be negligible indirect effects from construction activity within the corridor, since there is a high ambient (pre-existing) level of noise, motion of vehicles, and human presence. Construction within the envelope of the corridor would be, to the animals as receptors, indistinguishable from what occurs at present (see for example Bowles et al., 1991 and further discussion in Appendix B). This conclusion is not intended to suggest that the pattern or intensity of construction activity is exactly analogous to ambient disturbance, but that the effect of such disturbance would not be measurable. Individual situations may require special attention, and therefore pre-construction and “during construction” nest surveys are proposed in Section 8.4.4.3. On a case-by-case basis, avoidance procedures will be proposed and coordinated with the Doyle Drive project lead agency. Therefore the effect is minor for all build alternatives.

This NES makes an exception for the impact of conventional pile driving, which can cause concussive noises in excess of 100 dBA.[26] In general, animals exposed to such sounds at first instance can be expected to display a startle reaction that might cause, for example, a bird to briefly abandon a nest, with some increase in the exposure of the eggs to heating, cooling, or predation. These reactions probably fall within the range of disturbances occasionally encountered (cars backfiring, sonic boom, humans approaching the nest site, etc.), and the impact on birds due to pile driving is considered adverse for all build alternatives, and potentially adverse (see also Appendix B, Doyle Drive Noise Effects on Wildlife Technical Memorandum).

Vibration within a 200-foot radial buffer area surrounding historic buildings (which encompasses much of the study area for biology) is expected to be less than or equal to 0.08 in/sec. However, based on past studies, there is little available information in the peer-reviewed literature on the effects of vibration on wildlife distinct from the effects of sound. Conjecture within an environmental analysis on a subject where there is little

[25] Staging areas and haul roads would be primarily placed on existing paved areas.

[26] Fish have been considered substantially at risk when pile driving exceeds 180 dBA (Rutten, 2003).

scientific consensus is merely speculative, a practice discouraged by CEQA Guidelines[27], which were used as a general guidance in NES development (see also Appendix B, Doyle Drive Vibration Effects on Wildlife Technical Memorandum).

Permanent Loss of Wildlife Habitat

Long-term impacts of all build alternatives are a permanent loss of minor amounts of wildlife habitat, which would be minor.

The permanent Doyle Drive Project footprint of the build alternatives would include impacts to wildlife habitat due to:

- lane widening (both build alternatives); and
- installation of an expanded Park Presidio Interchange and Park Presidio Boulevard (Presidio Parkway Alternative Diamond and Circle Drive).

Permanent, direct construction-related effects on vegetation under all build alternatives would involve removal of or damage to non-native vegetation. Permanent impacts vary for each alternative ranging from 4.54 hectares (11.23 acres) to 5.07 hectares (12.54 acres) of non-native introduced forest and ornamental wildlife habitat within the Doyle Drive construction corridor.

For northern coastal scrub on sandy soil with serpentinite inclusions, the Alt 2 Detour and Alt 2 No Detour options would result in the loss of approximately 0.20 hectares (0.50 acres). The Alt 5 Diamnd/Circle/Loop/Merchant Alternative would result in the loss of 0.37 hectares (0.91 acres) (Table 6-3), while the Alt 5 Diamnd/Circle/Hook/Merchant would result in 0.30 hectares (0.73 acres). Each of the Alt 5 options would result in the loss of a small amount of non-native grassland: 0.02 hectares (0.04 acres) for the Alt 5 Diamnd/Circle/Loop and Alt 5 Diamnd/Circle/Loop/Merchant options, and slightly less at 0.01 hectares (0.03 acres) for the Alt 5 Diamnd/Circle/Hook and Alt 5 Diamnd/Circle/Hook/Merchant alternatives. The Alt 5 options would result in varying degrees of permanent impacts to non-native introduced forest and ornamental wildlife habitat, varying from 4.54 to 5.07 hectares (11.22 to 12.53 acres), with the hook option having a slightly higher impact. These introduced habitats are capable of supporting nesting birds and other wildlife. Nesting substrate in the Doyle Drive Project study area and its vicinity for raptors and other birds, and other habitat types such as woodlands and scrubs, are sufficient in quality and extent relative to project-related habitat loss to offset any long-term effects.[28] The abundance and diversity of wildlife on the Presidio would not be adversely reduced over the long-term, and therefore the impact is minor for all build alternatives.

Wildlife Corridor

Project implementation would temporarily disrupt a segment of the primary connecting link of an urban wildlife movement corridor due to construction activities such as grading and trenching for all build alternatives. Doyle Drive is a primary link in the northern portion of the Presidio and connects to the Pacific Ocean, coastal bluffs in the west and the non-native introduced forest in the east. Smaller animals such as small mammals, reptiles, invertebrates and birds use this habitat and corridor primarily for foraging and movement purposes (primarily birds). Impacts of construction activities on wildlife due to the temporary disruption of the corridor may restrict wildlife movement; however the wildlife movement corridor already confronts the barrier of Doyle Drive as well as considerable habitat fragmentation and degradation. The area

[27] CEQA Guidelines 15145. Speculation: “If, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact.”

[28] For example, considering arroyo willow scrub Presidio-wide, its loss within the Doyle Drive construction corridor would constitute a reduction of about 4% of the total. Moreover, the impact would likely be mitigated (by willow planting elsewhere) as part of wetland restoration.

south of the project study area would continue to be available for wildlife movement. Thus, this impact is considered adverse, but minor, localized in the Presidio.

SECTION 7.0: CUMULATIVE IMPACTS

Cumulative impacts address the impacts of a project in the context of other past, present, or reasonably foreseeable future activities. Specifically, cumulative impacts on biological resources are based on analysis of approved projects at the Presidio in combination with potential effects of project alternatives. This analysis of cumulative impacts also includes proposed projects. Projects that would have a net local, long-term, beneficial cumulative effect on biological resources include those that would protect, enhance or expand biological resources in the Presidio. These projects include the Crissy Field Restoration Project, the Crissy Marsh Expansion Feasibility Study, PTMP, and the Tennessee Hollow Riparian Corridor Enhancement Project. For example, implementation of the Crissy Field Restoration Project has transformed approximately 16 hectares (40 acres) of asphalt surrounded by chain link fence to a restored dune and tidal marsh system, and increased habitat as well as diversity of plant and wildlife species. If the Crissy Field Marsh feasibility study identifies priority areas within the Trust's jurisdiction critical to ensuring the health of the marsh, the Trust would ensure that the Crissy Field planning efforts are completed and implemented in a timely manner. These efforts would result in increased species richness and habitat for special status species, and a net increase in habitat for native communities and wetland systems. The Tennessee Hollow Riparian Corridor Enhancement Project would connect to the expanded Crissy Field tidal marsh and would restore Tennessee Hollow, including its three main tributaries, as well as native riparian habitat that would be suitable for nesting avian species.

The Presidio Environmental Remediation Actions would result in short-term adverse effects on special-status species. However, the beneficial effects in the long-term due to increased habitat for special-status species would outweigh adverse effects of these actions. Effects on federally listed plant species are subject to Section 7 consultation under the Federal Endangered Special Act, which would require mitigation to avoid or minimize adverse effects. Implementation of USFWS Recovery Plans would have short-term construction-related impacts on special-status species, including San Francisco lessingia, but the long-term benefits to listed plant species of those plans would outweigh any adverse short-term effects.

There are no known cumulative projects in the Presidio that would have adverse effects on biological resources after implementation of mitigation measures.

The No-Build Alternative coupled with the cumulative projects at the Presidio would result in long-term beneficial effects to biological resources because there are no adverse activities associated with the No-Build Alternative, and there are no cumulative project activities that would lack mitigation. Additionally, the benefits of restoration would outweigh the short-term adverse effects of cumulative projects.

The Alt 2 Detour and Alt 2 No Detour options coupled with the cumulative projects at the Presidio would result in temporary and long-term effects on biological resources, primarily on important plant communities, ACOE jurisdictional waters of the U.S., Cowardin wetlands under protection of the NPS or the Trust, and nesting bird species. These effects coupled with other Presidio projects would contribute cumulatively to non-listed special-status plant and animal species, native plant community and jurisdictional wetland impacts at the Presidio. The cumulative benefits of restoration projects in historically disturbed and existing disturbed areas would outweigh the adverse effects of project construction activities under the Alt 2 Detour and No Detour options on biological resources.

The Alt 5 alternatives, from a cumulative impacts perspective, share some of these impacts and include underground (tunnel) segments with possibly indirect effects on hydrology. The long-term benefits of cumulative restoration of historically disturbed and existing disturbed areas proposed under the Presidio plans and projects would reduce the effects on biological resources. For both build alternatives, implementation of mitigation would reduce adverse effects of the Project and would thus reduce cumulative impacts on non-listed special-status plant and animal species, native plant communities, and jurisdictional wetlands.

SECTION 8.0 MITIGATION MEASURES

8.1 MITIGATION MEASURES AND CONSTRUCTION MONITORING FOR BIOLOGICAL RESOURCES

8.1.1 Introduction

The overall mitigation goal is to avoid or minimize temporary construction-related impacts and long-term project impacts. In regards to temporary construction-related impacts, please refer to Section 2.0 *Alternatives Description* for a description of Caltrans standard construction dust control, erosion control, and ESA avoidance mitigation measures that are incorporated as part of the proposed Doyle Drive Project. This section provides mitigation measures for the long-term impacts of the proposed Doyle Drive Project.

8.1.2 Construction Monitoring

The Doyle Drive Monitoring Program for Biological Resources (Monitoring Program) described in this section is designed to ensure that measures presented in this document are effectively administered, and that the implementation of these measures results in avoidance and minimization of effects on sensitive resources. It also provides that in cases where the above standards are not met, the appropriate parties are notified to take corrective action and implement adaptive management.

The Monitoring Program attempts to establish clear standards for compliance, inspection and monitoring on the Doyle Drive Project. In addition to the description of the role of Biological Monitor below, key positions for environmental staff are briefly identified below.

Construction Contractor Compliance Manager. The Construction Contractor Compliance Manager (Contractor) will oversee all aspects of the Monitoring Program that need to be implemented by persons working in the field. This person will interact directly with the Biological Monitor to notify the Resident Engineer when an activity is causing concerns where the activity should be stopped or to modify the conduct of the Doyle Drive Project when such actions are recommended by the Biological Monitor and approved by the Construction Project Manager.

Construction Project Manager. Construction Project Manager will be responsible for all aspects of the Monitoring Program requiring senior management review. He/she will receive monitoring reports, will forward those reports to resource agencies when appropriate, and will make decisions on Doyle Drive Project modifications.

Resident Engineer. All environmental construction monitoring must be done within proper protocols. As such, the Resident Engineer is the focal point for contact with the *Construction Contractor Compliance Manager*. The biological monitoring staff shall direct all construction-related concerns to the Resident Engineer. The Resident Engineer is the only one with authority to halt construction.

8.1.3 Biological Monitor Qualifications, Responsibilities, and Authority

The Biological Monitor will be a qualified biologist. Each Biological Monitor shall possess: (1) a 4-year college degree in Biology or Environmental Sciences and (2) a minimum of one year's experience in biological wildlife surveys or wildlife monitoring. In addition, the Biological Monitor shall also be able to identify the sensitive species present, general wildlife, woodrat nests, and bird nests. Documentation that the permitted Biological Monitor fulfills these minimum requirements shall be submitted to the Resident Engineer. These mitigation measures call for more than one Biological Monitor; however, the need for more than one Biological Monitor will have to be assessed and evaluated. In addition, the Biological Monitor(s) may only

need to be present during the construction activities involving ESA fence installation, clearing and grubbing, and the initial grading.

Biological Monitors will be responsible for the following:

- Completing surveys where required (i.e., nesting birds and roosting bats);
- Monitoring construction activities and active construction zones;
- Monitoring biological resources as needed; and,
- Recording compliance with the measures described in this section.

Biological Monitors function as facilitators and record-keepers. The Resident Engineer is the only one with the authority to halt construction. The Resident Engineer and the Biological Monitor shall be immediately notified if the Contractor's workers encounter special-status wildlife, nesting birds, or any other important biological resource noted in the Natural Environment Study. The Resident Engineer shall then immediately halt construction activities at that specific location, if necessary to protect a sensitive resource (in the immediate area around where the wildlife, bird nest, or important biological resource is found). Construction will be halted if necessary until (1) the special-status wildlife is removed by an authorized Biological Monitor from the construction area, (2) the bird nest, if active, is addressed pursuant to the Migratory Bird Treaty Act and California State Fish & Game Code S-3503, or (3) the important biological resource is assessed and evaluated. The Contractor shall not resume work without the approval of the Resident Engineer. Biological Monitors are responsible for educating the Construction Foremen and construction crews about compliance with biological mitigation measures (such instruction does not constitute direction about actual construction techniques). Biological Monitors will respond to requests for advice about biological mitigation and offer suggestions about improving implementation of mitigation measures.

Biological Monitors are responsible for monitoring biological resources that are designated as ESAs as well as performing surveys to identify those resources. Biological Monitors will also participate in the administration of the environmental training sessions to construction personnel.

Biological Monitors will complete a Biological Monitoring Report for each day spent monitoring construction on the Doyle Drive Project. This form documents the type of construction activities monitored, the actions of the monitor (including the results of any surveys), and the general level of compliance. If the Biological Monitor finds that an individual or contractor is violating any of the mitigation measures detailed in this section, a brief explanation is given on a *Biological Compliance Advisory*, which will be attached to a Biological Monitoring Report for that day. Biological Monitoring Reports and Compliance Advisories will be submitted to the Resident Engineer who will place them in the Project Files on the same day the condition was observed. If there are any outstanding issues or problems, the Resident Engineer will notify the Contractor.

The Biological Monitor may submit the reports to responsible resource agencies such as the USFWS, the CDFG, the NPS, or the Trust, if requested .

8.1.4 Monitor Training

The Biological Monitor and Resident Engineer will provide a Pre-Construction training session for all construction workers. This session will include the following components:

- Describe the construction sequence and key safety concerns;
- Provide insights into effective monitoring and inspection;
- Establish a common understanding of the Monitoring Program; and
- Establish communication procedures.

8.1.5 Project Environmental Kick-off

Prior to construction, the Construction Project Manager will hold a Project Environmental Kick-Off Meeting for all management-level project staff. Participants will include contractor management personnel, agency representatives (if available) and Monitors. The purpose of this training is to establish a common understanding of the Monitoring Program requirements, discuss responsibilities and communications, and provide a forum for joint problem-solving for the biological monitoring and construction teams.

8.1.6 General Doyle Drive Project Environmental Training

All Doyle Drive Project personnel will be required to complete a 30-minute environmental training program prior to accessing the job site. The training will be prepared by the lead Biological Monitor, and highlight the key environmental obligations of construction personnel. The training will describe the organization of the Doyle Drive Project's environmental team and summarize each team member's role. The training will emphasize the fundamental principle that each worker on the Doyle Drive Project is responsible for compliance of his/her actions with environmental laws and regulations. Time will be available to answer questions and discuss "what if" scenarios.

At the conclusion of the training, each attendee will receive the following materials:

- "Project Rules" brochure;
- Contacts, names and telephone numbers of emergency contacts on project rules card; and
- Certificate of Participation to be signed and submitted as proof of attendance.

Examples of "Project Rules" to be included are:

- Environmental regulations and penalties;
- Stay in designated work areas (explain how they will be identified and how ESAs will be identified);
- No refueling within 100 feet of streams or wetlands;
- No littering;
- No pets.

8.1.7 Tailgate Training

As a part of their field responsibilities, Biological Monitors will coordinate with construction staff to hold tailgate meetings on key environmental issues relevant to particular work crews or locations, or new information. Circumstances that might require tailgate training include:

- Activities in known sensitive resource areas (e.g., adjacent to a nest buffer zone);
- Repeated or uncorrected non-compliance events (e.g., activity outside of the work area);
- Discovery of a sensitive resource that requires special protection measures.

8.1.8 Construction Biological Monitoring Mitigation Completion

Mitigation described in this section shall be deemed complete and adequate upon submittal of a final "Compliance Monitoring Report" if requested by the National Park Service and the Presidio Trust, within three months of the Doyle Drive Project completion and the removal of all equipment from the Doyle Drive construction corridor.

8.2 WETLAND MITIGATION

8.2.1 Summary

This section presents avoidance and minimization measures for wetland and riparian habitats, as well as a conceptual revegetation design, and implementation, maintenance and monitoring strategies for restoring wetland and riparian habitats in response to temporary and permanent impacts of the Doyle Drive Project.

8.2.2 Introduction

There are two types of wetlands at the Presidio, ACOE jurisdictional waters of the U.S., and Cowardin wetlands protected by the NPS and/or the Trust. Waters of the U.S. include wetlands and other waters of the U.S., e.g., creeks, streams, and navigable waterways. For this document, the term wetland is used to include both waters of the U.S. and Cowardin wetlands.

Affected wetlands for the Doyle Drive Project for each alternative are discussed in Section 6.0 *Project Impacts* of this report. Corresponding acreages are presented in Table 6-1. Table 6-2 shows potential temporary disturbance of wetlands during construction activities.

Direct impacts to Cowardin wetlands protected by the NPS and the Trust and ACOE jurisdictional waters of the U.S. due to project construction activities of the build alternatives listed in the Permanent Wetlands Impact Table 3.2-1 as discussed above, would conflict with NPS' and Trust's natural resource management policies and the objectives of the management actions stated in the VMP. Direct impacts on the identified Cowardin wetlands and ACOE jurisdictional waters of the U.S. would be localized and adverse.

Temporary disturbances to waters of U.S. and Cowardin wetlands, excluding Tennessee Hollow, will be restored in place at a 1:1 ratio. Permanent losses of waters of the U.S. will be mitigated in-kind at a 2:1 ratio or out-of kind at a 3:1 ratio (or a ratio as determined by the ACOE during the wetland permit application phase) of the Doyle Drive Project within the boundaries of the Presidio. Permanent losses of Cowardin wetlands shall be mitigated at a 2:1 ratio. The NPS Procedural Manual #77-1 (Wetland Protection) states that "…compensation for wetland degradation or loss will be at a minimum 1:1 ratio" (NPS 2002). It also states that "Final compensation ratios may need to be greater than 1:1 in cases where: (1) the functional values of the site being impacted are determined to be high and the restored wetlands will be of lower functional value; (2) it will take a number of years for the restored site to become fully functional (e.g., reestablishment of forested wetlands); or (3) the likelihood of full restoration success is unclear. Conversely, the replacement ratio may simply be 1:1 for areas where the functional values associated with the area being impacted are determined to be low relative to the replacement site and the likelihood of the fully successful, timely replacement of functions at the restoration site is high" (NPS 2002). The NPS Procedural Manual serves as a guide for consideration of mitigation compensation.

In addition to permanent and temporary losses of Cowardin wetlands, tunneling, due to implementing the Presidio Parkway, may affect the groundwater flow, and subsequently, could potentially affect Cowardin wetlands (W-4, W-6d, and W-7) on the northern bluff face. Based on the wetland delineations as well as ACOE and Caltrans observations, no surface water has been observed at these locations of the bluff face. Groundwater (subsurface) flow appears to support riparian communities (i.e., central coast arroyo willow and California blackberry) on the northern bluff face. Construction of a tunnel upgradient of the bluff face could potentially disrupt the flow of groundwater in the fractures, potentially increasing or decreasing the flow rate and/or volume at specific points. Substantial changes in the character of individual areas could conceivably change the dynamics of riparian habitat on the bluff, and may result in permanent effects on riparian habitat. Mitigation measures to avoid or minimize these effects are presented below (see also the 2004 Revised Hydrology and Water Resources Technical Report).

The proposed Doyle Drive Project will require a Section 404 permit from the ACOE, and a Section 401 water quality certification from the Regional Water Quality Control Board.

8.2.3 Wetland Mitigation Goals

The goals of wetland mitigation are to:

1) Avoid, minimize or compensate (in this order) for the temporary and permanent losses of waters of the U.S. and Cowardin wetlands protected by the NPS or the Trust due to the Doyle Drive Project;

2) Satisfy the "no net loss" policy regarding type, function and value of wetlands per Executive Order 11990 and consistent with the NPS' and Trust's policies;

3) Improve wetland and riparian value and increase wildlife habitat quality relative to the quality waters of the U.S. and Cowardin wetlands protected by the NPS or the Trust that would be disturbed or filled; and

4) Create a successful mitigation site that will become a self-supporting natural system over time.

The functions of the proposed mitigation site are to convey seasonal or perennial flows, support a native plant community adapted to wetland and/or creek conditions, and provide suitable habitat for wildlife in degraded areas.

8.2.4 Wetland Mitigation Specifications

8.2.4.1 Avoidance and Minimization Measures

To the extent feasible, all impacts on waters of the U.S. and Cowardin wetlands will be avoided. These waters of the U.S. and Cowardin wetlands will be clearly marked on Doyle Drive Project maps as ESAs. Where permanent impacts are unavoidable (e.g., where identified wetland areas are located within the footprint of roadway or tunnel construction and cannot be feasibly avoided), then the Doyle Drive Project lead agency will implement *Compensation Measures* described below. Where temporary impacts on wetlands, excluding Tennessee Hollow, are unavoidable, temporarily disturbed areas would be revegetated and restored in place at a 1:1 ratio as described under the *Implementation Plan*, below. Maintenance and Monitoring activities as described below, are applicable to restored temporarily disturbed wetlands as well as restored wetland compensation sites.

Effects on groundwater flow would be avoided or minimized with implementation of the following measures. These measures are hydrologically based and would be overseen by a hydrologist (see also the 2004 Revised Hydrology and Water Resources Technical Report).

(1) A pre-design groundwater and surface water-monitoring program will be conducted by a hydrologist at least one year prior to construction to provide a baseline for ground and surface water level measurements and to aid in further refinement of the understanding of the hydrologic function including subsurface and groundwater conditions near the bluffs. The ground and surface water-monitoring program will be coordinated with subsequent geotechnical investigations performed for the final design stage. During the design phase, additional geotechnical analysis shall be conducted to determine the underlying water conveyance in that area. If through those investigations it is determined that the nature of the fractures are such that the success of water conveyance will be in question, wetland creation shall begin in advance of the project. The Trust and the NPS will review and comment on the details of the monitoring program and will be included in the distribution of those receiving periodic reports of the data and findings.

(2) During construction, dewatering of the downgradient side of the excavation will be minimized to the extent feasible to reduce the potential for drying out the bluff face during the estimated one to two year construction period. The approximate volume of water pumped from dewatering wells near the bedrock tunnel segment will be returned to the subsurface on the downgradient side of the tunnel through

infiltration galleries or injection wells. If the recharge wells or infiltration galleries are not effective in maintaining the riparian growth, then irrigation may be considered until hydrology has reestablished.

(3) The tunnel will be designed and constructed in a way that minimizes the potential for post-construction alteration of groundwater flow patterns near the bluff, as described in the 2004 *Revised Hydrology and Water Resources Technical Report* (BASELINE Environmental Consulting, July 2004).

(4) It is possible that groundwater flow in fractures will be significantly altered even after implementation of the mitigation measures described above, potentially causing significant effects to the Cowardin wetlands (including wetland areas W-4, W-6d, and W-7) on the bluffs. To determine whether significant effects occur in the bluff wetlands after construction of the project, the ecological health and spatial extent of wetland areas and habitats will be monitored by a qualified biologist prior to initiation of construction of the tunnel segment (to confirm a baseline condition) and on an annual basis for a period of not less than five years after the completion of the project. A long-term monitoring program will be implemented using standard ecological methods to estimate plant cover and wetland extent, and will be reviewed by appropriate agencies. In addition to the long-term monitoring program, a short-term monitoring program will be implemented to monitor the annual vigor of individual specimens of mature willow trees and other selected vegetation. Annual vigor monitoring will provide short-term data that can be directly related to groundwater. A qualitative analysis of wildlife species will be included as part of the monitoring.

Pre-construction monitoring will occur to document pre-construction conditions of the bluff plant communities. Monitoring will also occur during dewatering activities. Annual reports will be provided for appropriate agency review and approval. It is presumed that post-construction conditions could potentially differ significantly from pre-construction conditions, and appropriate mitigation will be prescribed in the final environmental document and agreed to, prior to the start of project construction.[29]

8.2.4.2 Compensation Measures

Compensation for permanent impacts on wetlands may include (1) wetland creation or restoration, (2) in-lieu funding[30] (in accordance with ACOE Federal Guidance on the Use of In-lieu-Fee Arrangements for Compensatory Mitigation Under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, Federal Register November 7, 2000) during the period of construction if wetland creation or restoration is determined impracticable, or (3) a combination of both (1) and (2). In-lieu funding, which includes the appropriate funding to fully accomplish mitigation, including monitoring and contingency measures, shall only be used if wetland restoration and/or creation is not practicable. The Doyle Drive Project lead agency will be responsible for implementing wetland compensation measures, but such measures will be carried out by appropriate qualified persons as indicated below.

8.2.4.3 Proposed Wetland Compensation Sites

Potential wetland compensation sites could include the northern bluffs, the western bluffs, Dragonfly Creek, Lobos Creek, Mountain Lake, Tennessee Hollow within the Doyle Drive corridor, and/or Tennessee Hollow at the Mason Street crossing within the Presidio. Except for Lobos Creek and Tennessee Hollow at the Mason Street crossing, the proposed mitigation sites are within the Trust's jurisdictional area. Lobos Creek is within

[29] At the NPS/Trust natural resource mitigation meeting on October 27, 2004 the NPS restated their position that this mitigation should not be contingent upon future monitoring. Rather it should be a presumed impact for which wetland compensation must made, preferably, before the project lead agency implements the Project. Consideration will be given to wetland creation in advance of the project, if it is determined through subsequent geotechnical investigations that the nature of the fractures are such that the success of water conveyance will be in question.

[30] In-lieu funding, as the term is used here, is defined as an amount placed in escrow adequate to carry out wetland compensation at the ratio identified in this section, where no wetland restoration project is identified.

NPS' jurisdictional area, and Tennessee Hollow at the Mason Street crossing is a shared boundary between both the Trust and NPS.

The northern and western bluffs support arroyo willow riparian habitat and Dragonfly Creek and Lobos Creek support in-stream wetlands and riparian vegetation. These sites also support non-native invasive species, such as eucalyptus, Himalayan blackberry and cape ivy. NPS and/or the Trust are currently restoring portions of some of the sites, particularly Mountain Lake, Lower Dragonfly Creek and Lobos Creek. Tennessee Hollow currently flows through two underground pipes in the project site and drains to Crissy Marsh. The NPS and the Trust propose restoration of the portion of Tennessee Hollow within the project boundaries to a brackish marsh.

All of the proposed wetland compensation sites could offset permanent impacts on waters of the U.S. and Cowardin wetlands protected by the NPS or the Trust. Although all of the sites have been proposed for restoration by the NPS or the Trust, only those that have no identified funding source will be acceptable as a wetland compensation site for the Doyle Drive Project. The most practicable potential compensation sites are the northern and western bluffs and Dragonfly Creek since habitat exists at these sites already. The following Implementation Plan focuses on Upper Dragonfly Creek (see Figure 3-4), but can be applied to any of the potential mitigation sites supporting freshwater wetlands and riparian vegetation. Restoring Tennessee Hollow would follow the same concepts, but would require planting brackish water marsh species, such as slough sedge (*Carex obnupta*), as well as engineering drawings showing plan and profile views of the proposed waterway. The commitments to specific wetland compensation sites or in-lieu funding will be determined prior to the Final EIR/EIS.

8.2.5 Implementation Plan

The Doyle Drive Project lead agency will be responsible for implementing the mitigation plan and the establishment and care of the mitigation site, as well as revegetating temporarily disturbed wetland sites. The Doyle Drive Project lead agency will be responsible for contracting a Restoration Monitor and Landscape Contractor, as necessary. The Restoration Monitor will be a qualified biologist with sufficient experience in managing implementation of wetland and riparian restoration activities and wetland and riparian construction monitoring. The Landscape Contractor will have proven expertise in implementing and caring for native riparian vegetation restoration.

8.2.5.1 Site Preparation

Prior to planting, site preparation will consist of removing non-native species (e.g., eucalyptus trees, French broom and cape ivy) prior to seed set, as well as removal of non-natural refuse and debris. Removal of re-invading individuals will continue through the maintenance and monitoring period. Native plants would be salvaged and replanted to the extent feasible. No artificial fill, fertilizers, or amendments will be used unless specified and approved by the NPS and/or the Trust. The mitigation site would be graded as necessary to provide sufficient drainage and enhance wetland and riparian habitat. Grading plans would be prepared as part of the construction documents. Site preparation activities will be the responsibility of the Landscape Contractor.

8.2.5.2 Preliminary Schedule

Major construction activities for the Doyle Drive Project will be phased over five years. Mitigation efforts will be initiated concurrent with, or immediately following, construction of the project. Sites disturbed temporarily prior to the planting effort will be treated immediately as described below. The planting effort at wetland compensation sites will commence in the fall following construction or during a latter phase of Doyle Drive Project construction. Seed collection and propagation will occur January to December prior to the year of planting. Willow cuttings will be taken from temporarily disturbed sites as well as from other locations in the Presidio between November and February. Willow cuttings will be planted the same day they are collected, or if necessary, stored for up to two nights. Planting will occur in the fall either just before or during the

dormant period. Revegetation and restoration will be completed in accordance with the 2001 VMP and standard NPS/Trust restoration practices (including database-documented reference communities, propagation goals, and nursery practices). The revegetation and restoration criteria will include general restoration concepts and methods, including use of locally native plant material, protection and restoration of soil conditions, irrigation, and control of aggressive non-native species.

8.2.5.3 Planting Plan

Plantings will include native wetland and riparian species collected and grown on-site or obtained from a NPS or Trust-approved local nursery. Cuttings will be obtained from plant resources on the Presidio. Native species will be planted at high densities to ensure cover and establishment, and to allow natural thinning.

Temporarily disturbed wetlands will have the potential for erosion and invasion of non-native species once bare soil is exposed. These sites will be immediately treated with a (1) biodegradable erosion control mat or netting, (2) seed mixture and mulch using broadcast methods, and/or (3) hydromulch (a bonded fiber matrix used to stabilize moderately sloped creek banks. Only native species will be used in the seed mix, such as California brome (*Bromus carinatus*), creeping wildrye (*Leymus triticoides*), and meadow barley (*Hordeum brachyantherum*). Sterile hybrid grasses, such as Regreen, may be acceptable as long as they do not account for more than 25 percent of the total seed mix. Temporarily disturbed sites may require additional planting as described below.

Proposed wetland compensation sites will also have the potential for erosion and invasion of non-native species once bare areas are exposed. Following site preparation, planting and erosion control measures will be implemented. Erosion control measures may include using (1) coir logs for streambank stabilization at the toe of the slope, (2) erosion control mats, woven with biodegradable netting such as jute, coconut fiber, or sterile, weed-free straw, in combination with a native seed mixture on banks, and/or (3) a seeded hydromulch.

8.2.5.4 Irrigation Plan

Irrigation may be required for the first two to three years following planting to allow successful plant establishment. The design and installation of the irrigation system will be the responsibility of the Landscape Contractor and either manual or directed drip irrigation will be used. The irrigation system should be designed to minimize water usage and weed growth. Irrigation will likely be required between May and October; however, the exact schedule will be established by the Landscape Contractor and Restoration Monitor. Watering will be based on plant appearance and health, soil moisture levels, and weather conditions. Irrigation will cease for the rainy season, if possible, depending on storm frequency and intensity. The irrigation system will be removed when plants are successfully established, which should be the end of the third year.

8.2.6 Maintenance

The Landscape Contractor will be responsible for implementing maintenance activities. Maintenance activities will include plant replacement, upkeep of erosion control materials and irrigation system, weed control and trash and other debris removal. The Landscape Contractor should schedule maintenance activities, which may include visits every 30 days for the first three months following planting, and every 60 days thereafter during the first year of plant establishment. The Landscape Contractor will check for disease and pests, and remove non-native invasive plants in accordance with Executive Order 13112. Removal of weeds will occur during the first two to three years of plant establishment as deemed necessary by the Restoration Monitor and the Landscape Contractor. The Landscape Contractor will maintain the mitigation site during the first two to three years of plant establishment to ensure that plants are establishing successfully. Following successful plant establishment, the Doyle Drive Project lead agency will maintain the site during the remaining monitoring years until the permitting agencies and NPS/Trust determine that the site meets the success criteria. It is expected that the mitigation sites will be managed as part the Presidio of

San Francisco National Park and will become the responsibility of the Presidio Trust and/or the National Park Service once the site meets the success criteria and mitigation goals.

The Landscape Contractor will remove trash and other debris from the mitigation site regularly. The Landscape Contractor and the Restoration monitor will determine the schedule of trash and debris removal. Additional maintenance and debris removal will likely be required following the winter.

