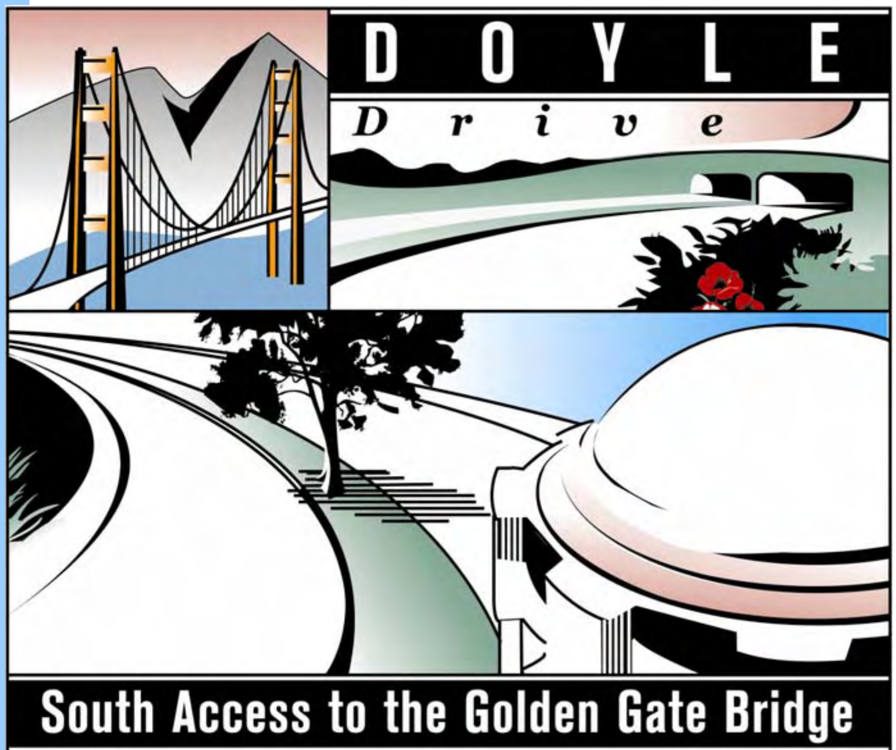
SFCTA Contract Number 99/00-7



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 <u>Wetlands</u>

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.

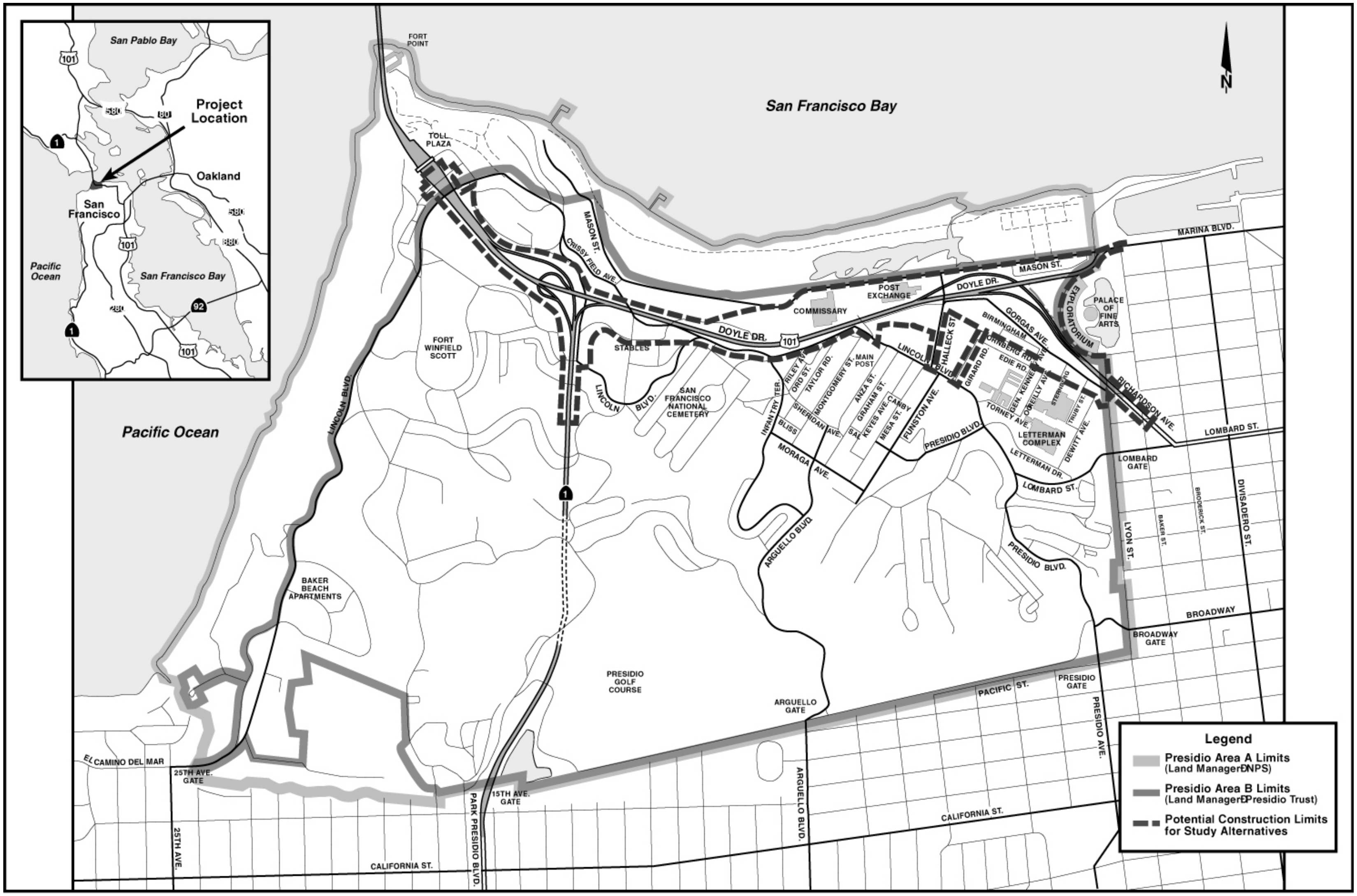
Doyle Drive is nearly 70 years old and is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic 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

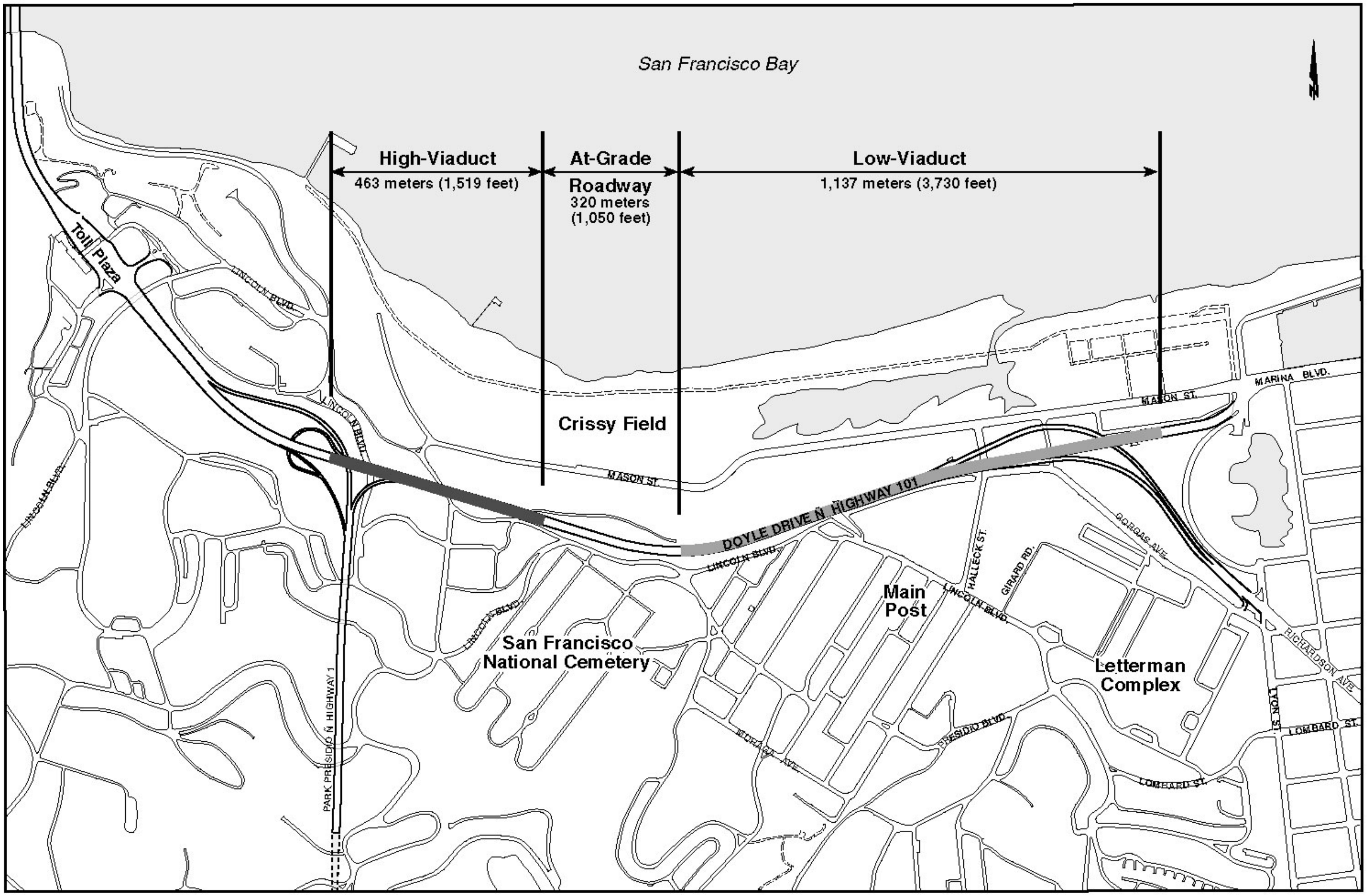
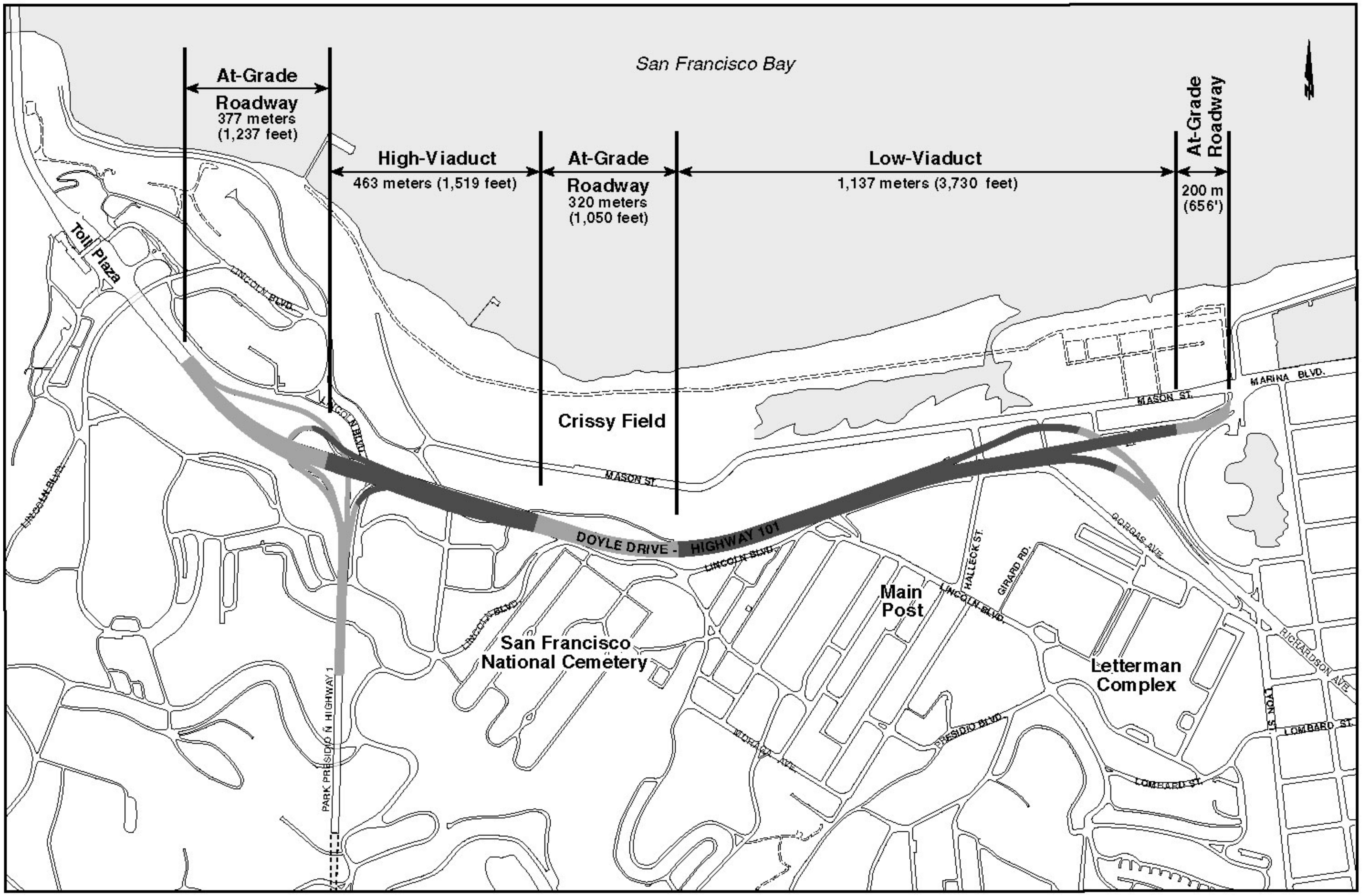


FIGURE 2-3
ALTERNATIVE 2: REPLACE AND WIDEN



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.

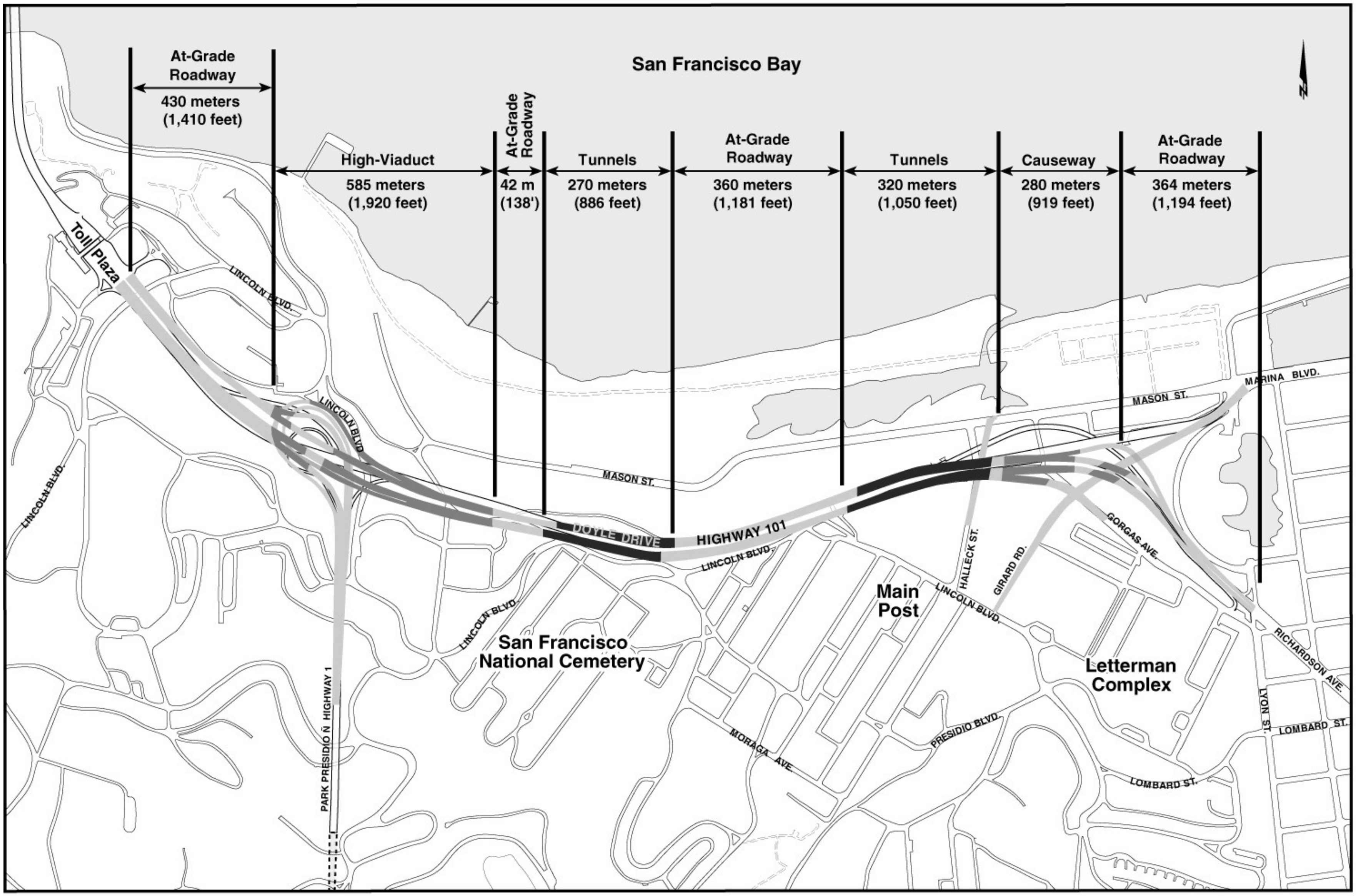
2.3.3 Alternative 5: Presidio Parkway Alternative

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).

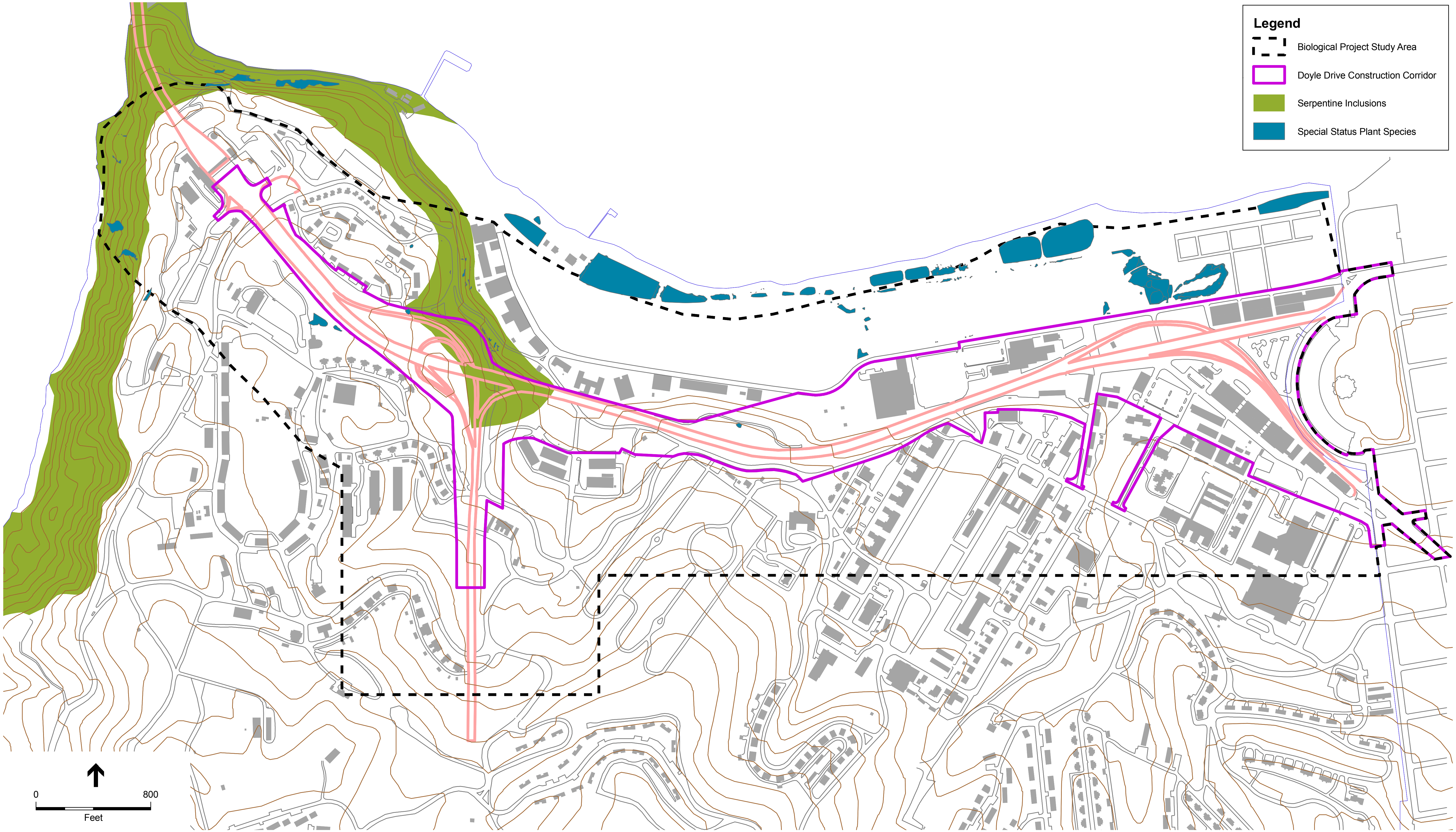
A detailed analysis of shade and the project's impacts on vegetation for the future Tennessee Hollow subarea was approached using three methods: 1) estimating the shading influence under the different construction alternatives (see Appendix B); 2) directly examining the shading influence of viaducts 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.

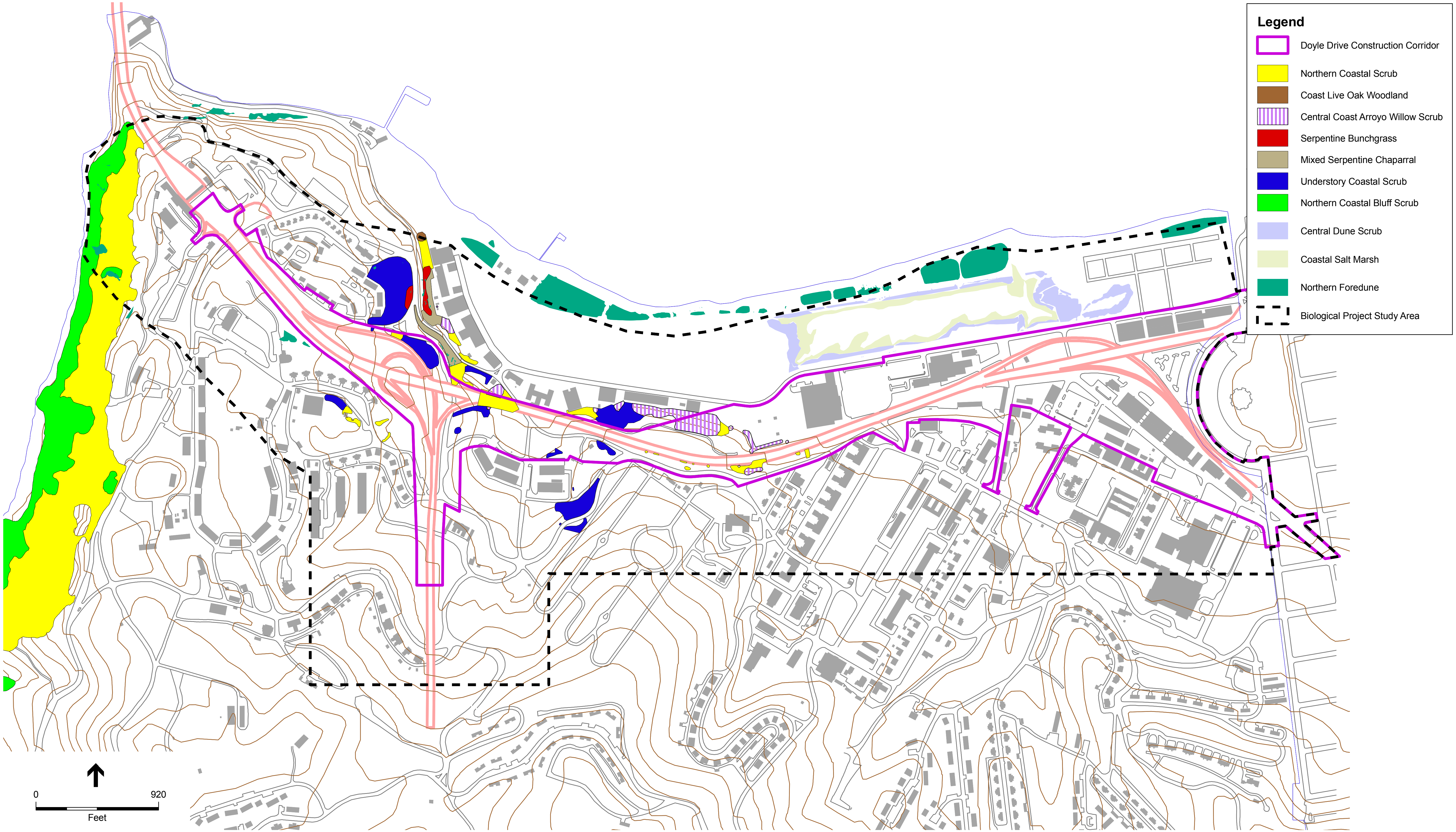
acronym, ESA. All references to ESA in this report, with the exception of Table 5-2 and Appendix B, will refer to Environmentally Sensitive Areas.

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



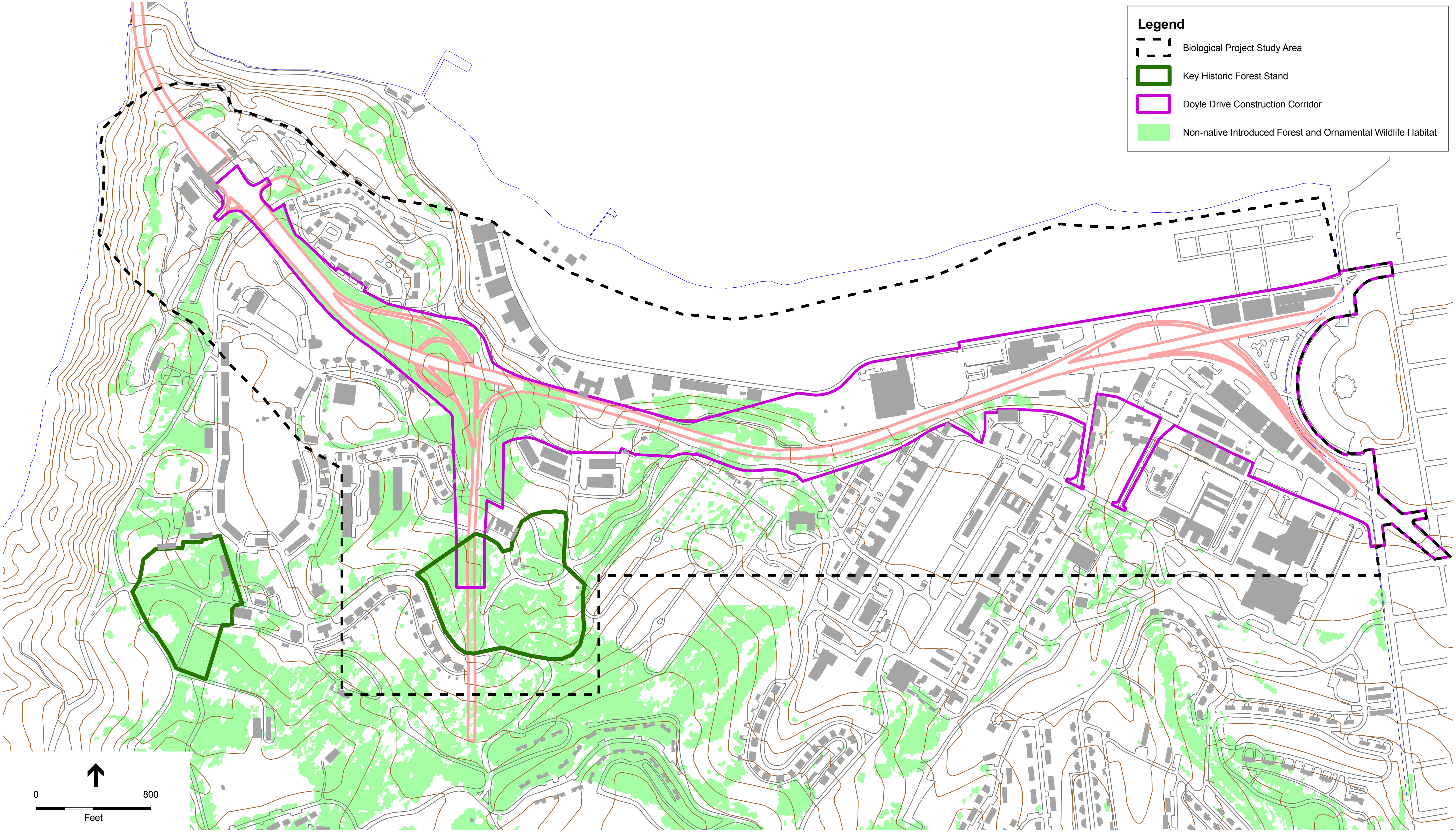
Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2004.
Notes: Location of Biological Resources are conceptual and not drawn to scale.

FIGURE 3-1
SPECIAL STATUS PLANTS IN PROJECT STUDY AREA



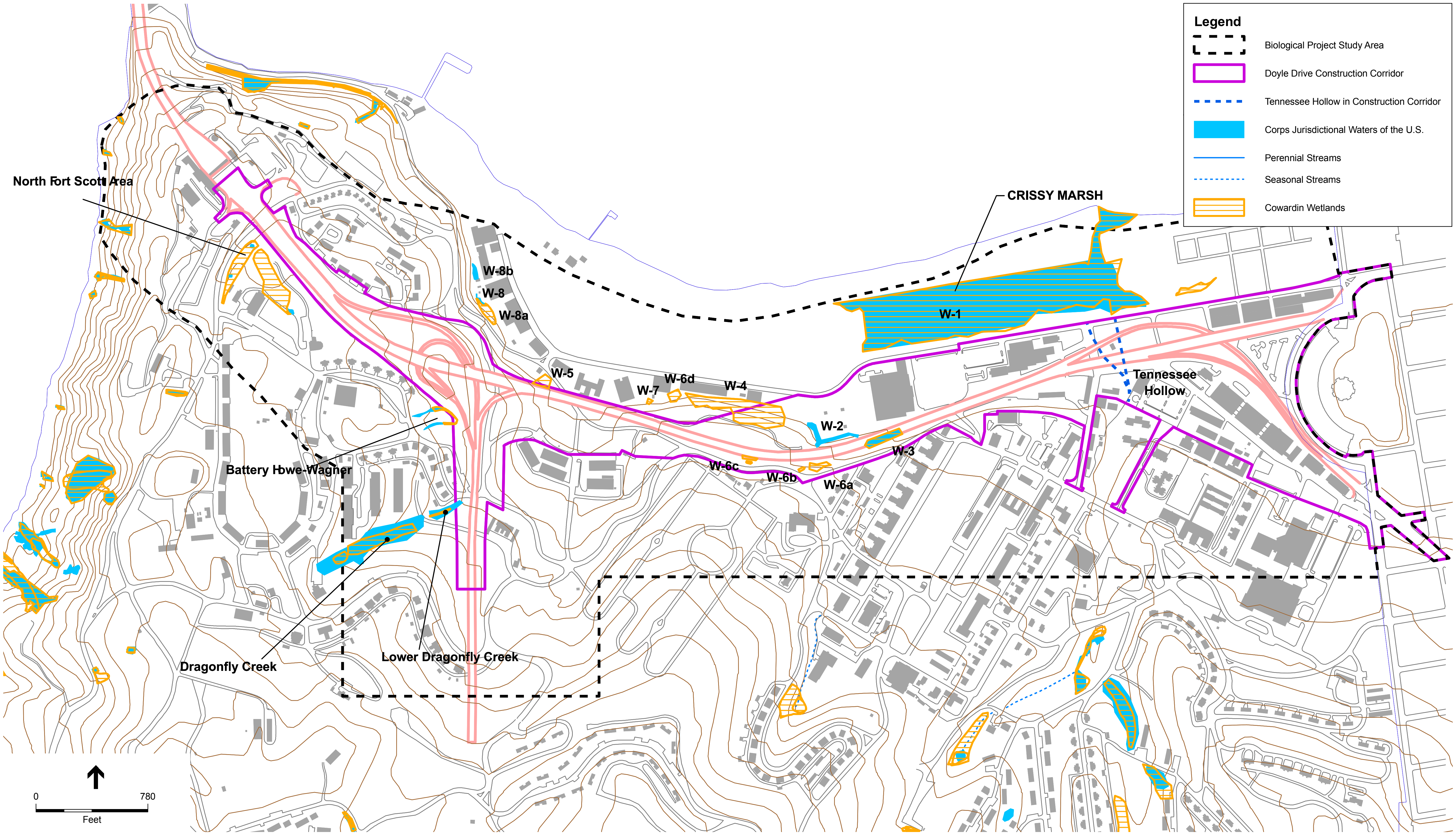
Source: Environmental Science Associates, 2004; Parsons Brinckerhoff Quade & Douglas, Inc., 2004; National Park Service, 2001.

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.

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[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.

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[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 <u>Sensitive Species</u>

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 <u>Special-Status Plant Species</u>

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

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
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

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
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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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
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

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PLANT SPECIAL STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE DOYLE DRIVE PROJECT

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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

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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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San Bruno elfin butterfly *Incisalia mossii bayensis*	FE/--	Coastal scrub and bunchgrass grassland habitats, with larval foodplant, *Sedum spathulifolium*; adults nectar on *Lomatium 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

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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

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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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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

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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 rickseckeri*	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					

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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

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**
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

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**
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 arboreu*s (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 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 * = California Natural Diversity Database Special Animals List	

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).

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[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.

<u>Plant Species of Concern</u>

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.

<u>Avian Species – Temporary Disturbance due to Construction Noise and Vibration</u>

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

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[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	

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 rickseckeri - 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

- 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)
- 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)
- 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 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)
- 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

TAKE PRIDE IN AMERICA

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	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)
(i.e., W-2, W-4 (Corps) and W-5 (NPS/PT))		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	--
(i.e., W-6a, W-6b, W-6c (NPS/PT))		Alt 5 Diamd/Circle/Loop/Mercht	0.08 / 0.19 (W-6a,6b,6c)	Alt 5 Diamd/Circle/Loop/Mercht	--
		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.

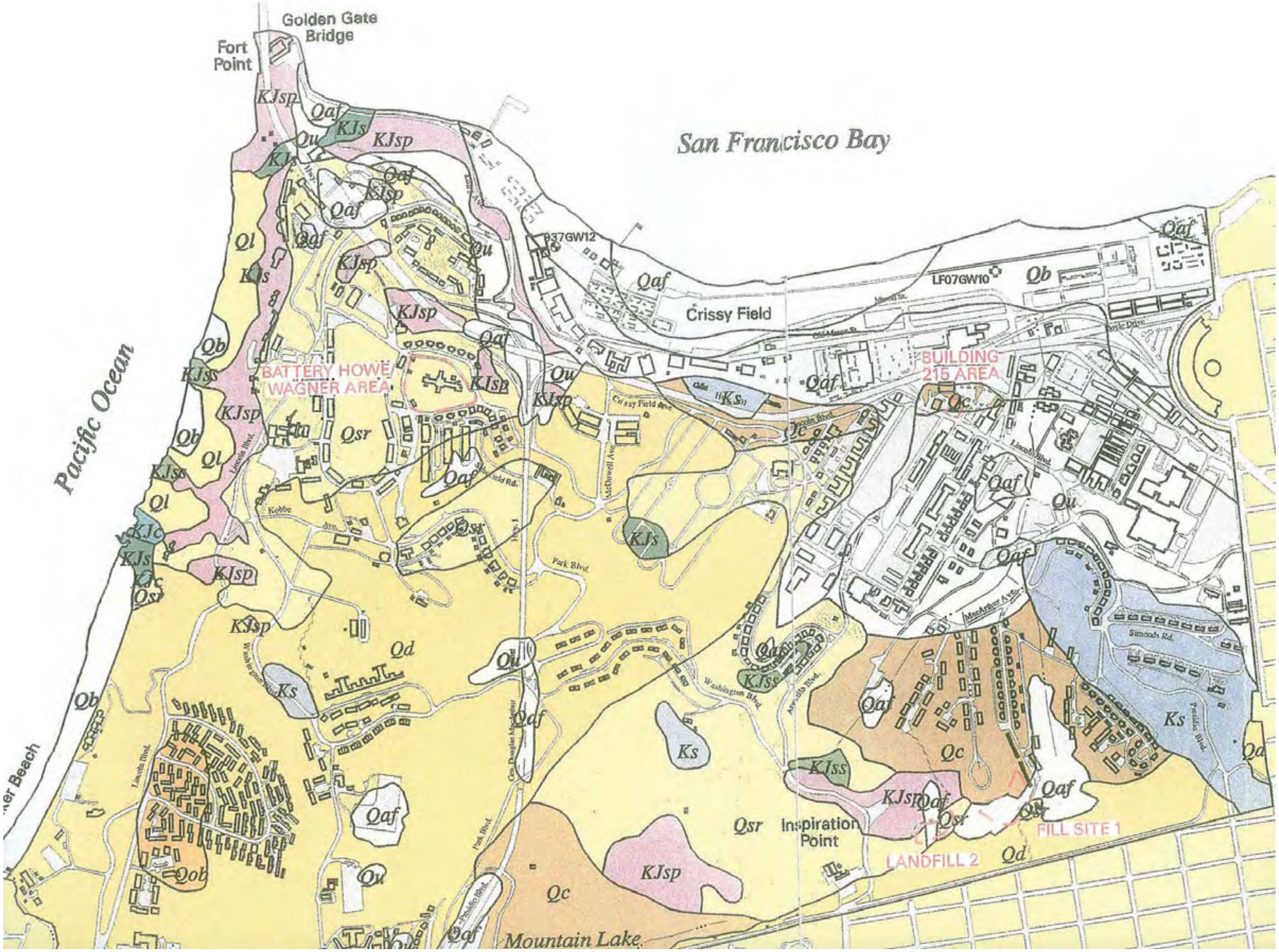
Source:Environmental Science Associates, 2004, 2005.

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	Alt 2 Detour	0.22 / 0.55 (W-2,3, BHW)	Alt 2 Detour	0.06 / 0.15 (Tenn Holl)
	(when all #s rounded to hundredths)	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	0.79 / 1.94	Alt 2 Detour	0.29 / 0.72	Alt 2 Detour	0.07 / 0.17
(including Corps wetlands)		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

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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

MEMORANDUM

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

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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

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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

---

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.

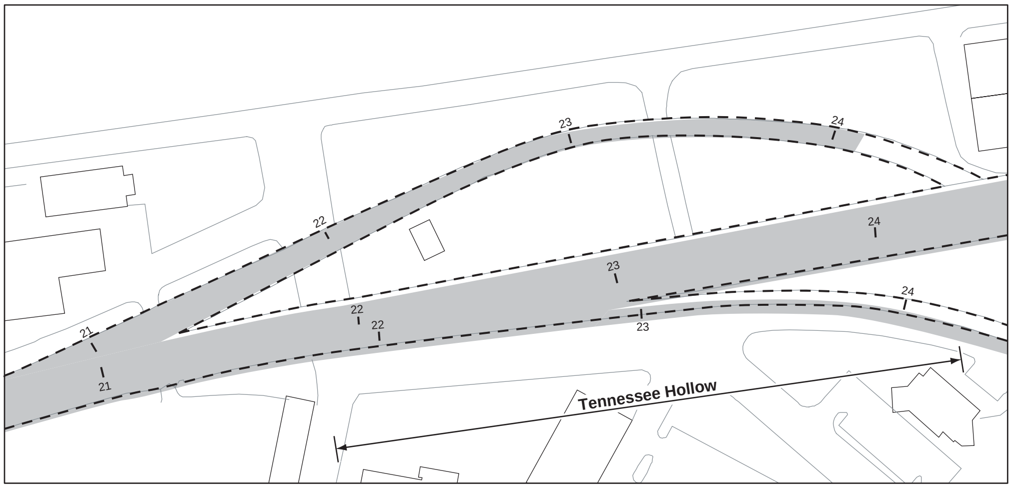
The shadows for the Alternative 1 No Build would reach corresponding distances of 15 m, 6 m and 9 m, respectively, and shadows for the Alternative 5 Parkway would reach corresponding distances of 14 m, 5 m and 8 m.

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.

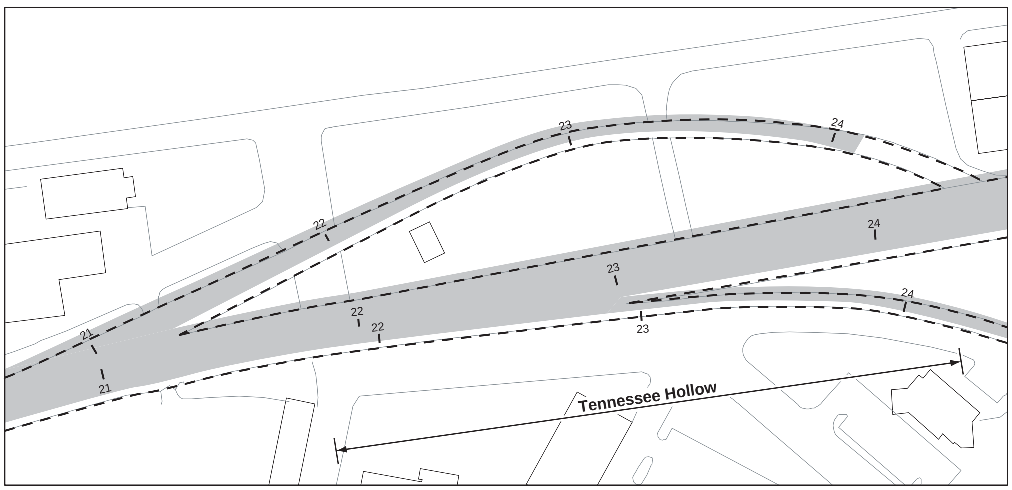
Shadows for the Alternative 1 No Build would reach corresponding distances of 10 m, 3 m and 4 m, respectively, and shadows for the Alternative 5 Parkway would reach corresponding distances of 9 m, 3 m and 3 m.

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.

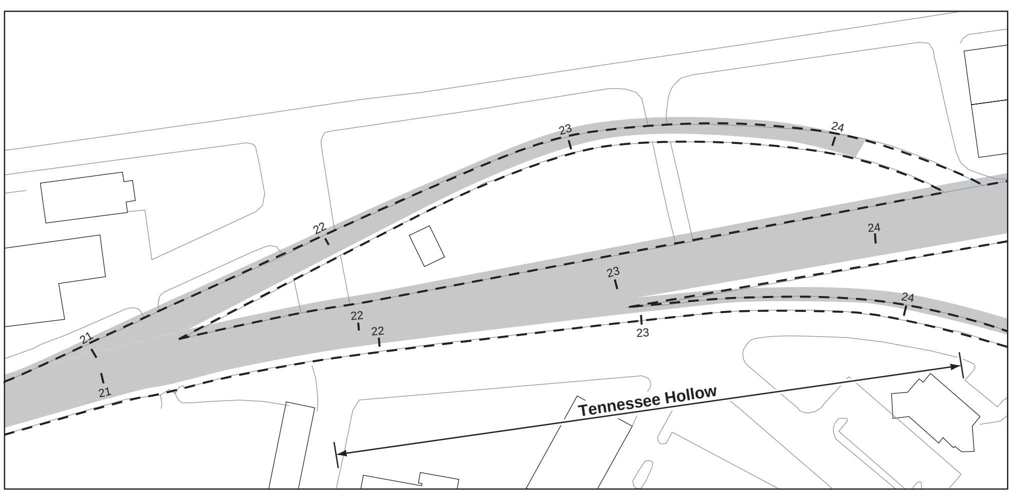
As the figures demonstrate, the quantity of shadow in the Tennessee Hollow subarea that results for Alternative 1 No Build and Alternative 2 Replace and Widen are similar in size and in reach away from the structures, while the lower structures of the Alternative 5 Parkway result in less shadow because 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



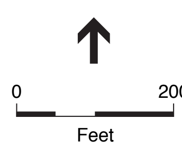
9 am



Noon



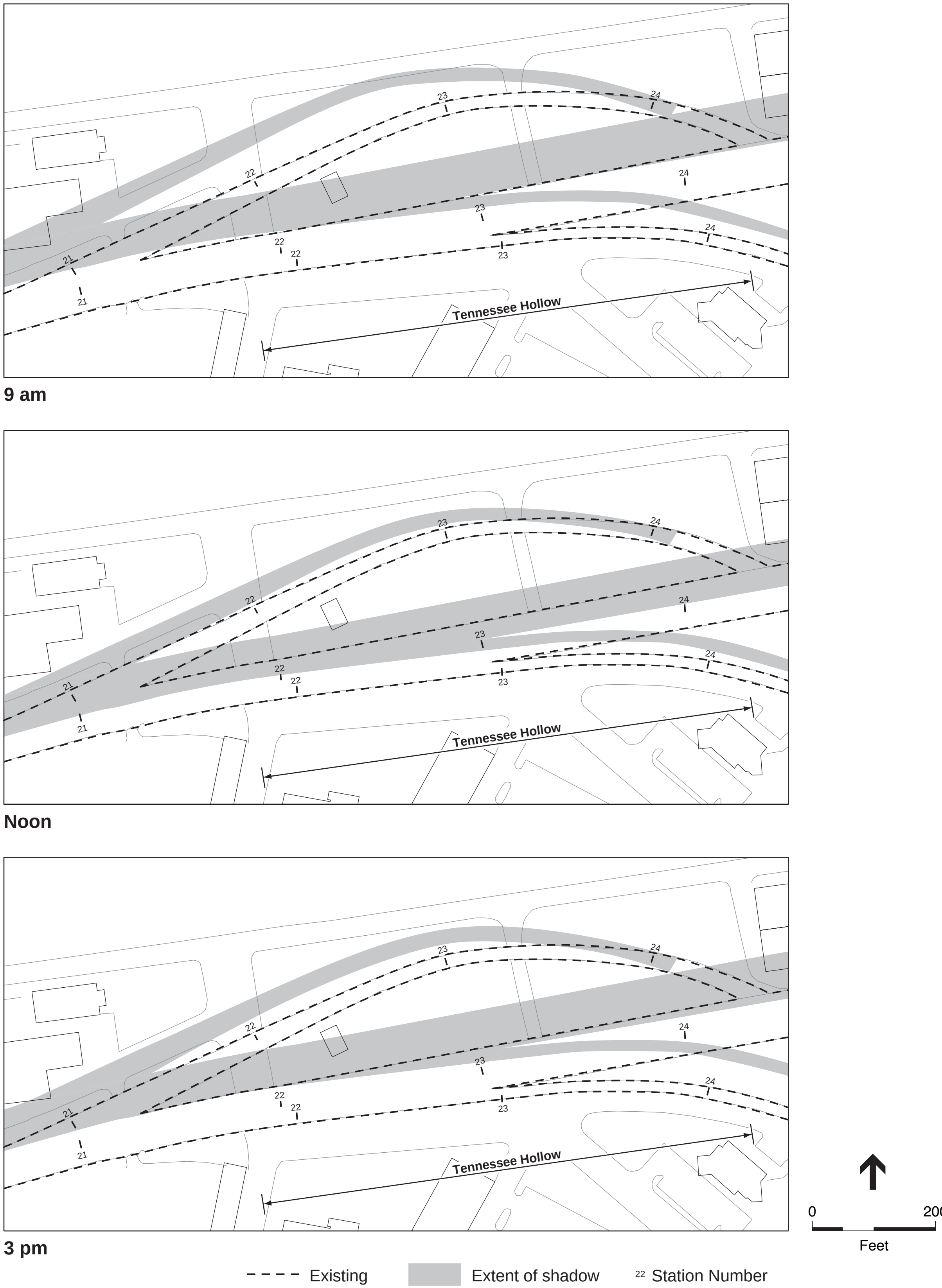
3 pm



Existing Extent of shadow 22 Station Number

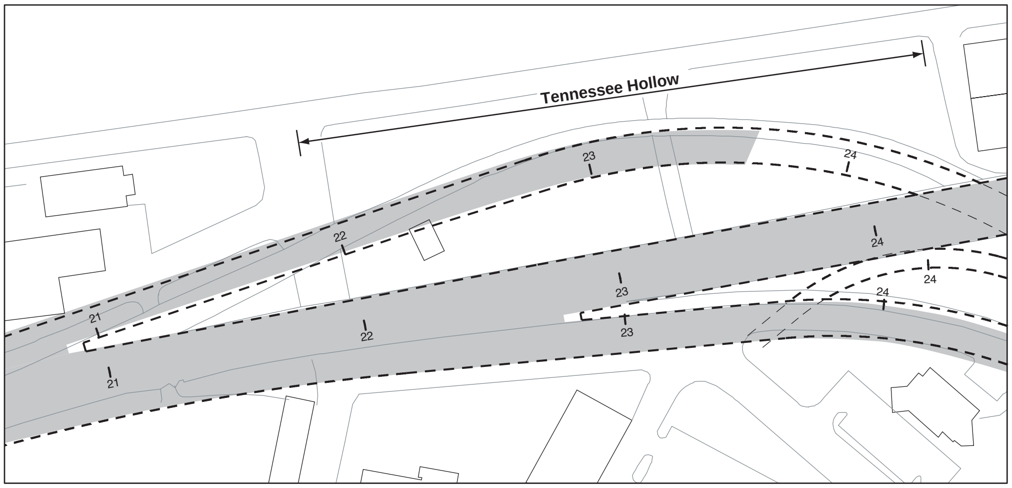
Source: Environmental Science Associates

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

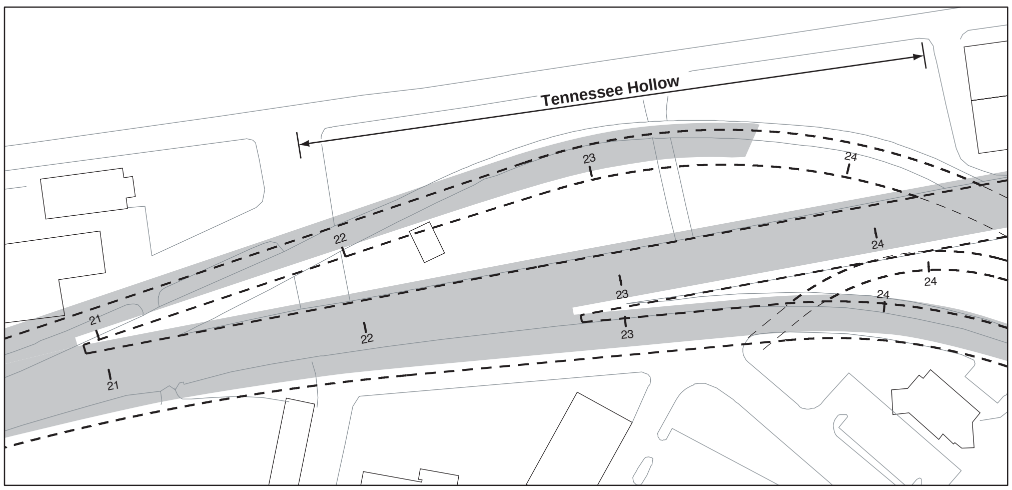


Source: Environmental Science Associates

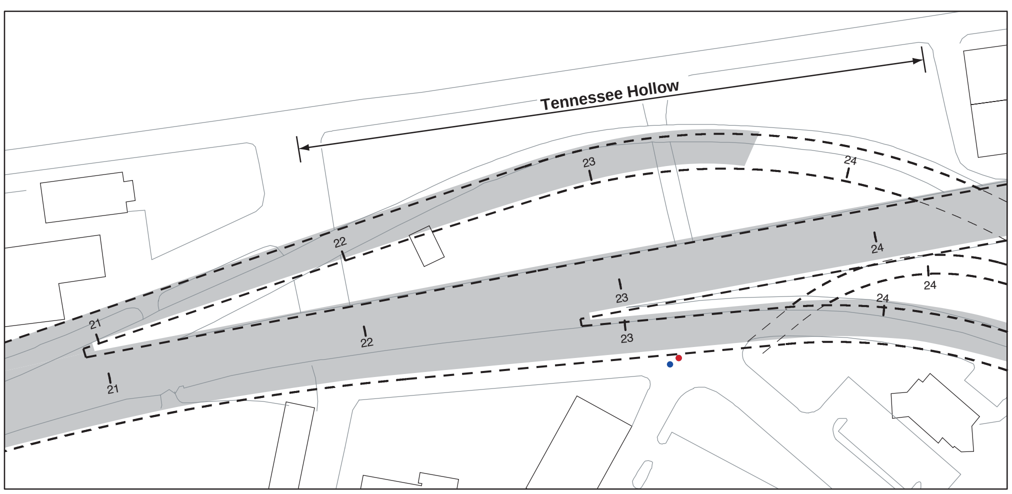
FIGURE 2
ALTERNATIVE 1: NO-BUILD
SHADOW STUDY, DECEMBER 21

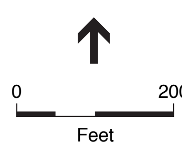


9 am



Noon



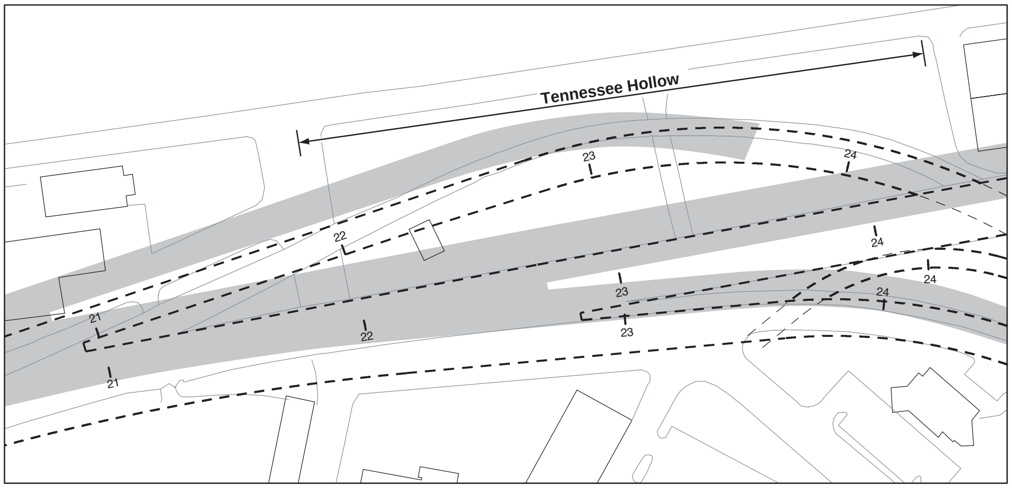


3 pm

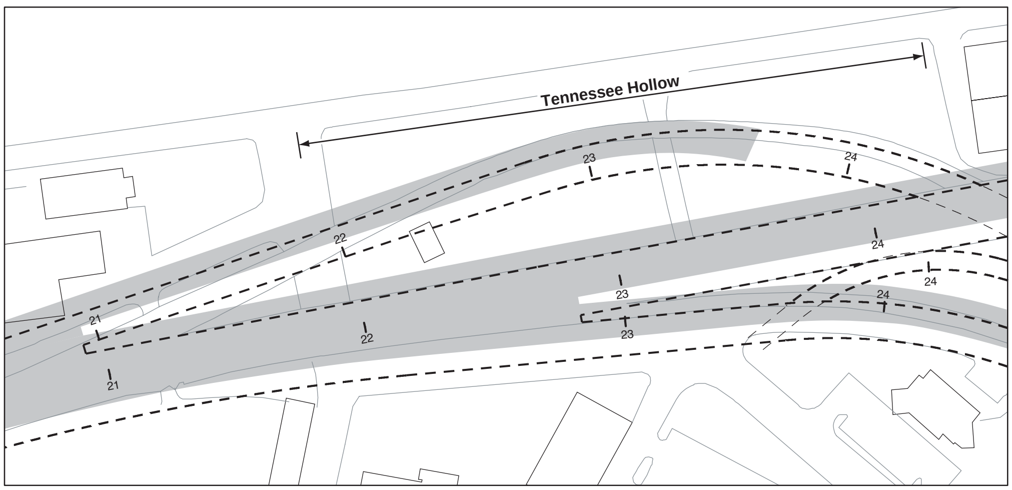
- - - - Project   Extent of shadow   22 Station Number