8.2.7 Monitoring Methods

8.2.8 Restoration Monitor

A contracted qualified biologist, landscaper or similarly qualified professional with the following authority and responsibilities will be designated to: (1) oversee planting (e.g., design the final planting plan in the field, delineate planting zones, approve suitability of plant materials, and direct planting crews as necessary); (2) monitor revegetation progress; (3) guide remedial actions as needed, such as plant replacement, so that performance criteria and permit conditions are met; and (4) produce annual reports.

8.2.9 Monitoring Program

8.2.9.1 Monitoring Schedule

Monitoring will occur during both construction and post-construction phases of the Doyle Drive Project. Wetland mitigation monitoring will begin upon completion of plant material installation, and continue for a period of five years or until the plantings demonstrate successful establishment and the performance criteria have been met. Three monitoring periods will be scheduled during the first year to quantitatively assess proper function of the mitigation design. These will occur in October-November (to collect baseline data in the fall), March-May 15 (to document spring conditions), and July-August (to document summer conditions). In years 2 and 3, the Restoration Monitor will monitor the mitigation site twice per year, in the spring by May 15 and the fall by October 31. If at the end of Year 3 the trend towards success is increasing (i.e., success criteria are met), then monitoring will occur annually in Years 4 and 5 by October 31. Otherwise, monitoring will continue biannually in Years 4 and 5 or until the NPS and/or the Trust and permitting agencies determine that the mitigation site is successful and self-sustaining, whichever comes first.

During the first year, qualitative monitoring of erosion control features will take place monthly and after periods of heavy rain. Post-rainstorm inspection may be carried out by construction personnel. The Landscape Contractor will repair any failures of the erosion control within 48 hours. Appropriate erosion control measures (netting, vegetation, silt fencing, straw, etc.) will be applied if unstable areas are identified. During Years 2 and 3, in-place erosion control features, as well as the entire restoration area will be inspected for significant erosion during the designated monitoring period as well as one additional time during the storm season. Appropriate erosion control measures will be applied if necessary. During subsequent years, inspections will be carried out during the fall monitoring visit, with erosion control measures applied to unstable areas as necessary.

All planted woody vegetation will be identified on the as-built plans. During each monitoring visit, survival of all plant species will be estimated and documented, as well as noting vigor, and overall health. Other factors will also be noted, including cover of native versus non-native species, refuse removal, weed control, access control, irrigation repairs, etc.). Photodocumentation of the site at permanent photo stations will also be performed by the Restoration Monitor. Recommendations for remedial actions would be communicated to the Doyle Drive Project's lead agency.

During the first year, the Restoration Monitor will evaluate the hydrology of the mitigation site during the monitoring periods as well as during the winter. The Restoration Monitor will document ponded areas and/or

the Ordinary High Water Mark (OHWM), as indicated by watermarks, scouring of banks, sediment deposits, drift lines and observations of inundation, saturation and flowing water.

Each year the data collected will be assessed and documented against the restoration goal. Based upon final restoration performance, a determination will be made in coordination with the Doyle Drive Project lead agency, the permitting agencies, and NPS and/or Trust as to whether or not the project achieved the final restoration performance standards and mitigation goals, and whether additional mitigation is required following the five-year monitoring period.

8.2.9.2 Success Criteria

Final success criteria (performance standards) will require approval from NPS and/or the Trust and wetland permitting agencies. The following success criteria are suggested for wetland mitigation:

(1) Planted woody vegetation will have no less than 80 percent survival rate of native plants.

(2) There will be no excessive rills, gullies, or other erosion features.

(3) There will be no noxious or targeted invasive non-native species. Non-invasive non-native species will be controlled to the greatest extent possible.

(4) There will be a properly functioning temporary irrigation system in Years 1 through 3 (if it is necessary to install one).

(5) Vegetation richness will include no less than 85 percent richness of the proposed revegetation planting palette.

(6) Evidence of wetland hydrology, including primary and secondary indicators as defined by the U.S. Army ACOE of Engineers' Wetlands Delineation Manual.

(7) Field evaluation of potential wildlife usage compared to the affected wetlands and other similar wetlands in the project area (include any direct observations of wildlife or tracks).

(8) No build up of garbage, refuse, or other unnatural debris in the mitigation area.

(9) The wetland mitigation site will be self-sustaining at the end of the monitoring period.

8.2.9.3 Reporting

Monitoring visits will be documented. An annual monitoring report will be submitted to the appropriate resource, including NPS and/or the Trust, and permitting agencies, including ACOE and RWQCB by December 15 of each monitoring year. The annual monitoring reports should include the following information: (1) Methods; (2) General discussion of the site including qualitative and quantitative statistics (e.g., survival and mortality percentages); (3) Assessment of trends in development of riparian habitat, whether performance criteria are being met, and analysis of restoration success; (4) Photographs of the revegetation area using standardized photo points; (5) Map of the area including all relevant features; (6) Copies of all data sheets employed in the data gathering, and (7) Discussion of any corrective actions needed or undertaken (e.g., erosion and weed control).

8.2.9.4 Contingency Measures

Contingency measures will be implemented if mitigation monitoring data shows a lack of success. These measures will be developed in consultation with NPS/Trust and permitting agencies after evaluating the existing function and values of the mitigation site against the success criteria and migration goals.

Contingency measures may include, but are not limited to, replanting, grading, extending the mitigation monitoring, or selecting an additional mitigation site. In the event of a catastrophic event during the period of plant establishment (Years 1 through 3), then the site will be evaluated and adequate remedial actions will be taken in consultation with the NPS and/or the Trust and permitting agencies.

8.2.10 Mitigation Completion

The Biological Monitor will prepare a draft final report documenting the achievement of the success criteria established for restored and revegetated sites. Biological Monitor will forward the draft final report to resource and regulatory agencies with a request in writing to schedule a final field review of the sites. After the final field review and concurrence from the resource and regulatory agencies that the mitigation has been a success, Biological Monitor will provide a letter and a final report confirming such findings.

8.2.11 Agency Confirmation

Upon submission of the final monitoring report, the NPS and/or the Trust, ACOE, and RWQCB, may conduct a site inspection to confirm completion of the mitigation program. The Doyle Drive project lead agency will formalize confirmation of program completion in writing and will provide copies of the written confirmation to all participating agencies.

8.3 SPECIAL-STATUS PLANT HABITAT MITIGATION AND REVEGETATION OF TEMPORARILY DISTURBED UPLAND VEGETATION

8.3.1 Summary

This section presents avoidance and minimization measures for special-status plant species habitat that may be required as a result of Doyle Drive Project implementation, as well as a conceptual revegetation strategy for restoring temporarily impacted communities, if avoidance is infeasible.

8.3.2 Introduction

No listed special-status species would be directly affected by the Doyle Drive Project. Implementation of measures described in this section will avoid or minimize indirect effects on special-status species.

Impacts to special-status plant species and their habitat would be restored at 1.5:1 ratio when effects are unavoidable. For example, within the construction corridor near Battery Blaney, all of the build alternatives would result in direct removal or disturbance to skunkweed, a federal species of local concern, and San Francisco gumplant, a federal species of concern. These species could be introduced back into their pre-disturbance areas (or immediately adjacent to former areas outside of impervious surface footprints). Both species could respond well to seed gathering from other local populations and seeding within designated areas.

8.3.3 Mitigation Goals

The mitigation goals are no net loss of special-status plants or their habitats, and to revegetate temporarily disturbed upland habitats using appropriate native vegetation types in natural areas, or appropriate ornamental vegetation types in landscaped areas in accordance with the NPS and the Trust's Vegetation Management Plan.

8.3.4 Avoidance and Minimization Measures

All sensitive habitat and special-status plant species (including, but not limited to, those documented in the 2001 Vegetation Management Plan [NPS, 1999] or current NPS and the Trust Natural Resources GIS database within or immediately adjacent to the Doyle Drive Project corridor), which are not temporarily or permanently affected by the project, will be designated as ESAs that will be off-limits to all construction activities. The ESAs will be clearly marked on the project plans, fenced on the project site and adjacent areas, and avoided by the Contractor. ESAs will be flagged in coordination with a Biological Monitor prior to construction activities. Resources will need to be fenced using materials such as construction orange fencing, silt-fencing, or otherwise protected from direct or indirect impacts. All fencing materials will be approved by the NPS and/or the Trust. ESAs will be monitored by a Biological Monitor during construction to ensure that these sites are avoided. Removed vegetation, such as trees, will be clearly marked and identified on construction drawings.

In the event that it is infeasible to avoid special-status plant species, then federal or state species of concern habitat will be restored at a 1.5:1 ratio as described below. In-lieu funding will be required if federal or state species of concern restoration is impracticable, subject to the approval of the NPS and the Trust.

Standard construction practices reviewed and approved by the Bay Area Air Quality Management District, and designed to eliminate airborne dust and particles from drift onto vegetation will be implemented, as described in Section 2.4.3.4 of the *Alternatives Description*. Discharge of construction-related materials and fluids will be prohibited to avoid damage to vegetation.

A Stormwater Pollution Prevention Program (SWPPP) to avoid or minimize soil runoff during the wet season will be prepared and implemented (see Section 2.4.3.2 of the *Alternatives Description* and Revised Hydrology and Water Resources Report for minimal standards of a SWPPP).

8.3.5 Revegetation

Within the construction corridor, all natural areas disturbed temporarily due to project activities, including tree lupine moth habitat in northern coastal scrub, will be revegetated and restored to the appropriate native vegetation type in natural areas, or appropriate ornamental vegetation type in landscaped areas. Revegetation and restoration will be completed in accordance with the 2001 VMP and standard NPS/Trust restoration practices (including database-documented reference communities, propagation goals, and nursery practices). The revegetation and restoration criteria will include general restoration concepts and methods, including use of locally native plant material, protection and restoration of soil conditions, irrigation, and control of aggressive non-native species. The planting effort will commence in the fall following construction or during a latter phase of the Doyle Drive Project construction. Seed collection and propagation will occur January to December prior to the year of planting. Sites disturbed prior to the planting effort will be treated immediately with a (1) seed mixture and mulch using broadcast methods, or (2) hydroseed.

The plant palette for revegetating with native plants may include coyote brush, coffeeberry, sticky monkeyflower, yellow bush lupine, toyon, San Francisco gumplant, skunkweed, California poppy, purple needlegrass, California brome, and blue wild rye.

The plant palette for revegetating landscape areas will be coordinated with the NPS' and/or the Trust's forester, landscape architect and natural resource staff. Replacement and monitoring of landscape trees should be implemented in accordance with current Trust forestry practices and planning efforts, or as described in the 2001 Presidio Vegetation Management Plan, the 2001 Historic Forest Characterization and Treatment Study, and/or the 1997 Jones & Stokes *Natural Resource Inventory and Vegetation Management Options* report (see Chapter 6 (Vegetation Management Treatment and Practices), Appendix B (Tree Hazard Assessment and Hazard Tree Management Plan), and Appendix M (Forest Management Activity Calendar and Equipment)). These document sections include soil preparation, planting material selection, plant installation, management, and maintenance.

8.3.6 Maintenance

The Landscape Contractor will be responsible for implementing maintenance activities. Maintenance activities will include plant replacement, upkeep of erosion control materials and irrigation systems, weed control, and trash and other debris removal. The Landscape Contractor should schedule maintenance activities, which may include visits every 30 days for the first three months following planting, and every 60 days thereafter during the first year of plant establishment. The Landscape Contractor will check for disease and pests, and remove non-native invasive plants in accordance with Executive Order 13112. Removal of weeds will occur during the mitigation monitoring period as deemed necessary by the Restoration Monitor and the Landscape Contractor. The Landscape Contractor will maintain the mitigation site during the first two to three years of plant establishment to ensure that plants are establishing successfully. Following successful plant establishment, the Doyle Drive project lead agency will maintain the site during the remaining monitoring years until the permitting and NPS/Trust determine that the site meets the success criteria. It is expected that the revegetated area will be managed as part the Presidio of San Francisco National Park and will become the responsibility of the Presidio Trust and/or the National Park Service once the revegetated area meets the success criteria and mitigation goals.

The Landscape Contractor will remove trash and other debris from the mitigation site regularly. The Landscape Contractor and the Restoration monitor will determine the schedule of trash and debris removal. Additional maintenance and debris removal will likely be required following the winter.

8.3.7 Monitoring and Reporting

Restored and revegetated sites will be monitored throughout the plant establishment period, at which point will be turned over to the appropriate maintenance agency. At the end of the monitoring period the success of the restoration effort will be assessed against the restoration goals (e.g., at least 80 percent survival of plantings, 75 percent vegetative cover by desirable species, and a viable, self-sustaining plant community). Based upon final restoration performance, a determination will be made in coordination with NPS and/or the Trust as to whether or not the project achieved the final mitigation goals, and whether additional mitigation is required following the five-year monitoring period.

8.3.8 Mitigation Completion

This mitigation shall be deemed complete and adequate upon submittal of a final “Compliance Monitoring Report” within three months of the project completion and the removal of all equipment from the Doyle Drive corridor.

8.4 SPECIAL-STATUS BIRD MITIGATION

8.4.1 Summary

This section outlines procedures for minimizing or avoiding impacts to nesting birds as a result of project implementation. Many of the actions are situation-specific: that is, the need for and type of action are determined by qualified biologists as the work is taking place.

8.4.2 Introduction

All species and subspecies of the families listed in the Migratory Bird Treaty Act (MBTA), and their nests, are protected resources. Most birds likely to be nesting in the construction corridor are protected either by the MBTA or California State Fish and Game Code §503. Destruction of nests will be avoided by conducting pre-construction surveys within one week before any ground-disturbing activity. “Avoidance,” as the term is used here, assumes a buffer area around the nest (see below).

8.4.3 Mitigation Goals

The mitigation goal is to avoid loss of active bird nests, from the onset of reproductive behavior through fledging of young.

8.4.4 Mitigation Specifications

8.4.4.1 Habitat Avoidance

Any wildlife habitat (including Historic Forest trees and those trees present in the Key Historic Stands) which is either within the construction corridor but not directly affected by construction, or immediately adjacent to the corridor, will be avoided. This will be accomplished by clearly marking habitat on Doyle Drive Project maps provided to the contractor. These areas will be designated ESAs on Doyle Drive Project plans and will be flagged and fenced prior to construction activities

8.4.4.2 Removal of Nesting Substrate

Trees and woody shrubs that would be suitable for nesting birds, and that would need to be removed as part of the Doyle Drive Project (i.e. within the project footprint, laydown areas or equipment access routes) will be removed during the non-nesting season (September 1 through January 1). This will avoid the possibility that nests would be inadvertently destroyed within the construction corridor.

8.4.4.3 Breeding Bird Surveys Prior to and During Construction

Regardless of mitigation carried out as discussed above, periodic surveys will be conducted before (pre-construction) and during construction for raptors and other native avian species. These surveys will be completed no more than five days prior to ground disturbance in any part of the site, and will include the actual area of disturbance in order to make sure that the pre-construction removal of nesting substrate was successful. While construction is ongoing during the period January 1 through August 1[31], weekly surveys will be performed within the construction corridor where active operations are scheduled to occur. The surveys will be performed by a qualified biologist. Positive results (i.e., an active nest) of both pre-construction and “during construction” surveys will be forwarded to the CDFG, the Trust and NPS for review and, on a case-by-case basis, avoidance procedures will be proposed by the biologist and coordinated with the Doyle Drive project lead agency. These can include construction buffer areas, 300 to 500 feet in the case of raptors, or restrictions on certain types of nearby construction activity.

8.4.5 Monitoring Methods and Adaptive Management

The Doyle Drive Monitoring Program (Program) described will include the measures specific to nesting birds described above. The Program will ensure that the mitigation measures are effectively administered, and provides that, in cases where the above standards are not met, the appropriate parties are notified to take corrective action and implement adaptive management.

8.4.6 Special Case: Pile Driving

It is expected that conventional pile driving techniques will find limited application on the project, largely due to vibration buffer areas established for historic buildings. Noise due to conventional pile driving is

[31] In the event of any confusion over, or yearly variation in, nesting season dates, the GGNRA definition will be used.

determined to be an adverse impact, and if used it will be seasonally restricted to a period outside the peak bird breeding activity season (January 1 through July 31).

8.4.7 Mitigation Completion

Upon submission of the final monitoring report, the NPS/Trust may conduct a site inspection to confirm completion of the mitigation program. The Doyle Drive Project lead agency will formalize confirmation of program completion in writing and will provide copies of the written confirmation to all participating agencies. This mitigation shall be deemed complete and adequate upon submittal of a final "Compliance Monitoring Report" within three months of the project completion and the removal of all equipment from the Doyle Drive corridor.

8.5 SPECIAL-STATUS BAT MITIGATION

8.5.1 Summary

This section outlines procedures for minimizing or avoiding impacts to special-status bats as a result of project implementation. Many of the actions are situation-specific: that is, the need for and type of action are determined by qualified biologists as the work is taking place.

8.5.2 Introduction

No bats were observed, nor was evidence of use of potential habitat, during the habitat assessment for the Doyle Drive Project. However, there is habitat available at: a) the wood framed, composite-shingled single-level building (Bldg. 230) scheduled for removal and b) portions of the existing elevated roadway, which contains expansion joints that provide possible sites for day and/or night roosting. Pre-construction surveys for breeding or roosting bat species (including Yuma myotis bat) are proposed in the event that bats occupy buildings or structures during the year preceding actual demolition and construction.

8.5.3 Mitigation Goals

The mitigation goal is to prohibit mortality of special-status bat species.

8.5.4 Mitigation Specifications

To protect breeding bats at the Doyle Drive project site, pre-construction surveys and avoidance measures will be implemented. To minimize effects on bat species large trees and riparian vegetation (which serve as important foraging habitat) will be designated as ESAs, which will be flagged and fenced on the project plans and off-limits to all construction activities. Buildings and elevated roadways with open expansion joints will be inspected by a qualified biologist for the presence of bats during the spring or summer of the year preceding construction and/or their removal.

In the event these habitats are occupied by bats, removal of structures will not occur between May 1 and September 15 (bat breeding season) unless the result of the surveys are discussed with CDFG, the Trust and NPS and either (1) suitable avoidance measures are developed or (2) the bats are removed and relocated by a qualified specialist holding the appropriate permit(s).

8.5.5 Monitoring Methods and Adaptive Management

The Monitoring Program described will include these bat-specific mitigation measures. The Monitoring Program will ensure that the mitigation measures are effectively administered and will provide that, in cases

where the above standards are not met, the appropriate parties are notified to take corrective action and implement adaptive management.

8.5.6 Mitigation Completion

This mitigation shall be deemed complete and adequate upon submittal of a final "Compliance Monitoring Report" within three months of the project completion and the removal of all equipment from the Doyle Drive corridor.

8.6 SPECIAL-STATUS INVERTEBRATE MITIGATION

The overall mitigation goal is to avoid and minimize temporary construction related impacts and long-term project impacts. In regard to temporary construction related impacts, please refer to Section 2.0 *Alternatives Description* for Caltrans standard construction mitigation measures that are incorporated as part of the proposed project. Refer also to Section 8.3 *Special-Status Plant Habitat Mitigation and Revegetation of Temporarily Disturbed Upland Vegetation* for habitat revegetation efforts. No additional measures are proposed.

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APPENDIX A

SPECIES LISTS

California Department of Fish and Game
Natural Diversity Database
Selected Elements by Scientific Name - Landscape
San Francisco North

	Scientific Name	Common Name	Element Code	Federal Status	State Status	Global Rank	State Rank	CNPS	R-E-D	CDFG
1	Arctostaphylos hookeri ssp. franciscana	Franciscan manzanita	PDERI040J3	Species of Concern		G3TXC	SX	1A	*	
2	Arctostaphylos hookeri ssp. ravenii	Presidio manzanita	PDERI040J2	Endangered	Endangered	G3T1	S1.1	1B	3-3-3	
3	Arenaria paludicola	marsh sandwort	PDCAR040L0	Endangered	Endangered	G1	S1.1	1B	3-3-2	
4	Astragalus tener var. tener	alkali milk-vetch	PDFAB0F8R1	Species of Concern		G1T1	S1.1	1B	3-2-3	
5	Chorizanthe cuspidata var. cuspidata	San Francisco Bay spineflower	PDPGN04081	Species of Concern		G2T2	S2.2	1B	2-2-3	
6	Clarkia franciscana	Presidio clarkia	PDONA050H0	Endangered	Endangered	G1	S1.1	1B	3-3-3	
7	Collinsia corymbosa	round-headed chinese houses	PDSCR0H060	Species of Concern		G1	S1.2	1B	2-2-3	
8	Cordylanthus maritimus ssp. palustris	Point Reyes bird's-beak	PDSCR0J0C3	Species of Concern		G4?T2	S2.2	1B	2-2-2	
9	Danaus plexippus	monarch butterfly	IILEPP2010			G4	S3			
10	Enhydra lutris nereis	southern sea otter	AMAJF09012	Threatened		G4T2	S2			
11	Euphydryas editha bayensis	Bay checkerspot butterfly	IILEPK4055	Threatened		G5T1	S1			
12	Fritillaria liliacea	fragrant fritillary	PMLIL0V0C0	Species of Concern		G2	S2.2	1B	2-2-3	
13	Grindelia hirsutula var. maritima	San Francisco gumplant	PDAST470D3	Species of Concern		G5T2	S2.1	1B	2-2-3	
14	Hesperolinon congestum	Marin western flax	PDLIN01060	Threatened	Threatened	G2	S2.1	1B	3-3-3	
15	Horkelia cuneata ssp. sericea	Kellogg's horkelia	PDROS0W043	Species of Concern		G4T1	S1.1	1B	3-3-3	
16	Icaricia icarioides missionensis	Mission blue butterfly	IILEPG801A	Endangered		G5T1	S1			
17	Laterallus jamaicensis coturniculus	California black rail	ABNME03041	Species of Concern	Threatened	G4T1	S1			
18	Layia carnosa	beach layia	PDAST5N010	Endangered	Endangered	G1	S1.1	1B	3-3-3	
19	Lessingia germanorum	San Francisco lessingia	PDAST5S010	Endangered	Endangered	G1	S1.1	1B	3-3-3	
20	Lichnanthe ursina	bumblebee scarab beetle	IICOL67020	Species of Concern		G2	S2			
21	Linanthus rosaceus	rose linanthus	PDPLM09180	Species of Concern		G1	S1.1	1B	3-3-3	
22	Microseris paludosa	marsh microseris	PDAST6E0D0	Species of Concern		G2	S2.2	1B	2-2-3	
23	Pentachaeta bellidiflora	white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1.1	1B	3-3-3	
24	Phalacrocorax auritus	double-crested cormorant	ABNFD01020			G5	S3			SC

	Scientific Name	Common Name	Element Code	Federal Status	State Status	Global Rank	State Rank	CNPS	R-E-D	CDFG
25	Plagiobothrys diffusus	San Francisco popcorn-flower	PDBOR0V080	Species of Concern	Endangered	G1Q	S1.1	1B	3-3-3	
26	Plagiobothrys glaber	hairless popcorn-flower	PDBOR0V0B0	Species of Concern		GH	SH	1A	*	
27	Rana aurora draytonii	California red-legged frog	AAABH01022	Threatened		G4T2T3	S2S3			SC
28	Riparia riparia	bank swallow	ABPAU08010	Species of Concern	Threatened	G5	S2S3			
29	Sanicula maritima	adobe sanicle	PDAPI1Z0D0	Species of Concern	Rare	G2	S2.2	1B	3-3-3	
30	Scapanus latimanus insularis	Angel Island mole	AMABB02032			G5T1	S1			
31	Silene verecunda ssp. verecunda	San Francisco campion	PDCAR0U213	Species of Concern		G5T2	S2.2	1B	3-2-3	
32	Stebbinsoseris decipiens	Santa Cruz microseris	PDAST6E050	Species of Concern		G2	S2.2	1B	2-2-3	
33	Triphysaria floribunda	San Francisco owl's-clover	PDSCR2T010	Species of Concern		G2	S2.2	1B	2-2-3	
34	Triquetrella californica	coastal triquetrella	NBMUS7S010			G2	S1.2	1B	3-2-2	

California Native Plant Society's
Inventory of Rare and Endangered Plants of California

Selected CNPS Plants - San Francisco North Quadrangle

Scientific/Common Name	CNPS	R-E-D	State	Federal
ARCTOSTAPHYLOS HOOKERI SSP. FRANCISCANA "Franciscan manzanita"	1A	*	None	None
ARCTOSTAPHYLOS HOOKERI SSP. RAVENII "Presidio manzanita"	1B	3-3-3	CE	FE
ARENARIA PALUDICOLA "marsh sandwort"	1B	3-3-2	CE	FE
ASTRAGALUS TENER VAR. TENER "alkali milk-vetch"	1B	3-2-3	None	None
CHORIZANTHE CUSPIDATA VAR. CUSPIDATA "San Francisco Bay spineflower"	1B	2-2-3	None	None
CIRSIUM ANDREWSII "Franciscan thistle"	1B	2-2-3	None	None
CLARKIA FRANCISCANA "Presidio clarkia"	1B	3-3-3	CE	FE
COLLINSIA CORYMBOSA "round-headed chinese houses"	1B	2-2-3	None	None
COLLINSIA MULTICOLOR "San Francisco collinsia"	1B	2-2-3	None	None
ERIOGONUM LUTEOLUM VAR. CANINUM "Tiburon buckwheat"	3	?-2-3	None	None
GILIA CAPITATA SSP. CHAMISSONIS "dune gilia"	1B	2-3-3	None	None
GILIA MILLEFOLIATA "dark-eyed gilia"	1B	2-2-2	None	None
GRINDELIA HIRSUTULA VAR. MARITIMA "San Francisco gumplant"	1B	2-2-3	None	None
HESPEROLINON CONGESTUM "Marin western flax"	1B	3-3-3	CT	FT
HORKELIA CUNEATA SSP. SERICEA "Kellogg's horkelia"	1B	3-3-3	None	None
LAYIA CARNOSA "beach layia"	1B	3-3-3	CE	FE
LESSINGIA GERMANORUM "San Francisco lessingia"	1B	3-3-3	CE	FE
LINANTHUS ROSACEUS "rose linanthus"	1B	3-3-3	None	None

Selected CNPS Plants - San Francisco North Quadrangle

Scientific/Common Name	CNPS	R-E-D	State	Federal
MICROPUS AMPHIBOLUS "Mt. Diablo cottonweed"	3	?-2-3	None	None
MICROSERIS PALUDOSA "marsh microseris"	1B	2-2-3	None	None
PLAGIOBOTHRYS CHORISIANUS VAR. CHORISIANUS "Choris's popcorn-flower"	1B	2-2-3	None	None
PLAGIOBOTHRYS DIFFUSUS "San Francisco popcorn-flower"	1B	3-3-3	CE	None
SANICULA MARITIMA "adobe sanicle"	1B	3-3-3	CR	None
SILENE VERECUNDA SSP. VERECUNDA "San Francisco campion"	1B	3-2-3	None	None
TRIPHYSARIA FLORIBUNDA "San Francisco owl's-clover"	1B	2-2-3	None	None
TRIQUETRELLA CALIFORNICA "coastal triquetrella"	1B	3-2-2	None	None

<- Revise Selection

Make Official Letter ->

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 040707111903

Database Last Updated: June 1, 2004

Quad Lists

SAN FRANCISCO NORTH (466C)

Listed Species

Invertebrates

- Haliotes sorenseni - white abalone (E) (NMFS)
- Icaricia icarioides missionensis - mission blue butterfly (E)
- Incisalia mossii bayensis - San Bruno elfin butterfly (E)

Fish

- Eucyclogobius newberryi - tidewater goby (E)
- Hypomesus transpacificus - delta smelt (T)
- Oncorhynchus kisutch - coho salmon - central CA coast (T) (NMFS)
- Oncorhynchus mykiss - Central Valley steelhead (T) (NMFS)
- Oncorhynchus tshawytscha - Central Valley spring-run chinook salmon (T) (NMFS)

Amphibians

- Rana aurora draytonii - California red-legged frog (T)

Birds

- Charadrius alexandrinus nivosus - western snowy plover (T)
- Diomedea albatrus - short-tailed albatross (E)
- Haliaeetus leucocephalus - bald eagle (T)
- Pelecanus occidentalis californicus - California brown pelican (E)
- Rallus longirostris obsoletus - California clapper rail (E)
- Sterna antillarum (=albifrons) browni - California least tern (E)

Mammals

- Arctocephalus townsendi - Guadalupe fur seal (T) (NMFS)
- Balaenoptera borealis - sei whale (E) (NMFS)

- Balaenoptera musculus - blue whale (E) (NMFS)
- Balaenoptera physalus - finback (=fin) whale (E) (NMFS)
- Eubalaena glacialis - right whale (E) (NMFS)
- Eumetopias jubatus - Steller (=northern) sea-lion (T) (NMFS)
- Physeter catodon (=macrocephalus) - sperm whale (E) (NMFS)
- Reithrodontomys raviventris - salt marsh harvest mouse (E)

Plants

- Arctostaphylos hookeri ssp. ravenii - Presidio (=Raven's) manzanita (E)
- Arenaria paludicola - marsh sandwort (E)
- Clarkia franciscana - Presidio clarkia (E)
- Hesperolinon congestum - Marin dwarf-flax (=western flax) (T)
- Layia carnosa - beach layia (E)
- Lessingia germanorum - San Francisco lessingia (E)

Candidate Species

Invertebrates

- Haliotes cracherodii - black abalone (C) (NMFS)

Fish

- Oncorhynchus tshawytscha - Central Valley fall/late fall-run chinook salmon (C) (NMFS)

Species of Concern

Invertebrates

- Adela oplerella - Opler's longhorn moth (SC)
- Cicindela hirticollis gravida - sandy beach tiger beetle (SC)
- Coelus globosus - globose dune beetle (SC)
- Hydrochara ricksecker - Ricksecker's water scavenger beetle (SC)
- Lichnanthe ursina - bumblebee scarab beetle (SC)

Fish

- Pogonichthys macrolepidotus - Sacramento splittail (SC)
- Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

- Rana boylii - foothill yellow-legged frog (SC)

Reptiles

- Clemmys marmorata marmorata - northwestern pond turtle (SC)
- Clemmys marmorata pallida - southwestern pond turtle (SC)
- Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

- Agelaius tricolor - tricolored blackbird (SC)
- Amphispiza belli belli - Bell's sage sparrow (SC)
- Arenaria melanocephala - black turnstone (SC)
- Athene cunicularia hypugaea - western burrowing owl (SC)
- Buteo regalis - ferruginous hawk (SC)
- Calidris canutus - red knot (SC)
- Chaetura vauxi - Vaux's swift (SC)
- Cypseloides niger - black swift (SC)
- Elanus leucurus - white-tailed (=black shouldered) kite (SC)
- Empidonax traillii brewsteri - little willow flycatcher (CA)
- Falco peregrinus anatum - American peregrine falcon (D)
- Geothlypis trichas sinuosa - saltmarsh common yellowthroat (SC)
- Haematopus bachmani - black oystercatcher (SC)
- Histrionicus histrionicus - Harlequin duck (SC)
- Lanius ludovicianus - loggerhead shrike (SC)
- Laterallus jamaicensis coturniculus - black rail (CA)
- Limosa fedoa - marbled godwit (SC)
- Melanerpes lewis - Lewis' woodpecker (SC)
- Numenius americanus - long-billed curlew (SC)
- Numenius phaeopus - whimbrel (SC)
- Oceanodroma homochroa - ashy storm-petrel (SC)
- Riparia riparia - bank swallow (CA)
- Rynchops niger - black skimmer (SC)
- Selasphorus rufus - rufous hummingbird (SC)
- Selasphorus sasin - Allen's hummingbird (SC)
- Sterna elegans - elegant tern (SC)

Mammals

- Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
- Eschrichtius robustus - gray whale (D) (NMFS)
- Eumops perotis californicus - greater western mastiff-bat (SC)
- Myotis evotis - long-eared myotis bat (SC)
- Myotis thysanodes - fringed myotis bat (SC)
- Myotis volans - long-legged myotis bat (SC)
- Myotis yumanensis - Yuma myotis bat (SC)
- Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
- Zapus trinotatus orarius - Point Reyes jumping mouse (SC)

Plants

- Abronia umbellata ssp. umbellata - pink sand-verbena (SLC)
- Arabis blepharophylla - coast rock-cress (SLC)
- Arctostaphylos hookeri ssp. franciscana - San Francisco manzanita (SC)
- Astragalus nuttallii var. virgatus - Nuttall's milk-vetch (SLC)
- Astragalus tener var. tener - alkali milk-vetch (SC)
- Atriplex californica - California saltbush (SLC)
- Castilleja affinis spp. affinis - Coast Indian paintbrush (SLC)
- Castilleja ambigua ssp. ambigua - salt marsh owl's clover (=johnny-nip) (SLC)