Source: Environmental Science Associates

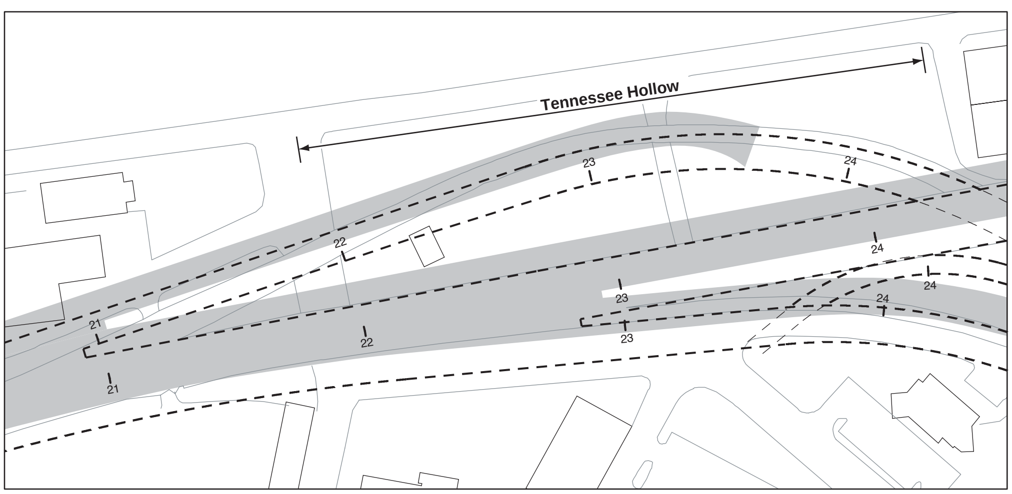
FIGURE 3
ALTERNATIVE 2: REPLACE AND WIDEN WITH DETOUR
SHADOW STUDY, JUNE 21



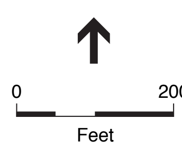
9 am



Noon



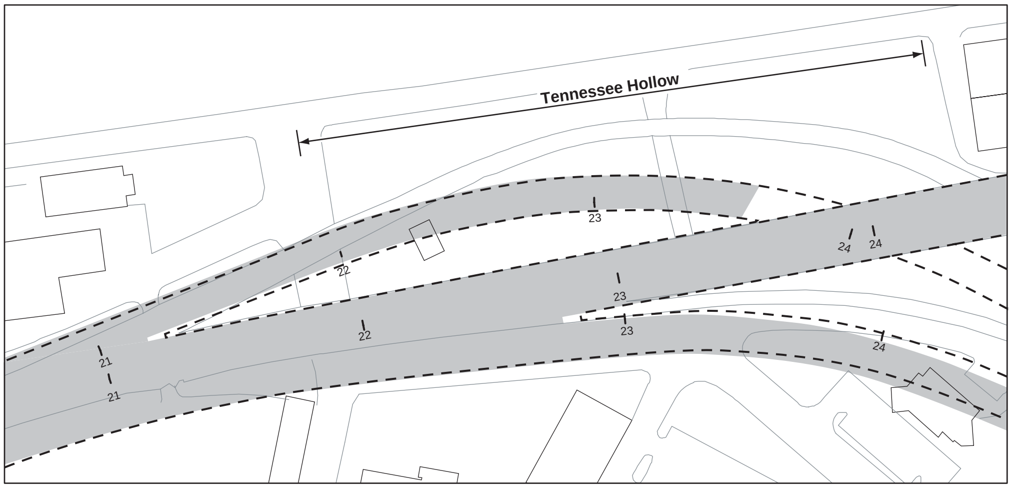
3 pm



- - - - 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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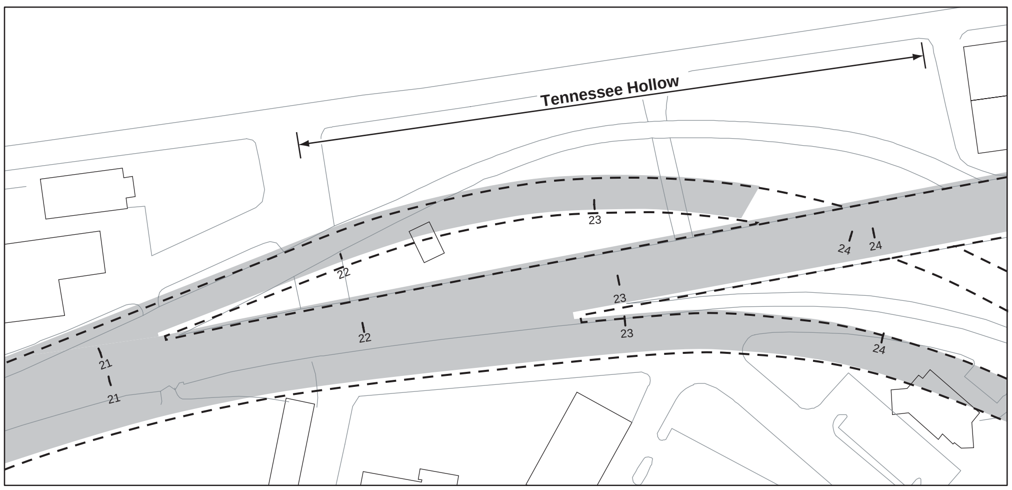

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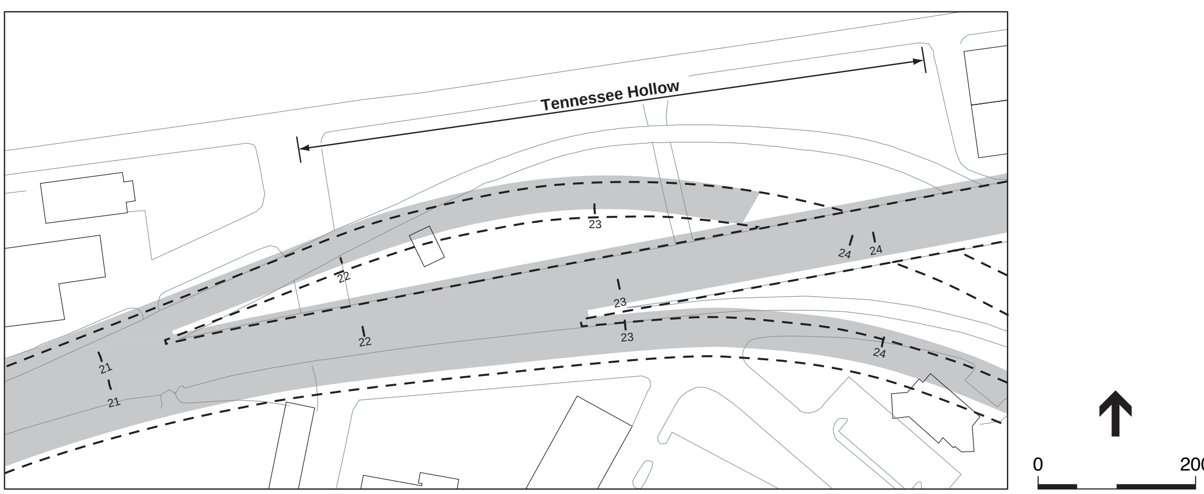
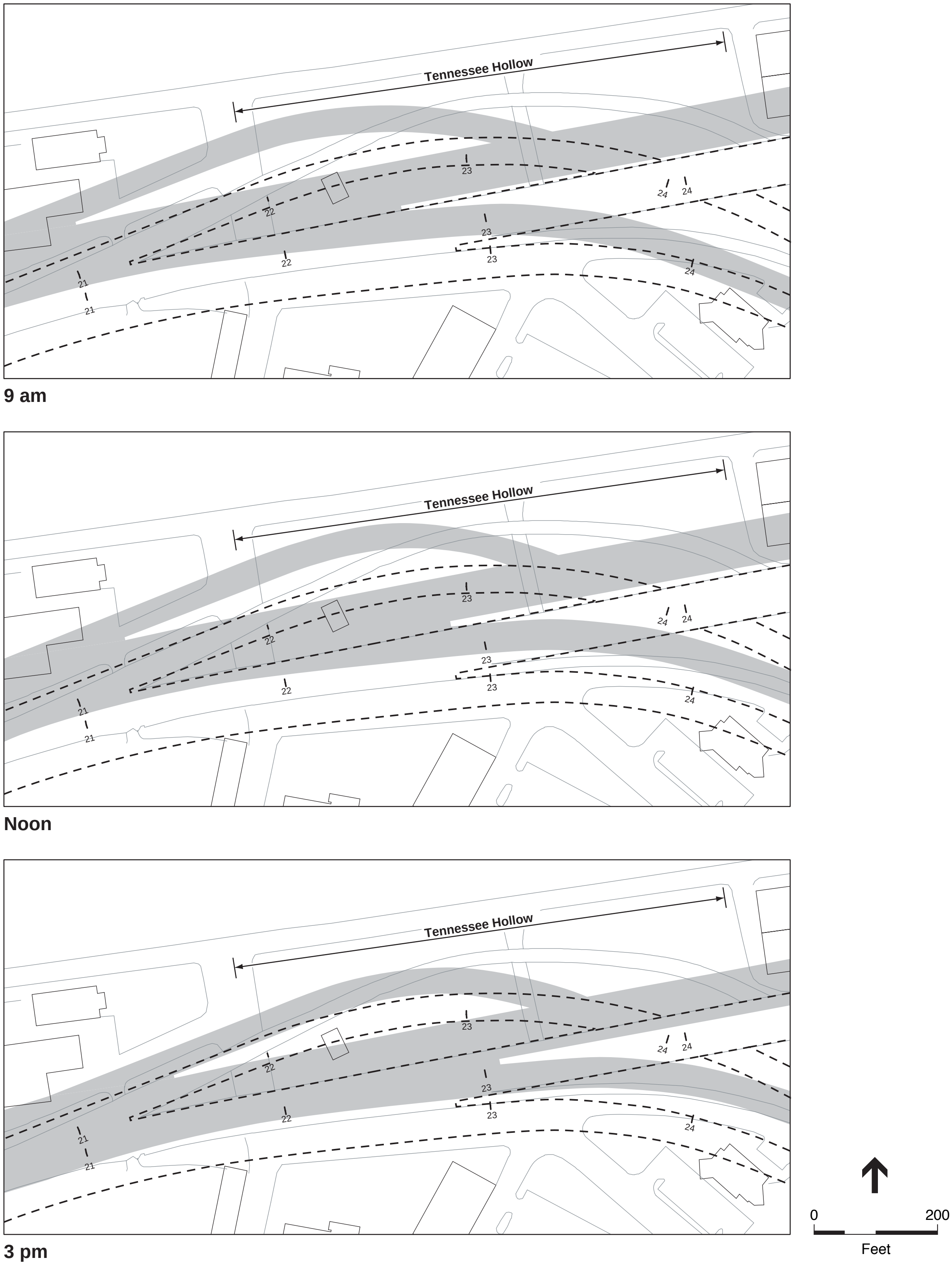


3 pm

Project | Extent of shadow | 22 Station Number

Source: Environmental Science Associates

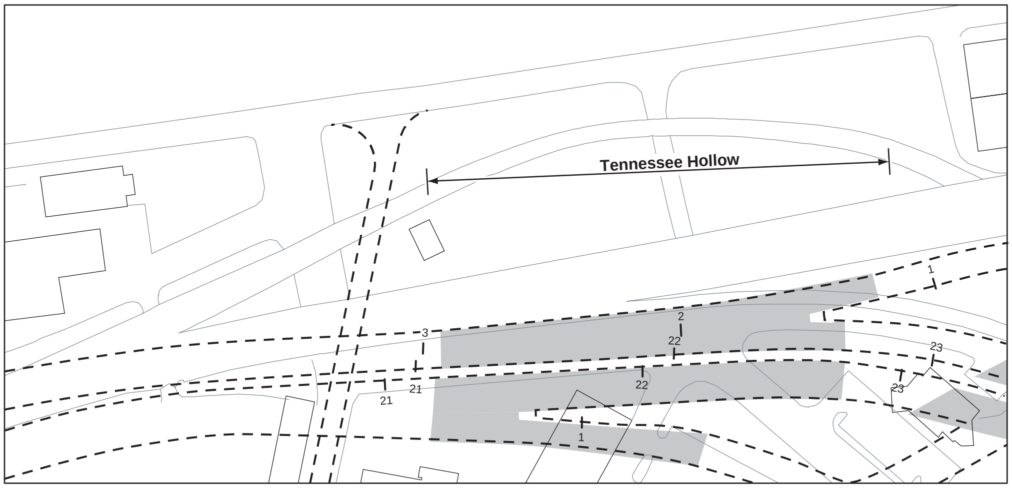
FIGURE 5
ALTERNATIVE 2: REPLACE AND WIDEN WITHOUT DETOUR SHADOW STUDY, JUNE 21



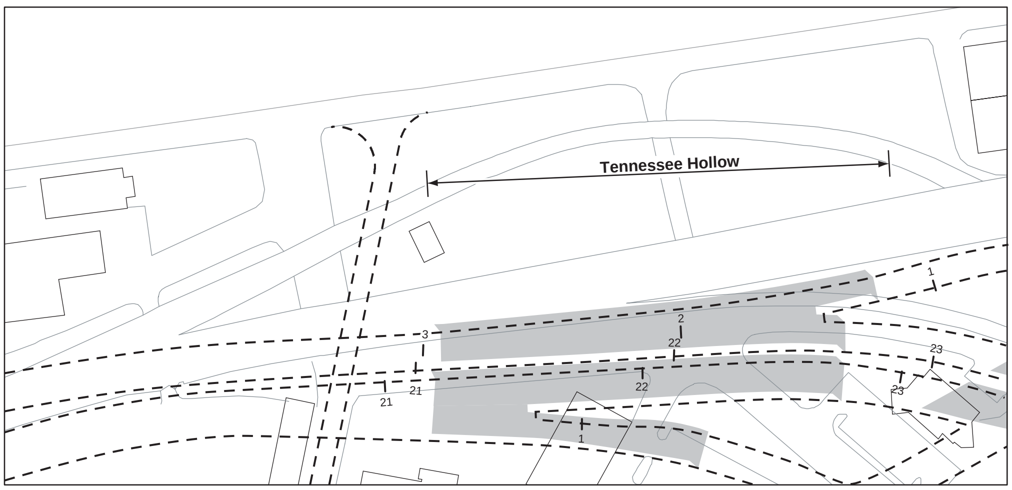
- - - - Project
Extent of shadow
22 Station Number

Source: Environmental Science Associates

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



9 am



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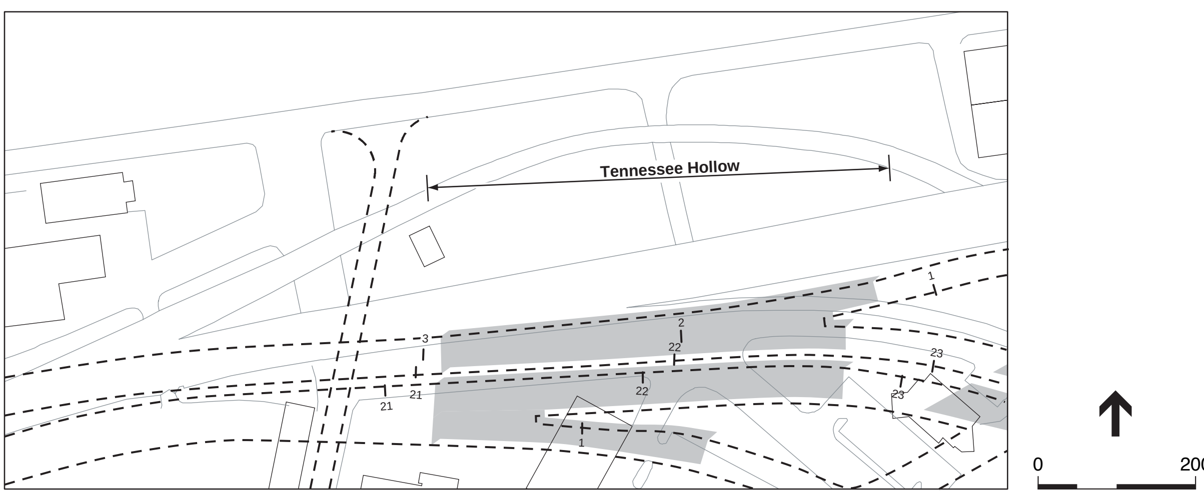
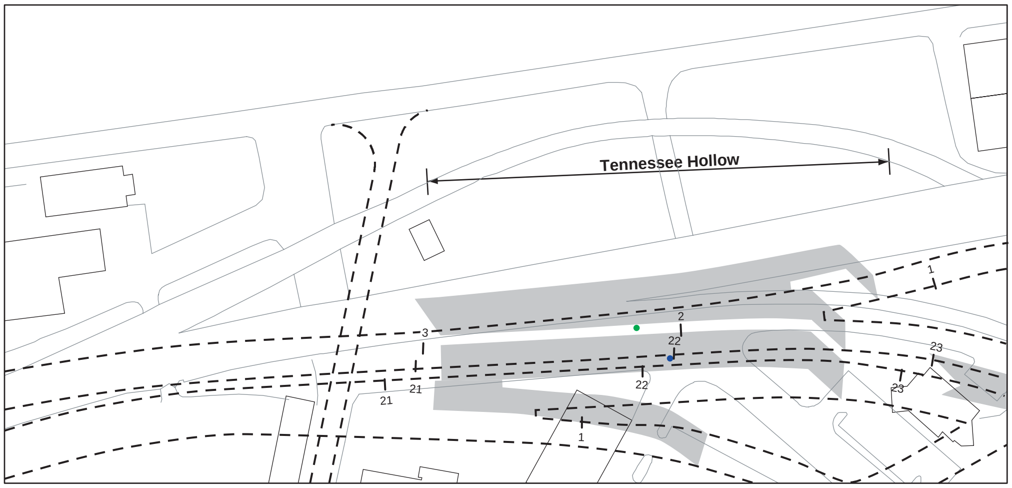


3 pm

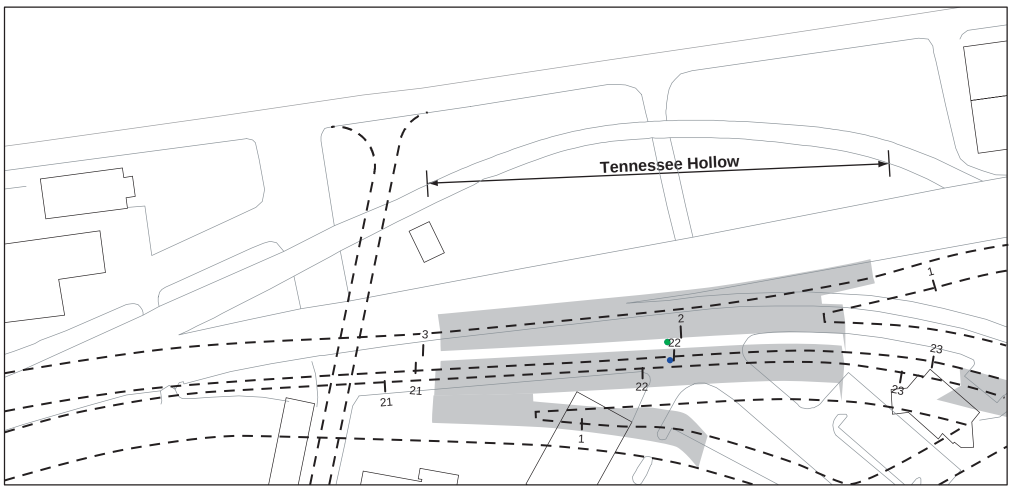
- - - - Project   Extent of shadow   22 Station Number

Source: Environmental Science Associates

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



9 am



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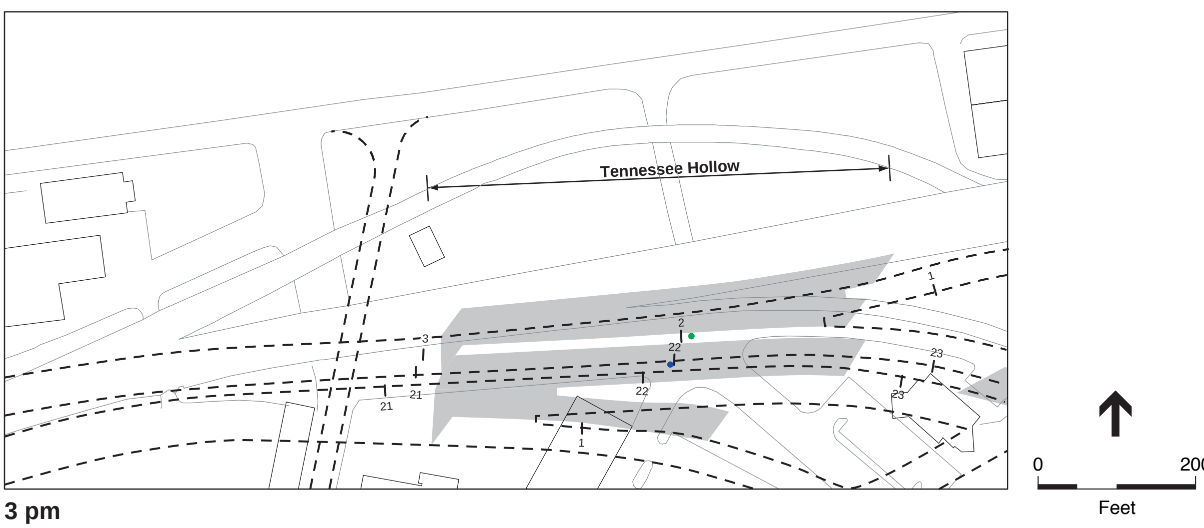


3 pm

Project | Extent of shadow | 22 Station Number

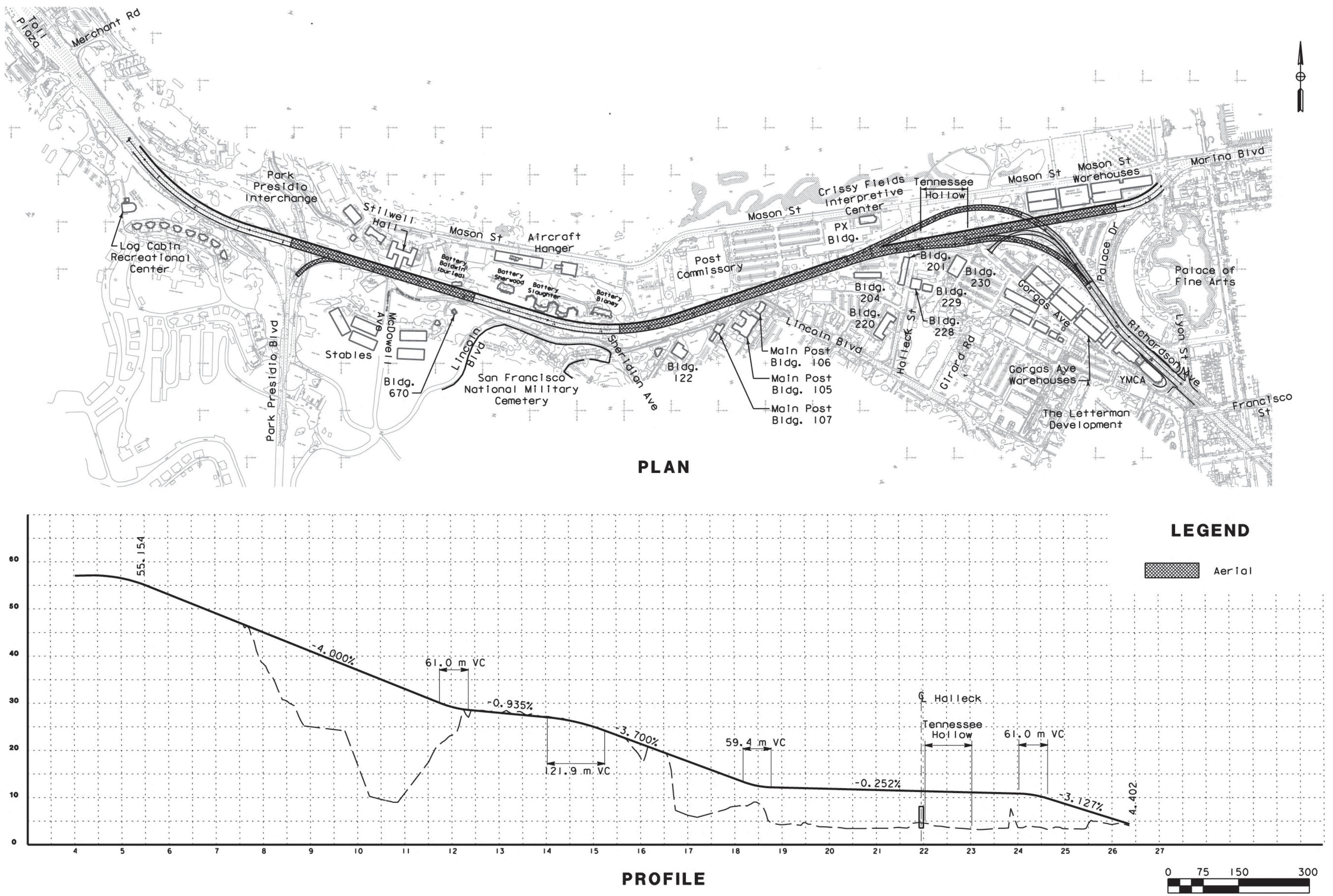
Source: Environmental Science Associates

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

APPENDIX C

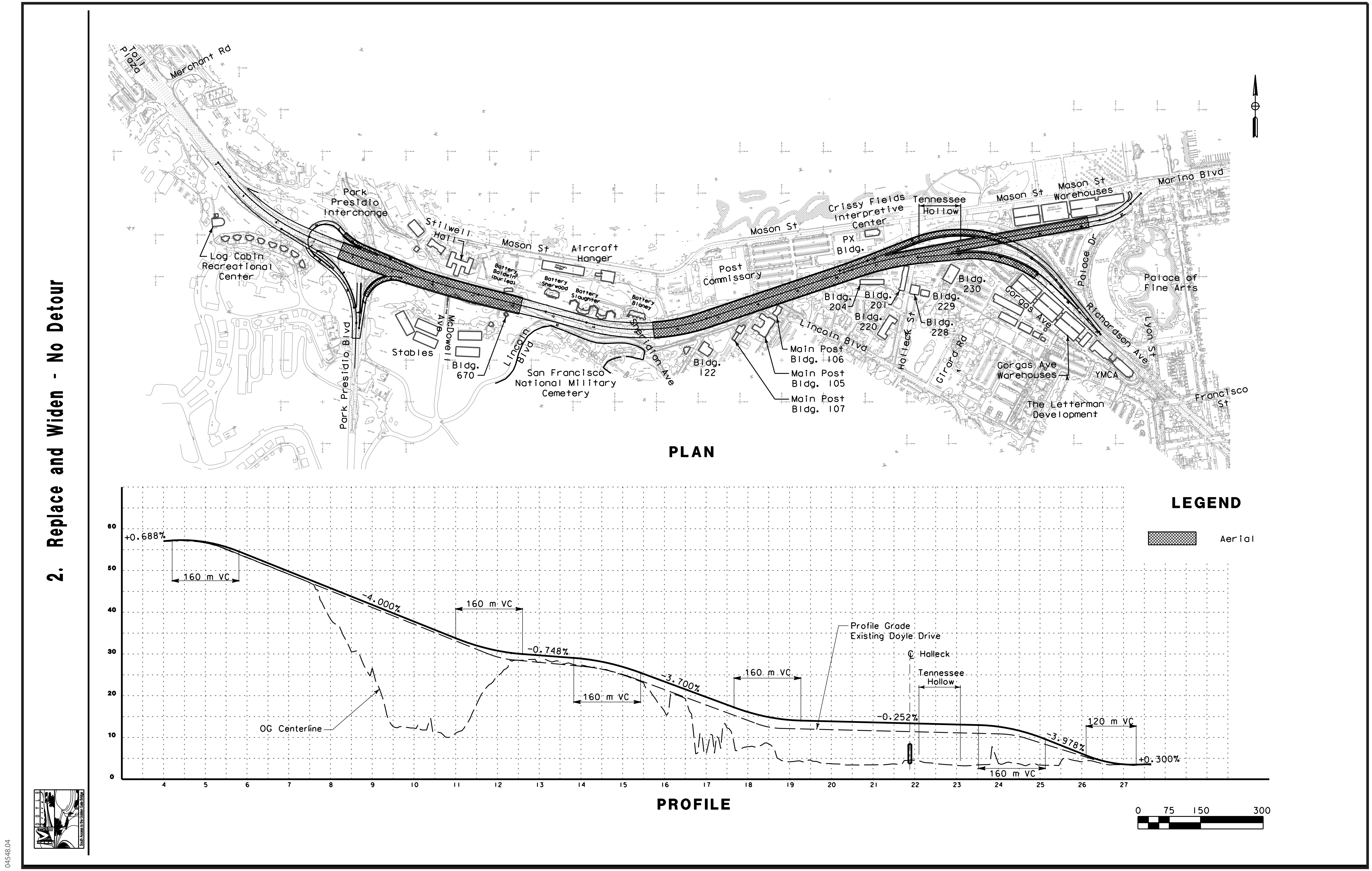
DETAILED ALTERNATIVE AND DESIGN OPTION DRAWINGS

1. No Build



04548.04

No Build Alternative



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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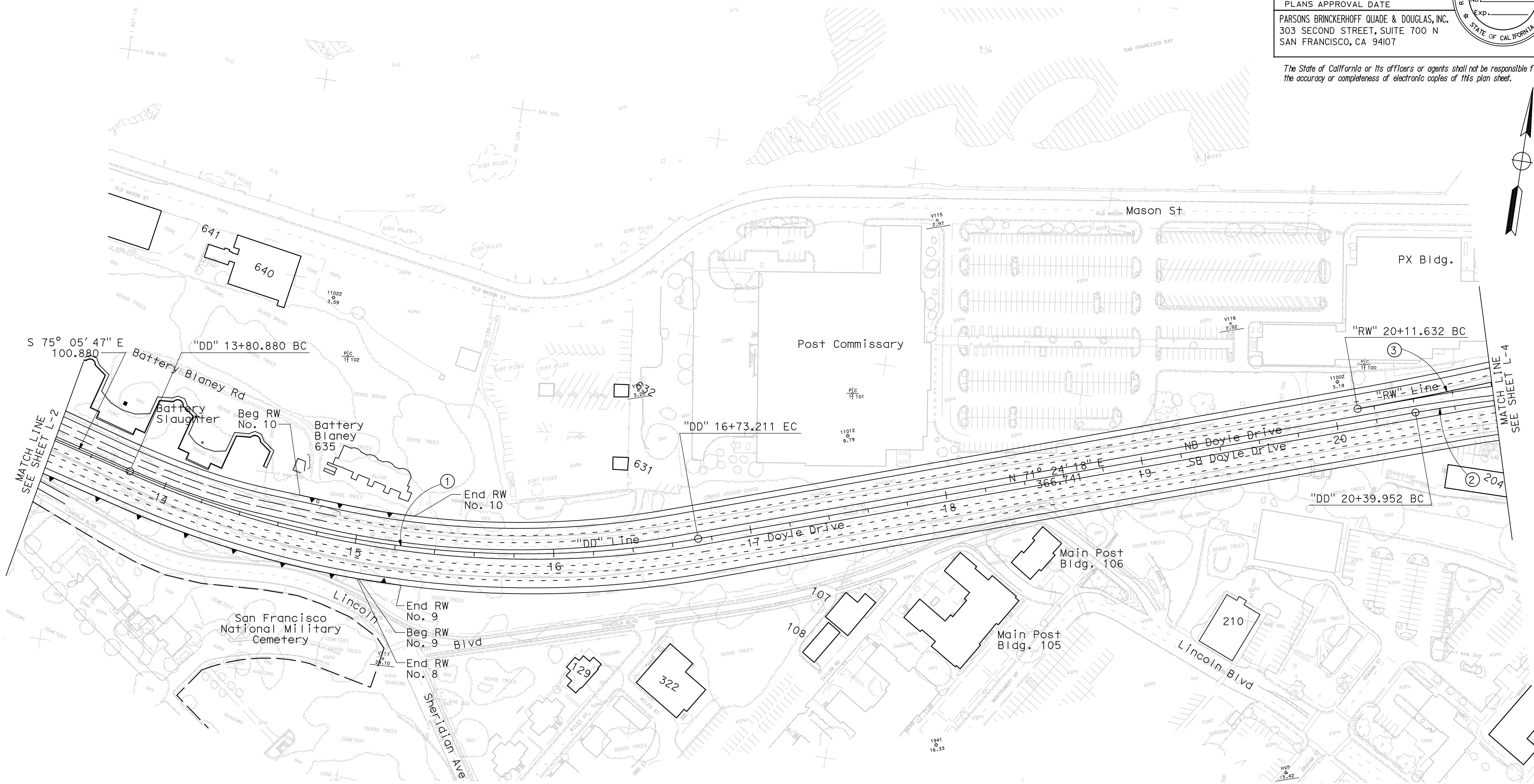
Caltrans Metric

DOYLE Drive — South Access to the Golden Gate Bridge

DATE | REVISED BY | DATE REVISED
CALCULATED/DESIGNED BY | CHECKED BY
DESIGN OVERSIGHT
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



CURVE DATA

NO.	R	△	T	L
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2	900.000	8°08′31″	64.055	127.893
3	1,510.200	2°41′50″	35.555	71.097

ALTERNATIVE 2
REPLACE AND WIDEN - NO DETOUR
LAYOUT

SCALE: 1:1000

L-3

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

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No.
Exp.
STATE OF CALIFORNIA

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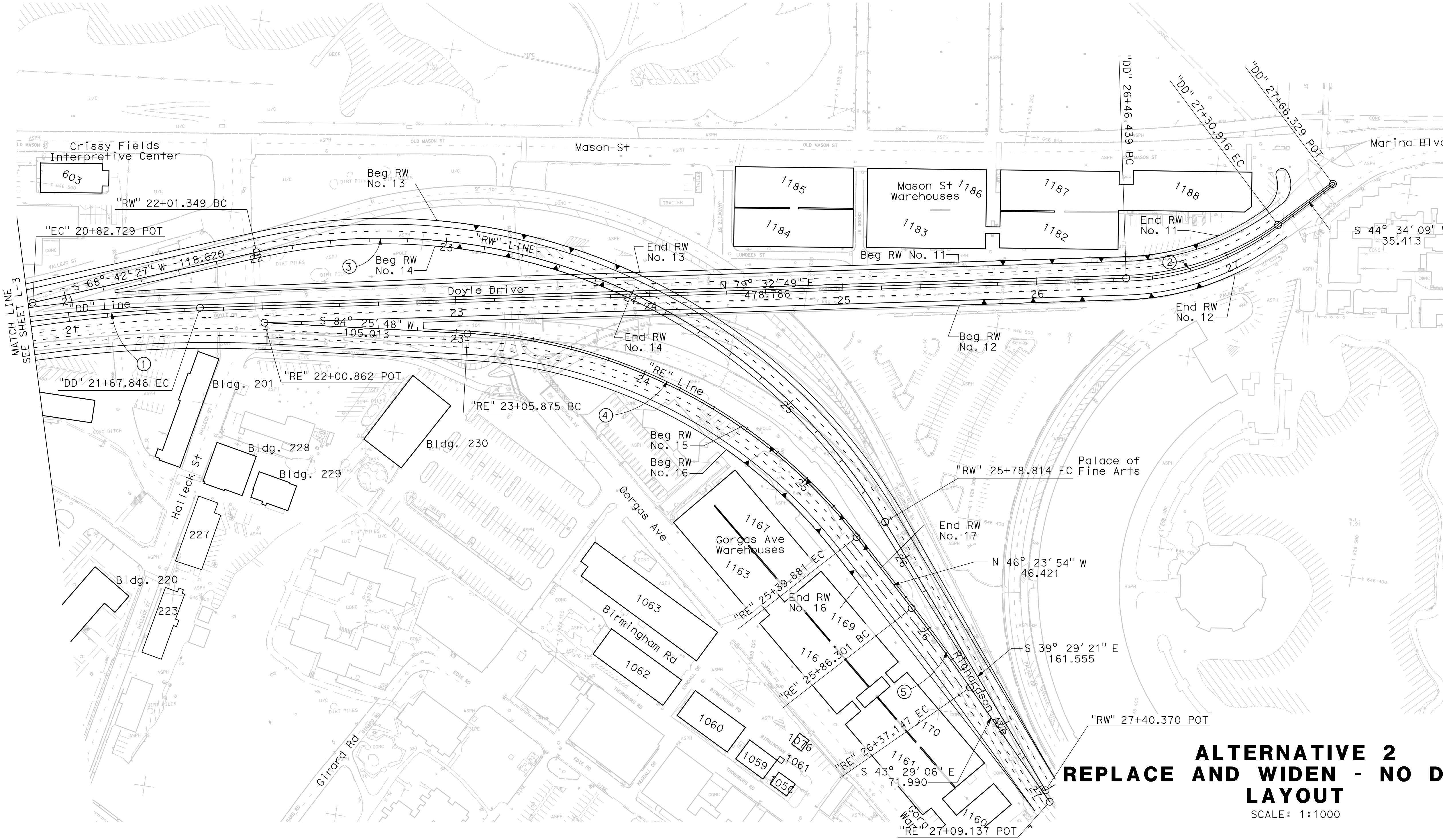
Caltrans Metric

CURVE DATA

NO.	R	△	T	L
1	900.000	8°08'31"	64.055	127.893
2	138.378	34°58'40"	43.601	84.477
3	301.200	71°48'12"	218.046	377.465
4	272.667	49°10'19"	124.756	234.006
5	1000.000	2°41'50"	35.555	71.097



ALTERNATIVE 2
REPLACE AND WIDEN - NO DETOUR
LAYOUT

SCALE: 1:1000

L-4

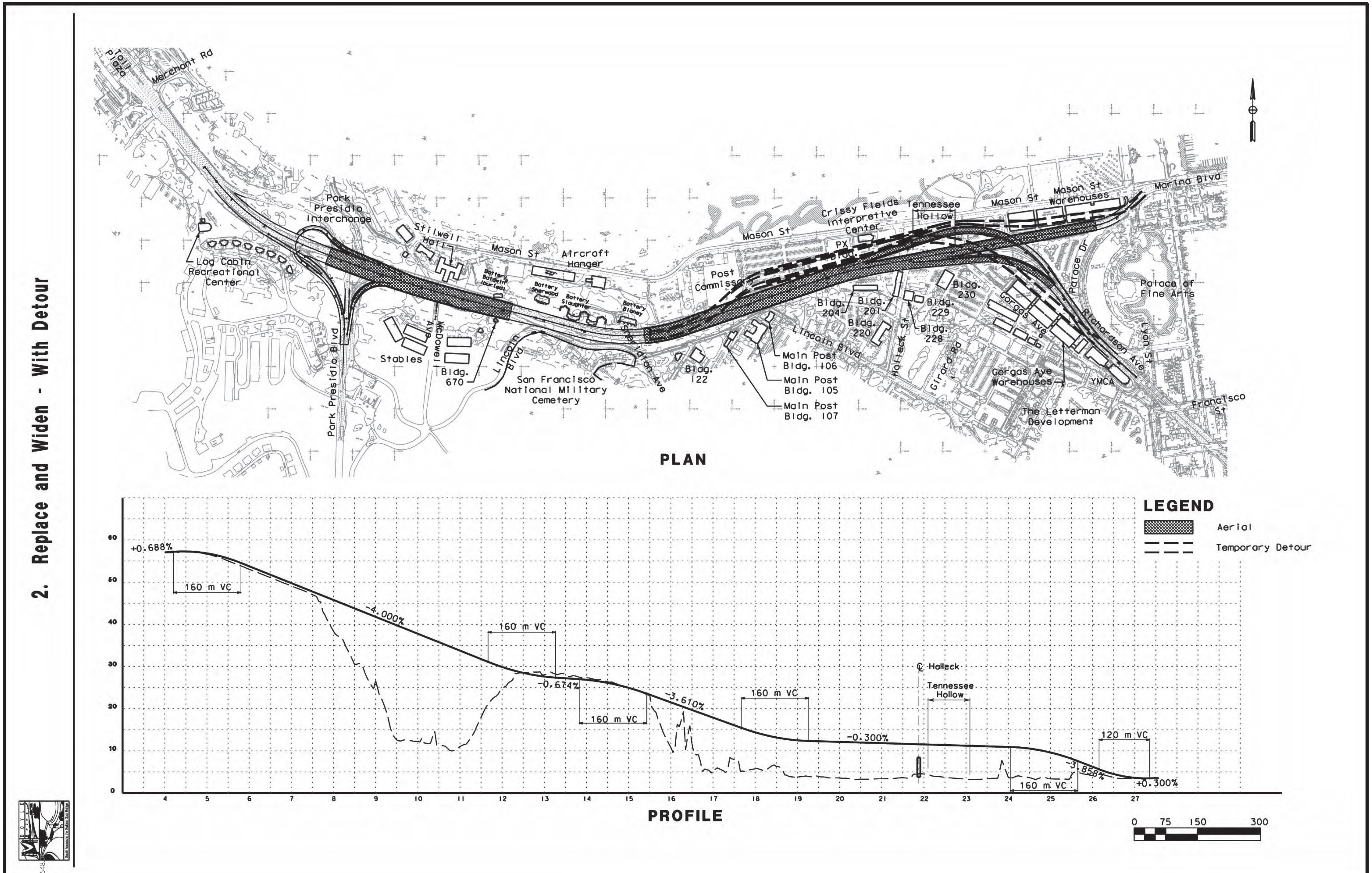
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DESIGN OVERSIGHT

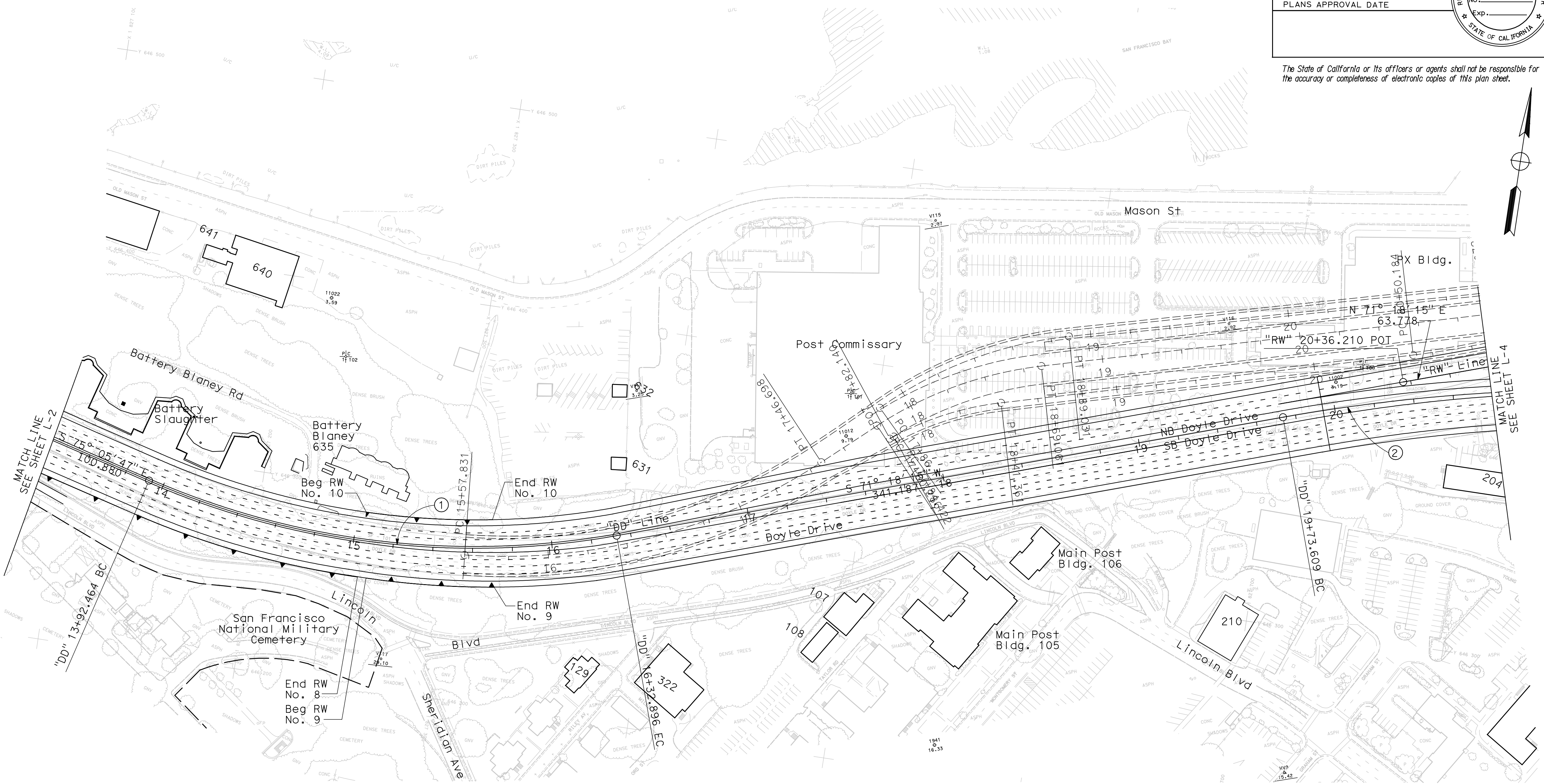
CALCULATED/ DESIGNED BY | CHECKED BY

DATE | REVISED BY | DATE REVISED

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



Alternative 2—Replace and Widen – with Detour



CURVE DATA

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS

PLANS APPROVAL DATE

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ALTERNATIVE 2
REPLACE AND WIDEN - WITH DETOUR
LAYOUT

SCALE: 1:1000

L-3

Alternative 2—Replace and Widen – with Detour
Detail Near Batteries and Building 106

CURVE DATA

NO.	R	△	T	L
1	900.000	8° 45′ 34″	68.931	137.594
2	138.378	34° 58′ 40″	43.601	84.477
3	230.000	73° 31′ 46″	171.841	295.166
4	221.032	60° 00′ 44″	127.644	231.511
5	248.000	12° 37′ 27″	27.433	54.643

Caltrans Metric

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

PLANS APPROVAL DATE

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

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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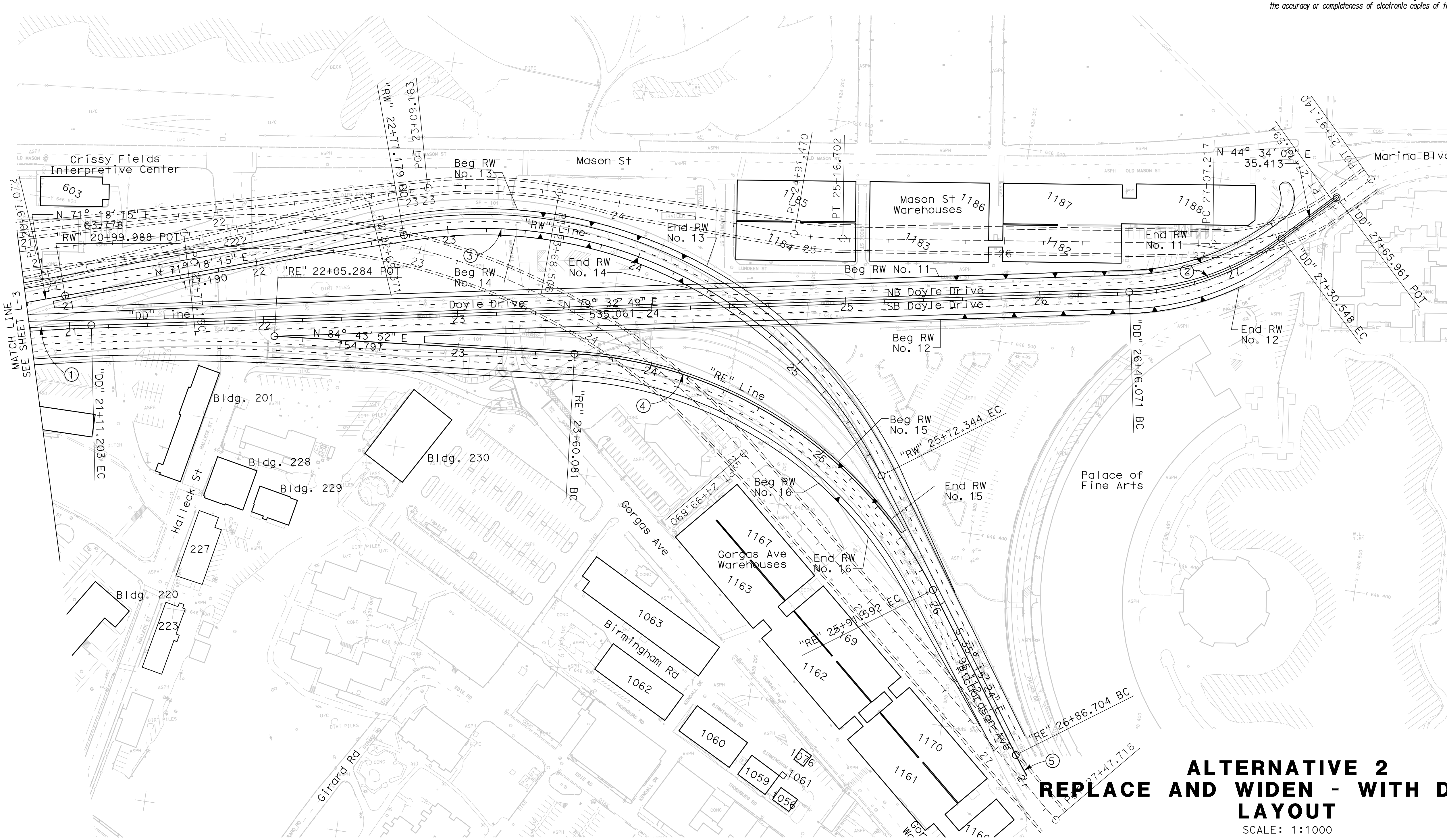
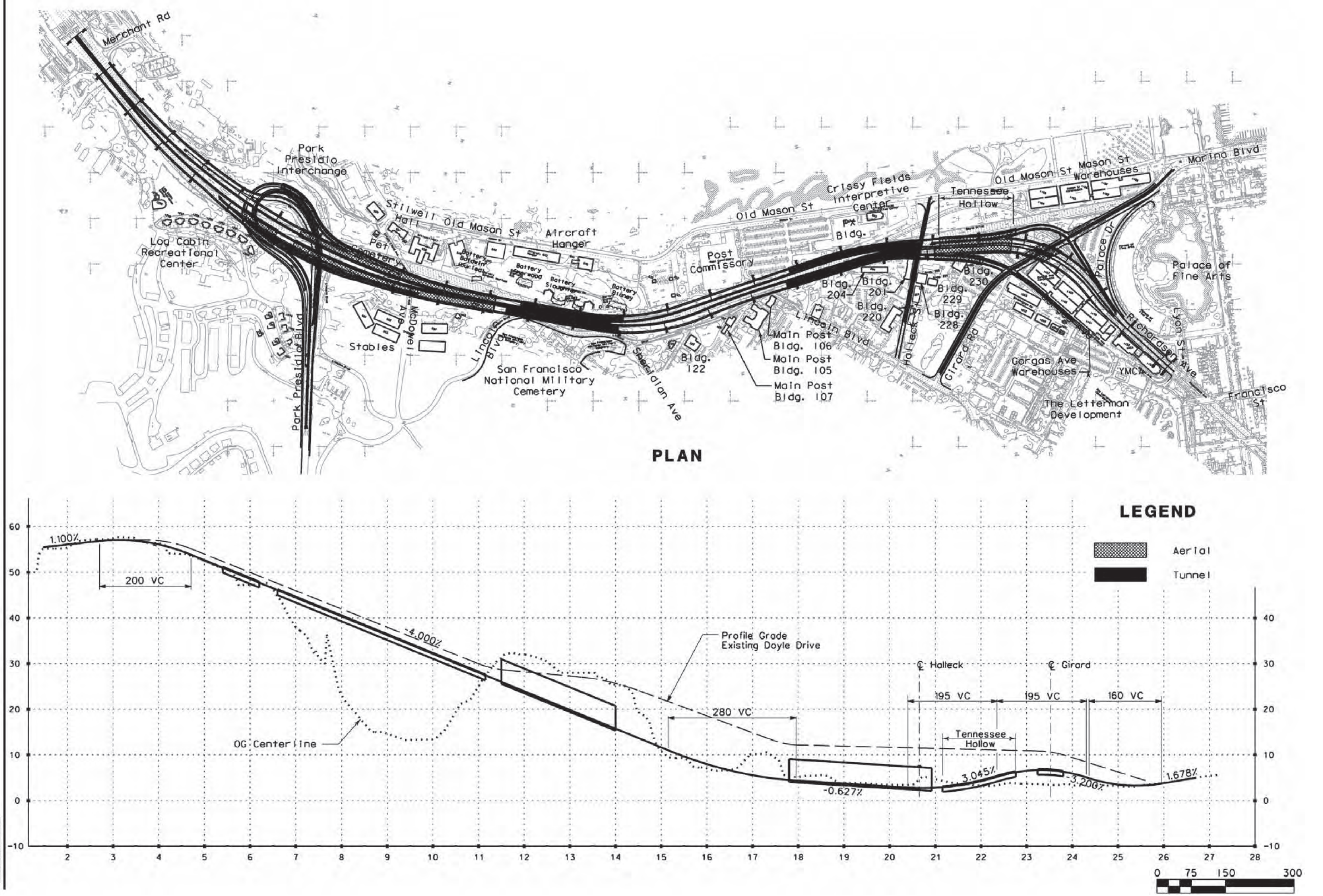