- Castilleja exserrta ssp. latifolia - purple owl's-clover (=wideleaf Indian paintbrush) (SLC)
- Chenopodium californicum - California goosefoot (SLC)
- Chorizanthe cuspidata var. cuspidata - San Francisco Bay spineflower (SC)
- Cirsium andrewsii - Franciscan thistle (SC)
- Clarkia davyi - Davy's clarkia (SLC)
- Collinsia corymbosa - Round-headed Chinese houses (SC)
- Croton californicus - California croton (SLC)
- Eriogonum caninum - Tiburon buckwheat (SLC)
- Erysimum franciscanum - San Francisco wallflower (SC)
- Gilia capitata ssp. chamissonis - San Francisco (=bluehead, Chamisso's, dune) gilia (SC)
- Gilia millefoliata - yarrow-leaf (=manyleaf, dark-eyed) gilia (SLC)
- Grindelia hirsutula var. maritima - San Francisco gumplant (SC)
- Horkelia cuneata ssp cuneata - wedgeleaf horkelia (SLC)
- Horkelia cuneata ssp. sericea - Kellogg's horkelia (SC)
- Linanthus grandiflorus - large-flowered (=flower) linanthus (SC)
- Microseris paludosa - marsh microseris (=marsh silverpuffs) (SLC)
- Monardella undulata - curly-leaved (=curlyleaf) monardella (SC)
- Navarretia squarrosa - skunkbush (SLC)
- Orobanche californica ssp. californica - California broomrape (SLC)
- Piperia elegans - coast (=elegant) rein-orchid (=piperia) (SLC)
- Plagiobothrys chorisianus var chorisianus - Choris's (=artist's) popcorn-flower (SLC)
- Plagiobothrys diffusus - San Francisco popcornflower (CA)
- Plagiobothrys reticulatus var. rossianorum - Greene's popcorn flower (SC)
- Sanicula maritima - adobe sanicle (SC)
- Silene verecunda ssp. verecunda - Mission Delores (=San Francisco) campion (SC)
- Spartina foliosa - Pacific cordgrass (=California cordgrass) (SLC)
- Tanacetum camphoratum - dune (=camphor) tansy (SC)
- Triphysaria floribunda - San Francisco owl's-clover (SC)
- Triquetrella californica - California triquetrella moss (SLC)

County Lists

San Francisco

Listed Species

Invertebrates

- Haliotes sorenseni - white abalone (E) (NMFS)
- Icaricia icarioides missionensis - mission blue butterfly (E)
- Incisalia mossii bayensis - San Bruno elfin butterfly (E)

Fish

- Eucyclogobius newberryi - tidewater goby (E)
- Hypomesus transpacificus - delta smelt (T)

- Oncorhynchus kisutch - coho salmon - central CA coast (T) (NMFS)
- Oncorhynchus mykiss - Central California Coastal steelhead (T) (NMFS)
- Oncorhynchus tshawytscha - winter-run chinook salmon (E) (NMFS)

Amphibians

- Rana aurora draytonii - California red-legged frog (T)

Reptiles

- Caretta caretta - loggerhead turtle (T) (NMFS)
- Chelonia mydas (incl. agassizi) - green turtle (T) (NMFS)
- Dermochelys coriacea - leatherback turtle (E) (NMFS)
- Lepidochelys olivacea - olive (=Pacific) ridley sea turtle (T) (NMFS)

Birds

- Charadrius alexandrinus nivosus - western snowy plover (T)
- Diomedea albatrus - short-tailed albatross (E)
- Haliaeetus leucocephalus - bald eagle (T)
- Pelecanus occidentalis californicus - California brown pelican (E)
- Rallus longirostris obsoletus - California clapper rail (E)

Mammals

- Arctocephalus townsendi - Guadalupe fur seal (T) (NMFS)
- Balaenoptera borealis - sei whale (E) (NMFS)
- Balaenoptera musculus - blue whale (E) (NMFS)
- Balaenoptera physalus - finback (=fin) whale (E) (NMFS)
- Eubalaena glacialis - right whale (E) (NMFS)
- Eumetopias jubatus - Steller (=northern) sea-lion (T) (NMFS)
- Megaptera novaeangliae - humpback whale (E) (NMFS)
- Physeter catodon (=macrocephalus) - sperm whale (E) (NMFS)
- Reithrodontomys raviventris - salt marsh harvest mouse (E)

Plants

- Arctostaphylos hookeri ssp. ravenii - Presidio (=Raven's) manzanita (E)
- Arenaria paludicola - marsh sandwort (E)
- Clarkia franciscana - Presidio clarkia (E)
- Hesperolinon congestum - Marin dwarf-flax (=western flax) (T)
- Layia carnosa - beach layia (E)
- Lessingia germanorum - San Francisco lessingia (E)

Candidate Species

Invertebrates

- Haliotes cracherodii - black abalone (C) (NMFS)

Fish

- Acipenser medirostris - green sturgeon (C)

Species of Concern

Invertebrates

- Adela oplerella - Opler's longhorn moth (SC)
- Cicindela hirticollis gravida - sandy beach tiger beetle (SC)
- Coelus globosus - globose dune beetle (SC)
- Hydrochara rickseckeri - Ricksecker's water scavenger beetle (SC)
- Lichnanthe ursina - bumblebee scarab beetle (SC)

Fish

- Lampetra ayresi - river lamprey (SC)
- Lampetra tridentata - Pacific lamprey (SC)
- Pogonichthys macrolepidotus - Sacramento splittail (SC)
- Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

- Rana boylii - foothill yellow-legged frog (SC)

Reptiles

- Clemmys marmorata marmorata - northwestern pond turtle (SC)
- Clemmys marmorata pallida - southwestern pond turtle (SC)
- Phrynosoma coronatum frontale - California horned lizard (SC)

Birds

- Agelaius tricolor - tricolored blackbird (SC)
- Amphispiza belli belli - Bell's sage sparrow (SC)
- Arenaria melanocephala - black turnstone (SC)
- Botaurus lentiginosus - American bittern (SC)
- Buteo regalis - ferruginous hawk (SC)
- Calidris canutus - red knot (SC)
- Chaetura vauxi - Vaux's swift (SC)
- Contopus cooperi - olive-sided flycatcher (SC)
- Diomedia nigripes - black-footed albatross (SC)
- Elanus leucurus - white-tailed (=black shouldered) kite (SC)
- Empidonax traillii brewsteri - little willow flycatcher (CA)
- Falco peregrinus anatum - American peregrine falcon (D)
- Geothlypis trichas sinuosa - saltmarsh common yellowthroat (SC)
- Haematopus bachmani - black oystercatcher (SC)
- Histrionicus histrionicus - Harlequin duck (SC)
- Lanius ludovicianus - loggerhead shrike (SC)
- Laterallus jamaicensis coturniculus - black rail (CA)

- Limosa fedoa - marbled godwit (SC)
- Melospiza melodia pusillula - Alameda (South Bay) song sparrow (SC)
- Numenius americanus - long-billed curlew (SC)
- Numenius phaeopus - whimbrel (SC)
- Oceanodroma homochroa - ashy storm-petrel (SC)
- Ptychoramphus aleuticus - Cassin's auklet (SC)
- Riparia riparia - bank swallow (CA)
- Rynchops niger - black skimmer (SC)
- Selasphorus rufus - rufous hummingbird (SC)
- Selasphorus sasin - Allen's hummingbird (SC)
- Sphyrapicus ruber - red-breasted sapsucker (SC)
- Sterna elegans - elegant tern (SC)
- Synthliboramphus hypoleucus - Xantus' murrelet (SC)

Mammals

- Corynorhinus (=Plecotus) townsendii townsendii - Pacific western big-eared bat (SC)
- Eschrichtius robustus - gray whale (D) (NMFS)
- Eumops perotis californicus - greater western mastiff-bat (SC)
- Myotis evotis - long-eared myotis bat (SC)
- Myotis thysanodes - fringed myotis bat (SC)
- Myotis volans - long-legged myotis bat (SC)
- Myotis yumanensis - Yuma myotis bat (SC)
- Neotoma fuscipes annectens - San Francisco dusky-footed woodrat (SC)
- Sorex vagrans halicoetes - salt marsh vagrant shrew (SC)

Plants

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- Chenopodium californicum - California goosefoot (SLC)
- Chorizanthe cuspidata var. cuspidata - San Francisco Bay spineflower (SC)
- Cirsium andrewsii - Franciscan thistle (SC)
- Cirsium occidentale var. compactum - compact cobweb thistle (SC)
- Clarkia davyi - Davy's clarkia (SLC)
- Collinsia corymbosa - Round-headed Chinese houses (SC)
- Croton californicus - California croton (SLC)
- Erysimum franciscanum - San Francisco wallflower (SC)
- Fritillaria liliacea - fragrant fritillary (= prairie bells) (SC)
- Gilia capitata ssp. chamissonis - San Francisco (=bluehead, Chamisso's, dune) gilia (SC)
- Gilia millefoliata - yarrow-leaf (=manyleaf, dark-eyed) gilia (SLC)
- Grindelia hirsutula var. maritima - San Francisco gumplant (SC)
- Helianthella castanea - Diablo helianthella (=rock-rose) (SC)
- Hesperevax sparsiflora var. brevifolia - short-leaved evax (SC)

- Horkelia cuneata ssp cuneata - wedgeleaf horkelia (SLC)
- Horkelia cuneata ssp. sericea - Kellogg's horkelia (SC)
- Lilium maritimum - coast lily (SC)
- Linanthus grandiflorus - large-flowered (=flower) linanthus (SC)
- Linanthus rosaceus - rose linanthus (SC)
- Microseris paludosa - marsh microseris (=marsh silverpuffs) (SLC)
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- Stellaria littoralis - seashore (=coast, =beach) starwort (SC)
- Tanacetum camphoratum - dune (=camphor) tansy (SC)
- Triphysaria floribunda - San Francisco owl's-clover (SC)
- Triquetrella californica - California triquetrella moss (SLC)

Key:

- (E) Endangered - Listed (in the Federal Register) as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed (in the Federal Register) for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Marine Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (CA) Listed by the State of California but not by the Fish & Wildlife Service.
- (D) Delisted - Species will be monitored for 5 years.
- (SC) Species of Concern/(SLC) Species of Local Concern - Other species of concern to the Sacramento Fish & Wildlife Office.

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regard-less of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the quad or quads covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the nine surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. However you should contact the California Department of Fish and Game Wildlife and Habitat Data Analysis Branch for official information about these species.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two

procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compen-sates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our critical habitat page for maps.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

Your list may contain a section called Species of Concern. This is an informal term that refers to those species that the Sacramento Fish and Wildlife Office believes might be in need of concentrated conservation actions. Such conservation actions vary depending on the health of the populations and

degree and types of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species may need to be listed as a Federal threatened or endangered species. Species of concern receive no legal protection and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be October 05, 2004.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

July 7, 2004

Document Number: 040707111903

Martha Lowe
Environmental Science Associates
436 14th Street
Oakland, CA 94602

Subject: Species List for Doyle Drive Expansion Project

Dear: Ms. Lowe

We are sending this official species list in response to your July 7, 2004 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested. You have stated that this list is for consultation with the Fish & Wildlife Service.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be October 05, 2004.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found at sacramento.fws.gov/es/branches.htm.

Endangered Species Division

APPENDIX B

TECHNICAL MEMORANDA

DIRECT PERMANENT AND TEMPORARY IMPACTS ON BIOLOGICAL RESOURCES FOR EACH ALTERNATIVE AND ASSOCIATED OPTIONS

Plant Community	Number of Hectares (Acres) in Doyle Drive Construction Corridor	Permanent Impact	Hectare / Acre	Temporary Impact Areas	Hectare / Acre
Non-native Introduced Forest and Ornamental Wildlife Habitat (Historic Forest and Ornamental tree groves)	9.95 (24.59)	Alt 2 Detour	2.37 / 5.86	Alt 2 Detour	0.67 / 1.65
		Alt 2 No Detour	2.57 / 6.35	Alt 2 No Detour	0.59 / 1.45
		Alt 5 Diamd/Circle/Loop	4.54 / 11.23	Alt 5 Diamd/Circle/Loop	1.18 / 2.91
		Alt 5 Diamd/Circle/Loop/Mercht	5.01 / 12.38	Alt 5 Diamd/Circle/Loop/Mercht	1.18 / 2.91
		Alt 5 Diamd/Circle/Hook	4.61 / 11.39	Alt 5 Diamd/Circle/Hook	1.22 / 3.02
		Alt 5 Diamd/Circle/Hook/Mercht	5.07 / 12.54	Alt 5 Diamd/Circle/Hook/Mercht	1.22 / 3.02
Riparian Scrub (arroyo willow and blackberry)	0.59 (1.46)	Alt 2 Detour	0.17 / 0.42 (W-2,3,6a,6c)	Alt 2 Detour	0.01 / 0.02 (W-6b)
		Alt 2 No Detour	0.17 / 0.42 (W-2,3,6a,6c)	Alt 2 No Detour	0.01 / 0.02 (W-6b)
		Alt 5 Diamd/Circle/Loop	0.18 / 0.44 (W-2,3,6a,6b,6c)	Alt 5 Diamd/Circle/Loop	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Loop/Mercht	0.18 / 0.44 (W-2,3,6a,6b,6c)	Alt 5 Diamd/Circle/Loop/Mercht	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook	0.18 / 0.44 (W-2,3,6a,6b,6c)	Alt 5 Diamd/Circle/Hook	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook/Mercht	0.18 / 0.44 (W-2,3,6a,6b,6c)	Alt 5 Diamd/Circle/Hook/Mercht	0.06 / 0.16 (W-5)
Central Coast Arroyo Willow as a component of Riparian Scrub (i.e., W-2, W-4 (Corps) and W-5 (NPS/PT))	0.51 (1.27)	Alt 2 Detour	0.10 / 0.25 (W-2)	Alt 2 Detour	--
		Alt 2 No Detour	0.10 / 0.25 (W-2)	Alt 2 No Detour	--
		Alt 5 Diamd/Circle/Loop	0.10 / 0.25 (W-2)	Alt 5 Diamd/Circle/Loop	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Loop/Mercht	0.10 / 0.25 (W-2)	Alt 5 Diamd/Circle/Loop/Mercht	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook	0.10 / 0.25 (W-2)	Alt 5 Diamd/Circle/Hook	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook/Mercht	0.10 / 0.25 (W-2)	Alt 5 Diamd/Circle/Hook/Mercht	0.06 / 0.16 (W-5)

DIRECT PERMANENT AND TEMPORARY IMPACTS ON BIOLOGICAL RESOURCES FOR EACH ALTERNATIVE AND ASSOCIATED OPTIONS (CONT.)

Plant Community	Number of Hectares (Acres) in Doyle Drive Construction Corridor	Permanent Impact	Hectare / Acre	Temporary Impact Areas	Hectare / Acre
Blackberry riparian scrub as a component of Riparian Scrub	0.08 (0.19)	Alt 2 Detour	0.07 / 0.17 (W-6a,6c)	Alt 2 Detour	0.01 / 0.02 (W-6b)
		Alt 2 No Detour	0.07 / 0.17 (W-6a,6c)	Alt 2 No Detour	0.01 / 0.02 (W-6b)
		Alt 5 Diamd/Circle/Loop	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Loop	--
		Alt 5 Diamd/Circle/Loop/Mercht	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Loop/Mercht	--
(i.e., W-6a, W-6b, W-6c (NPS/PT))		Alt 5 Diamd/Circle/Hook	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Hook	--
		Alt 5 Diamd/Circle/Hook/Mercht	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Hook/Mercht	--
					--
Non-native grassland	0.05 (0.13)	Alt 2 Detour	--	Alt 2 Detour	--
		Alt 2 No Detour	--	Alt 2 No Detour	--
		Alt 5 Diamd/Circle/Loop	0.02 / 0.04	Alt 5 Diamd/Circle/Loop	--
		Alt 5 Diamd/Circle/Loop/Mercht	0.02 / 0.04	Alt 5 Diamd/Circle/Loop/Mercht	--
		Alt 5 Diamd/Circle/Hook	0.01 / 0.03	Alt 5 Diamd/Circle/Hook	--
		Alt 5 Diamd/Circle/Hook/Mercht	0.01 / 0.03	Alt 5 Diamd/Circle/Hook/Mercht	--
Seasonal Wetland	0.11 (0.28)	Alt 2 Detour	0.11 / 0.28 (Corps)	Alt 2 Detour	--
(i.e., W-3)		Alt 2 No Detour	0.11 / 0.28 (Corps)	Alt 2 No Detour	--
		Alt 5 Diamd/Circle/Loop	0.11 / 0.28 (Corps)	Alt 5 Diamd/Circle/Loop	--
		Alt 5 Diamd/Circle/Loop/Mercht	0.11 / 0.28 (Corps)	Alt 5 Diamd/Circle/Loop/Mercht	--
		Alt 5 Diamd/Circle/Hook	0.11 / 0.28 (Corps)	Alt 5 Diamd/Circle/Hook	--
		Alt 5 Diamd/Circle/Hook/Mercht	0.11 / 0.28 (Corps)	Alt 5 Diamd/Circle/Hook/Mercht	--

Plant Community	Number of Hectares (Acres) in Doyle Drive Construction Corridor	Permanent Impact	Hectare / Acre	Temporary Impact Areas	Hectare / Acre
Seasonal stream (i.e., Tennessee Hollow)	0.06 (0.15)	Alt 2 Detour	--	Alt 2 Detour	0.06 / 0.15 (Corps)
		Alt 2 No Detour	--	Alt 2 No Detour	0.06 / 0.15 (Corps)
		Alt 5 Diamd/Circle/Loop	--	Alt 5 Diamd/Circle/Loop	0.06 / 0.15 (Corps)
		Alt 5 Diamd/Circle/Loop/Mercht	--	Alt 5 Diamd/Circle/Loop/Mercht	0.06 / 0.15 (Corps)
		Alt 5 Diamd/Circle/Hook	--	Alt 5 Diamd/Circle/Hook	0.06 / 0.15 (Corps)
		Alt 5 Diamd/Circle/Hook/Mercht	--	Alt 5 Diamd/Circle/Hook/Mercht	0.06 / 0.15 (Corps)
Perennial stream habitat (i.e., Battery Howe-Wagner (BHW) (Corps), Lower Dragonfly Creek (Corps))	0.02 (0.05)	Alt 2 Detour	0.01 / 0.02 (BHW)	Alt 2 Detour	--
		Alt 2 No Detour	0.01 / 0.02 (BHW)	Alt 2 No Detour	--
		Alt 5 Diamd/Circle/Loop	0.01 / 0.02 (BHW)	Alt 5 Diamd/Circle/Loop	--
		Alt 5 Diamd/Circle/Loop/Mercht	0.01 / 0.02 (BHW)	Alt 5 Diamd/Circle/Loop/Mercht	--
		Alt 5 Diamd/Circle/Hook	0.01 / 0.02 (BHW)	Alt 5 Diamd/Circle/Hook	--
		Alt 5 Diamd/Circle/Hook/Mercht	0.01 / 0.02 (BHW)	Alt 5 Diamd/Circle/Hook/Mercht	--
Northern Coastal Scrub on sandy soils	0.30 (0.73)	Alt 2 Detour	0.16 / 0.40	Alt 2 Detour	0.04 / 0.11
		Alt 2 No Detour	0.17 / 0.43	Alt 2 No Detour	0.02/ 0.06
		Alt 5 Diamd/Circle/Loop	0.20 / 0.50	Alt 5 Diamd/Circle/Loop	0.01 / 0.02
		Alt 5 Diamd/Circle/Loop/Mercht	0.20 / 0.50	Alt 5 Diamd/Circle/Loop/Mercht	0.01 / 0.02
		Alt 5 Diamd/Circle/Hook	0.20 / 0.50	Alt 5 Diamd/Circle/Hook	0.01 / 0.02
		Alt 5 Diamd/Circle/Hook/Mercht	0.20 / 0.50	Alt 5 Diamd/Circle/Hook/Mercht	0.01 / 0.02

DIRECT PERMANENT AND TEMPORARY IMPACTS ON BIOLOGICAL RESOURCES FOR EACH ALTERNATIVE AND ASSOCIATED OPTIONS (CONT.)

Plant Community	Number of Hectares (Acres) in Doyle Drive Construction Corridor	Permanent Impact	Hectare / Acre	Temporary Impact Areas	Hectare / Acre
Northern Coastal Scrub on sandy soil with serpentinite inclusions	0.71 (1.76)	Alt 2 Detour	0.20 / 0.50	Alt 2 Detour	0.06 / 0.16
		Alt 2 No Detour	0.20 / 0.50	Alt 2 No Detour	0.06 / 0.16
		Alt 5 Diamd/Circle/Loop	0.27 / 0.67	Alt 5 Diamd/Circle/Loop	0.30 / 0.73
		Alt 5 Diamd/Circle/Loop/Mercht	0.37 / 0.91	Alt 5 Diamd/Circle/Loop/Mercht	0.30 / 0.73
		Alt 5 Diamd/Circle/Hook	0.20 / 0.49	Alt 5 Diamd/Circle/Hook	0.35 / 0.87
		Alt 5 Diamd/Circle/Hook/Mercht	0.30 / 0.73	Alt 5 Diamd/Circle/Hook/Mercht	0.35 / 0.87

Note: All parenthetic text correspond with the wetland map symbols identified in Figure 3-4 and Table 5-3; BHW = Battery Howe Wagner.

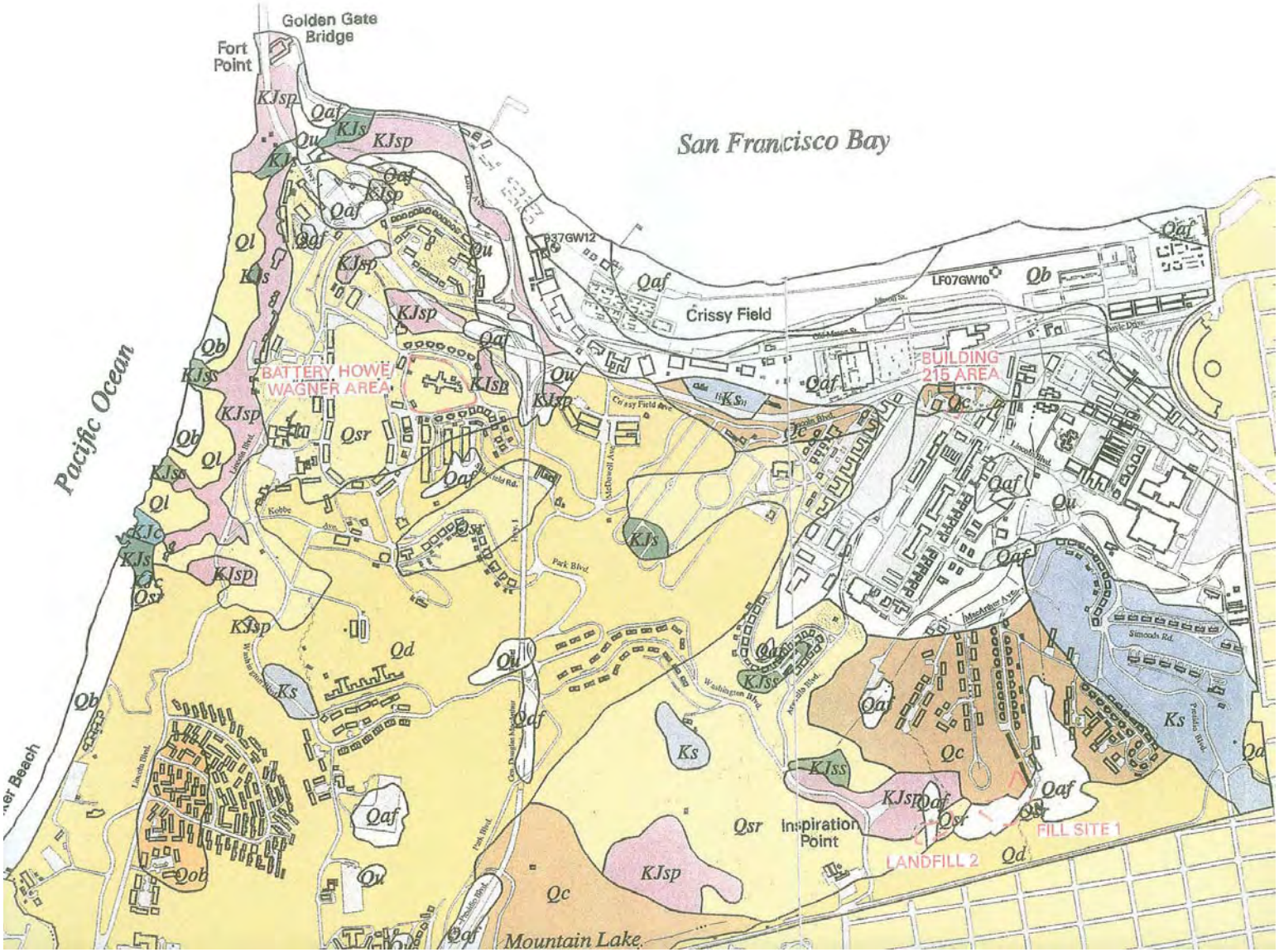
Source:Environmental Science Associates, 2004, 2005.

DIRECT PERMANENT AND TEMPORARY IMPACTS ON WETLANDS FOR EACH ALTERNATIVE AND ASSOCIATED OPTIONS

Type	Number of Hectares (Acres) in Doyle Drive Construction Corridor	Permanent Impact	Hectare / Acre	Temporary Impact Areas	Hectare / Acre
Corps wetland	0.30 / 0.73 (when all #s rounded to hundredths)	Alt 2 Detour	0.22 / 0.55 (W-2,3, BHW)	Alt 2 Detour	0.06 / 0.15 (Tenn Holl)
		Alt 2 No Detour	0.22 / 0.55 (W-2,3, BHW)	Alt 2 No Detour	0.06 / 0.15 (Tenn Holl)
		Alt 5 Diamd/Circle/Loop	0.22 / 0.55 (W-2,3, BHW)	Alt 5 Diamd/Circle/Loop	0.06 / 0.15 (Tenn Holl)
		Alt 5 Diamd/Circle/Loop/Mercht	0.22 / 0.55 (W-2,3, BHW)	Alt 5 Diamd/Circle/Loop/Mercht	0.06 / 0.15 (Tenn Holl)
		Alt 5 Diamd/Circle/Hook	0.22 / 0.55 (W-2,3, BHW)	Alt 5 Diamd/Circle/Hook	0.06 / 0.15 (Tenn Holl)
		Alt 5 Diamd/Circle/Hook/Mercht	0.22 / 0.55 (W-2,3, BHW)	Alt 5 Diamd/Circle/Hook/Mercht	0.06 / 0.15 (Tenn Holl)
Cowardin wetland (excluding Corps wetlands)	0.49 / 1.21	Alt 2 Detour	0.07 / 0.17 (W-6a,6c)	Alt 2 Detour	0.01 / 0.02 (W-6b)
		Alt 2 No Detour	0.07 / 0.17 (W-6a,6c)	Alt 2 No Detour	0.01 / 0.02 (W-6b)
		Alt 5 Diamd/Circle/Loop	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Loop	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Loop/Mercht	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Loop/Mercht	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Hook	0.06 / 0.16 (W-5)
		Alt 5 Diamd/Circle/Hook/Mercht	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Hook/Mercht	0.06 / 0.16 (W-5)
Cowardin wetland (including Corps wetlands)	0.79 / 1.94	Alt 2 Detour	0.29 / 0.72	Alt 2 Detour	0.07 / 0.17
		Alt 2 No Detour	0.29 / 0.72	Alt 2 No Detour	0.07 / 0.17
		Alt 5 Diamd/Circle/Loop	0.30 / 0.74	Alt 5 Diamd/Circle/Loop	0.13 / 0.31
		Alt 5 Diamd/Circle/Loop/Mercht	0.30 / 0.74	Alt 5 Diamd/Circle/Loop/Mercht	0.13 / 0.31
		Alt 5 Diamd/Circle/Hook	0.30 / 0.74	Alt 5 Diamd/Circle/Hook	0.13 / 0.31
		Alt 5 Diamd/Circle/Hook/Mercht	0.30 / 0.74	Alt 5 Diamd/Circle/Hook/Mercht	0.13 / 0.31

Non-habitat areas (ornamental landscape (lawn, isolated trees and shrubs), buildings, paved areas, roadways) total 86.14 ac. Area of construction corridor is 116.75 ac.

Source:Environmental Science Associates, 2004, 2005.



SOURCE: Schlocker, 1974

Appendix B-1
Bedrock Types in Presidio of San Francisco

ESA Environmental Science Associates

M E M O R A N D U M

TO • 980304 Files - Doyle Drive

FROM • Thomas A. Roberts, CWB

DATE • June 31,200517, 2001

SUBJECT • Bird Survey and Special-Status Species Habitat Evaluations at Doyle Drive Wetland Sites

---

On June 17, 2001 I surveyed all of the wetland habitat sites potentially affected by (i.e., either within or adjacent to) the Doyle Drive Project area. These excluded sites W-1 and W-8 and are referenced as per Figure 2 *Doyle Drive Corridor Wetland Delineation* in the Project documentation. I was in the area from 0700 to 0900 hrs. The sky was clear and windless, the temperature ranged between 55 and 65 degrees F. Since this was a Sunday morning, there was relatively little disturbance in a usually very busy urban park environment. Only those bird species clearly associated with the habitats surveyed were recorded; transient birds were not included.

The smaller sites (W-3, W-5, W-6, and W-7) were relatively low value habitat sites. Small size, limited plant species structural and height diversity, and a high level of ambient disturbance combine to limit the use of these sites by breeding birds. W-2 and W-4, however, support riparian vegetation that approaches the composition and structure of more natural Bay Area environments, and would be considered patches of minimal size to support species of concern (special-status species). The following species were observed:

Oregon junco (*Junco oregonus*)
Brown towhee (*Pipilio fuscus*)
Black phoebe (*Sayornis nigricans*)
House finch (*Carpodacus mexicanus*)
Anna's Hummingbird (*Calypte anna*)
American goldfinch (*C. tristis*)
Wilson's warbler (*Wilsonia pusilla*)
Black-headed grosbeak (*Pheucticus melanocephalus*)

The presence of Wilson's warbler (a riparian obligate) at site W-2 in mid June suggests that both W-2 and W-4 have the potential to support other willow-riparian dependent species. In particular, yellow warbler (*Dendroica petechia brewsteri*) observed at Crissy Field (NPS File information) is a potential (though unlikely) breeder at both W-2 and W-4. The yellow warbler is a "Species of Special Concern" in California. A pre-construction survey to avoid nest destruction is advisable if construction occurs during the breeding season for any of the riparian-dependent birds. Because of the presence of hummingbirds, which can begin breeding in February in the Bay Area, the breeding season should be considered to be Feb. 15 through July 15.

The areas are not, however, dense or extensive enough to support little willow flycatcher (*Empidonax trailii brewsteri*) or willow flycatcher (*Empidonax traillii extimus*) (Sedgwick, J. A. and F. L. Knopf. 1992. Describing Willow Flycatcher habitats: scale perspectives and gender differences. Condor 94:720-733).

ESA Environmental Science Associates

M E M O R A N D U M

TO • 980304 Files - Doyle Drive

FROM • Thomas A. Roberts, CWB

DATE • April 16, 2002

SUBJECT • Bat and Red-legged Frog Habitat Assessment for Doyle Drive

---

On April 12, 2002 bat specialist, Greg Tatarian, and I re-surveyed all of the project area (potential bat roosts and wetland habitat sites) in response to Caltrans' comments on the draft July 2001 Natural Environmental Study (letter from Randell H. Iwasaki, Acting District Director, January 31, 2002). Caltrans requested that the NES explain and evaluate in more detail the potential impact to Yuma myotis bat and other bats of special concern, and noted that, since some areas which hold water until September can also provide habitat for the California red-legged frog, frog potential be re-assessed as well.

Special Status and Other Bat Species

Exterior surveys were conducted of two buildings – one wood framed, composite-shingled single-level building (Bldg. 230), and a nearby concrete single-level structure (Bldg. 231). Surveys of the buildings were conducted with a 45,000 candlepower focused-beam flashlight and a digital video/still camera with 20x zoom.

The elevated sections of Doyle Drive from the abutments near Crook Street, on the eastern portion of the Presidio, to just before the toll plaza, were surveyed, as well as the abutment for the elevated roadway at Lincoln and Storey. Surveys of the bridge, supports, and adjacent trees were conducted using 10 x 42 roof-prism binoculars, a 45,000 candlepower focused-beam flashlight, and a digital video/still camera with 20x zoom. All areas beneath the roadway were first reconnoitered by vehicle, and then walked on foot. Areas inaccessible by vehicle or foot were examined with the aid of binoculars and/or camera. Trees were not surveyed individually, but assessed according to proximity of the roadway and potential for cavities.

Building. No bats were observed, and no evidence of use by bats (fecal matter or staining) was observed at either of the two structures, although the wood building has numerous openings suitable for entry by bats. Openings were found where rafters were spaced closely together and blocking was absent, and around the rear sliding doors. No fecal matter was observed at the ground level, on the windowsills, or walls, and no urine staining was observed.