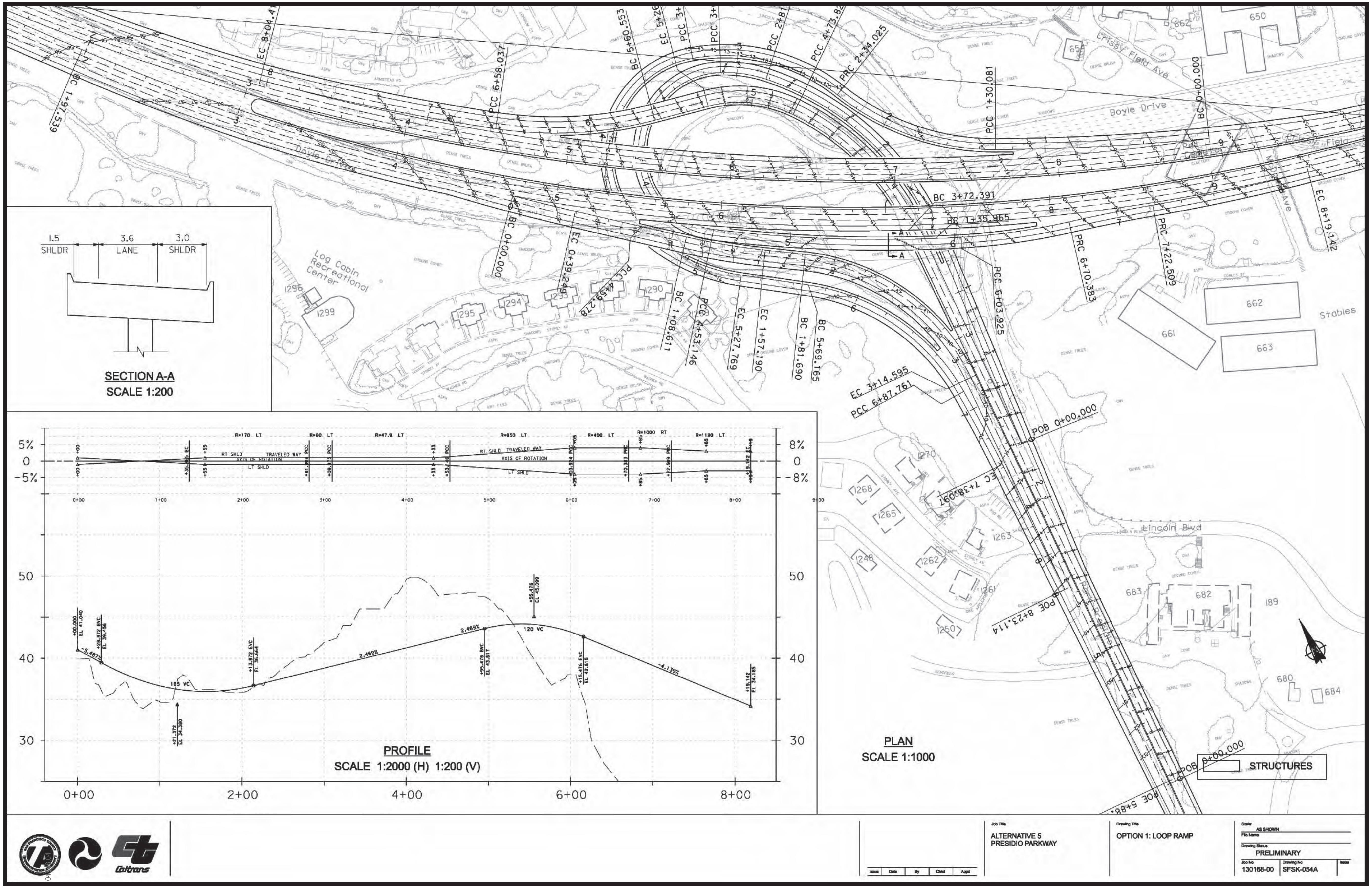
ALTERNATIVE 2
REPLACE AND WIDEN - WITH DETOUR
LAYOUT
SCALE: 1:1000

L-4

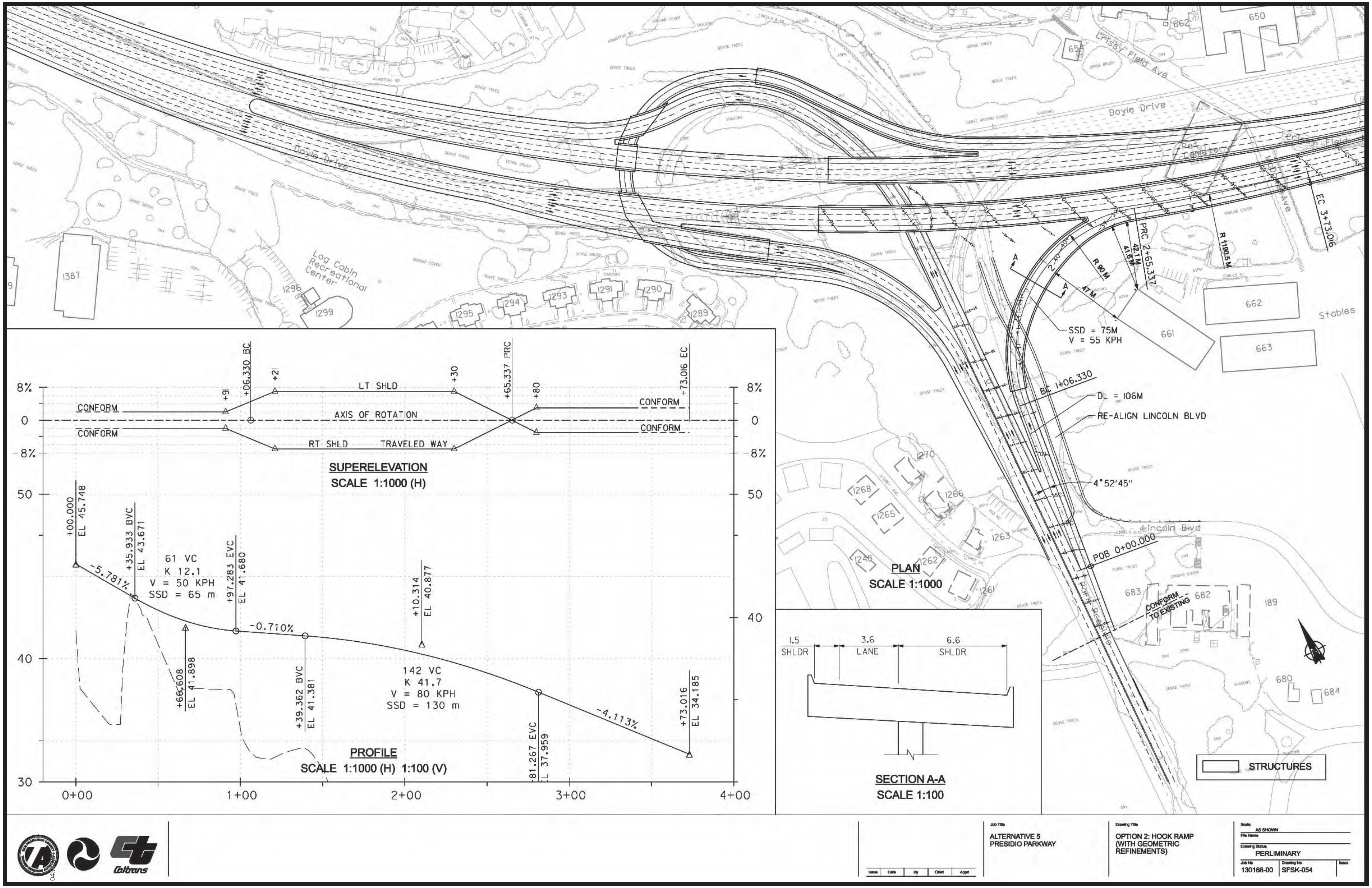
Alternative 2—Replace and Widen – with Detour
Detail of Gorgas Avenue and Mason Street

5. Presidio Parkway

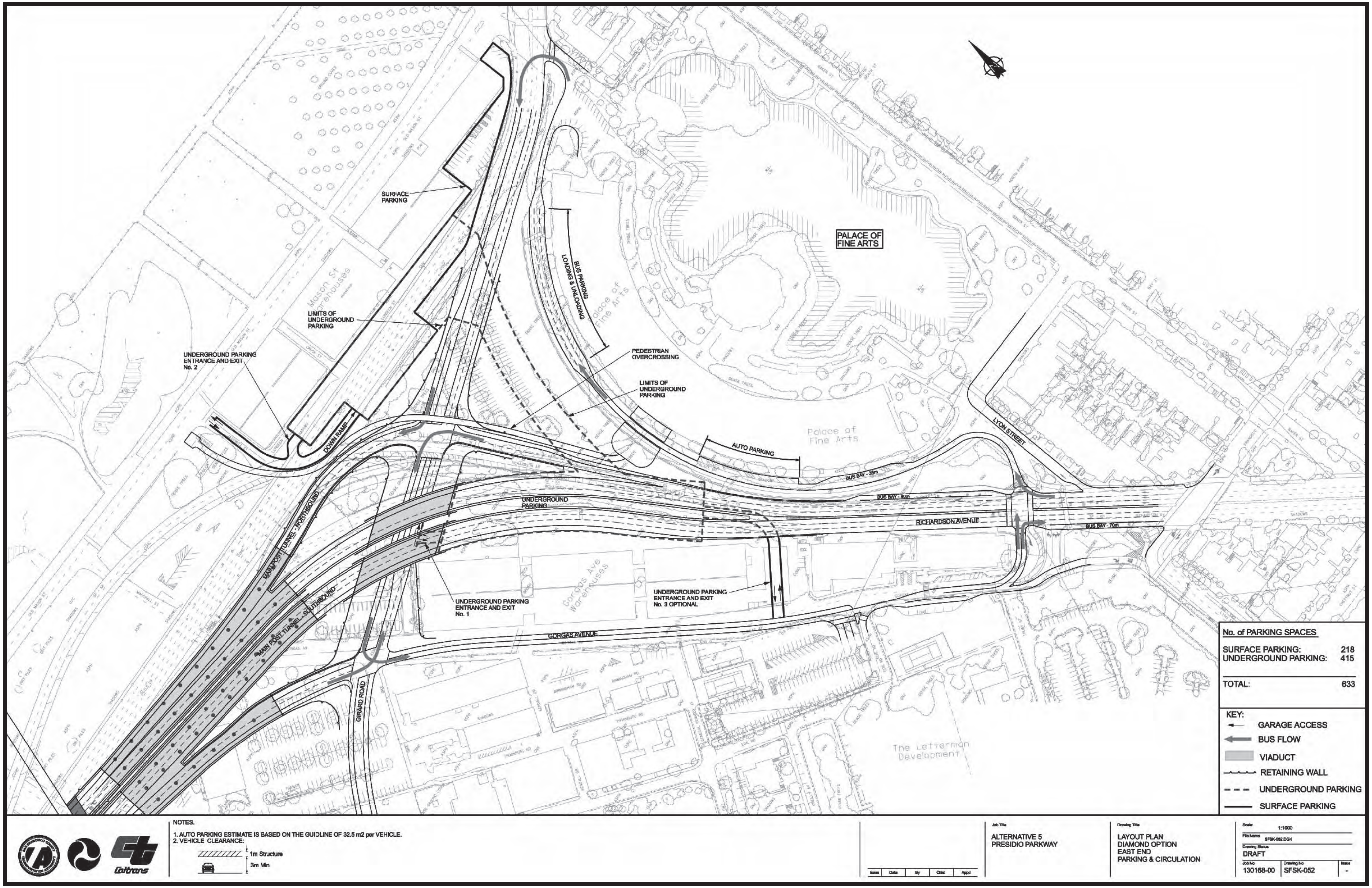




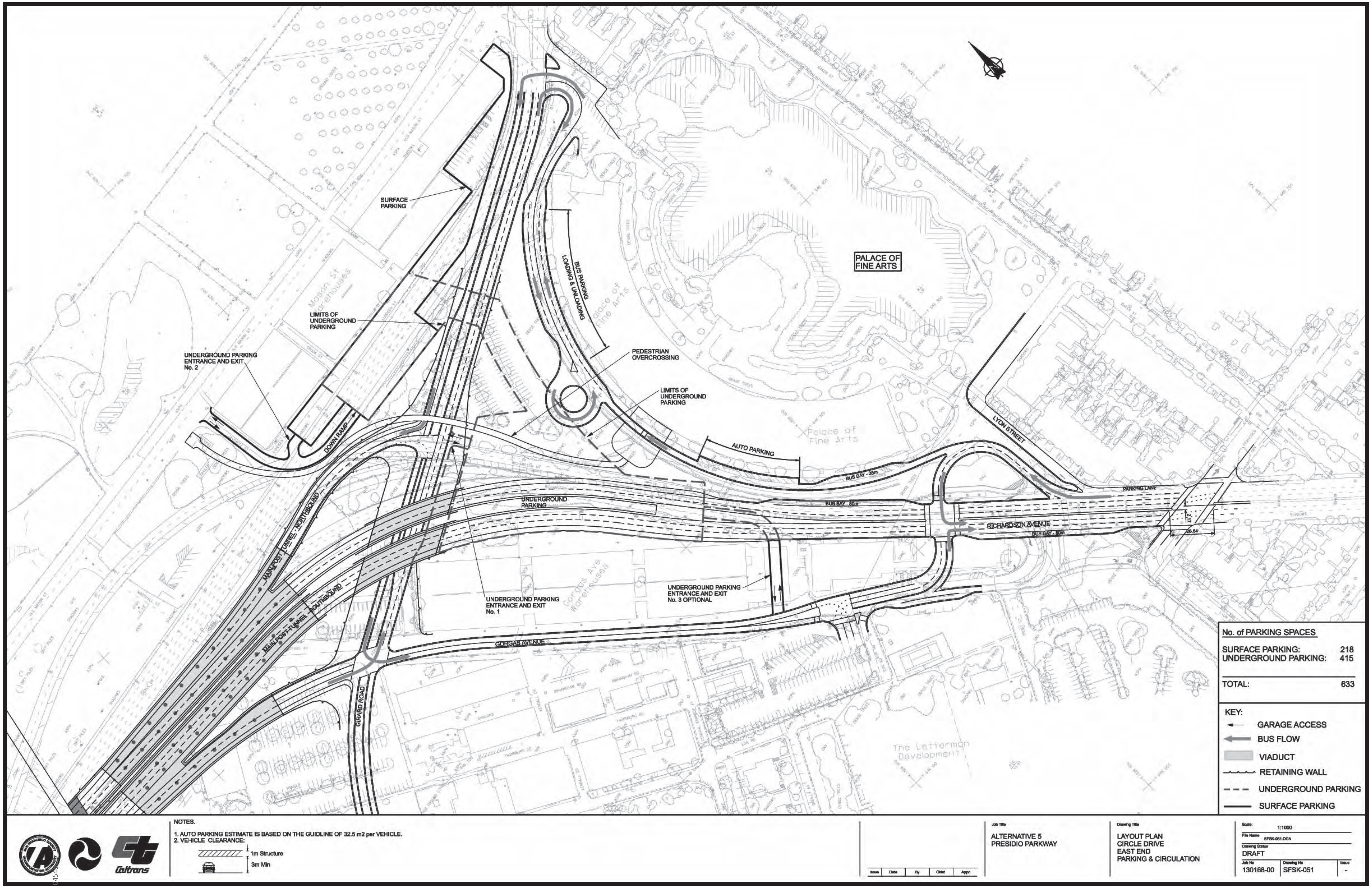
Alternative 5—Presidio Parkway with Loop Ramp Option



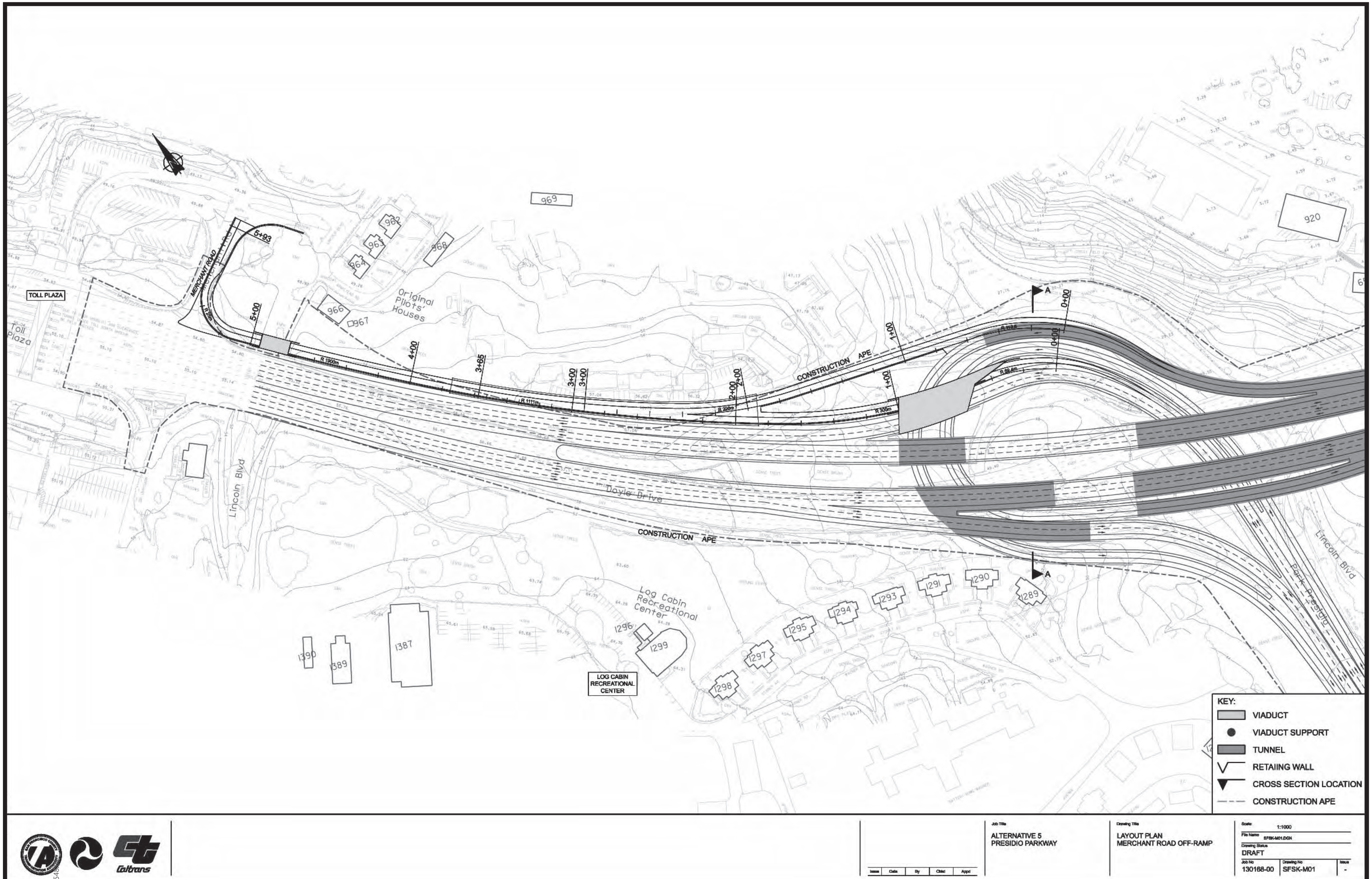
Alternative 5—Presidio Parkway with Hook Ramp Option



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 rickseckeri*)
- 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*)

[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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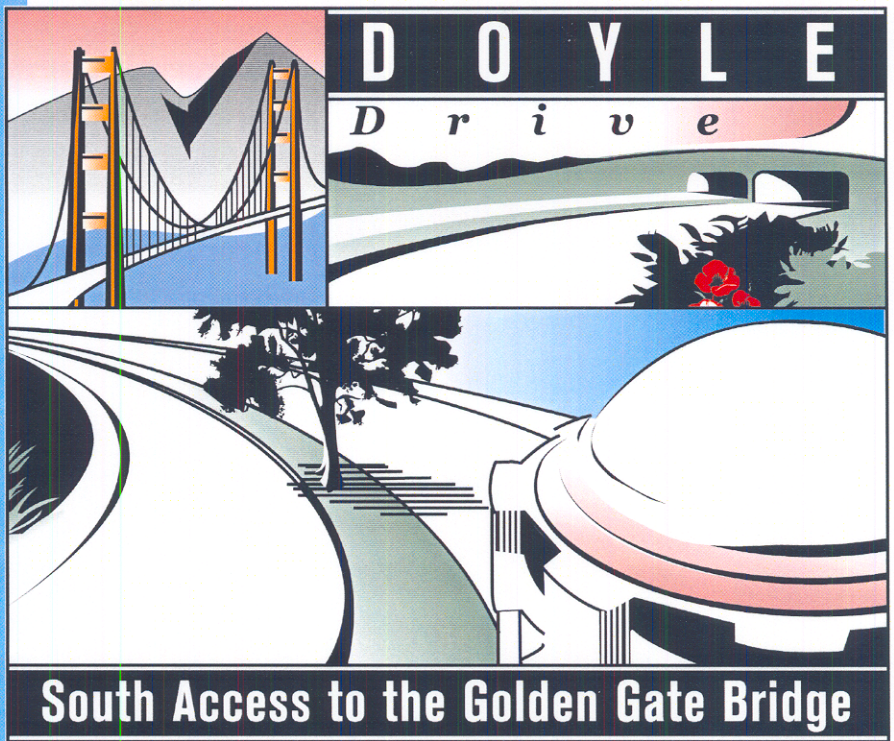

FINAL
NOISE AND VIBRATION STUDY
December 2004

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EXECUTIVE SUMMARY

This report presents the results of the noise and vibration study conducted for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). This report is one of several technical reports prepared in support of the Draft Environmental Impact Report (DEIS/DEIR). The information from this report will be summarized in the DEIS/DEIR.

Doyle Drive is 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. 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. The following alternatives were considered:

- Alternative 1: No-Build Alternative,
- Alternative 2: Replace and Widen Alternative, and
- Alternative 5. Presidio Parkway Alternative

The study considered the potential for construction and operational phase impacts of each alternative. The noise analysis was conducted following guidelines in 23 CFR 772 and Caltrans' Traffic Noise Analysis Protocol. Compliance with 23 CFR 772, the Federal Highway Administration's (FHWA) noise standard, satisfies National Environmental Policy Act (NEPA) requirements with respect to traffic noise impacts. The noise and vibration analyses were also conducted following methodologies that are consistent with the California Environmental Quality Act (CEQA). In addition, the analysis also considered City of San Francisco Noise Ordinance requirements.

Traffic noise levels were predicted at receptor sites near the project corridor for existing, year 2010, and year 2030 conditions. Results of the analysis indicate that traffic noise would exceed the FHWA and Caltrans criteria at 37 receptor locations under one or more of the modeled conditions. The abatement measures considered to reduce the predicted traffic noise impacts including traffic management measures, horizontal and vertical shifts in the roadway alignment, noise barriers, retrofit of windows at residences exceeding the FHWA Noise Abatement Criteria (NAC), and the use of alternative paving materials. Although feasible, traffic management, roadway realignment measures, and alternative paving materials are not considered reasonable noise abatement measures.

Construction of noise barriers at receptor locations that are on local streets such as Richardson Avenue, Lyon Street, Marina Boulevard, Mason Street, Lincoln Boulevard, Gorgas Avenue, Montgomery Street, Girard Road and Halleck Street, would not be feasible because driveways would need to be maintained to provide access to those properties. As such, there appear to be no reasonable measures to reduce the predicted traffic noise with the Doyle Drive alternatives at Receptors 1 and 2 (the Palace of Fine Arts Building), Receptors 70 and 72 (Gorgas Avenue Warehouses), Receptors 73 and 74 (YMCA Buildings) and at Receptor 76 (residential area along Lyon Street and Richardson Avenue).

Receptors 10-13 (the Battery area), 17-18 (Armistead Road area), 27 (the Log Cabin area), 29-36 (residences along Storey Avenue) and 43 (the National Cemetery) have the potential to be benefited by the construction of noise barriers along the various alternatives under consideration, depending upon cost and effectiveness considerations. To determine whether noise barriers would be reasonable and feasible for these locations, the Caltrans protocol was applied to a series of noise barrier options for each site.

For the Replace and Widen Alternative, a 278 meter (912 foot) noise barrier 4.27 meters (14 feet) high along the south side shoulder of Doyle Drive from the east end of the high viaduct section eastward to the western end of the National Cemetery could provide noise reduction on the order of 2 to 11 dBA along the frontage area of the National Cemetery. The barrier appears preliminarily to be reasonable and feasible following the Caltrans protocol. Extending the barrier to the vicinity of Building 106 was also investigated to determine if additional impacted receivers would be benefited. A barrier along the shoulder of the viaduct section was tested up to 4.88 meters (16 feet). The results indicate that only Building 128 would receive at least 5 or more decibels of noise reduction from such a wall design. Due to the additional cost and the design limitations of the viaduct section to be able to support the wind and dead load of such a wall, it was determined that extending the standard masonry block wall was not a reasonable abatement effort. However, a lower cost wall material design (such as wood) could make this wall preliminarily reasonable. If this alternative is selected, coordination with the impacted property owners will be conducted during the design phase to determine if a cost reasonable alternative can be agreed to. Under the Presidio Parkway Alternative, abatement in this section of the Presidio was also investigated. The design of the Parkway within much of this location would be in a cut (depressed) section with a concrete overhang and safety barrier to support the relocated section of Lincoln Boulevard. The overhang would effectively reduce traffic noise from most of this section of Doyle Drive and eliminate the need for additional abatement. Traffic noise from Lincoln Boulevard would be more noticeable in this area than would the noise from Doyle Drive. However, due to space limitations and safety concerns, placement of a noise barrier along Lincoln Boulevard was not considered a viable option.

A noise barrier along the westbound on-ramp from Park Presidio Boulevard to Doyle Drive westward to the Merchant Road area was investigated to determine if abatement would be reasonable and feasible for the areas impacted by both the Presidio Parkway and Replace and Widen Alternatives. A 3.05 meter high (10 foot) noise barrier, 318 meters long (1,043 feet) placed along the edge of the Doyle Drive right-of-way line in this area could provide a noise reduction on the order of 10 dBA to the five impacted residential receptors located north of Doyle Drive in the area along Armistead Road. Following the Caltrans protocol, this barrier would be considered preliminarily to be reasonable and feasible. However, if the Merchant Road Slip Ramp option were to be selected, it is anticipated that most of the noise sensitive residences along this portion of Doyle Drive would be removed and the need for the noise barrier may be eliminated or modified in terms of impacted receptors and the height and length of noise barrier needed. Therefore the reasonableness of constructing this noise barrier would be determined during design once the interchange option (if any) is selected.

A noise barrier along the south side of the eastbound section of Doyle Drive from west of the Log Cabin area that extended partially down the southbound Park Presidio off-ramp was investigated for both the Presidio Parkway and Replace and Widen Alternatives to determine if it might provide relief for the receptors along Storey Avenue (Receptors 27 through 36). Due to the topographic conditions of the area, a shoulder barrier along this section of Doyle Drive for all build alternatives would not be effective. The average reduction to the impacted receptors with a 4.88 meter high (16 foot) wall was only 1.7 dBA, well below the required 5 dBA reduction to be considered feasible. A barrier placed outside of the right-of-way along the top of the ridge bordering Doyle Drive in this area may prove effective but would require additional right-of-way and would most certainly impact the area of the Log Cabin site that contains identified protected plant species that could be adversely impacted. Therefore abatement at this location was not considered reasonable or feasible.

Noise abatement in the form of a noise barrier was also investigated for the Replace and Widen Alternative in the area of Batteries Blaney, Slaughter, Sherwood and Baldwin. A noise barrier extending 380 meter (1,246 feet) along the frontage of the Battery area that is 3.05 meters (10 feet) tall along the shoulder of Doyle Drive would provide a noise reduction in the range of 2 to 11 dBA. Following the Caltrans protocol, this noise barrier concept appears preliminarily to be reasonable and feasible.

Receptors 45-47, 49-51, 53 and 60 within the Main Post area of the Presidio are all considered Category C land uses and had no evidence of frequent human use of exterior areas that would benefit from noise abatement. The use of several of the buildings is for storage and electrical switching equipment, neither of which are noise sensitive. While noise abatement in the form of a noise barrier wall may be feasible for some of these receptors, it does not appear to be a reasonable course of action due to the lack of exterior noise sensitive activities. Interior noise levels would be reduced by the building envelope (generally 20 decibels or more, depending upon the building construction), which would bring all of these sites within the interior NAC.

With the Presidio Parkway Alternative, the use of tunnels would provide substantial traffic noise reduction to a number of receptors along the project corridor, including the Battery area, much of the Main Post area, and some of those along the Mason Street area. An investigation of tunnel portal noise reduction was conducted for the very same areas that could potentially be impacted by the increase noise levels associated with the combination of traffic noise and the portal noise created by reverberation within the tunnels. The placement of a small length of noise barrier wall along the top of the portal areas that extends away from the portal for a distance of approximately 20 meters (66 feet) and 1.83 meters tall (6 feet) should be more than sufficient to reduce the potential portal noise from impacting the noise sensitive sections of the National Cemetery and the Battery area, thereby maintaining or enhancing the soundscape for both of these areas.

In order to assess the possibility that the vibration generated by vehicles operating in the Doyle Drive tunnels could cause or contribute to cosmetic cracking or building damage, it is necessary to assess the exterior vibration with respect to studies and standards which relate ground vibration to building damage. Exterior vibration is the standard that is generally used since it eliminates the variability of the response of specific building structures and measurement locations within the building. In addition, damage assessment is normally accomplished by evaluating the peak particle velocity of the ground surface, commonly referred to as PPV.

Since the Doyle Drive tunnels would be founded at an elevation well below grade and are expected to be massive structures, it is expected that the groundborne vibration at a location over the top of the tunnels would actually be lower than that measured at the base of the column of the existing elevated structure (Location 1b). Even assuming that the groundborne vibration levels are the same and factoring in a worst case crest factor as discussed above, a conservative estimate of the maximum PPV outside any of the buildings under consideration would be 95 VdB or approximately 1.4 millimeters per second (0.056 inch per second).

Most modern buildings can easily withstand peak particle velocities as high as 51 millimeters per second (2 inches per second) without structural damage. Even for structures that might be considered “ruins or historical monuments,” the limit is a PPV of 0.2 millimeter per second (0.08 inch per second), which is still greater than the maximum PPV conservatively estimated to be generated by vehicular traffic in the future Doyle Drive tunnels.

SECTION 1: INTRODUCTION

This report presents results of the noise and vibration study conducted for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). The report addresses potential noise and vibration 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.

1.1 PROJECT DESCRIPTION

Doyle Drive is 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). In 1994, when the US Army transferred jurisdiction of the Presidio to the National Park Service (NPS), it became part of the National Park system and Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), the agency responsible for oversight of 80 percent of the Presidio delineated as Area B; and the NPS, which is responsible for management of the coastal portions of the park (the remaining 20 percent) that are delineated as Area A. Doyle Drive lies predominately 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, the southern approach of US 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which 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 1-1). 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.

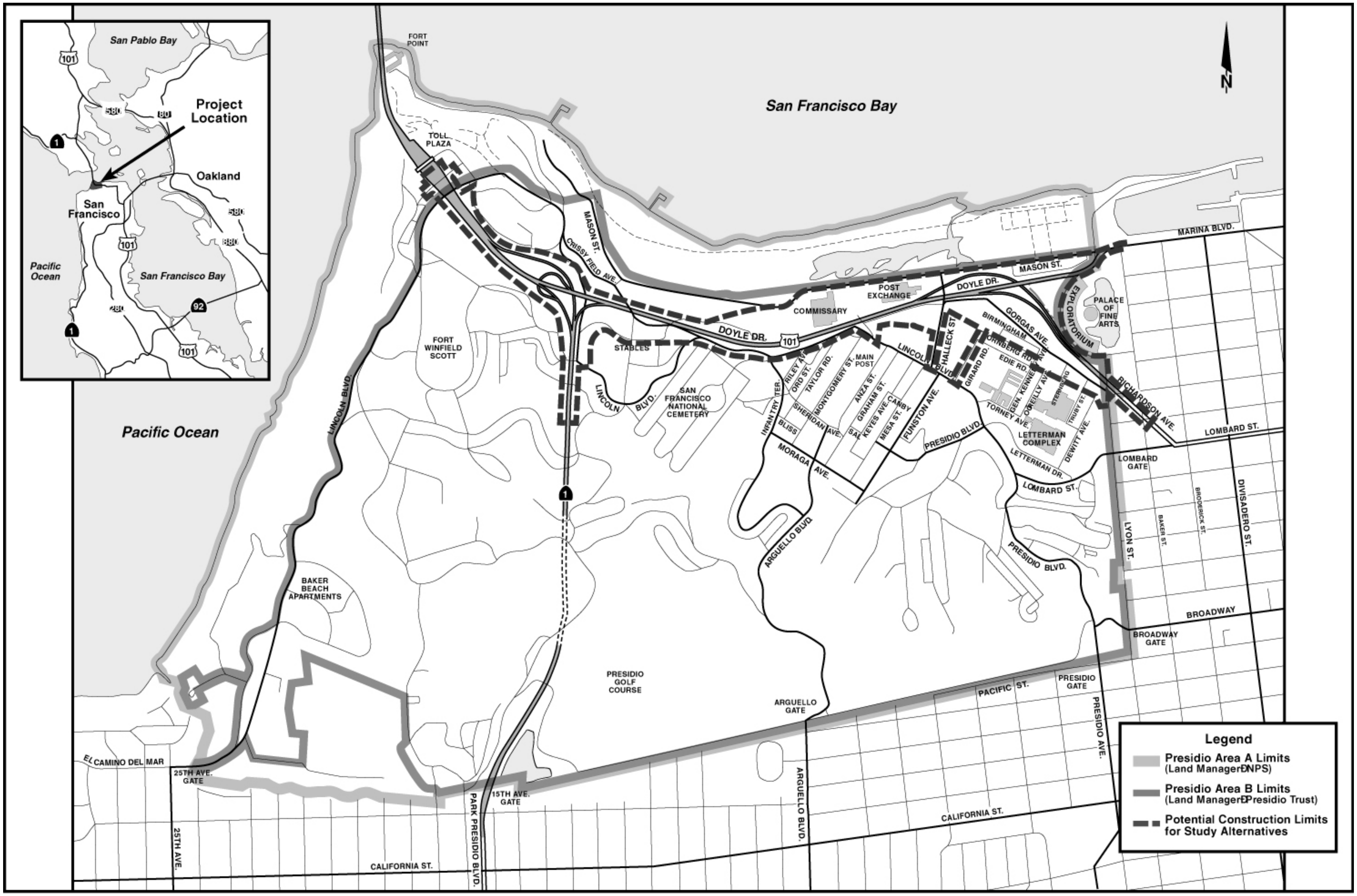
Doyle Drive is nearly 70 years old and it is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic 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 facility 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 manually moved 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).

1.2 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 1-1
PROJECT LOCATION



1.3 ALTERNATIVES DEVELOPMENT

The build alternatives for the Doyle Drive Project were developed with input from public scoping and reflected the parkway concept that evolved from previous studies. Through the screening analysis, six alternatives were selected for consideration in the Administrative DEIS/DEIR: Alternative 1, No-Build; Alternative 2, Replace and Widen; Alternatives 3a and 3b, Long Tunnels; and Alternatives 4a and 4b, Short Tunnels.

Subsequent to the Administrative DEIS/DEIR in 2002, a fifth alternative, the Presidio Parkway, was added to the list of alternatives for more detailed study. In comparison to the tunnel alternatives it was determined that Alternative 5, Presidio Parkway, would provide all the benefits and functions of Alternatives 3a, 3b, 4a, and 4b with less cost, construction duration and environmental impact. Hence, in November 2003 the four tunnel alternatives were recommended to be removed from further consideration and analysis in the DEIS/DEIR.

At a public meeting held in February 2004, the public agreed with the decision to drop Alternatives 3a, 3b, 4a, and 4b and retain Alternative 1, No-Build, Alternative 2, Replace and Widen, and Alternative 5, Presidio Parkway for consideration in the DEIS/DEIR.

1.3.1 Project Alternatives

This section describes the build alternatives in terms of physical and operating characteristics and a No-Build Alternative. As shown in Figure 1-1, the project limits are from Merchant Road, just south of the Golden Gate Bridge Toll Plaza, to the intersection of Richardson Avenue/Francisco Street and Marina Boulevard/Lyon Street. During the screening process, all alternatives were evaluated for their ability to meet the project's Purpose and Need. Detailed drawings showing the plan and profile of each alternative in addition to the various design options can be found in Appendix A.

1.3.1.1 Alternative 1: No-Build Alternative

The No-Build Alternative represents the future year 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 1-2). 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 (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. Presidio access at the east end of the project will be provided for southbound traffic via a right turn from Richardson Avenue to Gorgas Avenue. Presidio access for northbound traffic will be provided by a slip ramp from Richardson Avenue to Gorgas Avenue, which is currently under construction.

1.3.1.2 Alternative 2: Replace and Widen Alternative

The Replace and Widen Alternative would replace the 463-meter (1,519-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 1-3). The new facility would be replaced on the existing alignment and widened to incorporate improvements for increased traffic safety.

FIGURE 1-2
ALTERNATIVE 1: NO-BUILD

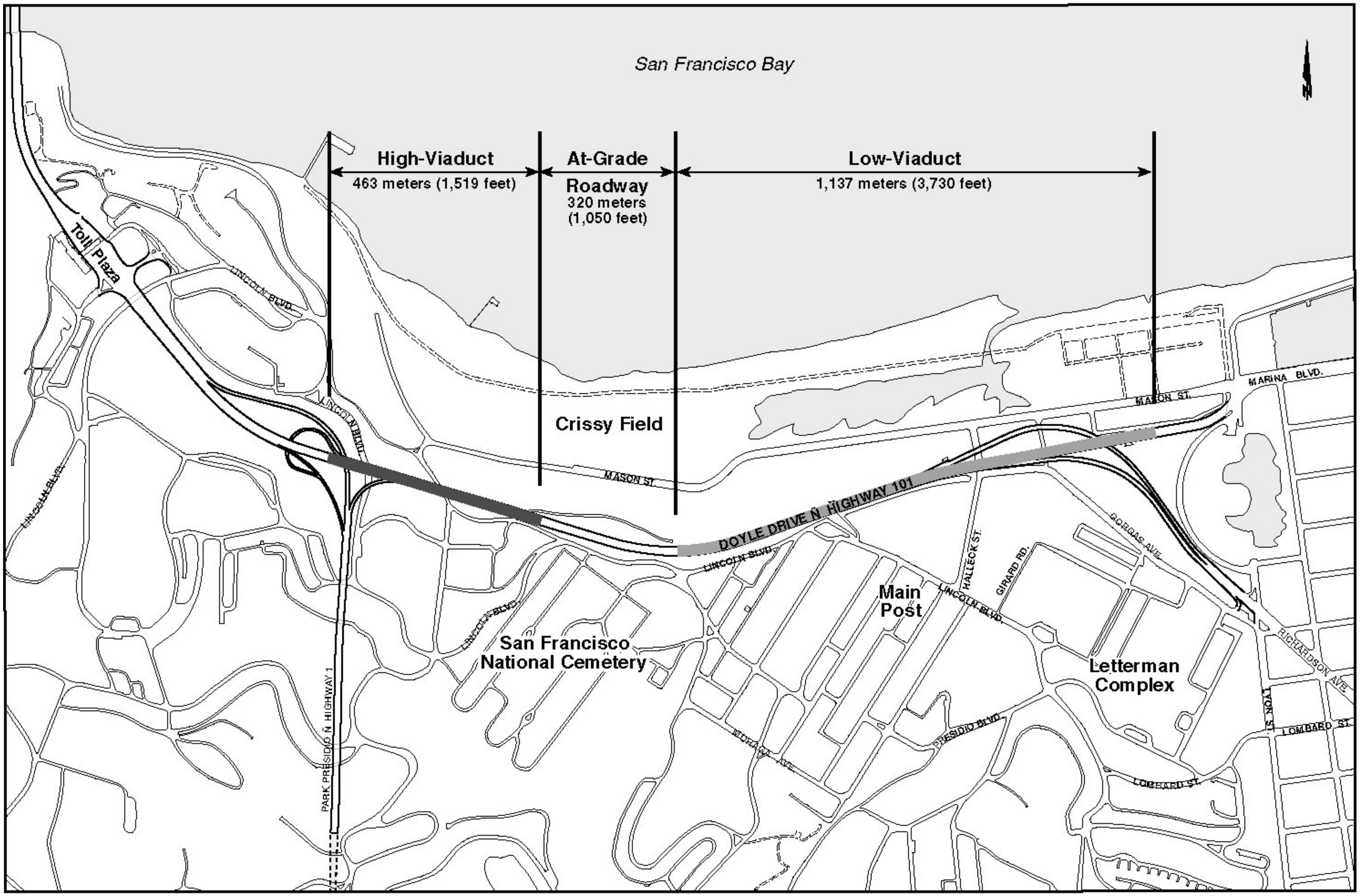
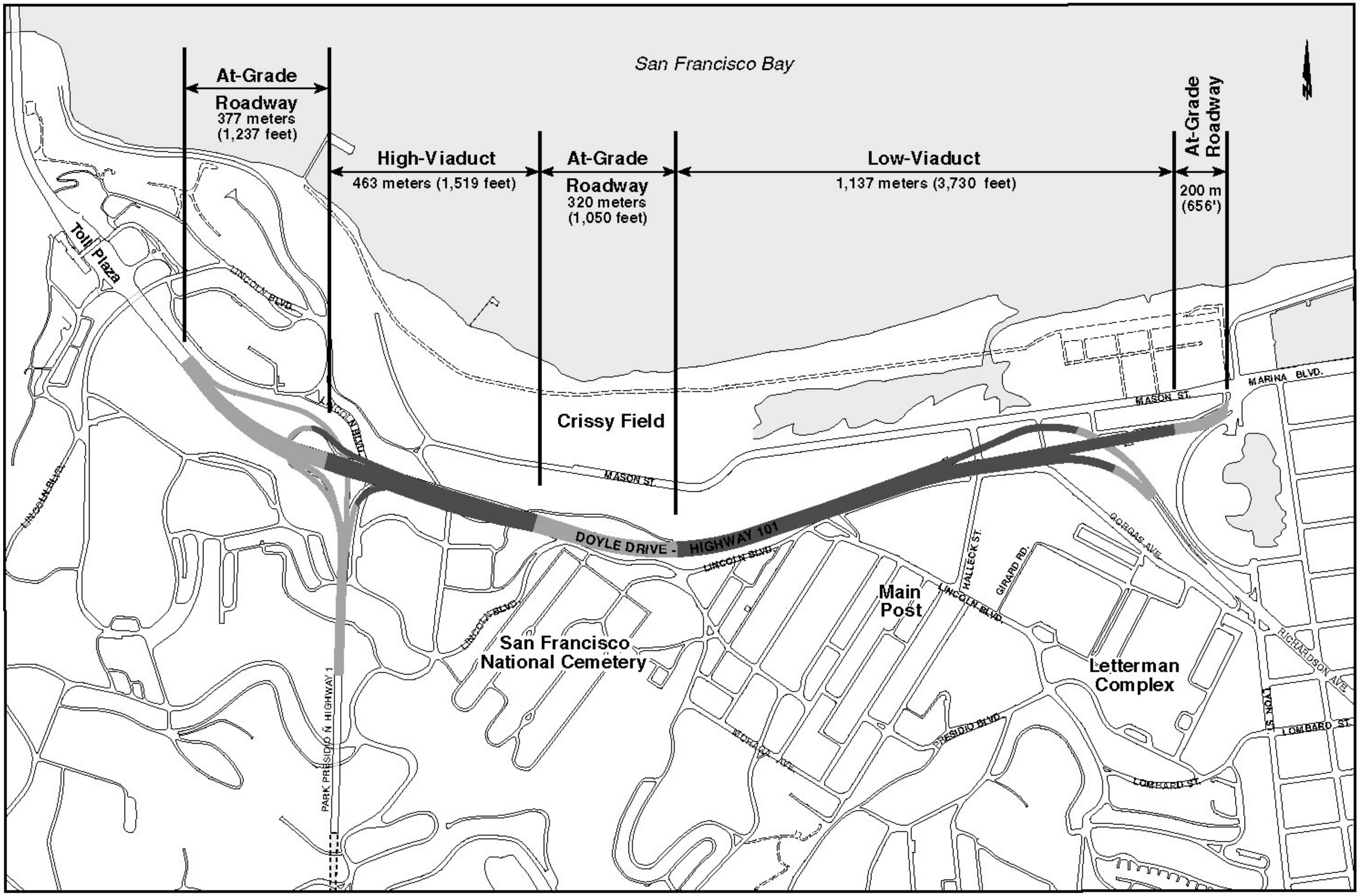


FIGURE 1-3
ALTERNATIVE 2: REPLACE AND WIDEN



This alternative would include either six 3.6-meter (12-foot) lanes and a 3.6-meter (12-foot) eastbound auxiliary lane with a fixed median barrier or six 3.6-meter (12-foot) lanes with a moveable median barrier. The new facility would have an overall width of 38.0 meters (124 feet). The fixed median barrier 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 32.4 meters (106 feet). 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 and the ramp connecting westbound Doyle Drive to southbound 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.

The Replace and Widen Alternative includes two options for the construction staging:

> 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 the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.
>
> With 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.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. Presidio access at the east end of the project will be provided for southbound traffic via a right turn from Richardson Avenue to Gorgas Avenue. There would be no Presidio access for northbound traffic at the east end of Doyle Drive due to geometric constraints and concerns for traffic safety.

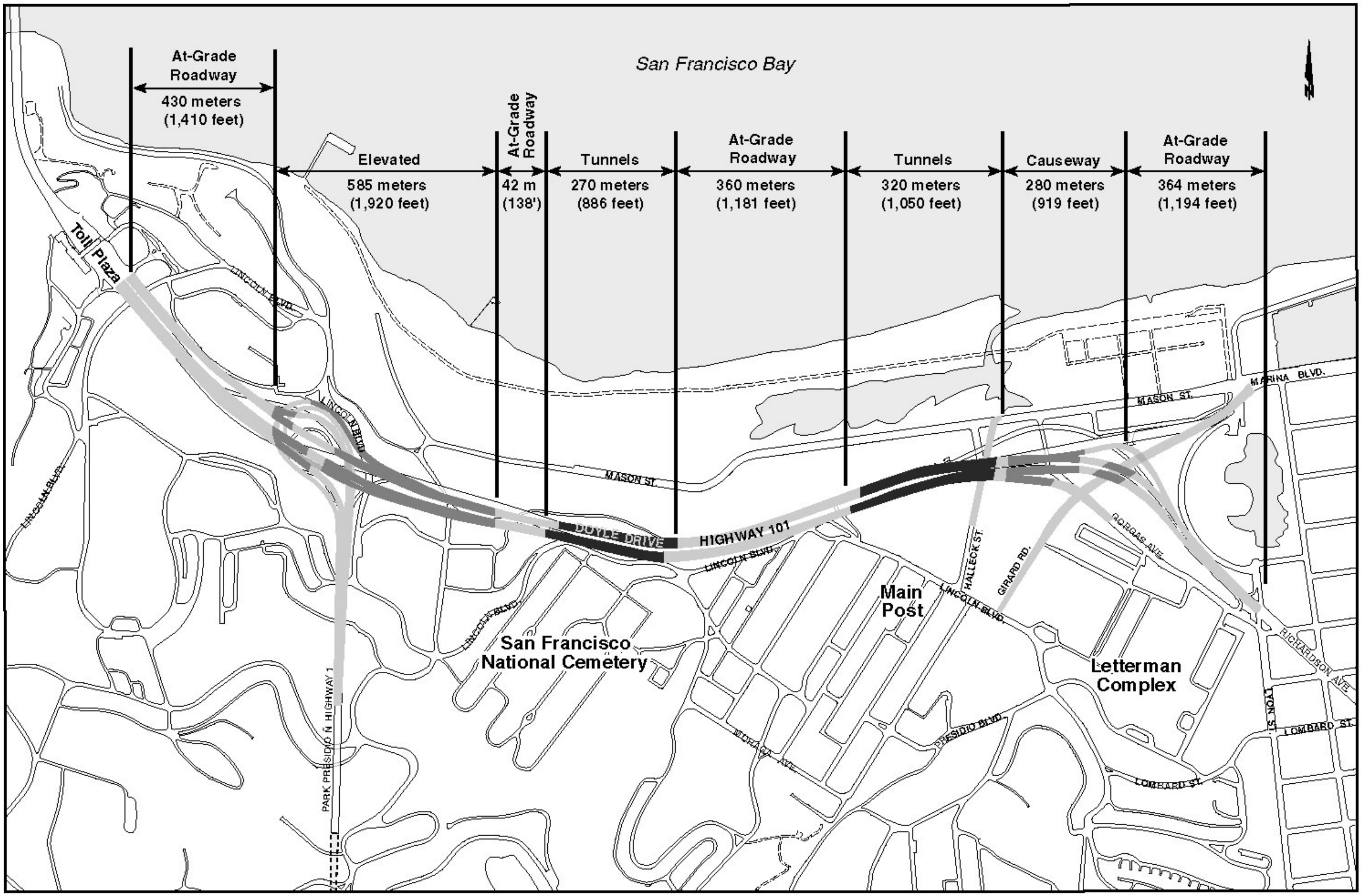
1.3.1.3 Alternative 5: Presidio Parkway Alternative

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 1-4). 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. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend 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 existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The Presidio Parkway Alternative would include an underground parking facility at the eastern end of the project corridor between the Mason Street Warehouses, Gorgas Street Warehouses and Palace of Fine Arts. The parking garage would supply approximately 500 spaces to maintain the existing parking supply in the area and improve pedestrian and vehicular access between the Presidio and the Palace of Fine Arts.

At the intersection with Merchant Road, just east of the toll plaza, a design option has been developed for a Merchant Road slip ramp. This option would provide an additional new connection from westbound Doyle

FIGURE 1-4
ALTERNATIVE 5: PRESIDIO PARKWAY



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.

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. 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 Calvary 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.

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, Gorgas Avenue is a one-way street and 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.

SECTION 2: FUNDAMENTALS OF TRAFFIC NOISE

2.1 NOISE PRINCIPLES AND DESCRIPTORS

Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB). Zero dB is typically the threshold of human hearing and 120 to 140 dB is typically the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in Figure 2-1.

This time-varying characteristic of environmental noise is described using various noise descriptors. The most frequently used noise descriptors are summarized below:

Leq: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

Lmax: the instantaneous maximum noise level for a specified period of time.

L50: the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.

L10: the noise level that is equaled or exceeded 10 percent of the specified time period.

DNL: 24-hour day and night A-weighted noise exposure level that accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: similar to the DNL the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM.

As a general rule, in areas where the noise environment is dominated by traffic, the Leq during the peak-hour is generally equivalent to the DNL at that location.

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1 All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

FIGURE 2-1
COMPARATIVE SOUND LEVELS

Sound Level (dBA, L_{eq})	Common Indoor Sound Levels	Common Outdoor Sound Levels	Description
	Rock Band		
110			
		Jet Flyover at 305 meters (1,000 feet)	
100			
	Inside Subway Train (New York)	Gas Lawn Mower at 0.9 meter (3 feet)	**Very Annoying**
90			**Loss of Hearing with Prolonged Exposure**
	Food Blender at 0.9 meter (3 feet) Garbage Disposal at 0.9 meter (3 feet)	Diesel Truck at 0.9 meter (3 feet) Noisy Urban Daytime	
80			**Annoying**
	Shouting at 0.9 meter (3 feet) Vacuum Cleaner at 0.9 meter (3 feet)	Gas Lawn Mower at 30 meters (100 feet)	
70			
		Commercial Area Heavy Traffic at 91 meters (300 feet)	**Intrusive**
60			
	Large Business Office		
50	Dishwasher Next Room	Quiet Urban Daytime	**Quiet**
		Quiet Urban Nighttime	
40	Small Theater		
	Large Conference Room (Background) Library	Quiet Suburban Nighttime	
30			
	Concert Hall (Background)	Quiet Rural Nighttime	**Very Quiet**
20			
	Broadcast and Recording Studio		
10			
			Threshold of Hearing
0			

Sources: Caltrans Transportation Laboratory Noise Manual 1982.

2.2 NOISE EXPOSURE AND COMMUNITY NOISE

Noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time or averaged over a defined period of time. The noise levels presented in Figure 3-1 are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time.

Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level gradually changes throughout a typical day corresponding with the addition and subtraction of distant noise sources with many of the individual contributors unidentifiable. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identified, also add to the fluctuations in the community noise levels. Successive addition of sound to the community noise environment varies the community noise level, requiring the measurement of noise exposure over a period of time to evaluate cumulative noise impacts.

2.3 EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning;
- and physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no complete satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected (Peterson, et al.); and
- a 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale is used. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

2.4 NOISE ATTENUATION

Traffic noise, which generally behaves as a "line source" of noise, attenuates (lessens) at a rate of 3 to 5 dBA per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and noise barriers (either vegetative or manufactured, etc.). Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate at a rate of 6 to 7.5 dBA per doubling of distance.

Propagation of noise is dependant on several factors including the type of intervening ground surface, meteorological factors and the presence of natural or man-made barriers. Ground surfaces may be characterized as "hard" (i.e., an asphalt parking lot) or "soft" (i.e., rolling grassy hills with vegetation), with hard surfaces serving to more effectively propagate noise with distance.

Vehicle noise emissions are predominantly influenced by the number of vehicles on a given roadway per hour, the speed of the vehicles on that roadway, and the type of vehicles. Generally, a doubling of vehicle traffic volumes would result in an increase of 3 dBA. At a distance of 15 meters (50 feet) noise emissions of passenger automobiles are approximately 60 dBA at a speed of 40 kilometers per hour (25 miles per hour) and increase to approximately 75 dBA at 105 kilometers per hour (65 miles per hour). For heavy trucks the noise-speed relationship proceeds from approximately 79 dBA at a speed of 40 kilometers per hour (25 miles per hour) and increases to approximately 85 dBA at 105 kilometers per hour (65 miles per hour).

SECTION 3: FEDERAL AND STATE POLICIES AND PROCEDURES FOR NOISE

3.1 OPERATIONAL PHASE

3.1.1 Federal Requirements

Noise is identified in the National Environmental Policy Act as an area for review in terms of environmental impacts of Federal actions. For the Federal Highway Administration (FHWA), the applicable standard is 23 CFR 772. Compliance with 23 CFR 772 will satisfy National Environmental Policy Act (NEPA) requirements with respect to traffic noise impacts. Under 23 CFR 772, noise abatement must be considered for Type I projects when the project would result in a substantial noise increase, or when the predicted noise levels approach, meet, or exceed the "Noise Abatement Criteria," shown in Table 3-1. Following guidance in the Caltrans Traffic Noise Analysis Protocol, “approach” is defined as being within 1 dBA of the FHWA criteria and a noise increase is substantial when the predicted noise levels with the project exceed existing noise levels by 12 dBA, Leq(h).[2]

TABLE 3-1
ACTIVITY CATEGORIES AND NOISE ABATEMENT CRITERIA (NAC)

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA, Leq(h))	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, and auditoriums.

Source: 23 CFR 772.

The Presidio Parkway and the Replace and Widen Alternatives are considered to be Type I projects as defined in 23 Code of Federal Regulations (CFR) 772. A Type I project is defined as a proposed Federal or Federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes.

2 Leq(h) refers to the noisiest one-hour-average noise level over the course of a 24-hour due to motor vehicle traffic. Depending upon average speeds during the peak (traffic) periods, the Leq(h) may or may not coincide with the peak traffic hour.

Operational noise impacts for roadway projects with a Federal Highway Administration (FHWA) nexus are defined in 23 CFR 772. An impact occurs if a project would result in a substantial noise increase, or when the predicted noise levels approach, or exceed the Noise Abatement Criteria (NAC) shown in Table 3-1. The Caltrans' *Traffic Noise Analysis Protocol* defines approach as being within 1 A-weighted decibel (dBA) of the FHWA criteria and a substantial noise increase is when the predicted noise levels with the project exceed existing noise levels by 12 dBA, Leq(h)[3] during the loudest traffic-hour of the day. The FHWA noise abatement criteria represent a balance between what is desirable and what is achievable and are based on speech interference.

For park lands, use determines the appropriate criteria. Category A areas include certain pristine or meditative areas. Category B is applicable to open space used for recreational and educational activities, and is the appropriate designation for much of the outdoor use areas at the Presidio and Palace of Fine Arts. Category C applies to any areas with retail or office use.

The National Park Service (NPS) and the Presidio Trust have a desire to provide additional emphasis on noise within the project corridor that lies within the control of each of these two entities. While there are no existing federal noise standards that are specific to the Presidio or the NPS other than the FHWA criteria noted above, the NPS does have a policy set forth in Director's Order #47 *Soundscape Preservation and Noise Management*, which requires that all park facilities be managed to minimize noise pollution. The Presidio Trust Management Plan Final EIS identifies the FHWA criteria as the appropriate federal criteria to apply to the Presidio Trust lands. The EIS also identifies those areas of the Presidio that the Trust's believes warrant special consideration as noise sensitive areas. Every effort will be made to ensure that these policies are incorporated into all decisions made relative to noise impacts and noise abatement.

3.1.2 State and Local Requirements

Under the California Environmental Quality Act (CEQA), a substantial noise increase may result in a significant adverse environmental effect and must be mitigated or identified as a noise impact for which it is likely that no, or only partial abatement measures are available. For the purposes of CEQA analysis, Caltrans considers a noise increase to be substantial when the predicted noise levels with the project exceed existing noise levels by 12 dBA, Leq(h). Further requirements are found in the California Streets and Highway Code Section 216. Caltrans has also established noise analysis policies in the Traffic Noise Analysis Protocol and the Highway Design Manual. Additional guidance from Caltrans can be found in the Technical Noise Supplement of October 1998 (TeNS), Chapter 30 of the Project Development Procedures Manual, and in Chapter 12 of the Standard Environmental References.

3.2 CONSTRUCTION PHASE

3.2.1 Federal Requirements

FHWA requires that construction noise impacts be addressed consistent with 23 CFR 772.19. The general requirement is to:

- identify potentially impacted land uses or activities which may be affected by noise from construction of the project;
- determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts; and
- incorporate the abatement into the plans and specifications for the project.