Bridge/Roadway Structure. No bats were observed, and no evidence of use by bats was observed along the entire surveyed length of Doyle Drive. Evidence of significant use by pigeons (*Columba livia*) was observed, and European starlings (*Sturnus vulgaris*) were observed entering numerous cavities that could potentially provide access by bats. Though portions of the bridge contain suitable night-roosting habitat, no evidence was observed of past or present use. The bridge structure contains few expansion joints, which are often used by bats for day and/or night roosting. The only expansion joints observed were filled with packing material. No urine staining was found at any observed location along the structure. No fecal matter was found either adhered to concrete surfaces or accumulated on ground surfaces below potential roost areas.

Trees. Trees were not surveyed individually, however, large trees in close proximity to the structure were examined with the aid of binoculars for any obvious cavities or openings. Most of the trees observed were Monterey cypress (*Cupressus macrocarpa*) and Eucalyptus (*Eucalyptus* sp.). Though many of the trees adjacent to the bridge/roadway structure are mature and large in size, neither tree species is indigenous. Eucalyptus is not prone to support cavities of any significant size, which may be suitable as roosts for indigenous colonial species of bats. Cypress trees observed showed evidence of regular maintenance (limb removal), and did not exhibit obvious cavities. The bark of the cypress trees observed did not appear to provide significant roost habitat, which normally occurs in trees with bark that is thick, and forms fissures or is exfoliating.

Because the two buildings surveyed lack any evidence of use by bats, it should be considered that the removal of these structures is unlikely to pose an impact to roosting bats, even though potential openings exist. Buildings such as these, that have been in existence for extended periods without previous use by bats, likely do not provide suitable roosting habitat. However, it might be advisable to have a pre-demolition bat survey conducted of the wood structure by a qualified biologist. The concrete building appears to provide no suitable roosting habitat or openings into the structure.

About half of the bridge/roadway structure is constructed of concrete (starting at the abutment at the on ramp to Highway 101); the remainder of the structure is steel, with a pavement road deck on top of steel plates. The absence of evidence of bat use of the bridge structure is significant; the bridge offers suitable features for night-roosting activity, though no evidence of either day or night roosting activity was observed, either on the structure, or on the ground below.

Among tree-roosting bat species likely to occur in this area, the solitary, foliage-roosting Western red bat (*Lasiurus blossevillii*), a Western Bat Working Group High Priority species, is strongly associated with leafy trees such as cottonwood, sycamore, oak and walnut in riparian edge zones (Shump and Shump, 1982). None of these trees occur within the project footprint.

In our opinion, although some modest structural habitat is available, it is unused, and thus it is unlikely that the proposed project will pose a significant negative impact to bats.

California Red-legged Frog

All of the wetland habitat sites potentially affected by (i.e., either within or adjacent to) the Doyle Drive Project area were re-surveyed, as part of a more robust red-legged frog habitat assessment.

The most recent document, which evaluates suitable habitat, is the U.S. Fish and Wildlife Service *Draft Recovery Plan for the California Red-legged Frog* (January 2000). This document describes the frog as breeding in a variety of aquatic habitats, from deep pools to marshes and sag ponds, and in shallow sections of streams with and without riparian vegetation. Since larvae typically metamorphose between July and September, features incapable of holding water into this period would be unlikely to support successful reproduction; moreover, since egg masses (deposited between November and April) need to be laid in water, some ponding of a depth sufficient to float egg masses must be present during this period to even attract frogs to breed at the site.

The wetland sites within and adjacent to the limits of construction are not the result of ponded water at any time of year. That is, they are wetlands derived from subsurface water flow, and vegetation, although it suggests the presence of water, does not provide frog habitat. The largest and most diverse sites, wetlands W-2 and W-4, are on a hillside which allows some water to accumulate at the toe of the slope, but a concrete drainage channel conducts this water away. Where the channel is absent, water is briefly held but not collected: there is a strip of saturated soil which supports a few cattails (*Typha* sp.) but no defined bank or bed. No water was present on April 12.

In our opinion, no suitable habitat is available for red-legged frog, and the project will have no effect on the species.

ESA Environmental Science Associates

TECHNICAL MEMORANDUM

TO • 204235 Files - Doyle Drive

FROM • Tom Roberts and Yolanda Molette, ESA

DATE • Revised August 27, 2004

SUBJECT • Evaluation of noise and air quality effects for the Doyle Drive Environmental and Design Study Natural Environmental Study

Air Quality

ESA reviewed a preliminary draft of the updated air quality report and incorporated appropriate data (e.g., fugitive dust) relating to biological resources in the current draft of the NES. The NES concluded that demolition, excavation and grading activities during the dry season under all build alternatives would result in dust, which could temporarily cover the leaves of plants and reduce light and gas exchange. As identified in the 2004 Air Quality Report, 'dust emissions from construction would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather.' Effects on common vegetation due to dust emissions during the dry season would be locally adverse, but less than significant. Effects on special-status plants due to dust emissions during the dry season would be considered significant if measures to minimize project-related dust are not implemented. The project proponent would be required to implement the Bay Area Air Quality Management District's basic dust control procedures. Refer to the 2004 Air Quality report for a description of measures that would avoid or minimize dust in the project study area." This conclusion does not change the analysis of air quality effects on plants, thus, no changes to the current draft of NES are necessary.

Noise

ESA biologists coordinated with the noise and vibration team to update this memo based on noise data collected between June 28 and July 2, 2004. The results of the 2004 data do not change the analysis of noise effects on wildlife, thus, no changes to the current draft of the NES are necessary.

ESA's analysis of noise in the Doyle Drive area assumes that measures to minimize construction noise levels would be consistent with Caltrans standard requirements and the City and County of San Francisco Noise Ordinance (see Noise and Vibration Study for a description on noise regulations). A similar discussion is made in the discussion below.

Data Inadequacy

The majority of studies on the effects of noise on birds have dealt with reproductive effects on poultry or behavioral response of wild birds; little work has been done on the physiological or population implications for the latter group, and almost no literature that would enable a species-by-species sensitivity comparison for all the birds or other wildlife resident in the Doyle Drive area. Moreover, few of the studies that have been completed are relevant to the evaluation of impacts at Doyle Drive, either because the species studied are not present or the experimental design was established to test noise levels such as sonic boom or aircraft (Manci et al., 1988).

Rationale for Impact Evaluation

Due to the scarcity of data, most environmental analyses do not consider in any detailed way how noise—at least noise within the levels common to development projects -- might impact wildlife. General background noise in natural settings is considered by the National Park Service, to cite one source, to be less than 60 dBA (NPS, 2000). Existing noise levels from traffic and other sources was measured within the Presidio between June 28 and July 2, 2004. Fifty-three 15 minute sets of readings were taken during that time. The measured noise levels ranged from an Leq (the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period) of 57 dBA (decibels on the A-weighted scale) to 84.5 dBA. The average noise levels measured was 70 dBA. Automobile noise frequently ranges up to 90 dBA at 50 feet (EPA, 1978) and is projected to reach similar levels along the reconstructed Doyle Drive. Construction activities typically operate in the range of 80-90 dBA at 50 feet (Schexnayder & Ernzen, 1999).

In a natural setting, we would consider the impacts of an increase in noise potentially significant for wildlife (i.e., an increase from less than 60 to between 80-90 dBA). However, at the Presidio noise typical of construction and operation is not expected to be substantially different from the existing noise levels. Therefore, impacts from the build alternatives on birds and other biota would not differ from the baseline in any way that we could quantify without undue speculation.

This is not to say that noise has no effect, or that all animals have habituated--the degree of disturbance to which animals can habituate is probably limited. Our conclusion as to the degree of impact is based on an assessment that those species with high levels of noise sensitivity are likely not present, i.e. the effect of disturbance has already happened at Doyle Drive, and construction activities currently occur in the vicinity of the Doyle Drive Project.

Literature Cited

California Department of Parks and Recreation (CDPR) and National Park Service (NPS), April 2000. Redwood National and State Parks, Final General Management Plan Environmental Impact Statement/Environmental Impact Report.

Environmental Protection Agency (EPA). 1978. Protective noise levels: Condensed Version of EPA Levels Document. EPA 550/9-79-l00.

Manci, K.M., Gladwin, D.N., Villella, R., and M.G.Cavendish. 1988. Effects of aircraft noise and sonic booms on domestic animals and wildlife: a literature synthesis NERC-88/29. U.S. Fish Wildl. Serv., National Ecology Research Center, Fort Collins, CO. 88 pp.

Schexnayder, Cliff J. and Ernzen, James. 1999. Mitigation of nighttime construction noise, vibrations, and other nuisances. NCHRP Synthesis 218; National Cooperative Highway Research Program, Transportation Research Board; Washington, DC, p. 8.

ESA Environmental Science Associates

TECHNICAL MEMORANDUM

TO • 980304 Files - Doyle Drive

FROM • Thomas A. Roberts, CWB

DATE • August 27, 2004

SUBJECT • Evaluation of vibration effects on wildlife for the *Doyle Drive Environmental and Design Study* – available literature

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ESA biologists coordinated with the noise and vibration team and reviewed a preliminary draft of the vibration section, which will be part of the 2004 Noise and Vibration Study, to update this memo. The analysis on vibration do not change the analysis of vibration effects on wildlife, thus, no changes to the current draft of the NES are necessary.

The purpose of this technical memorandum is to examine examples from the literature on the effects of vibration on wildlife in order to evaluate project impacts on wildlife in the Doyle Drive area.

Clearly some animals use vibration as sources of environmental information. Ross and Smith (1979) worked with salamanders in a laboratory setting and observed increases in activity over a vibration frequency range from 20 to 650 Hz. The results showed that the salamander ear is capable of transmitting considerable information about substrate vibrations to the central nervous system. Similarly, Shivik et al. (2000) were able to elicit predatory behavior in the brown treesnake using polymodal stimuli, which included vibration.

During the 1980s, several authors looked at the effects of off-road vehicles on desert vertebrates, and conjectured that low-intensity vibration might have effects such as causing spadefoot toads to emerge prematurely (see for example Brattstrom and Bondello, 1983).

One of the few studies attempting to correlate vibration and reproductive success in birds (Doresky et al., 2001) tried to assess the effects of selected military activities on reproductive success of birds. Noise and vibration levels were recorded at or directly adjacent to active red-cockaded woodpecker clusters that received significant use by the military on a regular basis (i.e., firing of small arms and artillery). Identical data were collected at active clusters that were not normally used by military personnel and that were perceived to be relatively free of such disturbances. Surprisingly, there were no significant differences between treatment and control sites with regard to the numbers of eggs, nestlings, adults, return rates of adults feeding young, or masses of nestlings and adults.

The preliminary vibration section suggests that typical construction equipment would generate vibration velocity approximately 10 dB higher than ambient conditions. Based on this and other assessments, there is little available information in the peer-reviewed literature on the effects of vibration on wildlife distinct from the effects of sound. This conclusion does not change the analysis of vibration effects on wildlife.

Literature Cited

Brattstrom, B.H. and M.C. Bondello. 1983. Effects of off-road vehicle noise on desert vertebrates. Pages 167-206 in R.H Webb and G. Wilshore, eds. Environmental effects of off-road vehicles. Impacts and management in arid regions. Springer-Verlag, New York.

Doresky, J.; Morgan, K.; Ragsdale, L.; Townsend, J.; Barron, M., and M. West. 2001. Effects of military activity on reproductive success of Red-cockaded Woodpeckers. J. Field Ornithology 72:305-311.

Ross, R. J. and J. J. B. Smith. 1979. Detection of substrate vibrations by salamanders: eighth cranial nerve activity. Can. J. Zool. 57:368-374.

Shivik, J.A.; Bourassa, J., and S. N. Donnigan. 2000. Elicitation of brown treesnake predatory behavior using polymodal stimuli. Journal of Wildlife Management 64:969-975.

ESA Environmental Science Associates

TECHNICAL MEMORANDUM

TO • 204235 Files - Doyle Drive

FROM • Chuck Bennett

DATE • July 30, 2004

SUBJECT • Evaluation of shade effects for the *Doyle Drive Natural Environmental Study*

Background

The natural ambient lighting that is available to plants and animals in the Tennessee Hollow area includes direct and scattered sunlight. Direct sunlight provides most of the light available, while sunlight that has been scattered in the atmosphere and reflected from the ground and waters of the Bay provides a portion of the available light. The presence of physical structures can strongly reduce the light available to plants by casting shadows – interrupting the direct sunlight that would otherwise be available. The extent to which a structure shadows any specific point on the ground depends upon the physical shape and dimensions of that structure and its distance from that specific point, as well as the geometric relationship of the structure and point with respect to the path of the sun in the sky.

The daily path of the sun across the sky is an arc that curves from east to west. The path of the shadows the sun casts on the ground is counter to the path of the sun in the sky. The sun rises in the east and sets in the west, while the shadows cast by the sun will fall to the west in the morning and will fall to the east in the afternoon. At solar noon, when the sun is due south and at its highest point overhead, shadows will fall to the north. During the course of the year, the arc of the sun through the sky is at its highest point during the summer solstice and at its lowest point at the winter solstice. As a result, noontime shadows are shortest around June 21st and longest around December 21st. On any given day, shadows are longest in the early morning and in the late evening when the sun is closest to the horizon.

The two objectives of this analysis are: 1) to provide basic information that will aid the determination of whether or not the project actions would have an adverse environmental effect on the vegetation that is anticipated to be a part of the Tennessee Hollow natural area restoration that is proposed as a part of the project; and, 2) to provide basic information about the extent and variation of shadow conditions in the Tennessee Hollow subarea due to the project alternatives.

IMPACTS AND MITIGATION

Methodology

The methodology of the shadow analysis of the Tennessee Hollow subarea begins with a topographic model of the vicinity and a simple structure model of the project alternatives. The next step is to calculate and depict the shadows that would be cast by each road segment within the boundaries of the Tennessee Hollow subarea. The shadow casting relies on accurate calculations of solar position for each day and time of interest. The method assumes that the area to be shadowed is flat; given the marsh use intended, this assumption introduces essentially no error. Since design of the structures is

not complete, insufficient information was available to determine support column design, numbers and locations; because the shadows cast by all support structures would necessarily fall under or within the region shadowed by the roadway, no error is introduced. The thickness of the roadway structure was assumed to be the same as the existing structures and was accounted for in the projections of the shadows from each alternative. The shadow outlines were projected onto the alternatives' plans to illustrate the extent of shadow for each alternative.

The areas of shadow and structure coverage that were used to assess the biological effect were calculated using roadway widths and segment lengths measured from project alternatives' plans. Overall, those area estimates should be accurate to within roughly ± 5 percent.

Shadow Impacts

As described in the Project Description, each of the project alternatives would result in various elevated roadway structures that would span the waterway centrally located within Tennessee Hollow. The height of the roadway structure above the projected water level would range from roughly 6 meters for the Parkway Alternative to about 9 meters for the highest of the other Build or No-Build Alternatives.

Shadow from the proposed road structures would generally extend to the west and northwest of the site in the morning, to the north at noon, and to the northeast and east in the afternoon. Mid-day shadows would be longer in the winter months, with the longest noontime shadow occurring on the winter solstice, December 21st. Mid-day shadows would be shorter in the summer months, with the shortest noontime shadow occurring on the summer solstice, June 21st. Lengths of the noontime shadow at the Tennessee Hollow waterway from the tallest of the roadway alternative structures would range from about 33 m on the winter solstice to less than 4 m on the summer solstice.

The following text describes aspects of project shadow conditions for each season:

Winter Solstice. On the winter solstice at 9 AM (mid-morning), shadow from the highest structure of Alternative 2 Replace and Widen would reach nearly 33 m northwest of the base of the structure. During the morning, shadows would shorten and move to the east-southeast. At noontime, that shadow would reach, at most, nearly 16 m to the north of the structure. During the afternoon, the shadows would lengthen again and move to the east-northeast. In mid-afternoon (3 PM), that shadow would reach, at most, about 28 m to the northeast of the base of the structure.

Shadows for the Alternative 1 No Build would reach corresponding distances of 26 m, 12 m and 23 m, respectively, and shadows for the Alternative 5 Parkway would reach corresponding distances of 23 m, 11 m and 20 m.

The Equinoxes. On the equinoxes, the first day of spring and the first day of fall, mid-morning shadow from the highest structure of Alternative 2 Replace and Widen would reach nearly 19 m west-northwest of the base of the structures. During the morning, the shadows would shorten and move eastward. At noontime, shadow would reach nearly 7 m north of the structure. During the afternoon, the shadows would lengthen again and continue to move eastward. In mid-afternoon, the shadow would reach up to 11 m northeast of the structure.

The shadows for the Alternative 1 No Build would reach corresponding distances of 15 m, 6 m and 9 m, respectively, and shadows for the Alternative 5 Parkway would reach corresponding distances of 14 m, 5 m and 8 m.

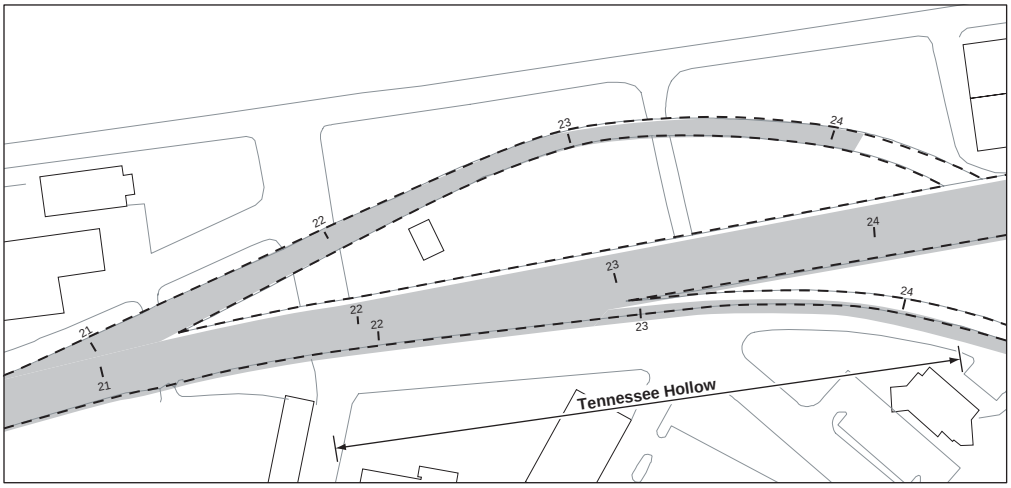
Summer Solstice. On the summer solstice at 9 AM (mid-morning), shadow from the highest structure of Alternative 2 Replace and Widen would reach about 12 m west of the base of the structure. During the morning, shadows would shorten and move to the east-northeast. At noontime, that shadow would reach, at most, about 3 m to the northwest of the structure. During the afternoon, the shadows would

lengthen again and move to the east-northeast. In mid-afternoon (3 PM), that shadow would reach, at most, less than 5 m to the east-northeast of the base of the structure.

Shadows for the Alternative 1 No Build would reach corresponding distances of 10 m, 3 m and 4 m, respectively, and shadows for the Alternative 5 Parkway would reach corresponding distances of 9 m, 3 m and 3 m.

See Figures 1 through 8. As is evident, the extent of shadow is small, as is the range of variation of shadow conditions from the largest shadows of winter to the smallest shadows of summer. For that reason, the shadow conditions at the spring and fall equinoxes are not illustrated.

As the figures demonstrate, the quantity of shadow in the Tennessee Hollow subarea that results for Alternative 1 No Build and Alternative 2 Replace and Widen are similar in size and in reach away from the structures, while the lower structures of the Alternative 5 Parkway result in less shadow because the roadway is partially on-grade and on lower structures. Thus, shadow from the Alternative 5 Parkway would cover less of the land area outside of the right-of-way than would the other Build and No-Build Alternatives



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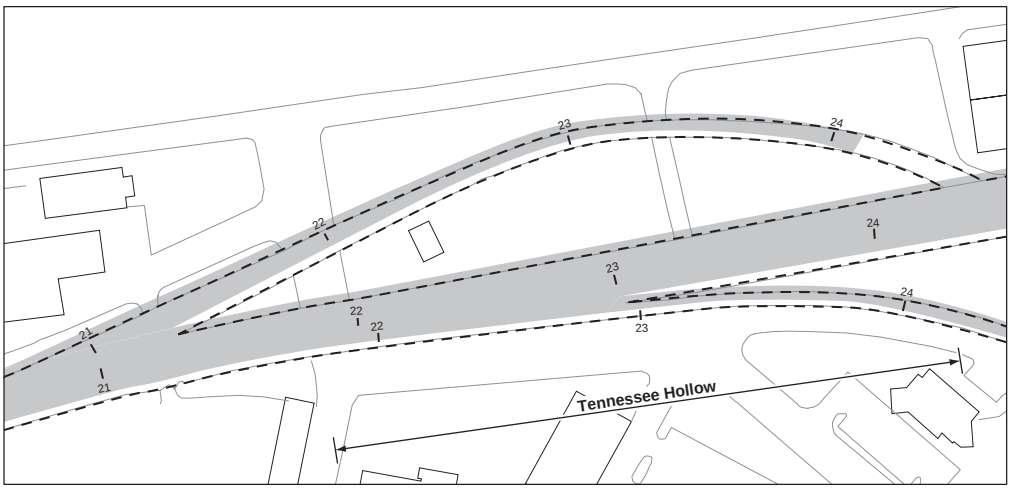

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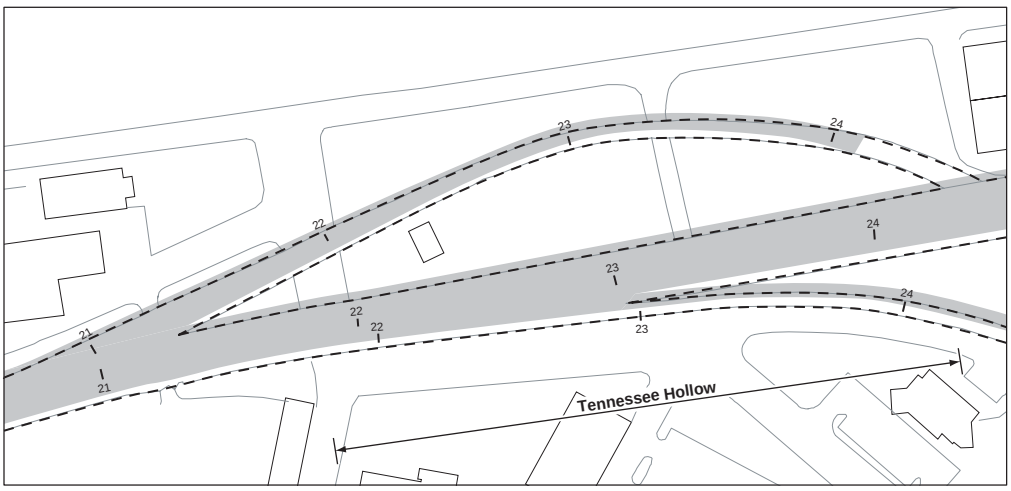

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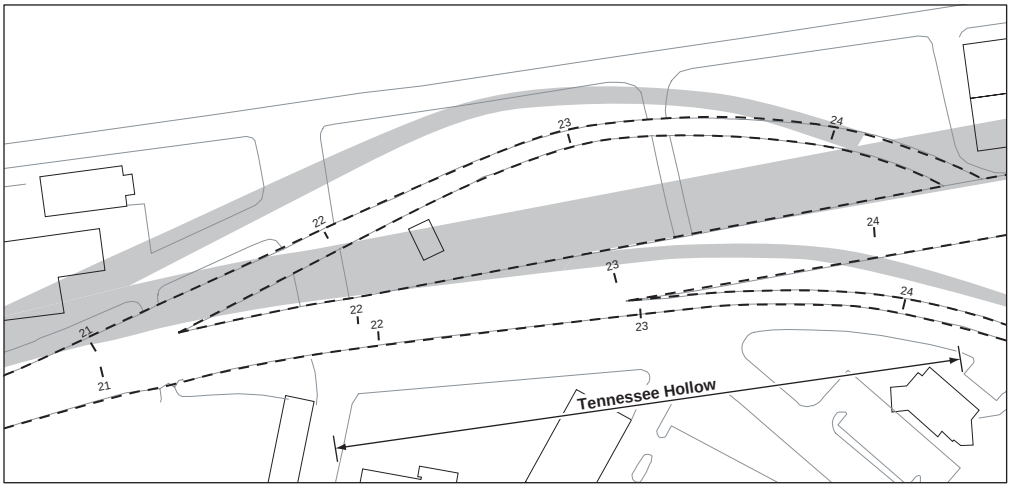
Feet

Existing Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 1
ALTERNATIVE 1: NO-BUILD
SHADOW STUDY, JUNE 21



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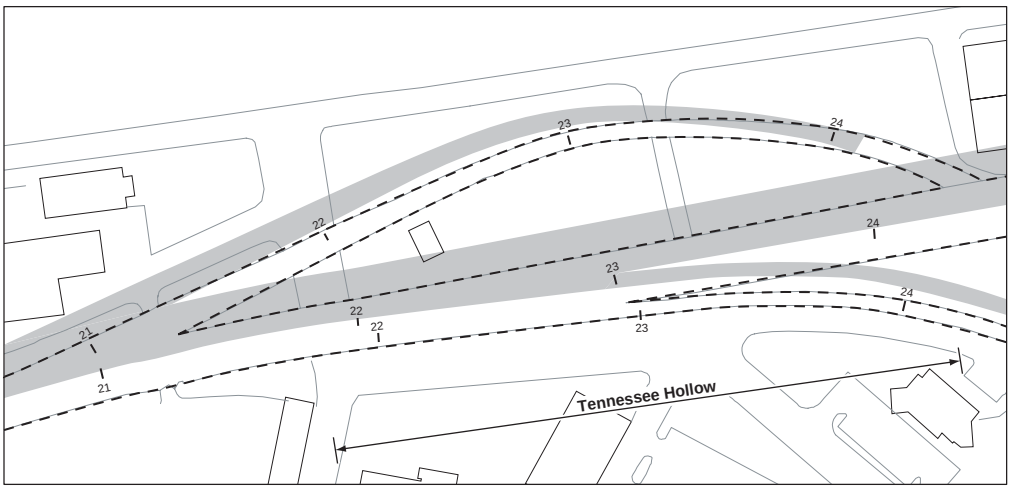

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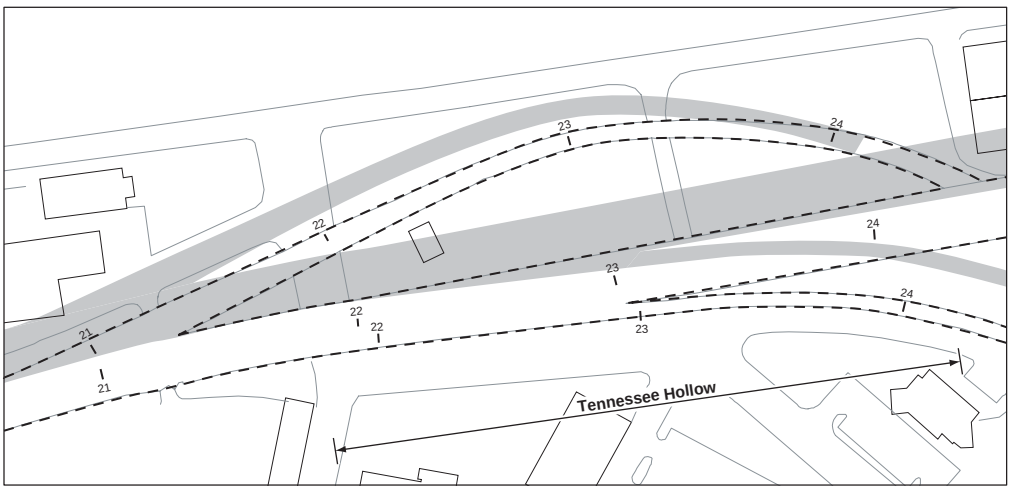

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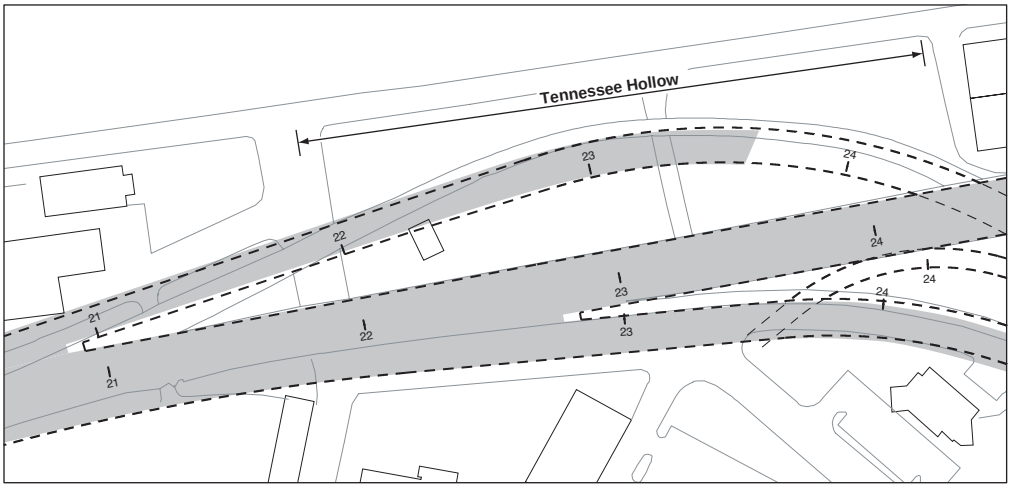
Existing Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 2
ALTERNATIVE 1: NO-BUILD
SHADOW STUDY, DECEMBER 21



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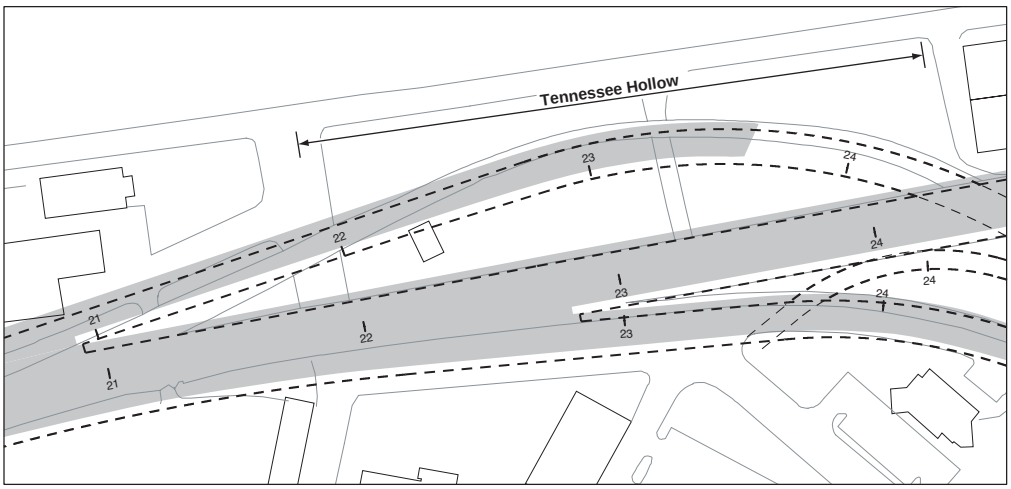

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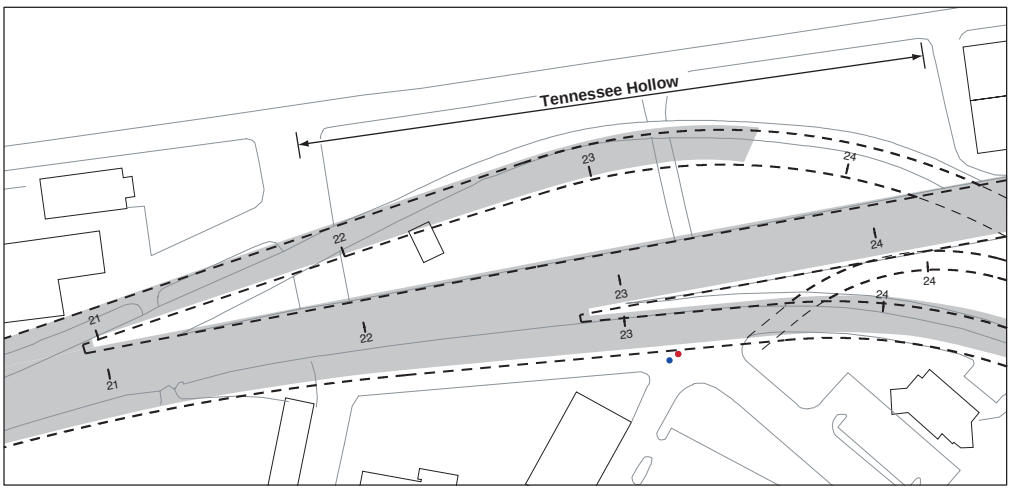