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3 Leq(h) is the sound level equivalent to the average sound energy occurring over a one-hour period.

Those portions of the NPS Director's Order #47 and the Presidio Trust Management Plan that relate to construction noise impacts and abatement will be also be used to evaluate the need for and appropriateness of construction noise mitigation.

3.2.2 State and Local Requirements

Caltrans protocol require that construction noise impacts be addressed on a case-by-case along with likely abatement measures. It is expected that specifications related to noise may be required for this project. General construction-related noise impact analysis is qualitative in nature and is based on a description of the expected construction phases, including the nature of the construction activity (e.g., such as pile driving) and its duration, the types of equipment that would be used, and proximity to noise-sensitive uses.

Additionally, the Presidio Trust Management Plan Final EIS identifies Title 24 of the California Code of Regulation as a regulatory approach to noise control. The noise standards found in this code are related to interior spaces and apply to all new multifamily residential units (hotels, motels, apartments, condominiums, and other attached dwellings that were permitted after 1974. As part of the Trust compliance process, the Trust would enforce the noise insulation requirements equivalent to the standards of Title 24 with building permit conditions.

Compliance with the San Francisco Noise Ordinance requirements would also be required of this project. Details of the anticipated construction phase noise impacts and abatement considerations are noted in Section 8.

SECTION 4: NOISE STUDY METHODS AND PROCEDURES

4.1 SELECTION OF RECEIVERS AND MEASUREMENT SITES

The selection of receiver points for modeling and locations for conducting field measurements was done in consultation with Caltrans, the Presidio Trust and the National Park Service. The receptor points were selected to represent all of the existing buildings within The Presidio that were or might be considered noise sensitive based on existing or anticipated usage and that might be impacted by traffic or construction noise associated with the Doyle Drive project. Additionally many of the sites were selected in anticipation that they are (or would be) expected to receive the highest noise levels over the life of the project. Representative sites throughout the project corridor were selected in an attempt to insure that all land use categories present in the vicinity of Doyle Drive were identified.

Likewise, field measurement sites were selected based on a number of criteria. One concern was the potential of the site to be impacted by relatively high project traffic and/or construction noise levels. Another goal was to use some of the sites to establish ambient or background noise levels, especially where the location was at a substantial distance from Doyle Drive. It was also a goal of the measurement sites selected to use some of these locations to serve as calibration sites for traffic noise modeling purposes. Where possible, sites were selected that had a consistent traffic flow, a clear view of the roadway of concern, and where terrain features were relatively uniform in nature. Unfortunately this was not often the case along this corridor due to the topographic changes that took place in nearly every segment of the project corridor.

4.2 FIELD MEASUREMENT PROCEDURES

Field measurements were generally conducted in accordance with the techniques found in the FHWA document *Measurement of Highway-Related Noise* and the Caltrans TeNS document.

4.2.1 Instrumentation and Setup

The basic setup for each field measurement site was as follows. Each site was visually inspected for conditions that might not make it suitable for field measurements such as temporary construction activities in the area, lawn care activities, frequent human passage, or frequent aircraft over flights. It was also inspected for safety concerns, access, and any other conditions that might make the site unsuitable, such as limited sight to the roadway for traffic assessment purposes. Once the visual inspection was completed, physical measurements were taken at each site to include reference points, compass directions, and a site sketch was then prepared. The sketch also includes vegetative features, ground cover type, and other pertinent data that might impact sound level transmission. Topographic data was obtained from elevation data provided as part of the project design information. Equipment used at each site to gather noise levels included a sound level meter, a sound level calibrator, an adjustable tripod on which to mount the meter, and a microphone equipped with a windscreen. Details of the noise gathering equipment, including make, model, calibration data, etc., can be found in Appendix B.

4.2.2 Noise Measurements

Noise measurements were generally taken consistent with the protocol established in the TeNS document and the FHWA document *Measurement of Highway-Related Noise*. As appropriate, traffic noise levels were scheduled to be monitored during peak noise hours based on observed traffic conditions and directional flow of the traffic. This allowed the traffic noise levels that were recorded to be “worst case” condition, or as close to it as possible. For those areas were traffic noise was not the primary source of noise, data was gathered during periods of time when conditions appeared to represent normal activity levels for the land use under consideration.

Prior to starting each set of measurements, the equipment was assembled on site and batteries were checked along with meteorological data prior to initiation of the study. Once the sound level meter was installed on the tripod with the microphone 1.5 meters (5 feet) above the ground, it was calibrated using a calibrator that is factory-approved for the specific sound level meter used. After calibration was complete and basic meteorological data had been gathered and noted on field data forms for that purpose, contact was initiated with field staff (when appropriate) that were to collect traffic data. Since some locations were not influenced by traffic noise or where 24 hour counts were taken, correlating traffic data was not generally gather. When it was appropriate to gather traffic information, data gathering for both traffic and noise levels were taken over a simultaneous time period. The time period selected for most of the field measurements taken in 2002 were for 24 hours while those taken in 2004 were for a 10 minute duration with at least two sets of data taken to insure that the consistency required in the TeNS document were meet. All measurements were taken using the slow-response setting on the A-weighing network. Once the measurement period was completed, traffic data (where obtained) was reviewed and logged along with the sound level data. Meteorological data was checked again at the end of each data set along with the status of the batteries in the sound level meter. Then a post-reading calibration check of the sound level meter was completed and the process repeated as often as necessary to meet the protocol requirement or as long as weather conditions allowed.

4.2.3 Traffic Counts and Speeds

When taken as part of the field measurements, traffic counts were taken throughout the entire noise measurement period. Traffic counts were taken manually using traffic tallying equipment and recorded on forms established for that purpose. Traffic was counted on both directions and classified into the following categories: cars, medium trucks, heavy trucks, buses, and motorcycles, consistent with the guidance provided by FHWA and Caltrans. Traffic speeds were taken by using a radar speed detection system in a manner prescribed by the manufacturer and recorded manually on a form designed for that purpose. At the end of each run the average speed for each classification was determined and logged on the field measurement data sheet as appropriate.

4.2.4 Meteorology

Prior to and following the gathering of all noise data for the 2004 series of measurements, meteorological data was gathered and noted on the field measurement data form. This data included cloud cover, relative humidity, air temperature, wind speed, and wind direction. If wind speeds exceeded 5 meters per second (11 mph), noise level readings were suspended and the data discarded. Humidity levels were also monitored carefully to insure that they did not exceed the manufacturer’s recommendations for the sound level meter. Equipment used for this function is listed in Appendix B.

4.2.5 Data Reduction

All data gathered as part of the study was recorded on appropriate forms and, in the case of the noise level data, downloaded from the meter into a computer program. The data was then stored on disks and later converted to spreadsheets for analysis purposes. Conversion of traffic data from the 10 minute recording period to a one-hour equivalent was done manually for inclusion in the noise model used to validate the accuracy of the field data gathered at those locations where this activity was appropriate. This conversion was consistent with the procedure found in the TeNS document.

4.3 NOISE PREDICTION METHOD

The FHWA Traffic Noise Model (TNM) version 2.5 was used for all future year traffic noise predictions used in this study. This included the calibration of field data as well as the prediction of traffic noise impacts from all alternatives associated with this project. This model was developed for FHWA under the guidance of the Noise Analysis Facility at the Volpe National Transportation Systems Center of the U.S. Department of

Transportation. First released for use by FHWA in March of 1998, the model has undergone a series of updates. The current version (2.5) was released for use in April of 2004 and has replaced all previously approved noise prediction models used on Federal-aid highway projects. TNM propagates sound energy, in one-third octave bands, between highways and receptors (noise sensitive locations) taking the intervening ground's acoustical characteristics and topography into account.

Existing and future noise levels (with and without the improvements to Doyle Drive) were predicted using TNM. To insure that the predictions were as accurate as possible, the computer model was calibrated using measured noise levels at selected receptor locations adjacent to the project corridor.

Input to TNM includes traffic volumes (for the noisiest hour), speeds, vertical and horizontal elevations of roadway segments and receptors, and topographic shielding. Vehicle traffic volumes were input by vehicle type to account for the "noisier" engines and elevated emission points of medium-duty and heavy-duty trucks, buses, and motorcycles. Traffic data prepared by DKS Associates was input into the TNM to predict noise levels within the Doyle Drive project limits (see Appendix C for traffic data summarized for use in the traffic noise model). The motor vehicle fleet used in the analysis for both the existing and future conditions consisted of automobiles, medium trucks (cargo vehicles with two axles and six tires), heavy trucks (cargo vehicles with three or more axles), buses (9 passenger or more), and motorcycles.

SECTION 5: EXISTING NOISE ENVIRONMENT

5.1 EXISTING NOISE SENSITIVE LAND USES

The Doyle Drive corridor lies within a National Park and land uses in the immediate area are not zoned like a typical urban area within the jurisdiction of a city or county. The corridor contains a mix of open space, residential and office land uses as well as a cemetery and institutional uses related to operations of the Presidio Trust, NPS, YMCA and other conservatory agencies.

5.2 FUTURE LAND USES

The Presidio Trust recently finalized the Presidio Trust Management Plan and certified the accompanying Environmental Impact Statement (EIS). The Management Plan examines future land use expectations within the Presidio. The document shows locations of planned housing retention, removal and replacement within the Presidio and does not identify any location proposed for conversion to residential use within one mile of the project alignment. The Final EIS identifies traffic-generated noise as the major source of environmental noise. The Final EIS further points out that natural sounds are intrinsic elements of the environment that are inherent components of the Presidio’s significant natural, historic, cultural, scenic, and recreational resources to be protected. The Final EIS also identifies specific examples of areas where quiet is of significance. These areas include Crissy Marsh, Tennessee Hollow, the Fort Scott parade ground, the National Cemetery, and the World War II Memorial. It is the intent of the Trust to maintain or enhance the noise environment within the Presidio whenever possible.

5.3 SENSITIVE RECEPTORS

Land uses considered to be sensitive to noise and vibration, are referred to as sensitive receptors. Some land uses are considered more sensitive to ambient noise and vibration levels than others, due to the types of activities typically occurring. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise and vibration than are commercial (other than lodging facilities) and industrial land uses.

Noise sensitive receptors that could be affected by the Doyle Drive Project have been identified through a review of the maps illustrating the build alternatives, a site reconnaissance, and a review of future plans and related traffic analyses for the Presidio as shown in the Final General Management Plan Amendment Environmental Impact Statement (EIS) for the Presidio of San Francisco (U.S. Department of the Interior, 1994) for Area A and in the Presidio Trust Management Plan Final EIS for Area B.

5.3.1 Sensitive Receptors within the Doyle Drive Corridor

Sensitive receptors within the Doyle Drive corridor include residential areas along and in the vicinity of Armistead Road (northwest of the junction of Highway 1 and Doyle Drive), Storey Avenue (north of Ruckman Avenue), Riley Avenue, General Kennedy Avenue, and Girard Road. In some cases, these residential areas are in active use. Other residential areas appear to be vacant but are designated as residential and are not slated for removal under the Presidio's General Management Plan Amendment. These areas are presumed to be available for residential purposes in the future. Additional noise-sensitive uses within the Doyle Drive corridor include the National Cemetery and Crissy Field. Representative sensitive receptors within the Doyle Drive corridor are identified as Receptors C through K on Figure 5-1.

FIGURE 5-1
LONG-TERM MONITORING LOCATIONS, 2002

(A) Noise Monitoring and Assessment Locations

5.3.2 Sensitive Receptors East of the Presidio

Sensitive receptors east of the Presidio include the residences immediately east of the Palace of Fine Arts along Baker Street, along the south side of Marina Boulevard, along the east side of Lyon Street north of Lombard, and along both sides of Richardson Avenue. These residential areas are identified as Receptors A and B on Figure 5-1.

5.4 EXISTING NOISE LEVELS

The area of analysis for potential noise impacts includes adjacent and off-site areas that could be affected by project-generated construction and operational noise. The existing noise environment in these areas is influenced primarily by vehicle traffic, principally on Doyle Drive / Highway 101, Richardson Avenue, Lincoln Boulevard, Mason Street and Gorgas Avenue. Stationary noise sources affecting the project vicinity include construction activity at the former Letterman Complex, Deliveries to the Post Commissary and air handling equipment common to most buildings. An additional occasional mobile noise source is horns blowing from marine vessels passing through the Golden Gate.

5.4.1 Field Measured Results

As part of the 2002 noise study, long-term 24-hour noise measurements were collected at 10 locations identified in consultation with the Presidio Trust, the NPS, a review of the maps illustrating the build alternatives, site reconnaissance, and a review of future plans and related traffic analyses for the Presidio as shown in the Final General Management Plan Amendment EIS for the Presidio of San Francisco (U.S. Department of the Interior, 1994). Monitoring locations in the project vicinity are illustrated on Figure 5-1. Table 5-1 provides a description of the monitoring locations and the measured noise levels at each location. Because of demolition activities occurring at the proposed Letterman site, long term noise monitoring was not conducted.

Additional short-term (10 minute) measurements were collected at 20 locations over a period of five days between June 28 and July 2, 2004. These measurements were taken to establish a general background level within the project area. The measurements at locations 1, 10, 14, 17, 18, 19, 20 and 21 were also used to calibrate the TNM model for the No-Build and Replace and Widen Alternatives, consistent with Caltrans Protocol. Table 5-2 provides a listing of the short-term measurement sites, along with measured noise levels at each of these locations. Figure 5-2 locates these sites for geographic reference, some of which were identical to those used for the long-term measurements.

Topography in the project corridor generally slopes downward from south to north. Between Lyon Street and Halleck Street topography is relatively level on both sides of Doyle Drive and Doyle Drive becomes an elevated structure. East of Halleck Street, however, the elevation on the south side of Doyle Drive increases to as much as 30 meters (100 feet) at Lincoln Boulevard. Between Lincoln Boulevard and Park Presidio, elevations on the south side of Doyle Drive drop and the Doyle Drive structure is a high viaduct span centered at McDowell Avenue. From McDowell Avenue westward, elevations on both sides of Doyle Drive increase in tandem up to 61 meters (200 feet) at Fort Scott towards the toll plaza.

5.4.2 Modeled Results

Where sufficient information related to traffic conditions that existed during the time period of each field measurement, the data was input into the TNM model for comparative purposes. The results of this modeling are shown in the following sections.

TABLE 5-1
LONG TERM (24 HOUR) MEASURED NOISE LEVELS[1]

Receptor No.	Location or Address[2]	Approximate Distance From Noise Source	Type of Development	Number of Units Represented	Traffic Noise Abatement Category and Criterion[3]	Existing Worst Hour Noise Level Leq(h)[4]
A	3234 Lyon Street	15 meters from Richardson Avenue Centerline	Residential	8	(B/E) 66	76
B	Marina Boulevard at Lyon Street	13 meters from Marina Boulevard Centerline	Residential	9	(B/E) 66	74
C	Building 1029	130 meters from Doyle Drive Centerline	Residential	40	B/E) 66	62
D	Main Post Building 106/211	15 meters from Doyle Drive Centerline	Commercial	N/A	(C) 71	70
E	Crissy Field/Commissary	130 meters from Doyle Drive Centerline	Open Space	N/A	(B) 66[5]	63
F	Crissy Field/Stilwell Hall	50 meters from Doyle Drive Centerline	Open Space	N/A	(B) 66	64
G	Crissy Field/USCG	320 meters from Doyle Drive Centerline	Open Space	N/A	(B) 66	63
H	1251 Armistead Road	50 meters from Doyle Drive Centerline	Residential	12	(B) 66	67
I	1291 Storey Avenue	50 meters from Doyle Drive Centerline	Residential	16	(B) 66	61
J	National Cemetery at Lincoln Boulevard	50 meters from Doyle Drive Centerline	Cemetery	N/A	(B) 66	63
K	National Cemetery south end	460 meters from Doyle Drive Centerline	Cemetery	N/A	(B) 66	57

Source: Environmental Science Associates, 2002.

Notes: [1]Noise levels measured between September 26, 2001 and April 10, 2002.

[2]See Figure 5-1 for the location of long-term measurement sites.

[3]Reflects Caltrans approach criterion.

[4]Worst hour noise levels represent the peak hourly average noise level for each location as monitored over a 24 to 48 hour period, except for Receptor A, for which monitoring was performed during the peak traffic hour as determined by data from the other monitoring locations.

[5]The land use at this location has changed to commercial use since these noise levels were measurement.

TABLE 5-2
SHORT-TERM FIELD MEASURED NOISE LEVELS[1]

Site No.	Location or Address	Approximate Distance From Noise Source	Current Land Use	Number of Units Represented	Traffic Noise Abatement Category and Criterion[2]	Average Measured Noise Level Leq(h)[3]	Measurement Date(s) and Time Period
1	3234 Lyon Street	3 meters from edge of Richardson Ave.	Residential	8	(B/E) 66	77	6/29/04 7:32-7:58
2	North of Doyle Drive at Building 1188 (Mason Street Warehouse) west of Lyon Street	17 meters from Doyle Drive Centerline (C/L)	Commercial	2	(C) 71	81	6/28/04 15:25-16:26
3	Building 1029 (Swords to Plowshares)	130 meters from Doyle Drive C/L	Residential	100	(B/E) 66	57	7/1/04 10:13-10:38
4	Main Post Building 103	186 meters from edge of Doyle Drive and 8 meters from Montgomery St. C/L	Commercial	N/A	(C) 71	74	6/28/04 9:11-9:37
5	NW Corner of Commissary/Sports Basement	130 meters from Doyle Drive C/L	Commercial	N/A	(C) 71	73	7/1-2/04 15:33-15:59 9:05-9:46
6	Building 650/Stilwell Hall	14 meters from Doyle Drive C/L	Lodging	N/A	(B) 66	70	6/29/04 17:01-17:26
7	Crissy Field Marsh/Recreation Area	144 meters from Mason St. C/L	Open Space	N/A	(B) 66	80	6/28-29/04 11:52-12:03 9:29-9:54
8	1253 Armistead Road	48 meters from Doyle Drive C/L	Residential	12	(B) 66	66	7/1/04 16:24-16:49

Site No.	Location or Address	Approximate Distance From Noise Source	Current Land Use	Number of Units Represented	Traffic Noise Abatement Category and Criterion[2]	Average Measured Noise Level Leq(h)[3]	Measurement Date(s) and Time Period
9	1291 Storey Avenue	50 meters from Doyle Drive C/L	Residential	16	(B) 66	66	7/1/04 7:26-7:51
10	National Cemetery at Lincoln Boulevard	37 meters from Doyle Drive C/L	Cemetery	N/A	(B) 66	69	6/28 & 7/2/04 8:21-8:48 8:21-8:48
11	Building 682/Cross Cultural Environ-mental Leadership Academy	35 meters from Park Presidio Blvd. C/L	Educational	N/A	(B) 66	66	6/30/04 9:08-9:35
12	Palace of Fine Arts-Baker St. area	14 meters from Baker St. C/L	Residential	30	(B) 66	82	6/28/04 16:54-17:20
13	Letterman Area – not available due to construction activities						
14	Building 1169 (Gorgas Avenue Warehouse)	28 meters from Richardson Rd. C/L	Commercial	NA	(C) 71	68	6/29/04 8:23-9:05
15	Buildings 1060/1062 on Thornburg	37 meters from Gorgas Ave.	Commercial	2	(C) 71	68	6/28/04 10:57-11:22
16	Crissy Field Center Building 603	11 meters from Mason St. C/L	Educational	NA	(B) 66	72	6/29/04 10:15-10:40
17	Building 106/Pacific Union office	20 meters from Doyle Drive C/L and 7 meters from Lincoln Blvd.	Commercial	NA	(C) 71	76	6/28 & 7/2/04 7:31-7:56 7:38-8:03
18	Building 610/Sports Basement – SE corner of the building	30 meter from Doyle Drive C/L	Commercial	NA	(C) 71	68	6/30/04 16:41-17:43

Site No.	Location or Address	Approximate Distance From Noise Source	Current Land Use	Number of Units Represented	Traffic Noise Abatement Category and Criterion[2]	Average Measured Noise Level Leq(h)[3]	Measurement Date(s) and Time Period
19	Cavalry Stable Pen / Building 661	99 meters from Doyle Drive C/L	Commercial	NA	(C) 71	64	6/30/04 15:55-16:21
20	Log Cabin Picnic Area	107 meter from Doyle Drive C/L	Recreational	NA	(B) 66	63	6/30/04 7:25-8:27
21	Battery Baldwin area	39 meters from Doyle Drive C/L	Recreational	NA	(B) 66	71	6/29/04 15:34-16:40

Source: Environmental Science Associates, 2004.

Notes: [1]Measurements taken between June 28 and July 2, 2004.
[2]Reflects Caltrans approach criterion.
[3]The average of all runs for each site. At least 2 runs (ten minutes per run) were taken for each site consistent with Caltrans procedures.

FIGURE 5-2
SHORT-TERM NOISE MEASUREMENT LOCATIONS, 2004

5.4.2.1 Long-Term Field Measurement Modeled Data

Table 5-3 presents the long-term measured existing noise levels and the predicted existing noise levels for the evaluated noise sensitive sites. With the exception of Receptor G (the United States Coast Guard facility at Crissy Field), differences in the measured and predicted levels are within 3 dBA. This range of difference is not considered unusual considering the generalization of traffic conditions required for the prediction of future traffic noise levels with the Doyle Drive alternatives. The difference in measured versus predicted levels at Receptor No. G is likely a result of an influence from local sound sources other than traffic during the measurement.

TABLE 5-3
LONG-TERM MEASURED/PREDICTED EXISTING NOISE LEVELS

Receptor No.	Location or Address	Noise Level Leq(h)		
		Measured Total	Predicted Traffic*	Difference
A	3234 Lyon Street	76	74	2
B	Marina Boulevard at Lyon Street	74	73	1
C	Building 1029/Swords to Plowshares	62	61	1
D	Main Post Building 106/211	70	68	2
E	Crissy Field/Commissary	63	62	1
F	Crissy Field/Stilwell Hall	64	61	3
G	Crissy Field/USCG	63	57	6
H	1251 Armistead Road	67	65	2
I	1291 Storey Avenue	61	62	1
J	National Cemetery at Lincoln Blvd.	63	63	0
K	National Cemetery (south end)	57	59	2

Source: Environmental Science Associates, 2002.

* The FWHA TNM Version 1.0b was used to predict traffic noise levels for these sites.

5.4.2.2 Short-Term Field Measurement Modeled Data

Table 5-4 presents the short-term measured existing noise levels and the predicted existing noise levels for the evaluated noise sensitive sites. As can be noted, there is often a difference between the measured noise levels and those predicted when using the same traffic volume, mix and speed that was noted during the field measurement period. In most cases the difference can be attributed to activities within the area that are not traffic-related and for which the TNM cannot be programmed to identify. These background sources are difficult to segregate from the traffic noise source of interest, and therefore are incorporated into an overall reading that represents the generalized ambient noise levels for that time and place. While this results in a noise level that may not represent traffic noise alone, it does give an indication of the impact of sources of noise other than traffic within a given area. For the purpose of model calibration, sites with an existing background noise level that substantially increased the overall noise level above that predicted for traffic noise only can not be used. The results of the calibration effort were applied only to the No-Build and

TABLE 5-4
SHORT-TERM MEASURED/PREDICTED EXISTING NOISE LEVELS

Site No.	Location or Address	Noise Level Leq(h) Average Measured Noise Level in dBA[1]	Average Predicted Noise Level in dBA[2]	Difference
1	3234 Lyon Street	77	73	4
2	Building 1188 north of Doyle Drive	81	NA	NA
3	Building 1029/Swords to Plowshares	57	NA	NA
4	Main Post Building 103	74	NA	NA
5	Commissary/Sports Basement	73	NA	NA
6	Building 650/Stilwell Hall	70	NA	NA
7	Crissy Field Marsh Recreation Area	80	NA	NA
8	1253 Armistead Road	66	NA	NA
9	1291 Storey Avenue	66	NA	NA
10	National Cemetery at Lincoln Blvd.	69	72	3
11	Building 682/Cross Cultural Center	66	NA	NA
12	Palace of Fine Arts/Baker St. Area	82	NA	NA
13	Letterman Area – not available	NA	NA	NA
14	Building 1169/Gorgas Avenue Warehouse	68	68	0
15	Buildings 1060/1062/Warehouses	68	NA	NA
16	Building 503/Crissy Field Center	72	NA	NA
17	Building 106/Pacific Life Office	76	74	2
18	Building 610/Sports Basement	68	66	2
19	Building 661/Cavalry Stable Pen	64	64	0
20	Log Cabin Picnic Area	63	64	1
21	Battery Baldwin Area	71	70	1

Source: Environmental Science Associates, 2004.

Notes: [1]The average noise level of all measurement sets that were taken.
[2]The average noise level of modeled runs for all sets.
Note: Sites shaded in gray were not used in model calibration for the No-Build and Replace and Widen Alternatives and were used only as background noise level indicators. See text for more explanation.

Replace and Widen Alternatives. Due to the substantially different conditions associated with the Presidio Parkway Alternative (e.g. – tunnels and horizontal alignment shifts), calibration of the model based on field measurements of existing conditions was not possible.

In the case of Site 1, traffic was less than 3.3 meters (10 feet) from the noise meter and the flow of the traffic was interrupted by a traffic signal on Richardson Avenue at Francisco. There was also substantially heavier traffic in the far (south-bound) lanes compared to the near (north-bound lanes), which could also account for some of the difference. Nearby construction activity also were detected during the study although it did not appear to have a substantial impact on the overall traffic noise level. Therefore, Site 1 was used in the calibration of the model.

Site 2 had substantial traffic on the far lanes heading east-bound on to Marina Boulevard, but the traffic was slowing down for the traffic light at Lyon Street and was frequently in a stop and go condition, which could be accounted for by the model. However, a number of cars within the parking lot area near the meter moved in and out of the area during all study sets. Since the noise within the parking lot could not be eliminated, this site was not used as a calibration site.

At Site 3, no traffic counts were taken since this was a background measurement site and very little traffic was present on the local streets.

Site 4 in front of Building 103 on the Main Post was a background level site, with very little traffic on Montgomery Street. The traffic that was noted included medium and heavy trucks, buses, and motorcycles as well as cars. This site was not used in model calibration.

At Site 5, the measurement location was substantially removed from the area of Doyle Drive and influenced by traffic on Mason Street and activities within the area. A substantial amount of pedestrian traffic (joggers, walkers) was present while vehicular traffic was relatively low during the readings, with a number of buses present. Low vehicle speeds (below 40 kph/25 mph) were also noted. Other background noise sources included kids and adults playing in the field area north of Mason Street and the passing of a Coast Guard helicopter. Therefore, Site 5 was not used as a calibration site.

Site 6 at the back of Stilwell Hall was nearly under the high viaduct section of Doyle Drive (within 4.6 meters/15 feet) and had occasional traffic on nearby Crissy Avenue. Noise from traffic passing over the expansion joints in bridge deck of Doyle Drive was also noted. It appears that extraneous sources had a substantial impact on the overall noise level, therefore this site was not used for calibration purposes.

At Site 7 within the Crissy Field Marsh area, the noise levels were dominated by two sources: active human users and the winds across the bay. Although traffic along Mason Street was noted, the noise from active users was far greater than any traffic noise emanating from either Mason Street or Doyle Drive. Joggers, dog walkers, children playing, and other human activities were frequent and constant sources of noise as they passed by the monitoring site. The low volume of traffic on Mason Street and the substantial distance between the traffic on Mason Street and the measurement site rendered this location unsuitable for calibration of Mason Street traffic noise, but it was representative of the ambient noise levels that can be found within the Crissy Field Marsh area as a result of natural and man made noise. Therefore, this site was viewed as a background location that was not strongly influenced by traffic noise.

Site 8, at the residential area along Armistead Road, was strongly influenced by the traffic on Doyle Drive. However there was enough occasional traffic on Armistead Road to increase the ambient measurements because they were physically close to the monitoring location. Therefore, this site was viewed as a background level indicator that was heavily influenced by traffic on Doyle Drive.