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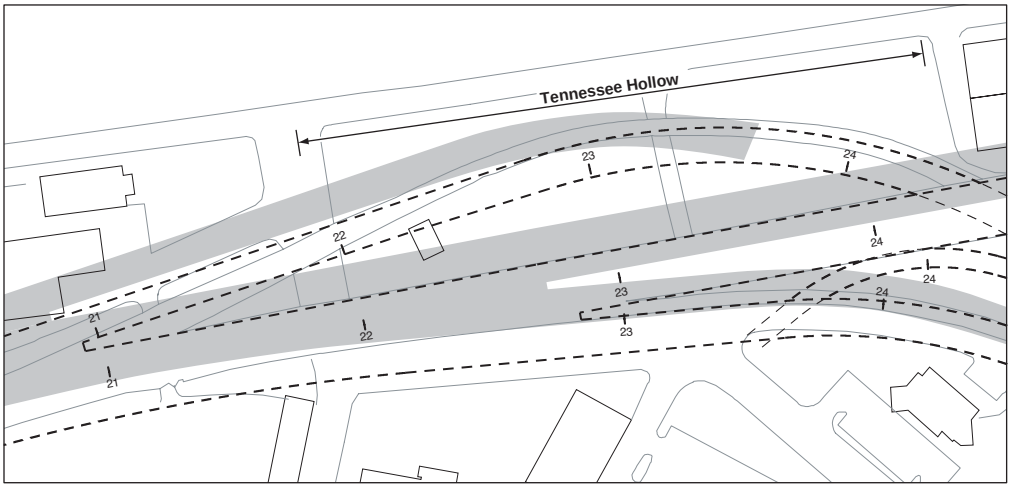
Project Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 3
ALTERNATIVE 2: REPLACE AND WIDEN WITH DETOUR
SHADOW STUDY, JUNE 21



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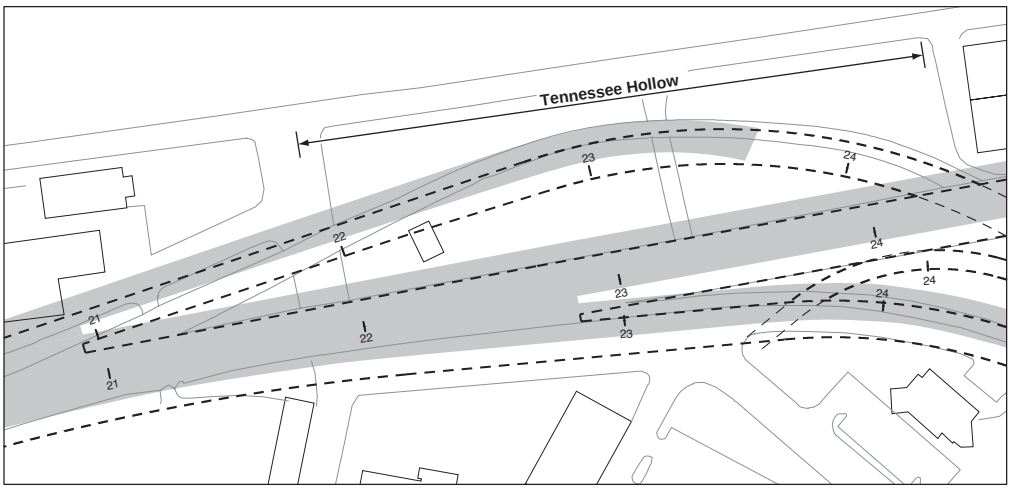

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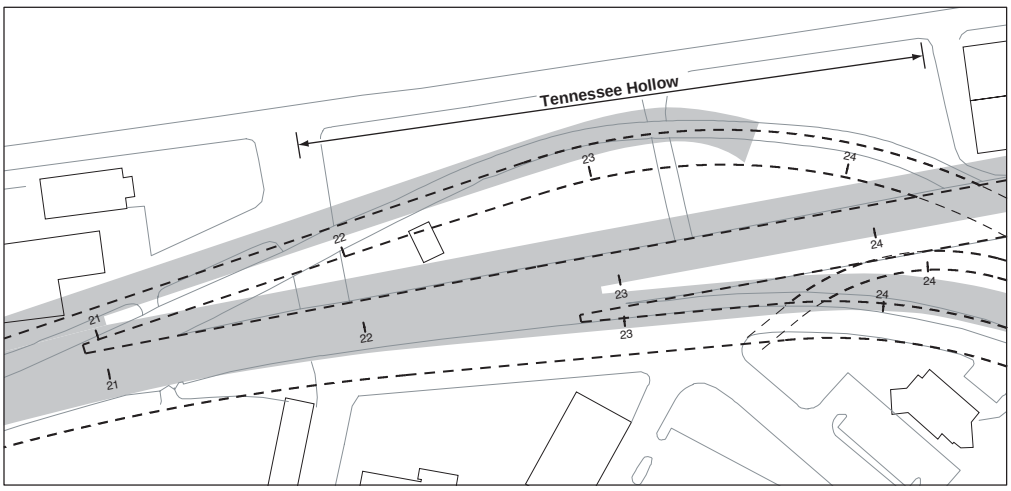

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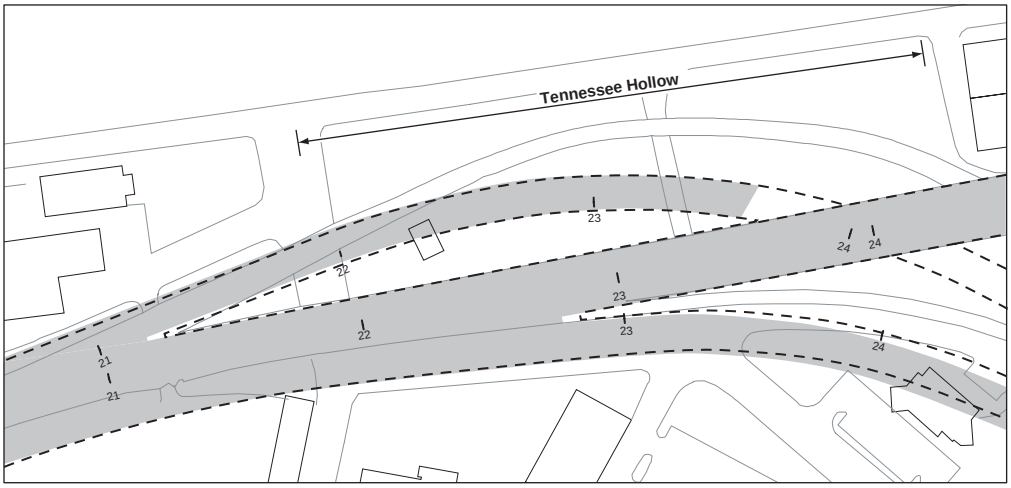
Project Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 4
ALTERNATIVE 2: REPLACE AND WIDEN WITH DETOUR
SHADOW STUDY, DECEMBER 21



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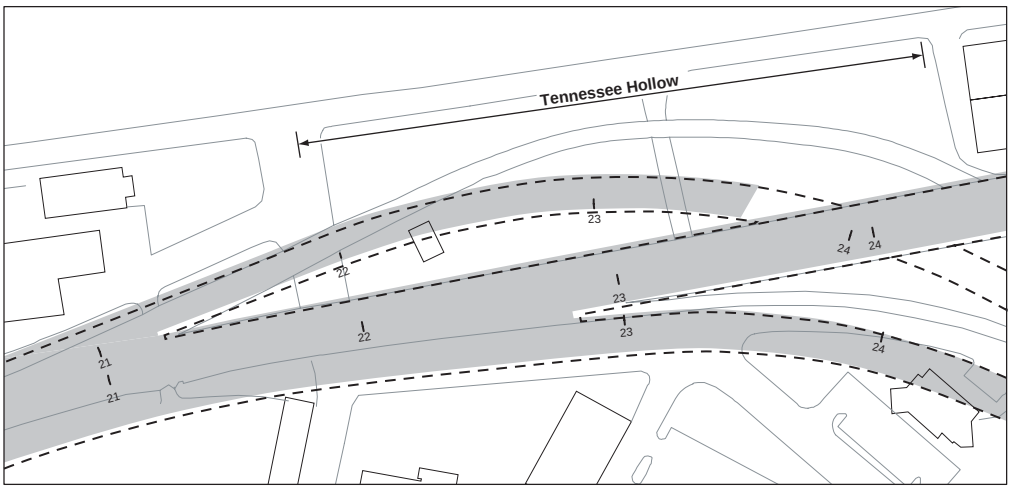

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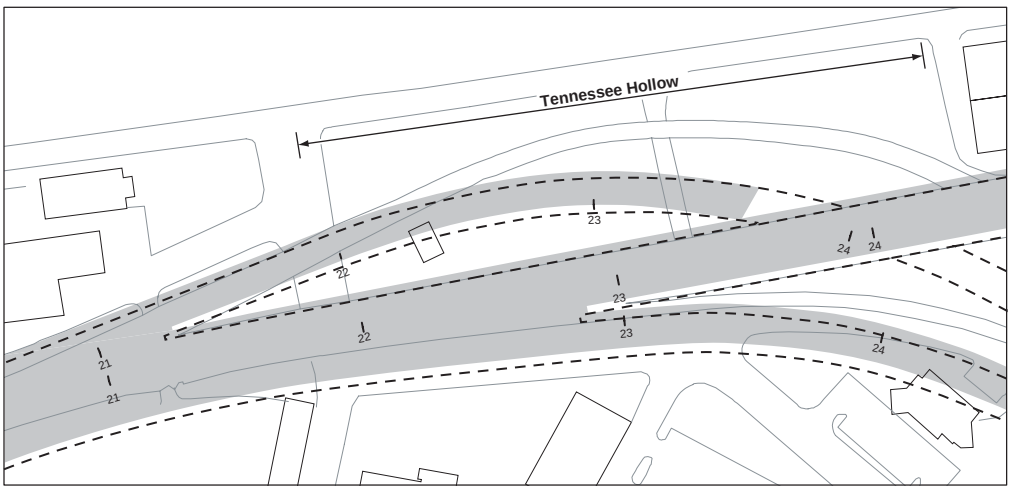

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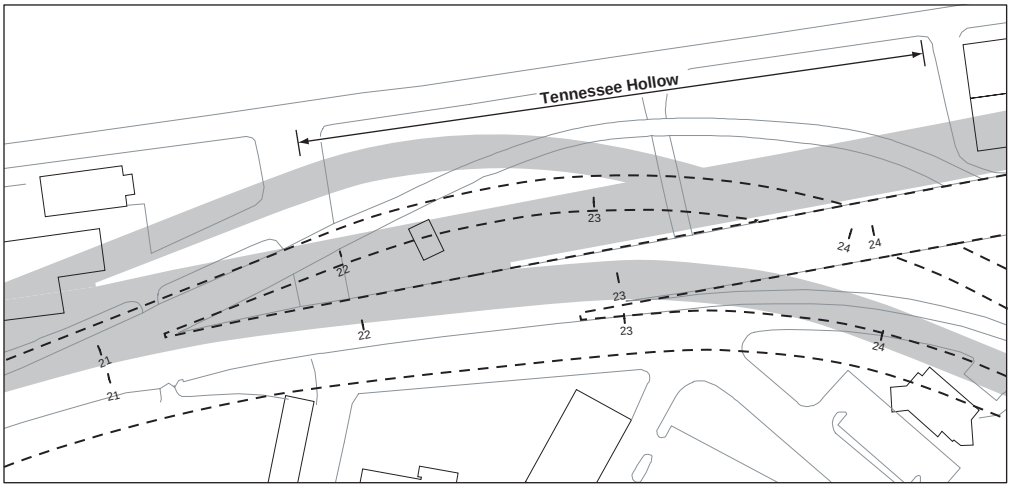
Project Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 5
ALTERNATIVE 2: REPLACE AND WIDEN WITHOUT DETOUR
SHADOW STUDY, JUNE 21



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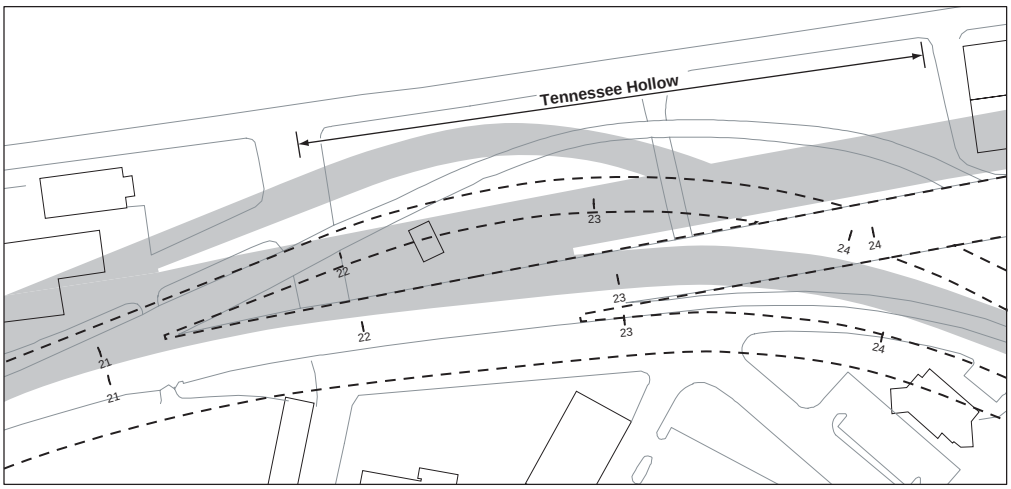

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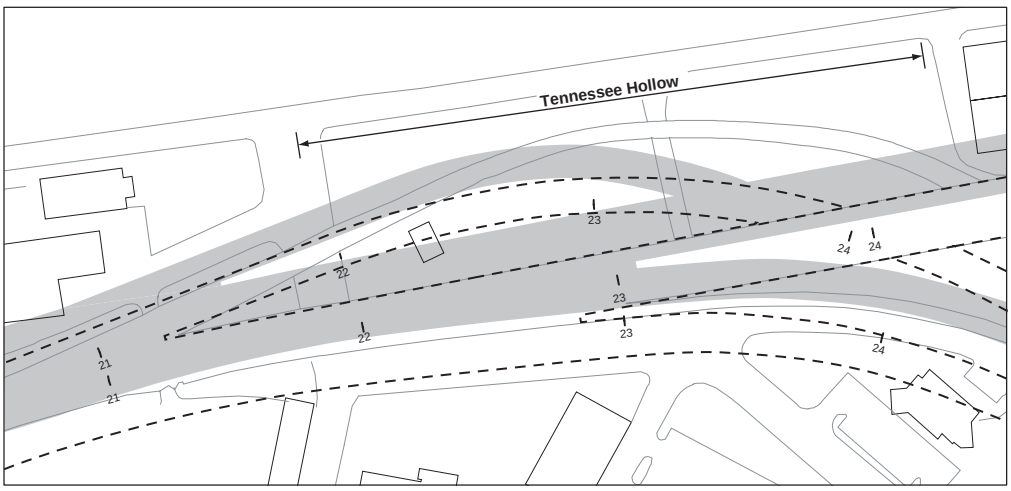

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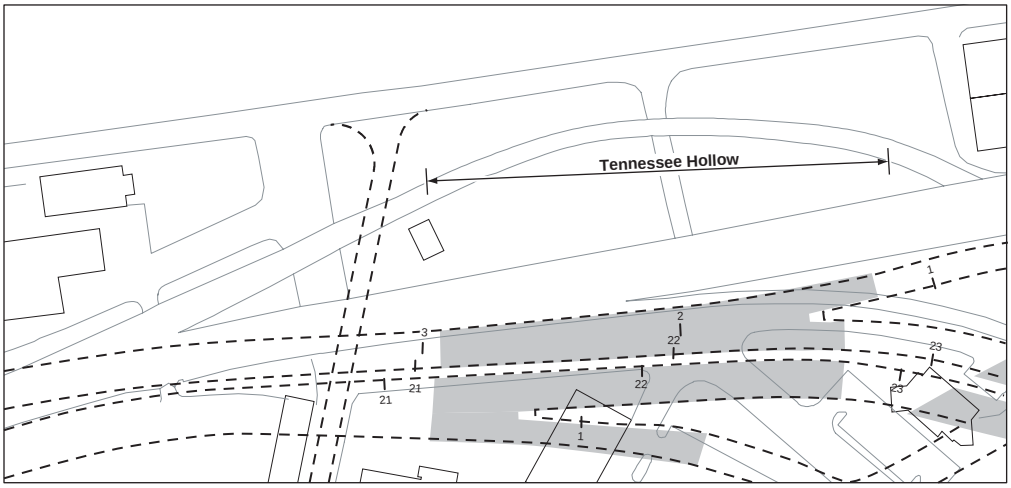
Project Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 6
ALTERNATIVE 2: REPLACE AND WIDEN WITHOUT DETOUR
SHADOW STUDY, DECEMBER 21



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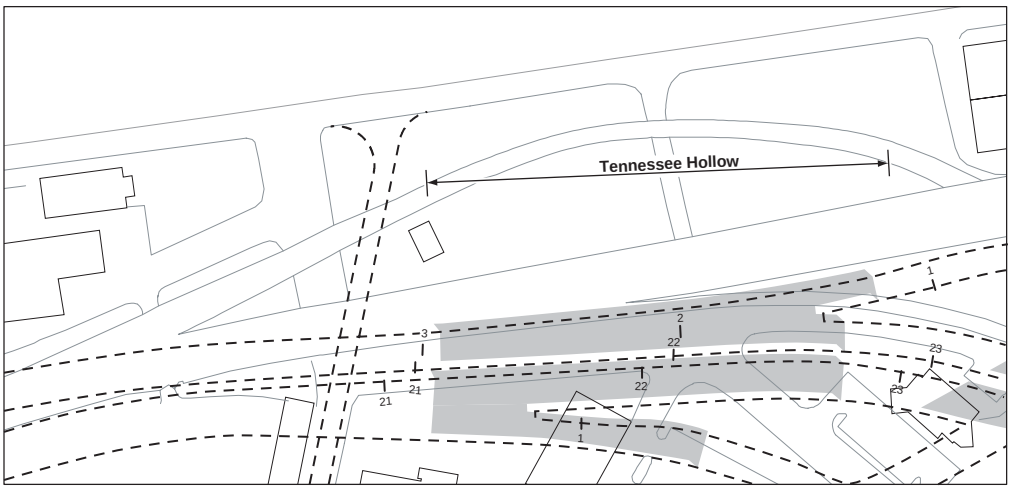

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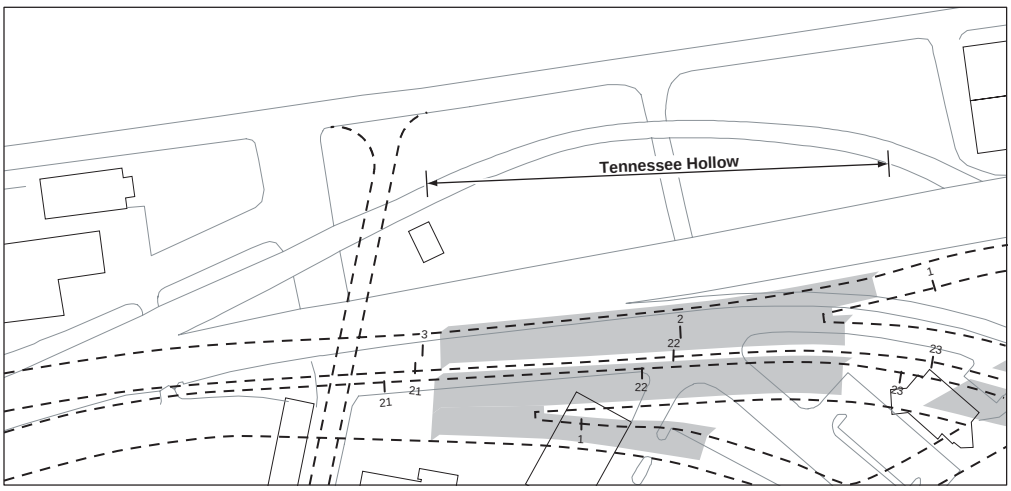

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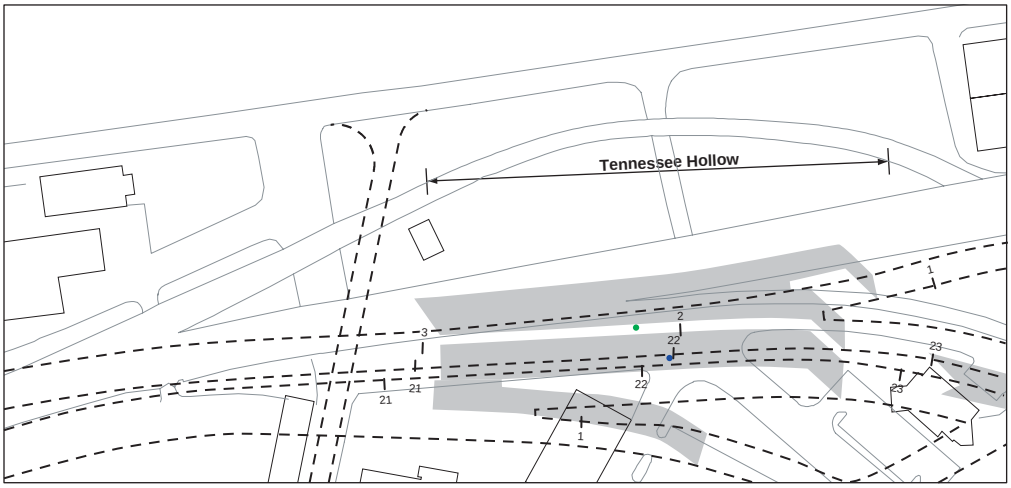
Project Extent of shadow 22 Station Number

Source: Environmental Science Associates

FIGURE 7
ALTERNATIVE 5: PRESIDIO PARKWAY
SHADOW STUDY, JUNE 21



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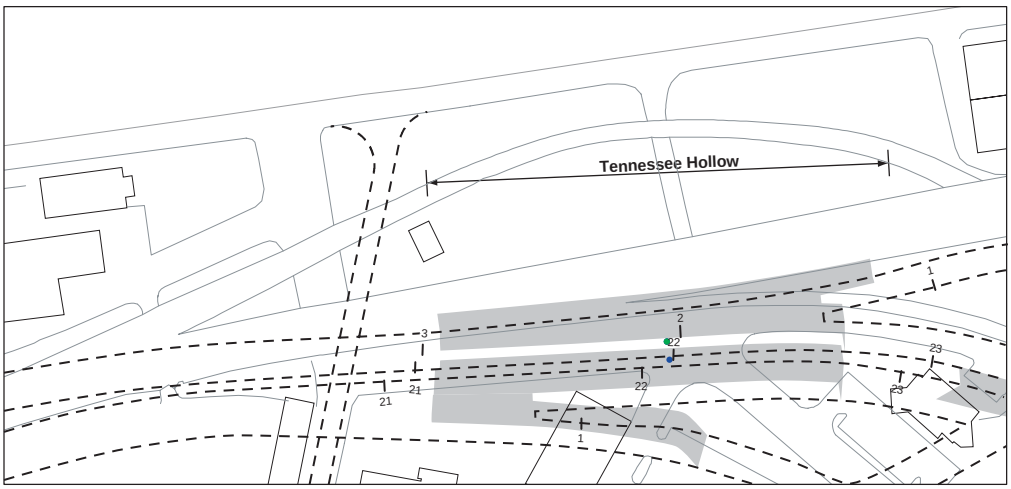

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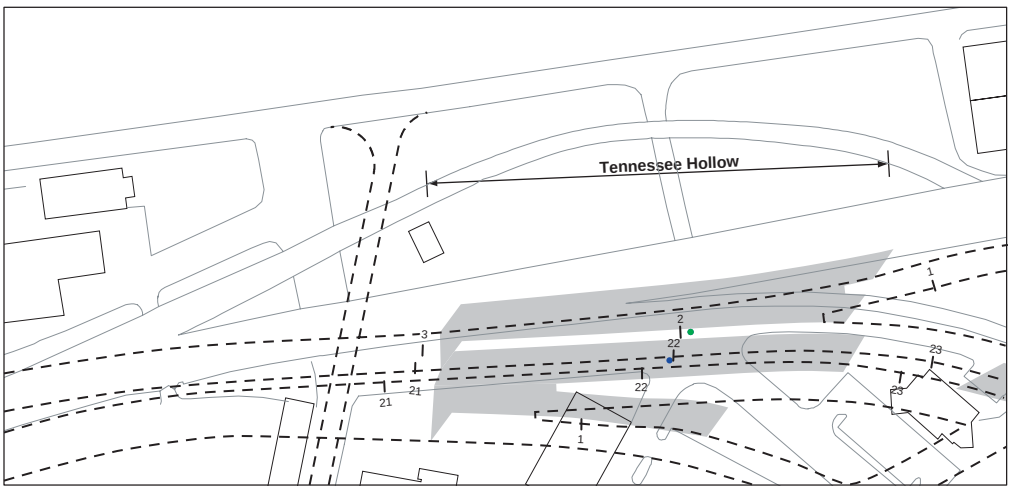

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Feet

Project | Extent of shadow | 22 Station Number

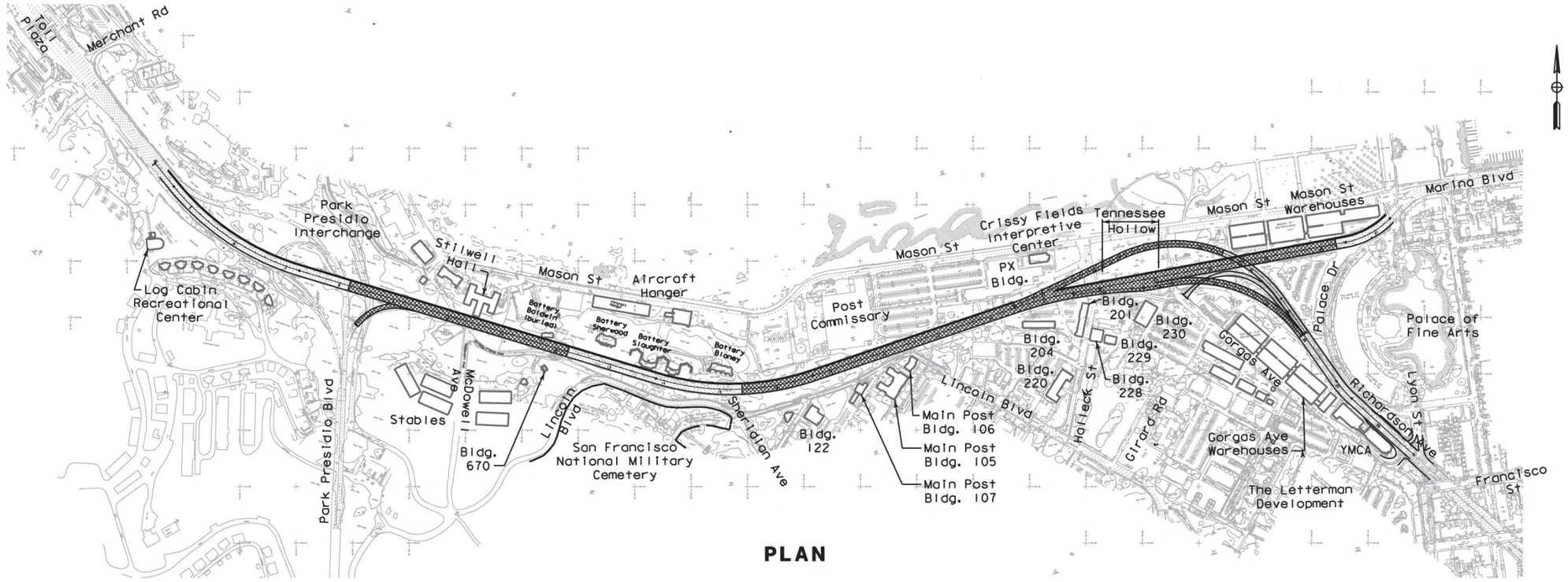
Source: Environmental Science Associates

FIGURE 8
ALTERNATIVE 5: PRESIDIO PARKWAY
SHADOW STUDY, DECEMBER 21

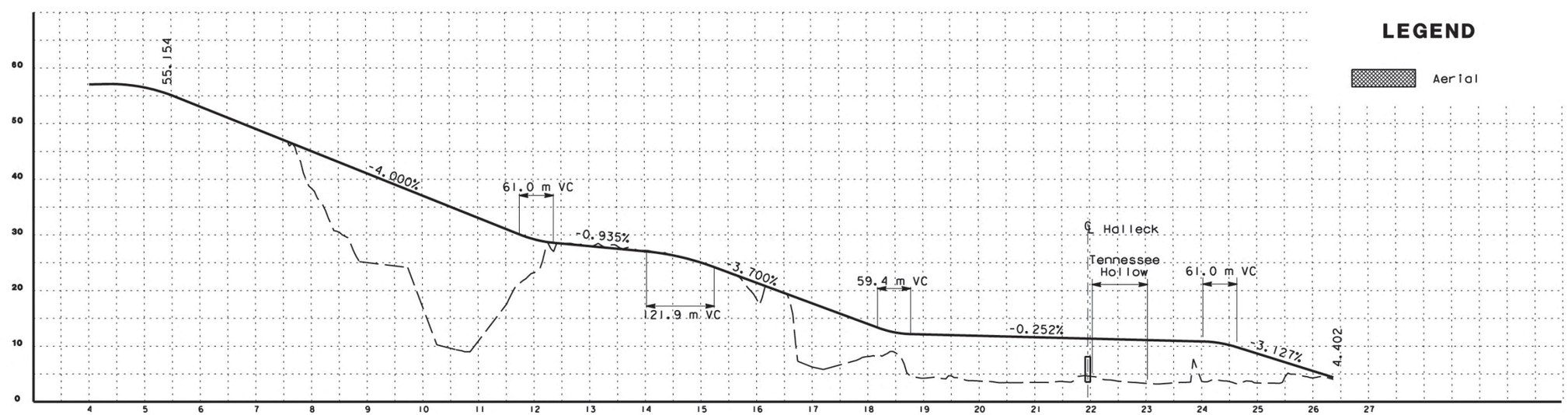
APPENDIX C

DETAILED ALTERNATIVE AND DESIGN OPTION DRAWINGS

1. No Build



PLAN



PROFILE

LEGEND

Aerial

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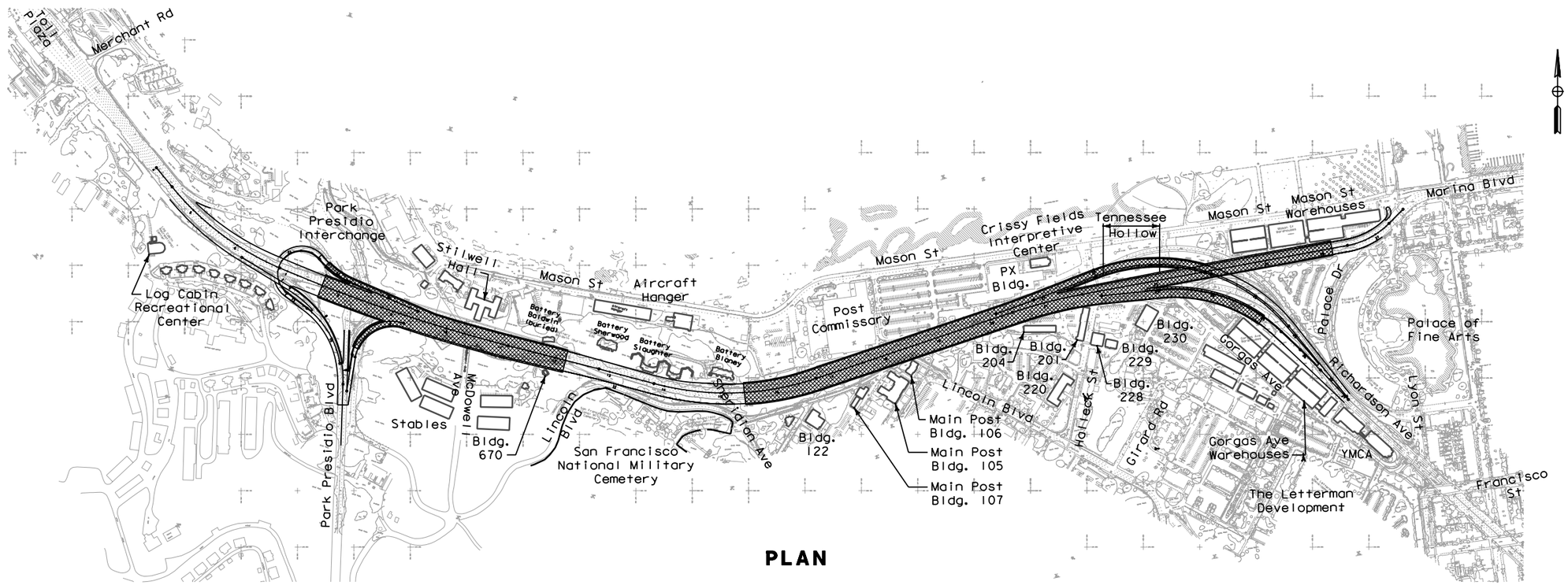
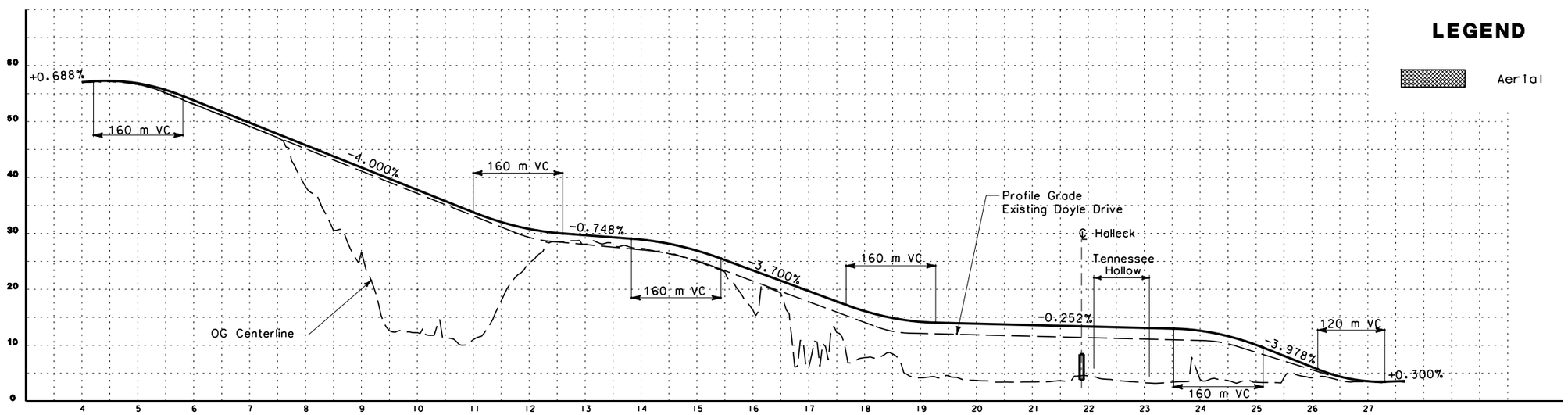
04548.04

No Build Alternative

2. Replace and Widen - No Detour



PLAN



PROFILE

LEGEND

Aerial

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04548.04

Alternative 2—Replace and Widen – No Detour

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
.	.	.	.		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. STATE OF CALIFORNIA

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.
303 SECOND STREET, SUITE 700 N
SAN FRANCISCO, CA 94107

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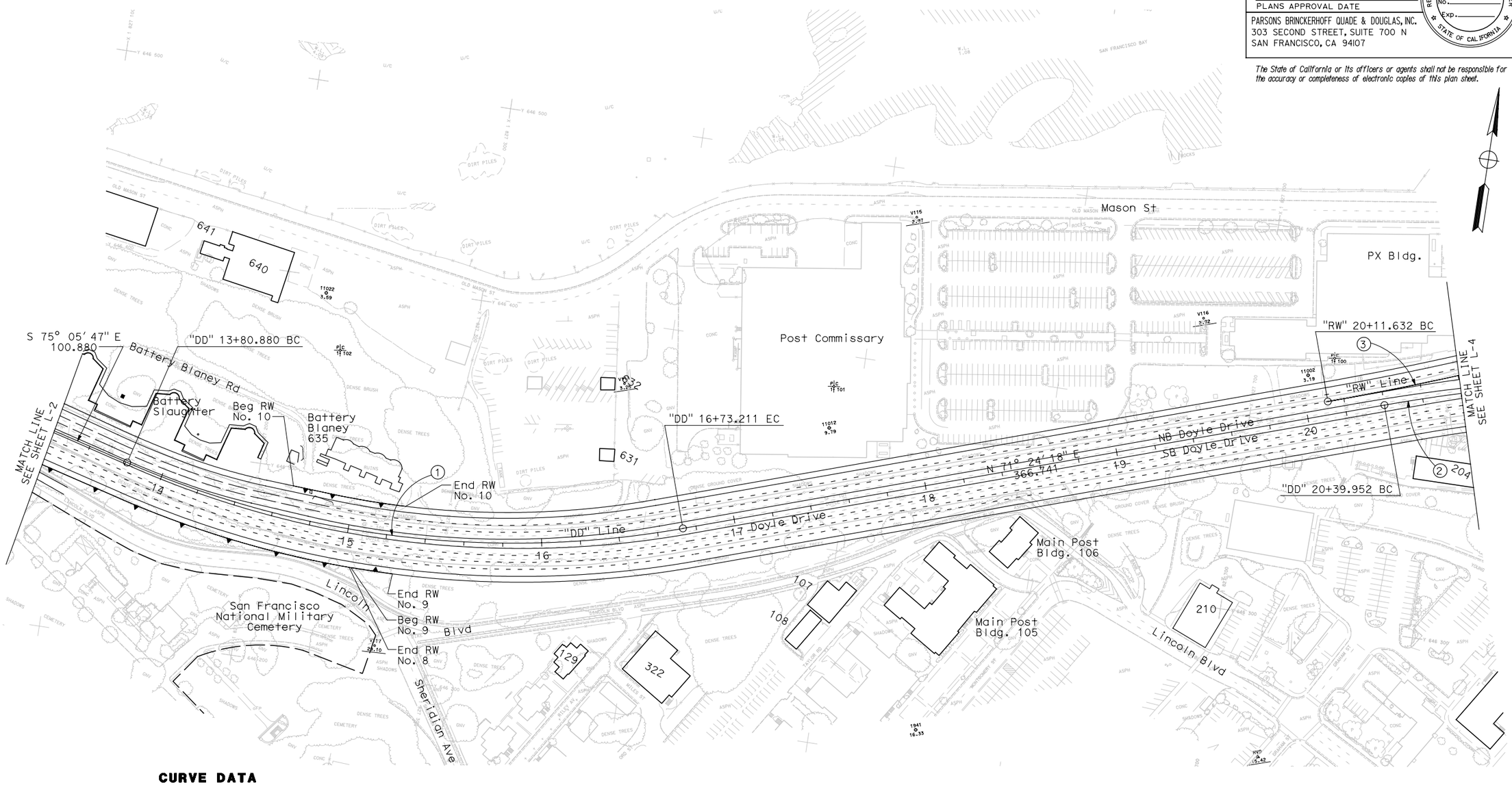

CURVE DATA

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ALTERNATIVE 2
REPLACE AND WIDEN - NO DETOUR LAYOUT

SCALE: 1:1000

L-3

DATE	REVISED BY
	DATE REVISED

CALCULATED/ DESIGNED BY	
CHECKED BY	

DESIGN OVERSIGHT .

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

Alternative 2—Replace and Widen – No Detour
Detail Near Batteries and Building 106

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
.					

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. EXP. STATE OF CALIFORNIA

Caltrans Metric

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CURVE DATA

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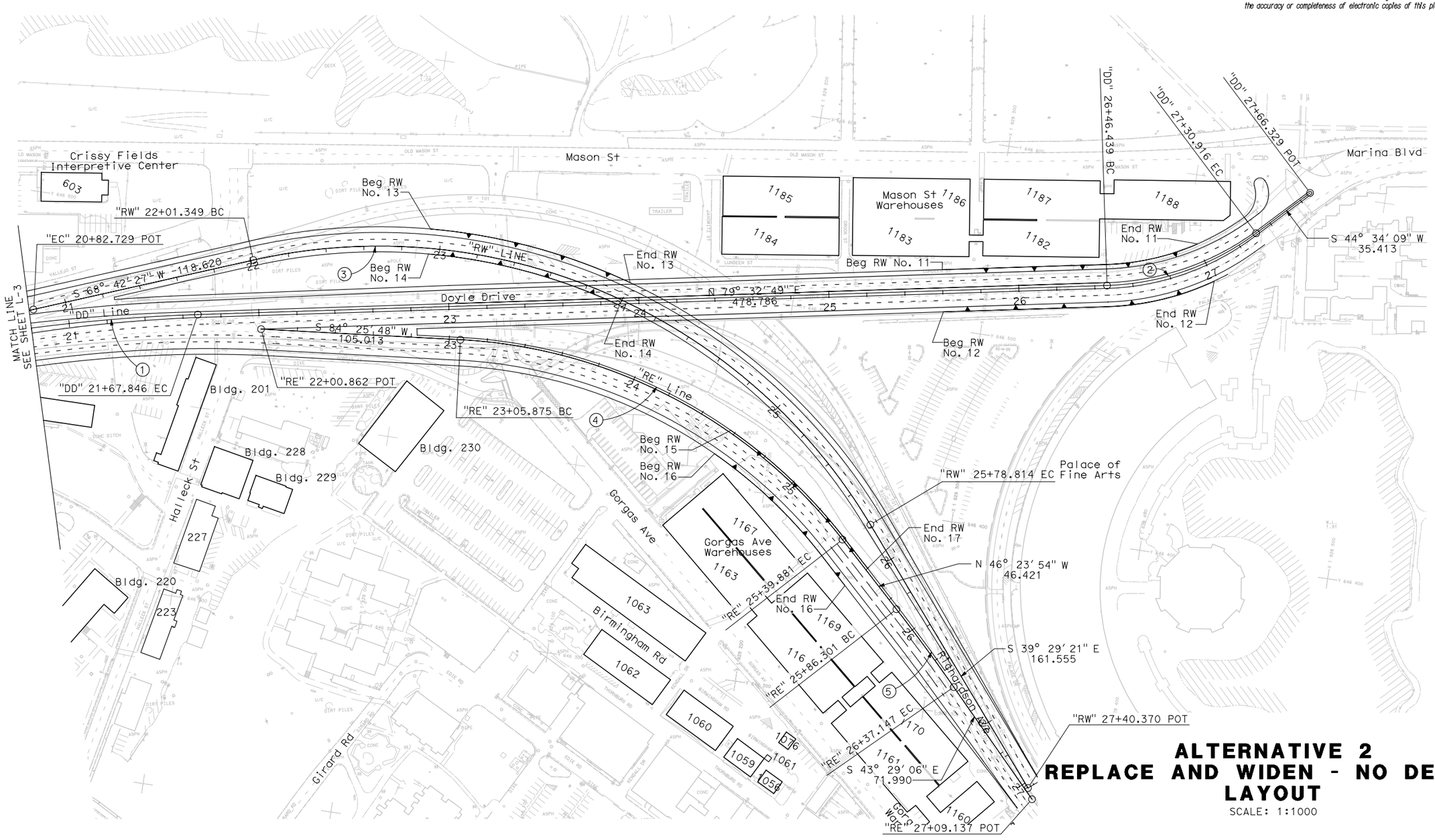


ALTERNATIVE 2
REPLACE AND WIDEN - NO DETOUR LAYOUT

SCALE: 1:1000

L-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN OVERSIGHT

CALCULATED/ DESIGNED BY

CHECKED BY

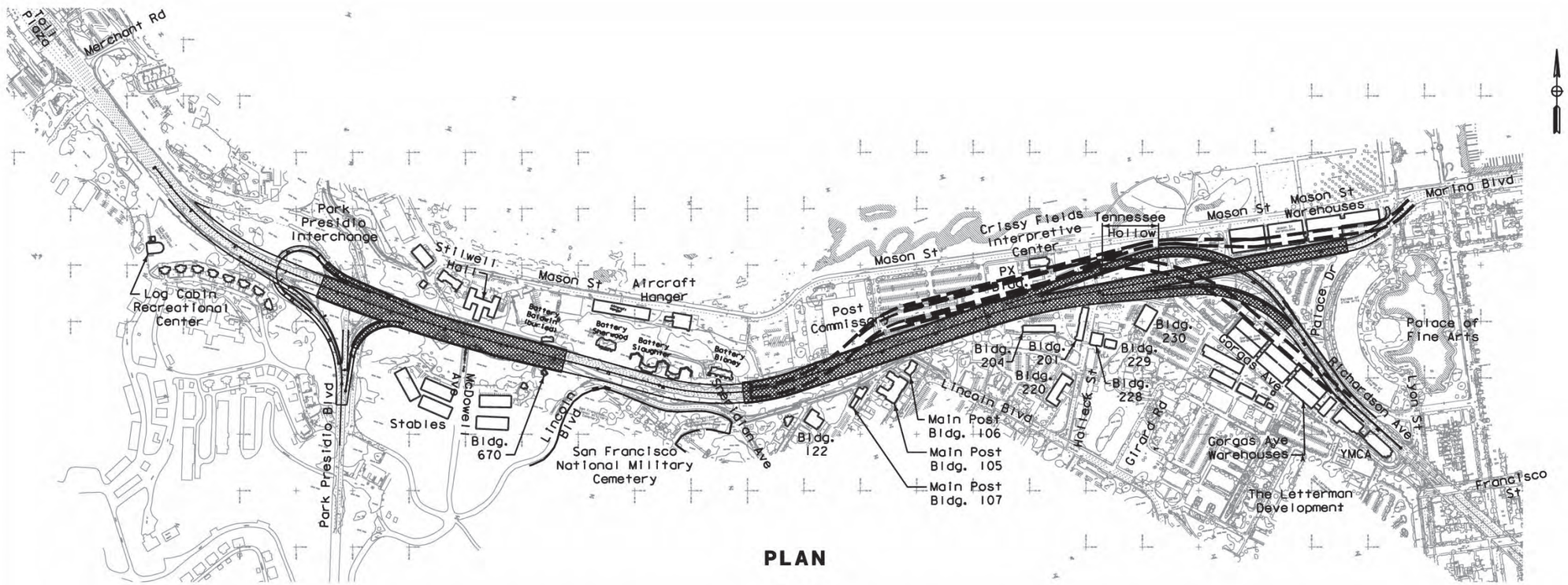
DATE

REVISED BY

DATE REVISED

Alternative 2—Replace and Widen – No Detour
Detail of Gorgas Avenue and Mason Street

2. Replace and Widen - With Detour



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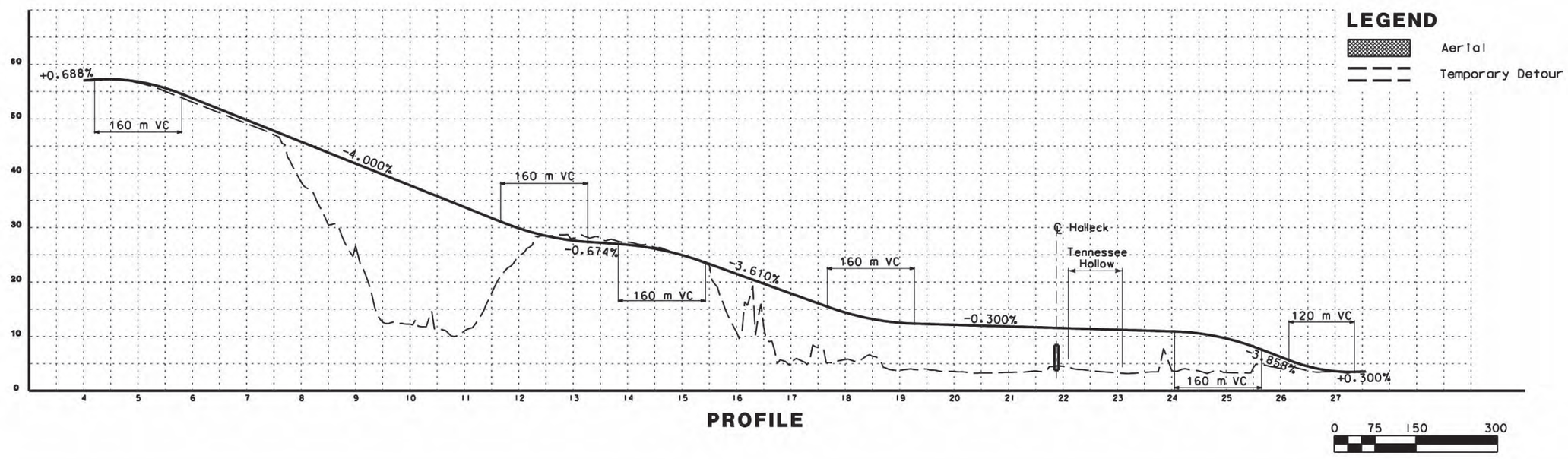

PROFILE

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
.					

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
STATE OF CALIFORNIA

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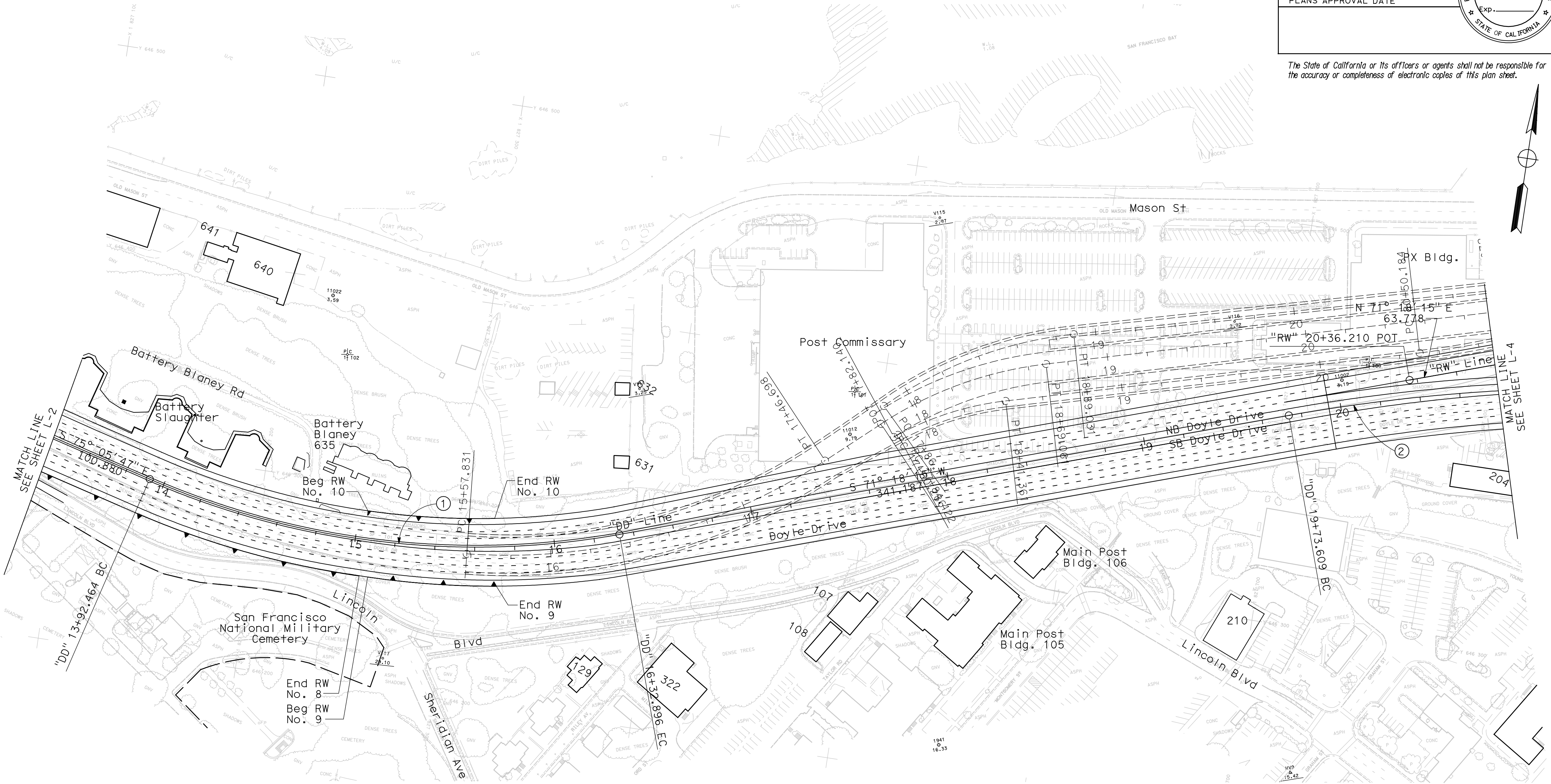

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ALTERNATIVE 2
REPLACE AND WIDEN - WITH DETOUR
LAYOUT

SCALE: 1:1000

L-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

DESIGN OVERSIGHT

CALCULATED/ DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED | DATE

Alternative 2—Replace and Widen – with Detour

Detail Near Batteries and Building 106

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
.					

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. EXP. STATE OF CALIFORNIA

Caltrans Metric

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

CURVE DATA

NO.	R	△	T	L
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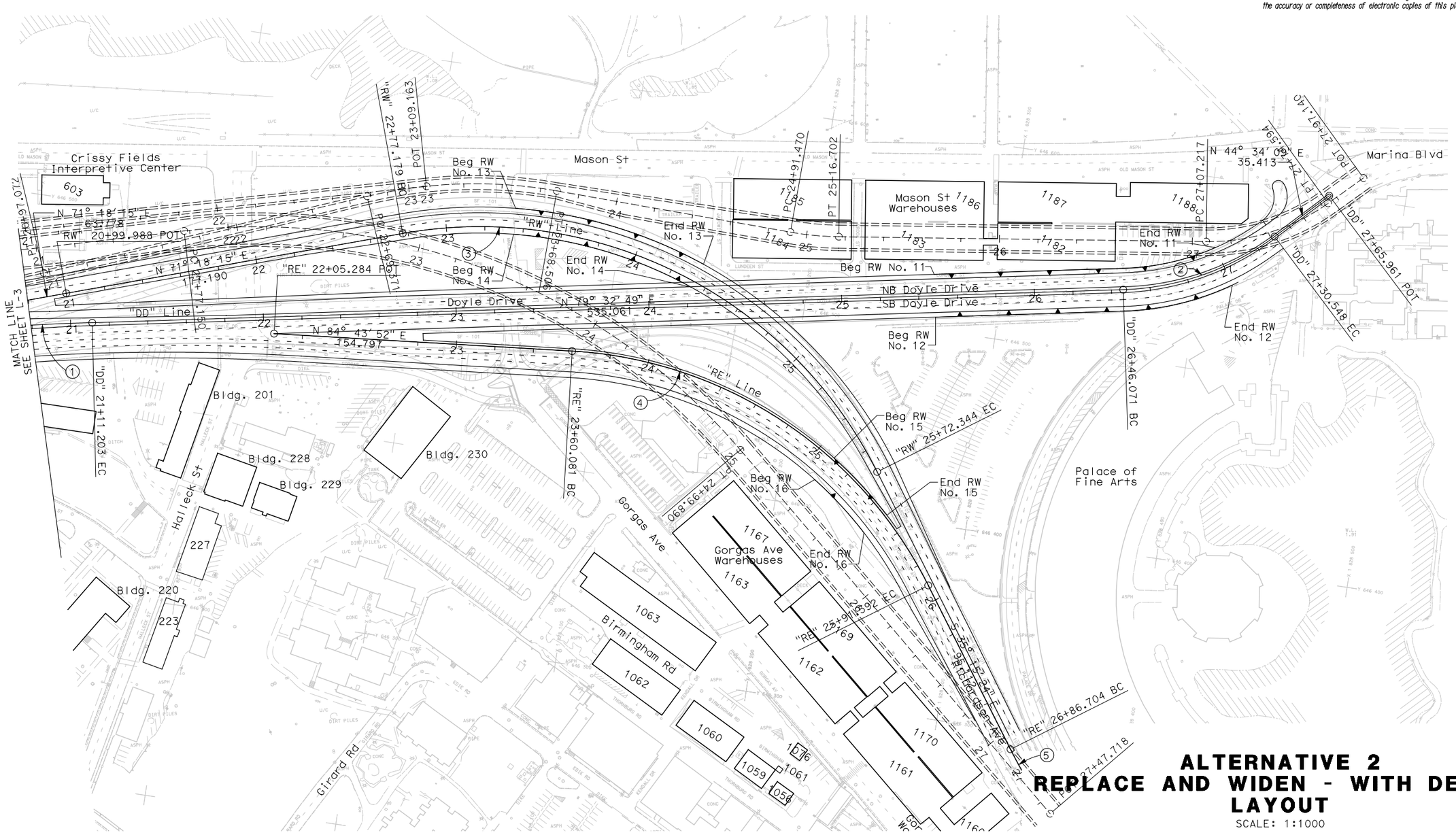


ALTERNATIVE 2
REPLACE AND WIDEN - WITH DETOUR LAYOUT

SCALE: 1:1000

L-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

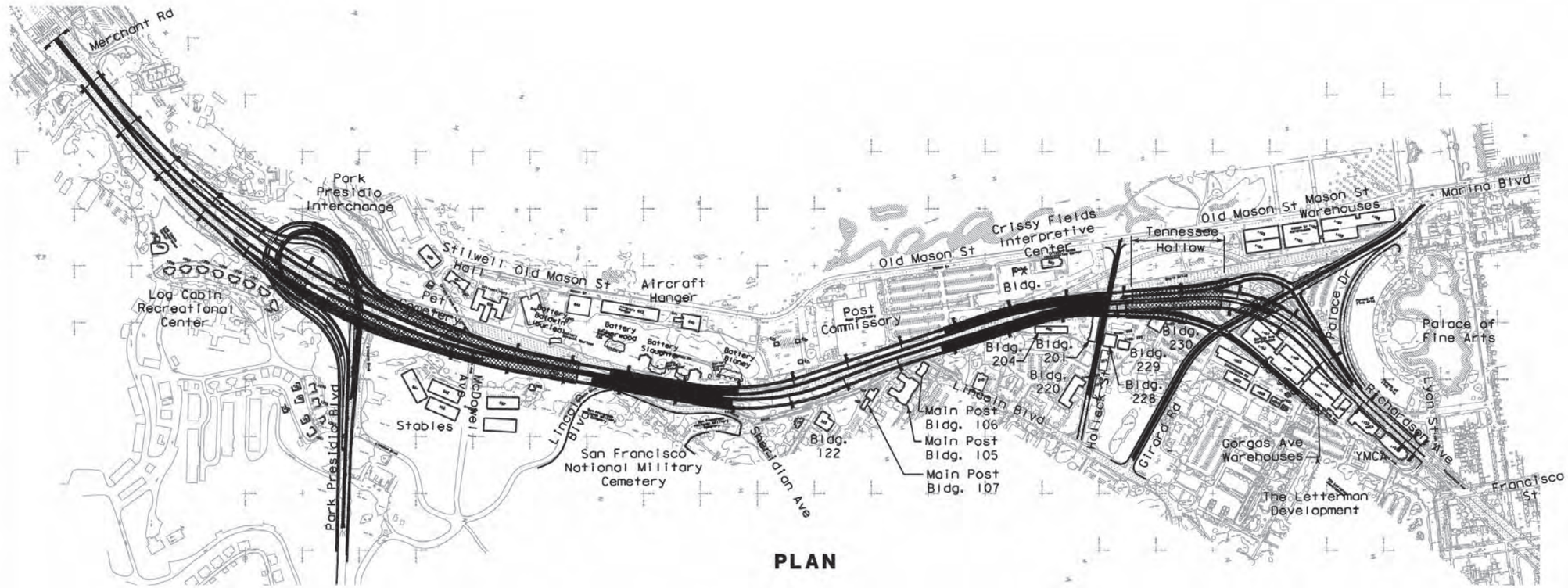
DESIGN OVERSIGHT

CALCULATED/DESIGNED BY | CHECKED BY

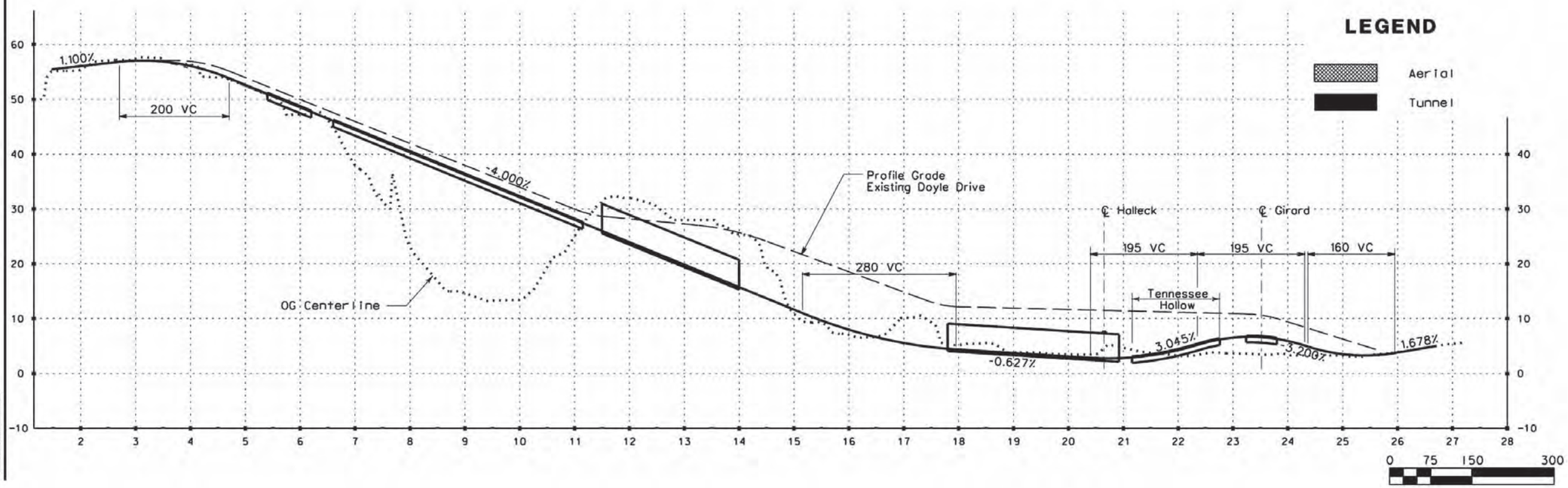
DATE | REVISED BY | DATE REVISED

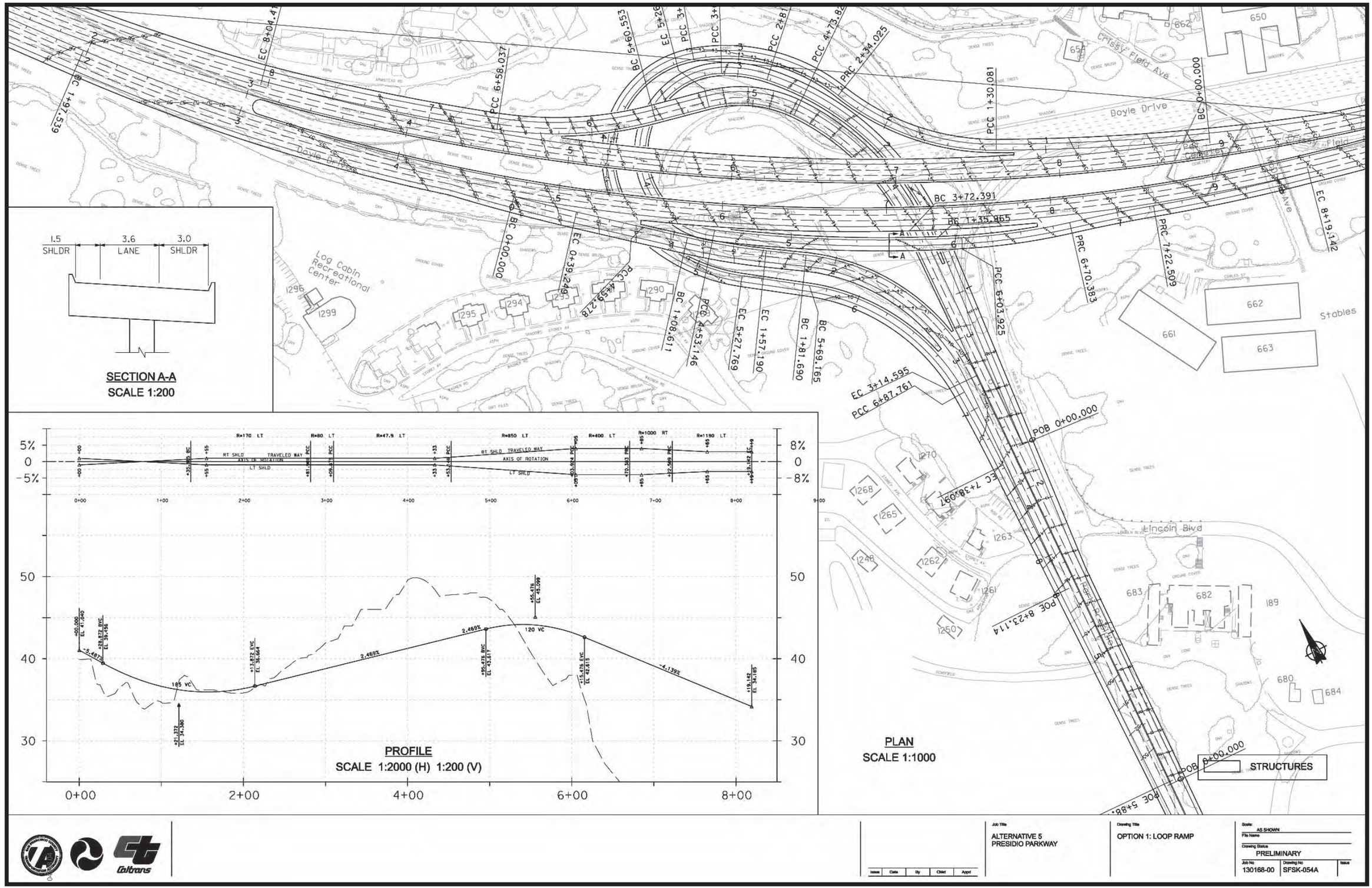
Alternative 2—Replace and Widen – with Detour
Detail of Gorgas Avenue and Mason Street

5. Presidio Parkway

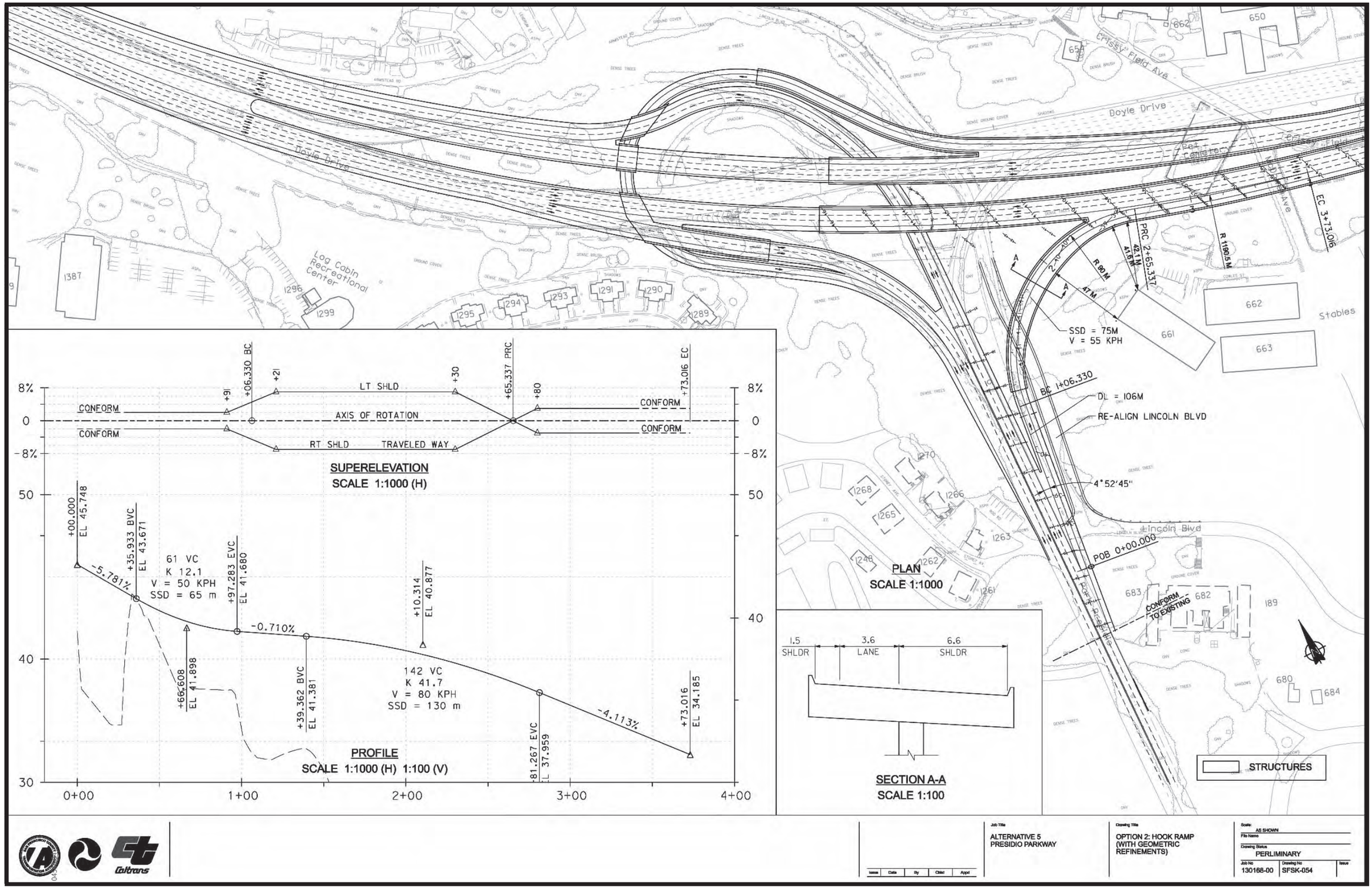


PLAN

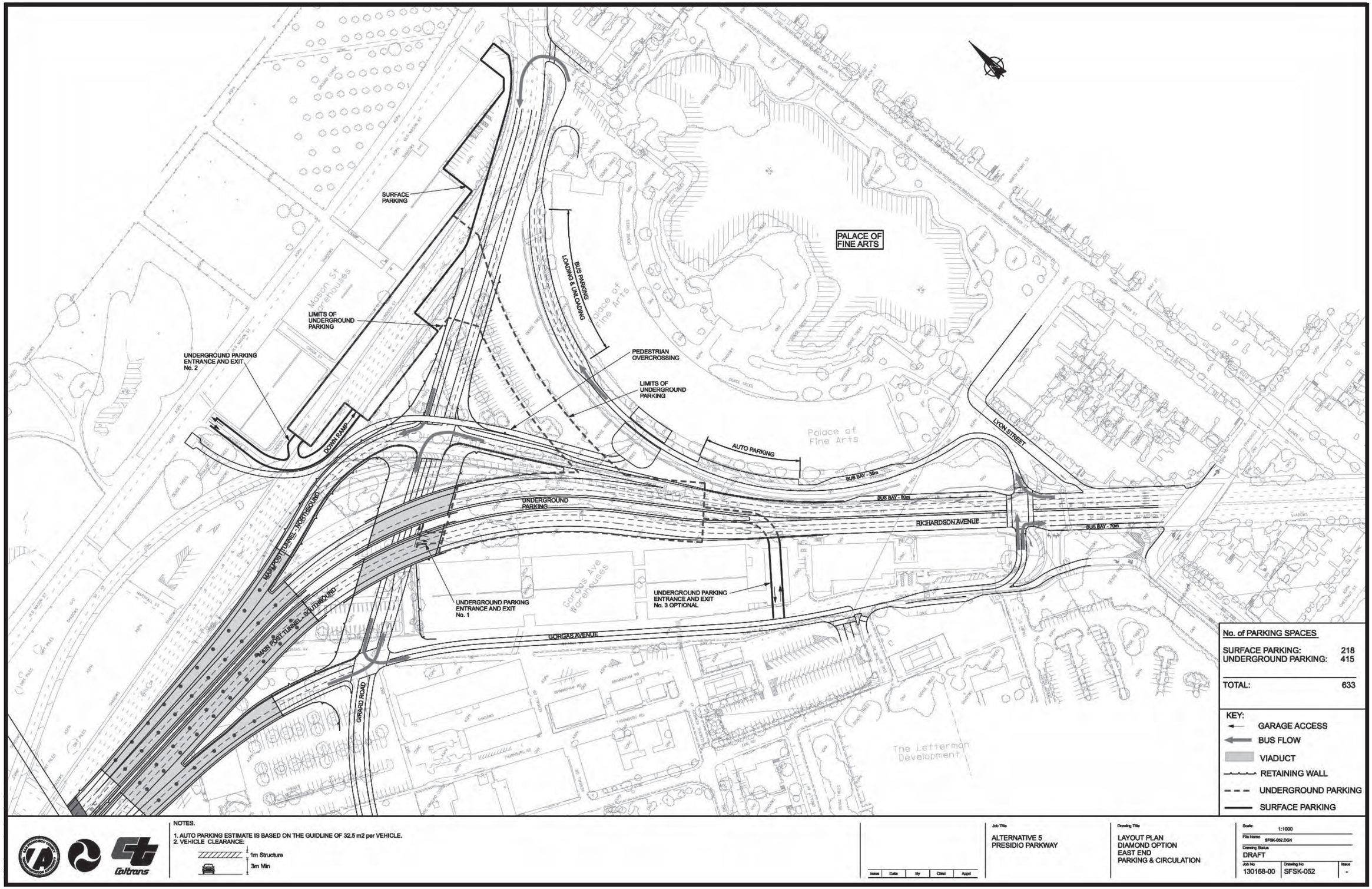




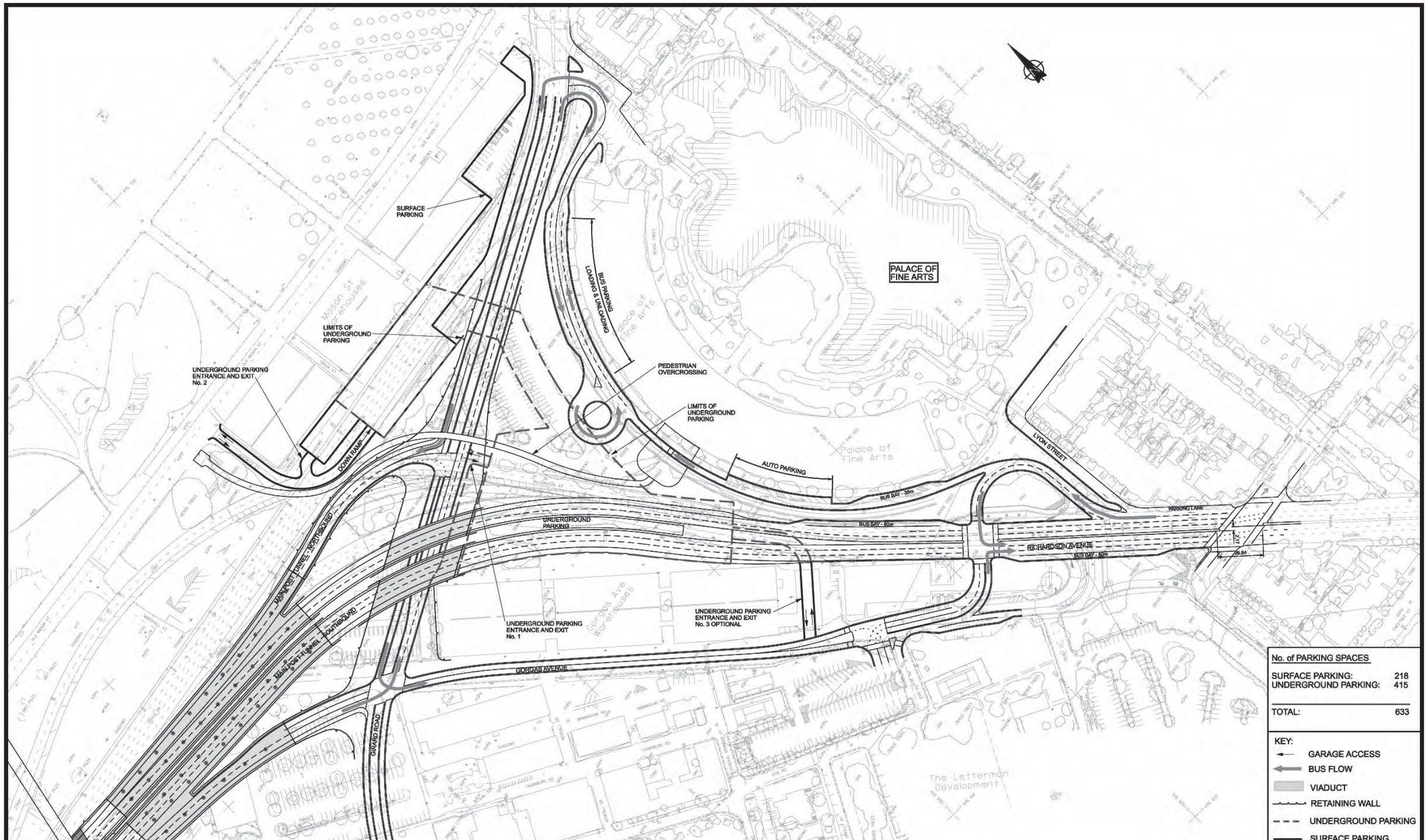
Alternative 5—Presidio Parkway with Loop Ramp Option



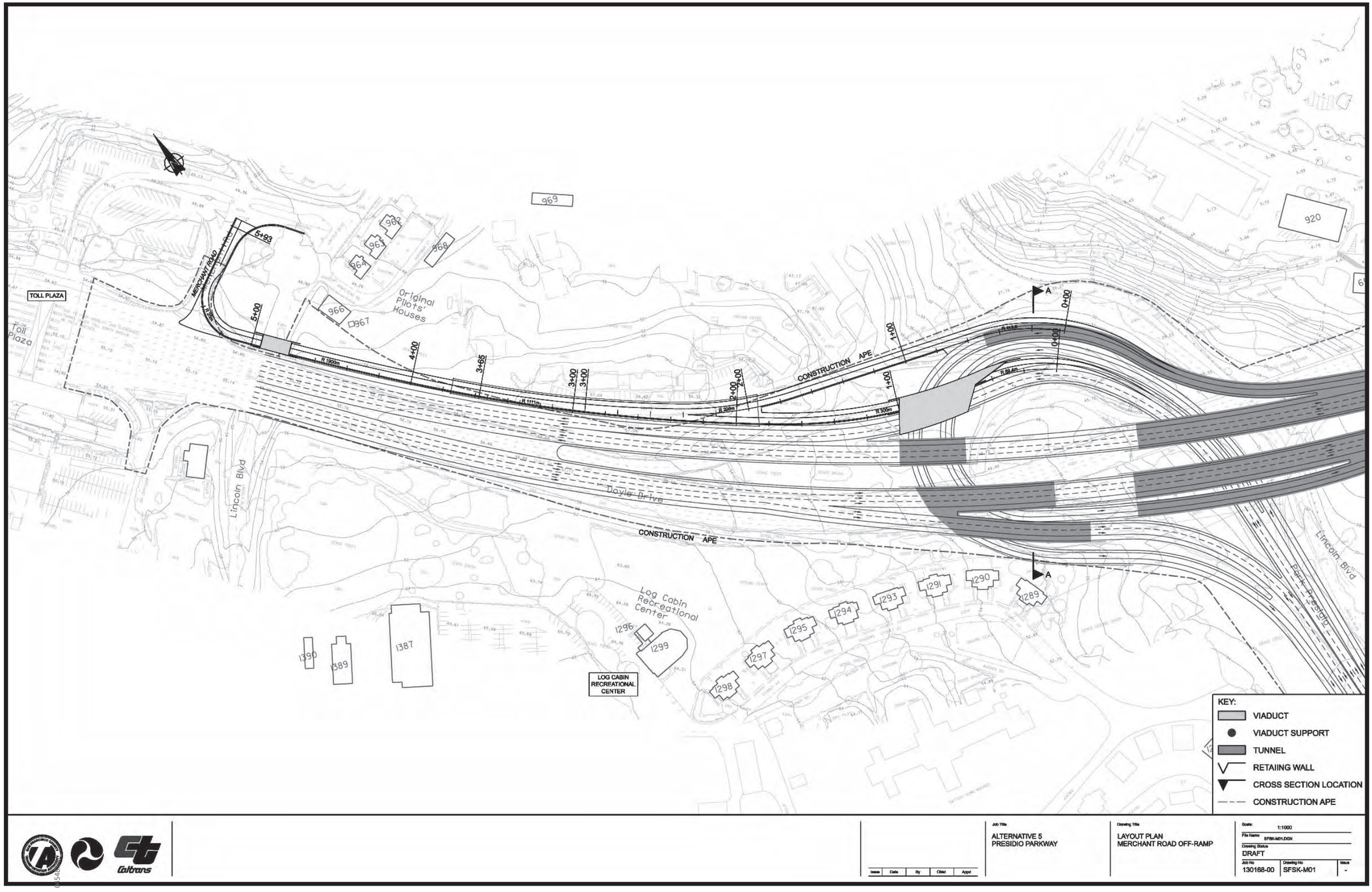
Alternative 5—Presidio Parkway with Hook Ramp Option



Alternative 5—Presidio Parkway with Diamond Option



Alternative 5—Presidio Parkway with Circle Drive Option



Alternative 5—Presidio Parkway with Merchant Road Slip-Ramp

APPENDIX D

BIOLOGICAL REPORT ON SPECIES OF CONCERN

Appendix D: BIOLOGICAL REPORT ON SPECIES OF CONCERN SUMMARY OF FINDINGS AND CONCLUSIONS

SECTION 1.0 INTRODUCTION

This Biological Report finds that *no effect* would occur to any of the species considered herein and listed under federal or state endangered species acts, or likely to become listed during period of project implementation.

Recovery plans have been prepared for serpentine plant species within the San Francisco Bay Area, including the Presidio. However a Biological Assessment and Biological Opinion is not necessary for the proposed project in regard to these recovery plans (D. Hankins, USFWS, pers. comm, November 2004).

1.1 SUMMARY

The purpose of this Biological Report is to provide sufficient information to determine if the proposed action, construction of the Doyle Drive project (project), would affect any of the threatened, endangered, proposed, or sensitive species listed with the Federal or State Endangered Species Acts. It was prepared at the request of the California Department of Transportation (Caltrans) for the National Park Service (NPS), GGNRA, California

This report was prepared largely with information from existing assessments and environmental evaluations. An NES has been completed for this project. Preparation of the NES, including field investigations, literature review, and most of the agency coordination and consultation, provided much of the background information for this Biological Report.

One hundred thirty-five (135) plant and animal species at all levels of state or federal concern were evaluated. Most were removed from the analysis due to (1) absence established as a result of past surveys, (2) the known range of the species falling outside the project study area, (3) very low occurrence potential in project study area or project vicinity, or (4) lack of suitable habitat in the project study area. Other special-status plant and animal species were further eliminated when the preparers of the Biological Report concluded that species are possibly present in the project study area, *but not in the construction corridor*, and that these species would avoid either direct or indirect impacts by construction build alternatives.

Impacts on the remaining four plant and eleven animal species are possible and are described in the Biological Report, but none of these species are listed as threatened or endangered.

1.1.1 Project Description

Doyle Drive is a freeway located in the Presidio of San Francisco (the Presidio), in the northern part of the City of San Francisco at the southern approach to the Golden Gate Bridge (see Figure 1-1 of the NES). Doyle Drive is within the Golden Gate National Recreation Area (GGNRA). The Presidio has been part of the National Park System since 1972 and a National Historic Landmark since 1962. Doyle Drive has been determined to be a contributing structure to that landmark status. A number of buildings and complexes line Doyle Drive, primarily east of the Park Presidio Boulevard. The San Francisco National Cemetery is located adjacent to Doyle Drive, as is the Commissary, the Post Exchange, and numerous residences once used by military staff. The Doyle Drive freeway and local roads provide an urban road system that is heavily used by all types of motor vehicles.

Doyle Drive, the southern approach of US Highway 101 to the Golden Gate Bridge, is one and one-half miles long with six traffic lanes. The roadway is over 70 years old and is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure

safe in the short term. The purpose of the project is to replace Doyle Drive to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio and its purpose as a National Park. Several alternatives for the project, including No Action, were considered. Other alternatives would seismically upgrade and widen lanes to 3.6 meters (12 feet) and install a fixed-median barrier or replace the existing structure with a new six-lane road with an eastbound auxiliary lane between the Park Presidio Interchange and new Presidio access. Alternatives are described in greater detail in the Natural Environmental Study (NES) of which this Biological Report is a part. For the purposes of this report, the area of impact or effect is considered to be the alternative which would result in the greatest amount of ground disturbance.

1.1.2 Survey Dates and Surveying Personnel

A biological survey of the project area was conducted by Environmental Science Associates ecologists, Yolanda Molette and Mark Fogiel on July 25, 2000, and a wetland delineation was conducted by Yolanda Molette, Laura Castellini (NPS) and John Krause (Caltrans) on November 28, 2000. On June 17, 2001 a Certified Wildlife Biologist (Thomas A. Roberts) conducted a bird survey of all of the wetland habitat sites potentially affected by (i.e., either within or adjacent to) the Doyle Drive project area. These included sites W-1 and W-8 as referenced in Figure 2 of the *Doyle Drive Corridor Wetland Delineation*.

On April 12, 2002 Thomas Roberts surveyed all of the wetland habitat sites within the project study area in response to Caltrans' comments on the draft NES (letter from Randell Iwasaki, January 31, 2002) requesting additional analysis on the presence of the California red-legged frog (*Rana aurora draytonii*). Yolanda Molette and Thomas Roberts re-assessed field conditions on June 2, 2004. On July 21 and 22, 2004 Thomas Roberts and Martha Lowe, an Environmental Science Associates staff botanist, conducted a separate study of wetland vegetation in shaded areas adjacent to bridges analogous to the project components where Doyle Drive would be elevated over the future restored Tennessee Hollow.

In preparation for field surveys, Environmental Science Associates reviewed aerial photographs (1"=1000', 1993), and vegetation, rare plant and wetland maps of the Presidio provided by the NPS and Presidio Trust (the Trust). Species descriptions in recognized manuals and floras (Munz and Keck, 1970; Hickman, 1993) were also reviewed to note key distinguishing characteristics of similar species. Based on information from California Natural Diversity Database, U.S. Fish and Wildlife Service (USFWS) and California Native Plant Society (CNPS), Environmental Science Associates compiled a list of special-status plant and animal species potentially occurring in the general project vicinity. Evaluations of habitat suitability for special-status species were based on field observations, previous data and reports, and knowledge of species' range and habitat requirements. Field reconnaissance surveys were conducted at the end of the survey periods for a number of plant species. The surveys were based on the presence of soil type and specific habitat requirements for each plant species, which are readily identifiable. The results of detailed-level special-status species surveys completed by the NPS in 1999, 2000 and 2003 were used to supplement field reconnaissance survey results.

SECTION 2.0: SPECIES OF CONCERN

2.1 AGENCY LISTS

A letter regarding information on special-status species potentially present within the vicinity of the proposed project was obtained from the USFWS (see NES Appendix A). The CDFG's California Natural Diversity Database was consulted for information concerning sensitive botanical and wildlife resources recorded within the vicinity of the project. This base search was completed for the U.S. Geological Survey San Francisco 7½-minute quadrangle.

2.2 LITERATURE REVIEW AND CONSULTATION WITH EXPERTS

Standard scientific literature was reviewed for the habitat requirements of the species potentially affected by the project, including electronic databases such as Absearch™. Consultation and research results are presented as Table 5-1 and Table 5-2 of the NES, *Wildlife Special-status Species Considered in the Evaluation of the Doyle Drive Project*, and *Plant Special-status Species Considered in the Evaluation of the Doyle Drive Project.*

SECTION 3.0: STUDY METHODOLOGY

3.1 IMPACT DETERMINATION

Potential impacts of the project to special-status species (Tables 5-1 and 5-2 in the NES) were assessed based on the literature review, professional judgment, and the following criteria:

1) A determination of susceptibility. This determination is a three-level process, which for any species considered "sensitive"[32] evaluated: a) potential occurrence in the study area (generally, the terrestrial and aquatic habitats of the Presidio); b) potential occurrence in the construction corridor (the project "footprint"); or, c) absence from either the study area or the construction corridor. If the species was determined unlikely to be found in the study area, the species was given no further consideration. The results of this determination for each species is provided in the "Potential Species Occurrence in Doyle Drive Construction Corridor" column of NES Tables 5-2 and 5-2A.

2) If species were determined likely or potentially occurring in the project study area, further analyses were made of life history and habitat requirements and the suitability of habitat found in the construction corridor for any life stage of a potentially impacted species. The results of this analysis for each species is also provided in the "Potential Species Occurrence In Doyle Drive Construction Corridor" column of NES Tables 5.2 and 5-2A.

3) If suitable habitat was deemed present in the construction corridor, or the species has either been observed in the study area or has at least a moderate potential to occur, additional analysis considered whether the species would be impacted by the project. Both direct effects (e.g., displacement of habitat) and indirect effects (e.g. noise) were considered. In addition, life history and habitat requirements were evaluated to ascertain the likelihood and severity of impact.

3.2 PROBLEMS OR LIMITATIONS OF RESULTS

There were no known problems associated with the methods and materials used to assess impacts to the species of concern. However, extensive field studies at the project site were not conducted.

SECTION 4.0: ENVIRONMENTAL SETTING

The project study area for biological resources encompasses the Doyle Drive freeway construction corridor (i.e., permanent footprint and construction limits of five build alternatives) as well as a 229-meter (750-foot) radius from the Doyle Drive construction corridor as an area of indirect impact. The San Francisco Bay borders the northern perimeter of the project study area, and urban development, landscaped with

[32] Throughout this document, the terms "sensitive" or "special-status" plant or animal species are used to describe species listed as threatened or endangered under state and federal law, or those not currently listed but which might be listed before the project is complete.

ornamental trees and introduced, non-native forests, occurs to the south as well as to the east of the project study area. Coastal bluffs border the western perimeter of the project study area.

Many of the native plant communities in the Presidio are remnant populations of communities that were once extensive along the coast of California. These native plant communities have been displaced by urban development or non-native plants that rapidly colonize disturbed open areas. Ten plant communities occur within the project study area (see **Table 4-1 in the NES**). Based partly on the Holland (1986) classification system, these plant communities include non-native introduced forests, coast live oak woodland, central coast arroyo willow scrub, mixed serpentine chaparral, serpentine bunchgrass, northern coastal scrub, northern coastal bluff scrub, northern foredune, restored tidal marsh and its associated wetland communities, and developed/ornamental.

Of these plant communities, restored tidal marsh and associated wetlands (coastal salt marsh), coast live oak woodland, central coast arroyo willow scrub, mixed serpentine chaparral, northern coastal bluff scrub, serpentine bunchgrass, northern coastal scrub (serpentine) and northern foredune are considered important plant communities by the NPS/Trust because they support a high diversity of native plants and special-status plant species, or have limited distribution in the Presidio (NPS 1999a). Of these sensitive communities, northern coastal scrub (occurring on sandy soil and on sandy soil with serpentine inclusions) and central coast arroyo willow scrub (and associated wetlands), would be impacted within the construction corridor.

Central coast arroyo willow scrub comprises 1.03 hectares (2.55 acres) in the project study area, and occurs on hillside slopes with perennial, or at least intermittent, water flows in three areas of the project study area. Arroyo willow (*Salix lasiolepis*) is the primary species in central coast arroyo willow scrub. California blackberry (*Rubus ursinus*) intermixes with arroyo willow in one area of the project study area. Decay organisms and larvae found in damp litter feed insects and other small animals, which in turn support a complex food web. This habitat is typically an important breeding habitat for amphibians. The physical structure of the arroyo willow trees provides a protected travel corridor between aquatic and upland habitat types, and serves as a feeding and resting place for resident and migratory birds.

The following bird species were observed in this habitat:

- Oregon junco (*Junco oregonus*)
- Brown towhee (*Pipilio fuscus*)
- Black phoebe (*Sayornis nigricans*)
- House finch (*Carpodacus mexicanus*)
- Anna's Hummingbird (*Calypte anna*)
- American goldfinch (*Carduelis tristis*)
- Wilson's warbler (*Wilsonia pusilla*)

4.1 SPECIAL-STATUS ANIMALS

Based on data gathered from the NPS/Trust, the USFWS, and California Natural Diversity Database, a total of 90 special-status animal species were considered in this analysis. These special-status animals are briefly described in Table 5-2 of the NES.

There are no designated Critical Habitats in the study area.

4.1.1 Special-Status Animal Species Removed from Analysis

Ninety special-status wildlife species were initially considered in this analysis. Fifty-three were removed due to (1) absence, determined on the basis of past surveys (Jones and Stokes, 1997); (2) their known range occurs outside the Presidio; (3) low nesting potential at the Presidio or in the project vicinity; or (4) lack of suitable habitat in the Presidio. These species include the following:

Invertebrates

- monarch butterfly (*Danaus plexippus*) (wintering sites)[33]
- white abalone (*Haliotis sorenseni*)
- black abalone (*Haliotis cracherodii*)
- Opler's longhorn moth (*Adella oplerella*)
- globose dune beetle (*Coelus globulus*)
- Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i)
- bumblebee scarab (*Lichnanthe ursina*)
- San Francisco forktail damselfly (*Ischnura gemina*).

Fish

- green sturgeon (*Acipenser medirostris*)
- tidewater goby (*Eucyclogobius newberryi*)
- Delta smelt & Critical Habitat (*Hypomesus transpacificus*)
- coho salmon, Central California Coast ESU & Critical Habitat (*Oncorhynchus kisutch*)
- steelhead, Central California Coast ESU (*Oncorhynchus mykiss*)
- Central Valley Chinook salmon-spring-run & Proposed Critical Habitat(*Oncorhynchus tshawytscha*)
- Chinook Salmon, Winter-run & Critical habitat (*Oncorhynchus tshawytscha*)
- Central Valley Chinook salmon, fall/late fall run (*Oncorhynchus tshawytscha*)
- Sacramento splittail (*Pogonichthys macrolepidotus*)
- longfin smelt (*Spirinichus thaleichthys*)

Amphibians

- foothill yellow-legged frog (*Rana boylii*)

Reptiles

- Silvery legless lizard (*Anniella pulchra pulchra*)
- Western pond turtle (*Clemmys marmorata marmorata*)
- Southwestern pond turtle (*Clemmys marmorata pallida)*
- California horned lizard (*Phrynosoma coronatum frontale*)

Birds

- tricolored blackbird (*Agelaius tricolor*)
- Bell's sage sparrow (*Amphispiza belli belli*)

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[33] National Park Service and Presidio Trust staff have reported this species in the project area, but the information was not sufficiently documented to require reconsideration at this time.

- western burrowing owl (*Athene cunicularia hypugaea*)
- red knot (*Calidris canutus*)
- black swift (*Cypseloides niger*)
- short-tailed albatross *(Diomedea albatrus*)
- white-tailed kite (*Elanus leucurus*)
- loggerhead shrike (*Lanius ludovicianus*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Lewis' woodpecker (*Melanerpes lewis*),
- ashy storm-petrel (*Oceanodrama homochroa*)
- California clapper rail (*Rallus longirostris obsoletus*)
- bank swallow (*Riparia riparia*)
- black skimmer (*Rhynchops niger*)

Mammals

- Guadalupe fur seal (*Arctocephalus townsendi*)
- Sei whale (*Balaenoptera borealis*)
- blue whale (*Balaenoptera musculus*)
- finback whale (*Balaenoptera physalus*)
- Pacific right whale (*Eubalaena glacialis*)
- Steller (northern) sea lion (*Eumetopias jubatus*)
- sperm whale (*Physeter macrocephalus*)
- humpback whale (*Megaptera novaeangliae*)
- salt marsh vagrant shrew (*Sorex vagrans halicoetes*)
- pallid bat (*Antrozous pallidus)*
- greater western mastiff bat (*Eumops perotis californicus*)
- long-eared myotis (*Myotis evotis*)
- fringed myotis (*Myotis thysanodes*)
- long-legged myotis (*Myotis volans*)
- Townsend's big-eared bat (*Corynorhinus* (=*Plecotus) townsendii*)
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)
- salt marsh harvest mouse (*Reithrodontomys raviventris raviventris*)

The nearest known wintering habitat for monarch butterfly is Rob Hill in the Presidio (S. Farrell, scoping comments dated August 5, 2001). According to past surveys, suitable habitat is absent for the following special-status invertebrates: globose dune beetle, Ricksecker's water scavenger beetle, bumblebee scarab,

and San Francisco fork-tailed damselfly[34] (Jones and Stokes 1997). There are very little unvegetated open sand dunes at the Presidio to support globose dune beetle and bumblebee scarab. The dense vegetation at Mountain Lake and Lobos Creek make these habitats suitable for Ricksecker's water scavenger beetle, and San Francisco forktail damselfly. The damselfly was found in seep habitat in 1999 and 2000 along Marina Drive at Fort Point (Castellini 1999; Presidio Trust, 2001) outside the Doyle Drive construction corridor.

Fish species removed from this analysis may occasionally migrate through the Bay waters outside the Presidio and some fish may inadvertently stray to Crissy Marsh. However, none of the identified species breed in portions of San Francisco Bay adjacent to the Presidio, and their potential occurrence at Crissy Marsh is low. Specifically, Coho salmon, Delta smelt, and Sacramento splittail are not known to occur in this part of San Francisco Bay. Similarly, whale species and Steller sea lion may migrate through the Pacific Ocean and the Bay outside the Presidio, but there is no potential breeding habitat or potential occurrence of these species in the project study area. Additionally, no element of the proposed action would be undertaken in the San Francisco Bay or Pacific Ocean.

There are no suitable streams or rivers present to support foothill yellow-legged frog and western pond turtle in the Presidio. Historically, observations of the southwestern pond turtle have been recorded at Mountain Lake; however, this species was not detected during recent surveys at Mountain Lake (Jones and Stokes 1997). There are no recorded historical occurrences of California horned lizard at the Presidio (CDFG 2000). Additionally, this species was not detected in recently conducted surveys (Jones and Stokes 1997).

No suitable habitat exists within the construction corridor to support a number of special-status birds that are either pelagic or shorebirds, or require other habitat not present, including Bell's sage sparrow, western burrowing owl, red knot, short-tailed albatross, Lewis woodpecker, ashy storm-petrel, and bank swallow. In addition, these species have not been documented as occurring in the Presidio (Clark 2002; Gardali 2002; Gardali 2003).

There are no tidal salt marshes associated with pickleweed (*Salicornia* sp.) present in the Presidio to support California black rail, California clapper rail, salt marsh vagrant shrew or salt marsh harvest mouse. The Guadalupe fur seal breeding population is centered on Isla de Guadalupe west of Baja, California, and thus remote from the Presidio.

Excepting yuma bat, the roosting habitat for bats at the Presidio is considered poor (Jones and Stokes 1997). No bats were observed during surveys, and no evidence of use by bats was observed along the entire surveyed length of Doyle Drive. Though many of the trees adjacent to the bridge/roadway structure are mature and large in size, eucalyptus trees are not prone to support cavities of any significant size suitable for indigenous colonial species of bats. Cypress trees observed showed evidence of regular maintenance (limb removal), and did not exhibit obvious cavities. The bark of the cypress trees observed did not appear to provide significant roost habitat, which normally occurs in trees with bark that is thick, forms fissures or is exfoliating.

4.1.2 Special-Status Animal Species Retained in Analysis but Eliminated Due to lack of Impact

A total of 37 special-status animals are retained in this analysis because these species, either (1) are known to occur in the Presidio, (2) have suitable habitat within the project study area, or (3) could be potentially affected (directly or indirectly) by the proposed project. However, after further analysis of the conditions on the Presidio, the preparers of this Biological Report concluded that animals present the project study area but *absent from* the construction corridor are not at risk from either direct or indirect impact.

The rationale for this conclusion is twofold. First, some of these species are only possible as transients and not dependent on any of the natural resources in the corridor. Second, the Doyle Drive corridor is within and

[34] This species has been downgraded from a federal special concern species.

adjacent to areas that are either urbanized or urban parklands, with nearly constant, high levels of ambient disturbance from Golden Gate Bridge traffic, recreational users, and dogs. Construction within the envelope of the corridor may be, to the animals as receptors, indistinguishable from what occurs at present (see for example Bowles et al., 1991). This conclusion is not intended to suggest that the pattern or intensity of construction activity is exactly analogous to ambient disturbance, but that the effect of such disturbance would not be measurable. The species eliminated at this stage of the analysis are discussed briefly below.

4.1.2.1 Federal and State Listed or Candidate Species

Invertebrates

Listed invertebrates include three species, Bay checkerspot butterfly (*Euphydryas editha bayensis*), Mission blue butterfly (*Icaricia icarioides missionensis*), and San Bruno elfin butterfly (*Incisalia mossii bayensis*). Bay checkerspot butterfly inhabits native grasslands in the San Francisco Bay area on serpentine soils with its associated host plants California plantain (*Plantago erecta*), denseflower Indian paintbrush (*Castilleja densiflora*) and purple owl's clover (*C. exserta*). Only one record of this species occurs at Twin Peaks located outside of the Presidio. Bay checkerspot has not been detected at the Presidio in previous studies (Jones and Stokes 1994). There are no host plants in the project study area to support this species. San Bruno elfin butterfly occurs in coastal scrub and bunchgrass grasslands with its larval food plant broadleaf stonecrop (*Sedum spathulifolium*). All known populations are from San Mateo County (Arnold 1983) and this species has not been detected in the vicinity of the project during past surveys (Jones and Stokes 1997). Mission blue butterfly occurs in grassland and coastal scrub with its larval food plants silver bush lupine, varicolored lupine, and summer lupine (*Lupinus albifrons*, *L. variicolor* and *L. formosus*). This species is primarily known from San Mateo County, but occurs at Twin Peaks and at the north end of Golden Gate Bridge in Marin County. Mission blue butterfly has not been recently observed in the Presidio and is not likely to occur in the project study area since there are no host plants in the project study area to support this species.

Amphibians

California red-legged frog requires ponds and habitat elements such as upland refugia, which are not present within the project study area or construction corridor.

The most recent document that evaluates suitable habitat for the California red-legged frog is the *Recovery Plan* for the species (USFWS, 2002). This document describes the frog as breeding in a variety of aquatic habitats, from deep pools to marshes and sag ponds, and in shallow sections of streams with and without riparian vegetation. Since larvae typically metamorphose between July and September, features incapable of holding water into this period would be unlikely to support successful reproduction; moreover, since egg masses (deposited between November and April) need to be laid in water, some ponding of a depth sufficient to float egg masses must be present during this period to even attract frogs to breed at the site.

The wetland sites within and adjacent to the limits of construction are not the result of ponded water at any time of year. The largest and most diverse sites are on a hillside which allows some water to accumulate at the toe of the slope, but a concrete drainage channel conducts this water away. Where the channel is absent, water is briefly held but not collected: there is a strip of saturated soil which supports a few cattails (*Typha* sp.) but no defined bank or bed (see NES, Appendix B).

Birds

Listed bird species include marbled murrelet (*Brachyramphus marmoratus*), western snowy plover (*Charadrius alexandrinus*), little willow flycatcher (*Empidonax traillii brewsteri*), willow flycatcher (*Empidonax traillii extimus*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), California brown pelican (*Pelecanus occidentalis californicus*), and California least tern (*Sterna antillarum browni*).

While the peregrine falcon is an uncommon visitor at the Presidio, it does not nest in the construction corridor. California brown pelican is a regular visitor along the shores of the Presidio, but the likelihood of

overflying the construction corridor so as to be exposed to impacts is low. The other species are either absent due to lack of suitable habitat or are not known to breed at the Presidio.

4.1.2.2 Federal and State Special Concern Species

Fourteen wildlife species are federal or state special-status species without formal listing status. These species include one invertebrate and 13 birds, which are listed below. None of these species would be subject to project impacts.

Invertebrates

- Sandy beach tiger beetle (*Cicindela hirticollis gravida*)

Birds

- black turnstone (*Arenaria melanocephala*),
- ferruginous hawk (*Buteo regalis*),
- Vaux's swift (*Chaetura vauxi*),
- saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*),
- black oystercatcher (*Haematopus bachmani*),
- harlequin duck (*Histrionicus histrionicus*),
- California gull (*Larus californicus* (nesting colony),
- marbled godwit (*Limosa fedoa*),
- long-billed curlew (*Numenius americanus*),
- whimbrel (*Numenius phaeopus*),
- double-crested cormorant (*Phalacrocorax auritus* (rookery site)),
- rufous hummingbird (*Selasphorus rufus*),
- elegant tern (*Sterna elegans*) (nesting colony).

Although the sandy beach tiger beetle may occur elsewhere in the Presidio, suitable habitat is absent within the Doyle Drive construction corridor for this species.

A number of special-status birds have been observed at the Presidio. The majority of these are rare to uncommon seasonal migrants that do not breed at the Presidio or in the state. For example, double crested-cormorant is a common non-breeding resident. California gull is a common visitor to the Presidio but also does not breed there. Ferruginous hawk, Vaux's swift, harlequin duck, and long-billed curlew are among the uncommon seasonal migrants that do not breed at the Presidio. These species are generally found in habitat that does not occur within the construction corridor and the project is not expected to impact them.

4.1.3 Special-Status Animal Species That May Be Affected by the Project

There are no state or federal threatened or endangered animal species that would be affected by the Doyle Drive Project. However, eleven non-listed special-status species have the potential to occur and may be affected. These are:

- Tree lupine moth (*Grapholita edwardsiana*),
- San Francisco forktail damselfly
- Cooper's hawk (*Accipiter cooperi*),

- great horned owl (*Bubo virginianus*),
- red-tailed hawk (*Buteo jamaicensis*),
- red-shouldered hawk (*Buteo lineatus*),
- California yellow warbler (*Dendroica petechia brewsteri*),
- American kestrel (*Falco sparverius*)
- western screech-owl (*Otus kennecottii*),
- Allen's hummingbird (*Selasphorus sasin*), and
- Yuma myotis.

These species are discussed in greater detail below.

4.1.3.1 Tree lupine moth

Status: The tree lupine moth is federal species of concern but has no State protections.

General Ecology and Distribution/Project Area Occurrence: Coastal sand dunes are typically associated with the moth's larval host plant yellow bush lupine (*Lupinus arboreus*). Yellow bush lupines occur at several locations south of the Golden Gate Bridge. There is potential habitat in coastal scrub within Doyle Drive construction corridor itself.

Project Impacts: Impacts to tree lupine moths would be limited to clearing of the host plant for construction. Indirect impact to the vigor of nearby plants could conceivably result from drifting dust.

4.1.3.2 San Francisco forktail damselfly

Status: The San Francisco forktail damselfly is a federal species of concern but has no State protections.

General Ecology and Distribution/Project Area Occurrence: This species is associated with wetlands that have emergent vegetation. There is potential habitat for the species at Mountain Lake and Lobos Creek. The species is present in the Presidio in seep habitat at Fort Point and there is potential habitat within the construction corridor at Tennessee Hollow and in a seep behind Building 926.

Project Impacts: Impacts to San Francisco forktail damselfly could occur if wetland emergent vegetation were removed within the construction corridor, potentially resulting in mortality of eggs and larvae. Dust generated by construction activities can affect plant vigor and survival, and could cause plants to become unsuitable for potential perching and metamorphosis of nymphs (immature forktail damselfly).

4.1.3.3 California yellow warbler

Status: The yellow warbler is a state species of concern.

General Ecology and Distribution/ Project Area Occurrence: This species breeds between April and August, with a peak in June, and utilizes riparian deciduous habitats throughout California with the exception of deserts and the Central Valley. Yellow warblers have been observed at Crissy Field.

Project Impacts: Impacts to yellow warbler could occur through destruction of nests when clearing central coast arroyo willow scrub vegetation. This species' habitat could be indirectly adversely affected by hydrological changes due to tunneling. Baseline (2001) reported that tunneling "could alter or disrupt groundwater flows [but] it should be noted that construction of a tunnel may increase flow to the seeps on the

bluffs by increasing deep infiltration in the location of the existing Doyle Drive roadway." It is not known exactly how the flows would be affected, if at all, at any particular location.

4.1.3.4 Raptors: Cooper's hawk, red-tailed hawk, red-shouldered hawk, American kestrel, great-horned owl, western screech-owl

Status: Raptors are protected in California under Fish & Game Code §3503.5 and disturbance to active nests is prohibited under the Migratory Bird Treaty Act.

General Ecology and Distribution/ Project Area Occurrence: All of these species use either dead or living large trees, located in forest or woodland habitat, to nest in, including conifers and eucalyptus. All of these species have been observed, and are known or suspected to nest, in the Presidio and all may potentially nest in trees within the construction corridor.

Project Impacts: Impacts to raptors could occur through destruction of nests, eggs, and nestlings when removing larger trees within the construction corridor, and a longer-term loss of nesting habitat and future nesting opportunities. Generalized disturbance due to construction activity would not likely be measurable, but in certain instances nests in close proximity to equipment may require site-specific protection.

4.1.3.5 Allen's hummingbird

Status: Allen's hummingbird is a federal species of concern and has no State status.

General Ecology and Distribution/ Project Area Occurrence: This species frequents brush and woodlands and can occasionally be found in landscaped areas. The species is known to breed at the Presidio. Allen's hummingbird may nest in scrub or woodlands within the Doyle Drive construction corridor.

Project Impacts: Impacts to Allen's hummingbird could occur through destruction of nests, eggs, and nestlings when removing shrubs and trees within the construction corridor, and a longer-term loss of nesting habitat and future nesting opportunities.

4.1.3.6 Yuma myotis

Status: Yuma myotis is a both a federal and state species of concern.

General Ecology and Distribution/ Project Area Occurrence: This species roosts in caves, old buildings, and under bark, forming maternity colonies in spring. The species has been observed at the Presidio and the trees in the Historic Forest located within the construction corridor may provide suitable roosting habitat.

Project Impacts: Impacts to Yuma myotis could occur through mortality to individuals and destruction of roosting habitat when removing trees within the construction corridor, and a longer-term loss of roosting habitat.

4.2 SPECIAL-STATUS PLANTS

Based on data gathered from the NPS (2003), the USFWS (2004), CNPS Electronic Inventory (2003), and CDFG (2004), a total of 45 special-status plant species were considered in this analysis. These special-status plants are presented in the NES, Table 5-1.

4.2.1 Special-Status Species Removed from Analysis

Of these 45 species, 17 species were removed from the analysis due to absence as a result of past surveys (NPS 1999b, NPS 2000b, NPS, 2003; Jones and Stokes 1997, Holloran 2002), the known distribution of the species, or lack of suitable habitat in the project study area. These 17 species include the following:

- marsh sandwort (*Arenaria paludicola)*
- Franciscan manzanita (*Arctostaphylos hookeri* ssp. *franciscana*)
- alkali milk-vetch (*Astragalus tener* var. *tener*)
- San Francisco collinsia (*Collinsia multicolor*)
- fragrant fritillary (*Fritillaria liliacea*)
- Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*)
- beach layia (*Layia carnosa*)
- large-flowered linanthus (*Leptosiphon* (= *Linanthus*) *grandiflorus*)
- rose linanthus (*Leptosiphon* (=*Linanthus*) *rosaceus*)
- marsh microseris (*Microseris paludosa*)
- curly-leaved monardella (*Monardella undulata*)
- California broomrape (*Orobanche californica* ssp. *californica*)
- Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*)
- Greene's (=San Francisco) popcorn flower (*Plagiobothrys reticulatus var. rossianorum* (=*P. diffusus*))
- white-rayed pentachaeta *(Pentachaeta bellidiflora*)
- adobe sanicle (*Sanicula maritima*)
- Marin checkerbloom (*Sidalcea hickmanii* ssp*. viridis*)

Please refer to NES Table 5-1 for a brief description of these species.

4.2.2 Special-status Plant Species with the Potential to be Affected by the Project

Following the removal of additional species that would not be exposed to project impacts, the 28 special-status plants retained in this analysis are discussed below. Due to their vulnerability, the specific locations of species in the Presidio are not provided to the public.

Skunkweed (*Navarretia squarrosa*) and San Francisco gumplant (*Grindelia hirsutula* var*. maritima*), both federal species of local concern, are the only special status plant species located within the area of construction. Skunkweed occurs along the road to Battery Blaney within the construction corridor (Brastow, NPS, personal communication, 2004). Two gumplant individuals occur within the construction corridor near Building 1258. Special status plants that are of federal special concern occur near the Doyle Drive construction corridor, including coast rock cress (*Arabis blepharophylla*), Franciscan thistle (*Cirsium andrewsii*) and San Francisco wallflower (*Erysium franciscanum*) on the coastal bluffs, and San Francisco gumplant located on the downward north-facing slope approximately 91 meters (300 feet) north of the area of construction. These plants and their habitat may be indirectly affected by construction of the build alternatives due to drifting dust and soil runoff during tunnel excavation and grading for the detour facility structure and construction activities at the Park Presidio Interchange.

4.2.2.1 Federal and State Listed Plant Species

Five of the 28 special-status plants retained in the analysis are federally and/or state listed plants. All of these listed species are present at the Presidio and are described below. Two species are present in the project study area. None of the five listed plants is present in the construction corridor (Jones and Stokes, 1997; NPS, 1999a; NPS, 2000b; NPS, 2003). These five listed species include:

- Presidio manzanita (*Arctostaphylos hookeri* ssp. *ravenii*)
- Presidio clarkia (*Clarkia franciscana*)
- Marin dwarf flax (*Hesperolinon congestum*)
- San Francisco lessingia (*Lessingia germanorum*)
- California seablite (*Suaeda californica*)

San Francisco lessingia was reintroduced at Crissy Marsh and is present in the project study area. The open sandy areas of coastal scrub are highly disturbed and are not suitable for supporting San Francisco lessingia in the construction corridor. The serpentine soil located in the northwestern portion of the project study area does not support Presidio manzanita, Presidio clarkia or Marin dwarf flax. These three species are not present in the construction corridor or the project study area. California seablite was reintroduced at Crissy Marsh within the project study area. There is no coastal salt marsh habitat in the construction corridor to support California seablite.

Presidio manzanita (also commonly known as **Raven's manzanita**) grows on open, rocky serpentine slopes in coastal scrub, chaparral, and coastal prairie and blooms February through March. Only one wild individual is known, and it occurs in the Presidio. The NPS transported numerous cuttings from this individual plant to other locations in the Presidio. This species does not occur in the project study area or construction corridor. Non-native species, and a significant loss of habitat as well as a decline in species numbers threaten this species (NPS, 1999c). Presidio manzanita is a federally and state endangered, and CNPS List 1B species.

Presidio clarkia grows in serpentine scrubs and grasslands as an erect or sprawling plant, which blooms May through July. This species does not occur in the project study area or construction corridor. This species has a very restricted range in the Presidio and is threatened by habitat degradation, including mowing, trampling, roadside maintenance, and presence of non-native plants (NPS, 1999c; CDFG 2000). Presidio clarkia is a federally and state endangered, CNPS List 1B species.

Marin dwarf flax is an herbaceous annual species that occurs in dry, serpentine scrub, and grassland slopes in the Presidio. This species grows from one to four decimeters tall and produces rose to white flowers from May to June. The potential range for this species is from Marin to San Mateo Counties. This species does not occur in the project study area or construction corridor. Non-native species, and a significant loss of habitat threatens this species (NPS, 1999c). Marin dwarf flax is a federally and state threatened, CNPS List 1B species.

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 was reintroduced at Crissy Marsh within the project study area. This species does not occur within the Doyle Drive construction corridor. An area near Lobos Creek and on the western side of Lincoln Boulevard above Baker Beach is under consideration by the NPS as a Special Management Zone for enhancement of San Francisco lessingia habitat. Non-native species and a change in the natural disturbance regime threaten this species (NPS, 1999c). This species blooms August through November. San Francisco lessingia is a federally and state endangered, and CNPS List 1B species.

California seablite is a succulent-leafed, perennial shrub that that blooms July through October. The NPS reintroduced this species to Crissy Marsh. Prior to its reintroduction, Morro Bay supported the only surviving

population within coastal salt marsh habitat. This species occurs within the project study area, but does not occur in the construction corridor. California seablite is a federally endangered and CNPS List 1B species.

4.2.2.2 Federal Species of Concern and Federal Species of Local Concern

Ten of the 28 special-status plants retained in the analysis are federal species of concern, including:

- California saltbush (*Atriplex californica*)
- San Francisco spineflower (*Chorizanthe cuspidata* var*. cuspidate*)
- Franciscan thistle
- round-headed collinsia (*Collinsia corymbosa*)
- Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *Palustris*)
- San Francisco wallflower
- dune gilia (*Gilia capitata* ssp. *chamissonis*)
- San Francisco gumplant
- San Francisco campion (*Silene verecunda* ssp. *verecunda*)
- San Francisco owl's clover (*Triphysaria floribunda*)

Thirteen of the 28 special-status species retained in the analysis are federal species of local concern, including:

- pink sand-verbena (*Abronia umbellata* ssp. *umbellata*)
- coast rock cress
- Nuttall's milk-vetch (*Astragalus nuttallii* var. *virgatus*)
- coast Indian paintbrush (*Castilleja affinis* ssp. *affinis*)
- salt marsh owl's clover (*Castilleja ambigua* ssp. *ambigua*)
- California goosefoot (*Chenopodium californicum*)
- Davy's clarkia (*Clarkia davyi*)
- California croton (*Croton californicus*)
- skunkweed
- coast rein-orchid (*Piperia elegans*)
- Pacific cordgrass (*Spartina foliosa*)
- dune tansy (*Tanacetum camphoratum*)
- California triquetrella moss (*Triquetrella californica*)

All of these federal species of concern and the federal species of local concern are present or have a potential to occur at the Presidio (Holloran, 2002; Jones and Stokes, 1997; NPS, 1999b; NPS, 2000b, NPS, 2003; NPS, 2004). These species are described below. Many of these species were reintroduced at Crissy Marsh (see Section 5.5.3 below). Except for Davy's clarkia and California triquetrella moss, these species are known to occur in the project study area. Potential habitat for Davy's clarkia and California triquetrella moss is at Crissy Marsh and the coastal bluffs within the project study area, although the occurrence of these species is low.

The quality of northern coastal scrub within the Doyle Drive construction corridor is marginal because it is highly disturbed. This community is not likely to support plant species such as San Francisco campion, San Francisco spineflower, coast rock cress, Franciscan thistle, Davy's clarkia, coast Indian paintbrush, California triquetrella moss, and dune gilia. Similarly, the serpentine soil in the construction corridor does not support fragrant fritillary or San Francisco owl's clover. Except for skunkweed and San Francisco gumplant, no special-status plant species are known to occur in the Doyle Drive construction corridor (Holloran, 2002; Jones and Stokes, 1997; NPS, 1999b; NPS, 2000b, NPS 2003; NPS, 2004), and their potential occurrence is low within the construction corridor. Skunkweed occurs along the road to Battery Blaney within the construction corridor (Brastow, NPS, personal communication, 2004), and San Francisco gumplant occurs north of the construction corridor below Lincoln Boulevard at the Park Presidio Interchange, and two individuals were found in the construction corridor near Building 1258.

San Francisco owl's clover is within the project study area, immediately south of the construction corridor at Fort Scott (NPS, 2003). San Francisco wallflower, San Francisco gumplant and Franciscan thistle occur approximately 91 meters (300 feet) north of the Doyle Drive construction corridor within the project study area (NPS, 2003). San Francisco gumplant is also immediately north of the construction corridor below Lincoln Boulevard at the Park Presidio Interchange.

Pink sand-verbena is an herbaceous perennial that occurs on coastal dunes and blooms June through October. This species is threatened by vehicles, non-native plants, and foot traffic (CNPS 2003). This species is a federal local concern and CNPS List 1B species. Pink sand-verbena occurs within the project study area, but outside the construction corridor.

Coast rock cress grows as a coarse perennial herb in northern coastal bluff scrub and northern coastal scrub. This species produces rose-purple flowers from February to May, and is found from Sonoma County south to Santa Cruz. The presence of non-native species threatens coast rock cress (NPS, 1999c). This species is a federal local concern and CNPS List 4 species. Coast rock cress occurs within the project study area, but outside the construction corridor.

Nuttall's milk-vetch is an herbaceous perennial that occurs on coastal dunes and coastal bluff scrub, and blooms January through November. This species is threatened by vehicles, non-native plants, and foot traffic (CNPS 2003). This species is a federal local concern and CNPS List 4 species. Nuttall's milk-vetch occurs within the project study area, but outside the construction corridor.

California saltbush is an herbaceous perennial that occurs in salt marshes, and blooms April through November. This species is a federal species of local concern. California saltbush occurs within the project study area, but outside the construction corridor.

Coast Indian paintbrush is an herbaceous perennial that grows on sea bluffs in coastal scrub and in dry places in chaparral and can bloom from February through September. Coast Indian paintbrush is a federal species of local concern. This species is documented as occurring in dune scrub habitat at the Presidio (Holloran, 2002). Coast Indian paintbrush occurs within the project study area and is not likely to occur in the Doyle Drive construction corridor as this habitat type is lacking there.

Salt marsh owl's clover is an annual that grows in salt marshes, coastal bluffs, and grasslands and blooms from May through August. This species occurs within the project study area at Crissy Marsh (P. Brastow, NPS, personal communication, 2004). The species is unlikely to occur in the construction corridor. Salt marsh owl's clover is a federal local concern and CNPS List 1B species.

California goosefoot is an herbaceous perennial that occurs in generally open sites on sandy and clay soils. This species blooms January through November and is threatened by vehicles, non-native plants, and foot traffic (CNPS 2003). This species is a federal species of local concern. California goosefoot occurs within the project study area, but outside the construction corridor.

San Francisco spineflower is an annual herb that grows in open sandy areas of coastal dune scrub and blooms April through July. Non-native species and a change in the natural disturbance regime threaten this

species (NPS, 1999c). San Francisco spineflower is a federal special concern and CNPS List 1B species. This species occurs within the project study area, but outside the construction corridor.

Franciscan thistle is a perennial species that occurs in moist places of northern coastal bluff scrub, mixed serpentine chaparral, and serpentine areas of northern coastal scrub in the Presidio. It produces solitary spiney flowers from June to July. The presence of non-native species threatens Franciscan thistle. This is a federal special concern and CNPS List 1B species. This species occurs within the project study area, but outside the construction corridor.

Davy's clarkia is an annual of coastal bluffs and grasslands, blooms from April through June, and has a low potential for occurrence at the Presidio. The species, however, is not documented as occurring at the Presidio (Holloran, 2002) and is unlikely to occur in the construction corridor. Davy's clarkia is a federal species of local concern.

Round-headed collinsia is an annual species that occurs within the upper zones of salt marshes, and blooms April through June. This species is a federal species of concern and CNPS List 1B species. Round-headed collinsia occurs within the project study area, but outside the construction corridor.

Point Reyes bird's-beak is an annual species that occurs in salt marsh habitats, and blooms May through September. This species is a federal species of concern and CNPS List 1B species. Point Reyes bird's-beak occurs within the project study area, but outside the construction corridor.

California croton is an herbaceous perennial that occurs on coastal dunes, and blooms June through September. This species is a federal species of local concern. California croton occurs within the project study area, but outside the construction corridor.

San Francisco wallflower is an herbaceous biennial or short-lived perennial that typically occurs in rocky, gravely, or sandy soils underlain by rocks of the Franciscan Formation and on disintegrated serpentine. At the Presidio, this species typically occurs in northern foredune, coastal dune scrub, northern coastal bluff scrub and northern coastal scrub. Non-native species threaten this species (NPS, 1999c). San Francisco wallflower typically blooms March to June. This species is a federal special concern and CNPS List 4 species. San Francisco wallflower occurs within the project study area, but outside the construction corridor.

San Francisco gumplant is a perennial, glandular-aromatic species that typically occurs in mixed serpentine chaparral, and serpentine soils of northern coastal scrub and northern coastal bluff scrub. Non-native species threaten this species (NPS, 1999c). This species blooms May through September (but is identifiable year-round). San Francisco gumplant is a federal special concern and CNPS List 1B species. This species occurs within the project study area, adjacent to the construction corridor and two individuals were observed south of Building 1258 (north of the Merchant Road on-ramp) within the construction corridor (P. Brastow, personal communication, August, 2004).

Skunkweed is an annual plant that grows in open, wet, gravelly flats or slopes and in upland dune habitat and blooms from June through August. This species was reintroduced at Crissy Marsh and is also documented as occurring at the Presidio in ruderal and scrub habitat (Holloran, 2002). Skunkweed is a federal species of local concern. This species occurs within the project study area, and less than 100 individuals were observed within the construction corridor in 2003 (P. Brastow, personal communication, August, 2004).

Coast rein-orchid generally inhabits dry, open slopes in scrub or coniferous forest and blooms from May through September. This species is documented as occurring at the Presidio (Holloran, 2002). Coast rein-orchid is a federal local concern and CNPS List 1B species. This species occurs within the project study area, but outside the construction corridor.

San Francisco campion grows as a multi-stemmed perennial with dense gland-tipped hairs. This species is native to sandy soils of coastal dune scrub and flowers from March to June. Non-native species and a change in the natural disturbance regime threaten this species (NPS, 1999c). San Francisco campion is a

federal special concern and CNPS list 1B species. This species occurs within the project study area, but outside the construction corridor.

San Francisco owl's clover is an annual green root-parasite, and occurs in serpentine chaparral at the Presidio. A population was observed in the Fort Scott area within the project study area, but outside the Doyle Drive construction corridor (Chasse CNPS Yerba Buena News June 2001; NPS, Peter Brastow, scoping comments August 23, 2001). Non-native species and significantly reduced habitat threaten this species (NPS, 1999c). This species blooms April through May. San Francisco owl's clover is a federal special concern and CNPS list 1B species.

Dune gilia is an annual herb that occurs on coastal dunes and in openings of coastal dune scrub. Its historical distribution includes Marin, San Francisco and Sonoma Counties. This species produces bright blue violet flowers April through July. The presence of non-native species and a change in the natural disturbance regime threaten this species (NPS, 1999c). Dune gilia is a federal special concern and CNPS List 1B species. This species occurs within the project study area, but outside the construction corridor.

Pacific cordgrass is a perennial grass that occurs in salt marsh habitats, and blooms June through October. This species is a federal species of local concern. Pacific cordgrass occurs within the project study area, but outside the construction corridor.

Dune tansy is an herbaceous perennial that occurs on coastal dunes, and blooms June through September. This species is a federal species of local concern. Dune tansy occurs within the project study area, but outside the construction corridor.

California triquetrella moss occurs in coastal bluff scrub and coastal scrub habitat. Although the species is not documented as occurring at the Presidio (Holloran, 2002), there is a low potential for occurrence as habitat is present. However, suitable habitat for this species in the construction corridor is generally marginal. This is a federal local concern and CNPS List 1B species.

4.2.3 Special-status Plant Species that Occur at Crissy Field

The following list of plant species occur in the restored dunes and wetlands at Crissy Field. Except for San Francisco lessingia, all of these species were introduced as part of the Crissy Field Restoration Project.

- California saltbush
- Point Reyes bird's-beak
- pink sand-verbena
- Nuttall's milk-vetch
- California goosefoot
- California croton
- Pacific cordgrass
- dune tansy
- San Francisco campion
- California seablite
- San Francisco lessingia
- dune gilia
- San Francisco wallflower
- San Francisco spineflower

- salt marsh owl's clover

Many of these species occur in coastal salt marsh and dune habitats and are not noted as occurring elsewhere in the Presidio. These species are not expected to occur in the construction corridor.

4.2.4 Special-Status Plant Species - Conclusion

There are no listed special status plants located within the area of construction. Skunkweed and San Francisco gumplant, a federal species of local concern are the only species within the construction corridor and could be directly affected within the construction corridor. Additionally, special status plants that are of federal special concern occur near the Doyle Drive construction corridor, including coast rock cress, Franciscan thistle and San Francisco wallflower on the coastal bluffs, and San Francisco gumplant located on the downward north-facing slope approximately 91 meters (300 feet) north of the area of construction. These plants and their habitat may be potentially indirectly affected by construction of the build alternatives due to soil runoff during tunnel excavation and grading for the detour facility structure and Presidio Interchange. However, BMPs including dust control and SWPPP measures will be implemented, minimizing any potential impacts.

4.3 U.S. FISH AND WILDLIFE SERVICE PLANT RECOVERY PLANS

The NPS and Trust have identified both non-native and native habitats as potential serpentine recovery areas for the re-introduction of special-status species based on recommendations in USFWS Recovery Plans. The underlying goal is to enlarge existing populations and provide long-term conservation. One area under consideration is within the Doyle Drive construction corridor on the northern bluffs of the Presidio Interchange. In its current condition the northern bluff area of the Presidio Interchange primarily supports non-native blue-gum eucalyptus (*Eucalyptus globulus*) trees, black acacia trees (*Acacia melanoxylon*) and fennel (*Foeniculum vulgare*). The understory consists of non-native annual grasses and herbs, including big-quaking grass (*Briza maxima*), wild oat (*Avena sp.*) and common sow thistle (*Sonchus oleraceus*). Currently, there are no federally or state endangered or threatened plant species located near the Presidio Interchange. Lincoln Boulevard separates this non-native eucalyptus habitat from a downward sloping native plant serpentine area, which is located below the Crissy Field overlook. This native serpentine area primarily supports lizard tail (*Saururus cernuus*), coyote brush (*Baccharis pilularis*), toyon (*Heteromeles californicus*), sticky monkeyflower (*Mimulus aurantiacus*), and California blackberry. Non-native species observed in the native serpentine area include cotoneaster (*Cotoneaster* sp.), Monterey cypress, pampas grass (*Cortaderia* sp.), black acacia and iceplant (*Carpobrotus edulis*). Non-native, invasive species, French broom (*Genista monspessulana*) and cotoneaster are found below the aerial structure of Doyle Drive.

The 2003 USFWS Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula (USFWS 2003) recommends that surface exposures of serpentine rocks and soils in the Presidio should be: (i) surveyed; (ii) assigned reasonable buffers in consultation with the USFWS under the Endangered Species Act. The Plan further states that the most abundant opportunities for reintroduction occur below Lincoln Boulevard on the serpentine bluffs (stable and unstable landslides), where relatively bare serpentine soil slopes and serpentine bedrock outcrops are still found. Exposed serpentine rocks and soils also occur behind Crissy Field. None of the serpentine locations, or the planned use of these areas, are described in detail.

Caltrans has determined that any recovery within the roadway right-of-way or immediately adjacent areas would be in direct conflict with the roadway right-of-way or land use due to future maintenance and possible future improvements. Caltrans, USFWS, and ACOE practice is to discourage species of concern from being introduced into the roadway right-of-way or immediately adjacent areas due to the direct land use conflict.

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