Site 9, at 1291 Storey Avenue, was used as a background level site since residential construction rehabilitation was ongoing in the area and strongly influenced the overall noise levels.[4]

[4] Although not directly associated with this noise study, at the request of staff of the Presidio Trust, a simple set of indoor noise level measurements were also taken in the upstairs area at this location. The readings indicated that an interior reduction of between 15 and 22 dBA was achieved by the building envelope which included newly installed double pane windows.

At Site 10, Doyle Drive was in a partial cut section which may have been effective at reducing the monitored noise levels and for which the model did not fully compensate although the difference between the two was less than 3 dBA. Traffic on Lincoln Boulevard may have also accounted for some of the over-prediction since it was so close to the monitoring site (less than 4 meters/14 feet away). This site was used as a calibration site.

Noise levels at Site 11 were strongly influenced by traffic on Park Presidio Boulevard but the location of the monitor was below the level of the roadway (by as much as 4 meters/14 feet). More importantly, there was some traffic in the parking area near the building and talking among painters working on the building which the model can not duplicate. Therefore, this site was not used as a model calibration location.

Site 12, along Baker Street in the vicinity of the Palace of Fine Arts, was selected as a site that could represent the traffic noise level along the homes on Baker Street. However, the very low traffic volumes and the heavy volume of pedestrian activity in the area created a noise environment that could not be replicated by the model. Background noise included sprinklers, kids playing along the waters edge, and people talking dominated the noise levels (along with a car alarm). Therefore, this site was not used as a model calibration site.

Site 13, originally planned within the Letterman complex, was not accessible due to major construction activities.

Site 14 was selected along Richardson Avenue to represent the traffic noise level for the warehouse area along Richardson Avenue and Gorgas Avenue. Very close correlation between measured and predicted noise levels occurred at this location, which made it possible for this site to be used in model calibration.

Site 15 on Thornburg Road had been selected as a background level check and was not modeled.

Site 16 at the Crissy Field Interpretive Center was designed to serve as a calibration site for traffic noise from Mason Street. The noise from human activity, particularly children going in and out of the Center, was the dominant source of noise. There was also construction noise in the background along with front-end loaders passing by, thereby rendering the site unsuitable for model calibration.

Site 17 was within 3.3 meters of Lincoln Boulevard and influenced by traffic on both Doyle Drive and Lincoln Boulevard. Correlation between modeled and measured noise levels was about 2 dBA. If one of the four sets of field measurements was excluded, the difference between measured and predicted levels would have been about 0.5 dBA. This close correlation allowed the site to be used for model calibration.

Site 18 was used as a calibration site for afternoon traffic on Doyle Drive within the low viaduct section. Correlation was quite close.

Site 19 was selected as a calibration site for Doyle Drive within the high viaduct section. Correlation was within 0.5 dBA difference.

Site 20, at the outdoor picnic area of the Log Cabin, also showed very close correlation between measured and predicted levels, where the average difference was less than 1 dBA. This allowed the site to be used for model calibration.

Finally, Site 21 in the Battery Baldwin area was selected as a calibration site and also to represent the existing noise level in an area where the Presidio Parkway Alternative would enter and leave a tunnel. The correlation between predicted and measured was within 0.5 dBA difference.

In summary, Sites 1, 10, 14, 17, 18, 19, 20 and 21 were used for model calibration for the No-Build and the Replace and Widen Alternatives while the remaining sites were used as indicators of background noise levels related to a variety of noise sources, including highway traffic.

5.5 MODEL CALIBRATION

The TNM model was calibrated consistent with the protocol found in the Caltrans TeNS document. The stated purpose of this effort is to “fine tune” the prediction model to actual site conditions which are not adequately accounted for by the model. Since this adjustment is only appropriate for locations where highway traffic noise is the dominant source, such as along Richardson Avenue and Doyle Drive, the application of calibrated noise levels was considerably limited within the project corridor. Since the Caltrans protocol does not specify a set number of sites needed to calibrate the noise model, eight of the short-term measurement sites were used for model calibration.

In general, model calibration is appropriate if site conditions, highway alignment, and profile are not expected to change substantially before and after construction of the project. This means that for the No-Build and Replace and Widen Alternatives, calibration at Sites 1, 10, 14, 17, 18, 19, 20, and 21 would be appear to be appropriate. For the Presidio Parkway Alternative, model calibration was not used since the entire nature of the roadway would be substantially altered from the existing condition. This is also true of the major construction phases since traffic routes and conditions would be very different in most instances compared to the current situation.

Based on the measurements taken at Sites 1, 10, 14, 17, 18, 19, 20 and 21, the modeled noise levels along north-bound Richardson Avenue from Francisco to Doyle Drive would be increased by 3.3 dBA; the segment of Doyle Drive EB and Lincoln Boulevard near the National Cemetery would be decreased by 2.5 dBA; the segment of EB Doyle Drive and Lincoln Boulevard in the vicinity of Building 106 would be increased by 2.2 dBA; the segment along southbound Richardson Avenue from Doyle Drive to Francisco would be increased by 0.3 dBA; the viaduct segment of Doyle Drive in the vicinity of the Sports Basement would be increased by 1.4 dBA; the high viaduct segment of Doyle Drive would be increased by 0.2 dBA; the segment of Doyle Drive between Park Presidio Boulevard and the end of the toll plaza would be increased by 0.7 dBA; and the segment of Doyle Drive in the vicinity of the Batteries would increase by 0.4 dBA.

SECTION 6: FUTURE NOISE ENVIRONMENT

The future noise environment within the Doyle Drive corridor was predicted using the TNM Version 2.5 model. This FHWA-produced model is now the required model for use in predicting highway traffic noise impacts. Because the study of traffic noise impacts for the Doyle Drive project has been extended over two years, the initial noise predictions were completed using TNM Version 1.0b. The results of the initial field measured and predicted values using TNM Version 1.0b are only used to illustrate the noise levels that were field measured and validated in 2002. All noise level predictions associated with the update of this study use field data and receptor sites gathered in 2004.

6.1 MODELING INPUT PARAMETERS

The basic input parameters used in predicting traffic noise levels associated with this study include the following:

- Roadway data included the width of the roadway, the location of the roadway in relation to other physical features via an x, y, z coordinate system, the type of pavement, flow controls (if any), and whether the roadway was on structure or not.
- Traffic data included vehicle classification, vehicle speed, and vehicle counts.
- Receiver data included location by the x, y, z coordinate system, the height of the receiver above ground, the impact criteria applicable to the receiver, existing noise levels (if available), and the number of dwelling units represented by a receiver (if applicable).

Other parameters that were available for consideration included ground cover, tree zones, terrain lines, and shielding, any or all of which may have been used on a location by location basis. For details of the modeling input, see Appendix D.

6.1.1 Traffic Assumptions

The basic traffic assumptions used in this study included traffic classification broken down into five (5) vehicle types: autos, medium trucks, heavy trucks, buses, and motorcycles. Each roadway segment was assigned a volume of traffic based on information provided by DKS Associates. Traffic was split directionally for AM and PM peak hour conditions and was classified based on the same variables. Detailed traffic data can be found in Appendix C.

Speed data used in this study was based on existing posted speeds or a generalized speed based on roadway design or ramp configuration. Mainline traffic was generally set at 88 kph (55 mph) while ramp traffic was generally assigned at 56 kph (35 mph). Most local streets, especially the lower volume two lane streets, were set at 32 kph (20 mph). The speeds assigned are consistent with the traffic speeds measured during the gathering of field data at peak and off-peak traffic conditions within the Doyle Drive corridor.

6.1.2 Results of Modeling

6.1.2.1 Future Year 2030 Results

To determine the likely impact of the project on traffic noise levels in the vicinity of Doyle Drive, 76 receptor sites (see Figure 6-1) were analyzed using TNM Version 2.5. These receptor locations represent a variety of land uses and physical distances to the Doyle Drive project. Two basic scenarios were evaluated for each alternative: existing conditions and future year 2030 conditions. For each alternative a morning peak and afternoon peak traffic level condition was evaluated to identify if directional splits would alter the impact on a given receiver. Additionally, traffic noise levels associated with the major construction phase for each

FIGURE 6-1
NOISE RECEPTOR PREDICTION LOCATIONS

9 Noise Receptor Predition Locations

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alternative was also evaluated. Table 6-1 illustrates the predicted noise levels for existing and 2030 traffic (adjusted based on calibration results as appropriate) while Table 6-2 illustrates the traffic noise impacts associated with two design options: the Merchant Road slip ramp option and the Park Presidio interchange design option.

A review of the results shown in Table 6-1 reveals that a total of 37 receptor sites currently are or are expected to approach or exceed the NAC for one or more of the alternatives. These sites include 1, 2, 7, 9-13, 17, 18, 26, 27, 29-37, 40-41, 43-47, 49-51, 53, 70, 72-74, and 76. 26 of these sites are classified as Category B land uses (residential, recreational, etc.) while the remaining 11 are identified as commercial or industrial sites under Category C. Of the 37 sites, 31 already approach or exceed the NAC. Likewise, 32 sites under the No-Build Alternative are expected to approach or exceed the NAC. 34 sites are expected to approach or exceed the NAC under the Replace and Widen Alternative, 25 under the Presidio Parkway Alternative Diamond option, and 24 under the Presidio Parkway Alternative Circle option. Depending upon the alternative, the noise levels for these 37 sites may increase by as much as 6 dBA over the existing levels or decrease by as much as 13 dBA. The typical increase is about 1 dBA over the existing, a change which is typically not detectable to the human ear in an exterior setting. This is a strong indication that the existing noise environment within the Doyle Drive corridor is typical of urban highway corridors. The fact that existing levels already approach or exceed the NAC in many instances is due to the proximity of noise sensitive land uses to the roadways and the increase of traffic over the life of Doyle Drive and other local roads and streets.

Traffic noise levels do vary by alternative as shown in Table 6-1. For the year 2030, noise levels under the No-Build Alternative show a range from 53 to 80 dBA, while the Replace and Widen Alternative has a range from 53 to 81 dBA. The Presidio Parkway Alternative Diamond option shows a range from 54 to 77 dBA while the Presidio Parkway Alternative Circle option has an identical range. In general, the overall traffic noise environment is not expected to change noticeably, regardless of the alternative selected. The impacts are very location specific and tend to be concentrated in the residential areas along Storey Avenue and Armistead Road, the Battery areas, the National Cemetery, and the residential and commercial uses along Richardson Avenue due to the close physical proximity of the roadway to the homes, often less than 6 meters (20 feet).

Table 6-1, when reviewed on a site by site and alternative by alternative basis shows variances that may not be readily apparent. Following is brief explanation of each site and the anticipated traffic noise impacts associated with each alternative:

Site 1, located at the southwest side of the Palace of Fine Arts to represent the noise levels that could be expected at the exterior of the building closest to Richardson Avenue. Under all alternatives, this location is expected to exceed the NAC by 2 to 5 dBA with only a 3 dBA variation among the alternatives.

Site 2, located at the northwest side of the Palace of Fine Arts, represents the noise levels that could be expected at the exterior of the building closest to the Doyle Drive/Girard Road connection to Marina Boulevard. Under the No-Build and Replace and Widen Alternatives this location is expected to equal or exceed the NAC by up to 4 dBA. The Presidio Parkway Alternatives have an expected noise level that would be 5 dBA below the NAC and 8 dBA quieter than the existing condition. This is a direct result of redirecting traffic to Richardson Avenue and having a lower speed on Girard Road traffic emptying into Marina Boulevard.

Site 3, located at the southeast corner of Building 1187/1188 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. Although the NAC would not be exceeded, noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that the new roadway would be shifted considerably further south and the speeds on the new access point would be lower.

Site 4, located at the southeast corner of Building 1182 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. Although the NAC would not be exceeded, noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that the new roadway would be shifted considerably further south and the speeds on the new access point would be lower.

TABLE 6-1
PREDICTED TRAFFIC NOISE LEVELS

Receptor[1]	Site Description	Assumed Future Land Use [2]	NAC Approach[3]	Alternatives				
				Existing	No-Build 2030	Replace & Widen 2030	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
1	Palace of Fine Arts	Educational	66	**71***	**72***	**71***	**70***	**69***
2	Palace of Fine Arts	Educational	66	**70***	**71***	**67***	62	62
3	Mason St. Warehouse Building 1187/ 1188	Office	71	68	69	67	57	58
4	Mason St. Warehouse Building 1182	Office	71	68	69	64	56	56
5	Mason St. Warehouse Building 1183/ 1186	Office	71	68	68	65	57	57
6	Mason St. Warehouse Building 1184/ 1185	Office	71	69	70	66	60	59
7	Building 603/Crissy Interpretative Center	Educational	66	**68***	**67***	**69***	56	57
8	PX Building	Undetermined/ Commercial	71	70	70	67	60	60
9	Building 610/ Post Commissary	Museum	71	69	69	66	**71***	**71***
10	Battery Blaney	Historic	66	**75***	**75***	**71***	**70***	**70***
11	Battery Slaughter	Historic	66	**79***	**80***	**81***	**66***	**66***
12	Battery Sherwood	Historic	66	**77***	**77***	**77***	**66***	**66***
13	Battery Baldwin	Historic	66	**66***	**67***	65	**68***	**68***
14	Building 644/ Unit Motor Pool	Undetermined/ Commercial	71	63	64	61	61	61
15	Building 649/ Army Reserves	Lodging	66	60	61	61	61	61
16	Building 650/ Stilwell Hall	Lodging	66	61	60	60	59	60

Receptor[1]	Site Description	Assumed Future Land Use [2]	NAC Approach[3]	Alternatives				
				Existing	**No-Build 2030**	**Replace & Widen 2030**	**Presidio Parkway Diamond 2030**	**Presidio Parkway Circle 2030**
17	Landrum Court/ Officers Quarters	Residential	66	64	65	**66***	65	65
18	1253 Armistead Road	Residential	66	**71***	**72***	**73***	**77***	**77***
19	Building 969/ Garage	Undetermined/ Commercial	71	52	53	53	59	59
20	Building 968/ Garage	Undetermined/ Commercial	71	54	55	55	60	60
21	Building 967/Film Vault	Undetermined/ Commercial	71	56	57	57	65	65
22	Building 966/Radio Receiver Station	Undetermined/ Commercial	71	56	57	57	66	65
23	Building 964/ Officer Family Housing	Residential	66	53	54	55	64	64
24	Building 963/Officer Family Housing	Residential	66	54	55	55	63	63
25	Building 962/ Officer Family Housing	Residential	66	54	55	55	62	62
26	Building 1659/ Data Center	Undetermined/ Commercial	71	69	70	70	**75***	**75***
27	Log Cabin Picnic Area	Recreational	66	**69***	**69***	**69***	**69***	**69***
28	Ft. Scott Chapel	Religious	66	61	63	62	65	65
29	1298 Storey Ave./ Enlisted Family Housing	Residential	66	**67***	**68***	**68***	**67***	**67***
30	1297 Storey Ave./Enlisted Family Housing	Residential	66	**68***	**70***	**69***	**69***	**69***
31	1295 Storey Ave./Enlisted Family Housing	Residential	66	**70***	**71***	**71***	**71***	**71***
32	1294 Storey Ave./Enlisted Family Housing	Residential	66	**72***	**73***	**73***	**71***	**71***
33	1293 Storey Ave./Enlisted Family Housing	Residential	66	**73***	**74***	**75***	**72***	**72***

Receptor[1]	Site Description	Assumed Future Land Use [2]	NAC Approach[3]	Alternatives				
				Existing	No-Build 2030	Replace & Widen 2030	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
34	1291 Storey Ave./Enlisted Family Housing	Residential	66	**73***	**74***	**75***	**73***	**73***
35	1290 Storey Ave./Enlisted Family Housing	Residential	66	**73***	**74***	**75***	**74***	**74***
36	1289 Storey Ave./Enlisted Family Housing	Residential	66	**70***	**71***	**72***	**73***	**73***
37	1263 Storey Ave./Enlisted Family Housing	Residential	66	**66***	**67***	**68***	**69***	**69***
38	Building 682/ Cross Cultural Center	Educational	66	63	63	64	65	65
39	Building 661/ Cavalry Stables	Park Police	71	66	67	67	60	60
40	Building 662/Cavalry Stables	Cultural/Educa tional	66	66	66	**67***	63	63
41	Building 663/Cavalry Stables	Cultural/Educa tional	66	65	65	**66***	63	63
42	Building 667/Cavalry Stables	NPS Archives	71	66	67	66	67	67
43	National Cemetery Grave Site	Cemetery	66	**72***	**72***	**73***	64	65
44	Building 129/ Enlisted Family Quarters	Residential	66	65	65	**70***	57	58
45	Building 122/ Gym	Mixed Use	71	**74***	**75***	**74***	62	63
46	Building 108/ Storage/Electric al Shop	Undetermined/ Commercial	71	**74***	**75***	**74***	63	63
47	Building 107/ Switching Station	Undetermined/ Commercial	71	**76***	**77***	**75***	68	68
48	Building 104/ Barracks and Mess Hall	Office	71	70	70	70	59	59
49	Building 105/ Barracks and Mess Hall	Office	71	**76***	**76***	**74***	**74***	**74***

Receptor[1]	Site Description	Assumed Future Land Use [2]	NAC Approach[3]	Alternatives				
				Existing	No-Build 2030	Replace & Widen 2030	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
50	Building 106/ Band Barracks	Office	71	**80***	**80***	**75***	**73***	**73***
51	Building 211/ former Burger King	Restaurant	71	**75***	**76***	**74***	66	66
52	Building 204/ Exchange Store	Office	71	68	69	67	Gone[4]	Gone[4]
53	Building 210/ Guard House	Bank and Post Office	71	**71***	**71***	**71***	63	63
54	Building 201/ Exchange Store	Office and Retail	71	65	68	64	Gone[4]	Gone[4]
55	Building 220/ Bakers and Cooks School	Office	71	64	65	65	54	54
56	Building 231/ Exchange Gas Station	Undetermined/ Commercial	71	66	67	66	66	66
57	Building 228/ Bakery	Retail	71	65	66	65	62	62
58	Building 227/ Warehouse	Retail	71	64	65	64	59	59
59	Building 223/ Warehouse	Office	71	60	61	61	57	58
60	Building 230/ Warehouse	Retail or other use	71	67	68	67	Gone[4]	Gone[4]
61	Building 1029/ Swords to Plowshares	Residential	66	63	64	63	60	60
62	Building 1030/ Swords to Plowshares	Residential	66	61	62	61	58	58
63	Building 1063/ Medical Supply Warehouse	Water Recycling Facility	71	61	62	62	63	63
64	Building 1062/ Quartermaster Shop	Undetermined/ Commercial	71	59	60	69	60	60
65	Building 1060/ Medical Supply Warehouse	Undetermined/ Commercial	71	58	59	59	60	60
66	Building 1167/ Gorgas Warehouse	Office	71	65	66	66	65	66

Receptor[1]	Site Description	Assumed Future Land Use [2]	NAC Approach[3]	Alternatives				
				Existing	**No-Build 2030**	**Replace & Widen 2030**	**Presidio Parkway Diamond 2030**	**Presidio Parkway Circle 2030**
67	Building 1163/ Gorgas Warehouse	Office	71	64	65	64	65	66
68	Building 1169/ Gorgas Warehouse	Office	71	66	67	68	65	64
69	Building 1162/ Gorgas Warehouse	Office	71	62	63	64	63	63
70	Building 1170/ Gorgas Warehouse	Office	71	70	70	**71***	**72***	**72***
71	Building 1161/ Gorgas Warehouse	Office	71	66	66	67	67	67
72	Building 1160/ Gorgas Warehouse	Office	71	**72***	**71***	**72***	**72***	**72***
73	Building 1152/ Presidio YMCA Gym	Office	66	**71***	**71***	**68***	**72***	**70***
74	Building 1151/ Presidio YMCA Pool	Recreational/ Pool	66	**74***	**73***	**75***	**73***	Gone[4]
75	Building 1004/ Officers Quarters	Office	71	55	56	57	57	57
76	3234 Lyon Street	Residential	66	**75***	**76***	**76***	**75***	**73***
Number of sites approaching or exceeding the NAC				31	32	34	25	24

Source: ESA 2004

Notes: [1]For details regarding the receptor location, see Appendix E.

[2]Based on Presidio Trust Management Plan and consultation with Presidio Trust and NPS staff. In cases where future land use was undetermined, the existing land use was assumed for future use.

[3]FHWA noise abatement criterion approach based on anticipated land use, as defined in Footnote 2. Approach is defined by Caltrans as being within one 1dBA of the noise abatement criterion.

[4]Indicates that this building is anticipated to be removed as part of the construction project.

Bolded numbers indicate a noise level that approaches, equals, or exceeds the NAC.

Site 5, located at the southeast corner of Building 1183/1186 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. Although the NAC would not be exceeded, noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that the new roadway would be shifted considerably further south and the speeds on the new access point would be lower.

Site 6, located at the southwest corner of Building 1184/1185 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. Although the NAC would not be exceeded, noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that the new roadway would be shifted considerably further south and the speeds on the new access point would be lower.

Site 7, located at the southeast corner of Building 603 (Crissy Field Center), represents an area where exterior noise levels are expected to exceed the NAC with the No-Build and Replace and Widen Alternatives by 1 to 3 dBA. Noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that Doyle Drive in this area would be enclosed in a tunnel.

Site 8, located at the south side of the PX Building, represents an area where exterior noise levels are not expected to have an adverse impact on the facility. Although the NAC would not be exceeded, noise levels would be considerably lower with the Presidio Parkway Alternatives due to the fact that Doyle Drive is in a tunnel.

Site 9, located at the southeast corner of Building 610/Sports Basement, represents the noise levels that would be expected at the exterior of the building closest to the Doyle Drive. Under the No-Build and Replace and Widen Alternatives this location is not expected to exceed the NAC. Under the Presidio Parkway Alternatives the noise level is expected to equal the NAC. This is a result of the encroachment of the roadway towards the building, resulting in an increase of 2 dBA above the existing level.

Site 10, located at the south side of Battery Blaney, represents the noise levels that would be expected at this outdoor area closest to Doyle Drive. Under all alternatives the NAC would be exceeded by 3 to 8 dBA, with the No-Build Alternative being the highest.

Site 11, located at the south side of Battery Slaughter, represents the noise levels that would be expected at this outdoor area closest to Doyle Drive. The NAC would be approached or exceeded by as much as 10 dBA, with the No-Build and Replace and Widen Alternatives being the highest. The Presidio Parkway Alternatives would be much lower due to the fact that Doyle Drive would be entering a tunnel near this location.

Site 12, located at the south side of Battery Sherwood, represents the noise levels that would be expected at this outdoor area closest to Doyle Drive. The NAC would be approached or exceeded by as much as 10 dBA, with the No-Build and Replace and Widen Alternatives being the highest. The Presidio Parkway Alternatives are much lower due to the fact that Doyle Drive would be entering a tunnel near this location.

Site 13, located at the south side of Battery Baldwin, represents the noise levels that would be expected at this outdoor area closest to Doyle Drive. Under the No-Build and Presidio Parkway Alternatives, the NAC would be equaled or exceeded by as much as 2 dBA.

Site 14, located at the southeast corner of Building 644/Unit Motor Pool, represents the noise levels that would be expected at this area next to Mason Street. The NAC would be not approached or exceeded with any of the alternatives, due to the distance from Doyle Drive and the topography of the area.

Site 15, located at the southwest corner of Building 649/Army Reserves, represents the noise levels that would be expected at this area next to Mason Street. The NAC would be not approached or exceeded with any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 16, located at the south side of Building 650/Stilwell Hall, represents the noise levels that could be expected at this area next to Mason Street. The NAC would be not approached or exceeded with any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 17, located at the southeast corner of the residential building on Landrum Court, represents the noise levels that would be expected at this area next to Doyle Drive and near the Park Presidio ramp. The NAC would be approached by the Replace and Widen Alternative only due to the distance from Doyle Drive and the topography of the area.

Site 18, located at the southeast corner of the residential building at 1253 Armistead Road, represents the noise levels that would be expected at this area next to Doyle Drive and near the merge for the Park Presidio northbound on-ramp. The NAC would be exceeded by all of the alternatives by 5 to 10 dBA with the Presidio Parkway Alternatives being the worst due to the shift northward to accommodate the proposed design.

Site 19, located at the southeast corner of Building 969/Garage, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area. This would also be true for residential units in close proximity to this site.

Site 20, located at the southwest corner of Building 968/Garage, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives, due to the distance from Doyle Drive and the topography of the area. This would also be true for residential units in close proximity to this site.

Site 21, located at the southwest corner of Building 967/Film Vault, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives, due to the distance from Doyle Drive and the topography of the area. This would also be true for residential units in close proximity to this site.

Site 22, located at the southeast corner of Building 966/Radio Receiver, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 23, located at the southwest corner of Building 964/Officer Family residence, represents the noise levels that could be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 24, located at the southwest corner of Building 963/Officer Family residence, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 25, located at the southwest corner of Building 962/Officer Family residence, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 26, located at the northeast corner of Building 1659/Data Center, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC is expected to be exceeded by the Presidio Parkway Alternatives by 3 dBA due to a minor shift in the alignment to the south in this area.

Site 27, located at the picnic area of the Log Cabin Building, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC is expected to be exceeded by all alternatives by 2 dBA.

Site 28, located at the northeast corner of Building 1389/Ft. Scott Chapel, represents the noise levels that would be expected at this area at a substantial distance from Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due to the distance from Doyle Drive and the topography of the area.

Site 29, located at the northeast corner of the residential building at 1298 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be approached or exceeded by all alternatives by 1 dBA.

Site 30, located at the northeast corner of the residential building at 1297 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 1 to 3 dBA.

Site 31, located at the northeast corner of the residential building at 1295 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 4 dBA.

Site 32, located at the northwest corner of the residential building at 1294 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 4 to 6 dBA.

Site 33, located at the northeast corner of the residential building at 1293 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 5 to 8 dBA.

Site 34, located at the northeast corner of the residential building at 1291 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 6 to 8 dBA.

Site 35, located at the northwest corner of the residential building at 1290 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 7 to 8 dBA.

Site 36, located at the northwest corner of the residential building at 1289 Storey Avenue, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be exceeded by all alternatives by 4 to 6 dBA.

Site 37, located at the southeast corner of the residential building at 1263 Storey Avenue, represents the noise levels that would be expected at this area west of Park Presidio Boulevard. The NAC would be equaled or exceeded by all alternatives by 1 to 2 dBA, primarily from traffic noise along this portion of the Park Presidio Boulevard.

Site 38, located at the southwest corner of Building 682/Cross Cultural Education Center on Schofield Road, represents the noise levels that would be expected at this area east of Park Presidio Boulevard and south of Doyle Drive. The NAC would be not be approached or exceeded by any of the alternatives due primarily to the distance from Doyle Drive and the elevated roadway of both Park Presidio Boulevard and Doyle Drive in this area.

Site 39, located at the northwest corner of the pen area of Building 661/Cavalry Stable, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would not be approached or exceeded by any of the alternatives although the Presidio Parkway Alternatives are expected to be 7 dBA quieter than the No-Build and Replace and Widen Alternatives, due primarily to the reconfiguration of the ramps to and from Park Presidio Boulevard and Doyle Drive.

Site 40, located at the north side of Building 662/Cavalry Stable, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be equaled under the Replace and Widen Alternative. The Presidio Parkway Alternatives are expected to be 3 to 4 dBA quieter than the No-Build and Replace and Widen Alternatives, due primarily to the reconfiguration of the ramps to and from Park Presidio Boulevard and Doyle Drive.

Site 41, located at the northeast corner of Building 663/Cavalry Stable, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would be approached under the Replace and Widen Alternative. The Presidio Parkway Alternatives are expected to be 2 to 3 dBA quieter than the No-Build and Replace and Widen Alternatives, due primarily to the reconfiguration of the ramps to and from Park Presidio Boulevard and Doyle Drive.

Site 42, located at the northeast corner of Building 667/Cavalry Stable, represents the noise levels that would be expected at this area south of Doyle Drive. The NAC would not be approached or exceeded by any of the alternatives.

Site 43, located at a gravesite in the National Cemetery south of Doyle Drive (near the intersection of Sheridan Avenue and Lincoln Boulevard), represents the noise levels that would be expected near the northern edge of the cemetery. Noise levels are expected to exceed the NAC for all alternatives due to the close proximity of both Doyle Drive and Lincoln Boulevard traffic to the northern boundary of the cemetery. The greatest noise impact is expected with the No-Build and Replace and Widen Alternatives due to the fact that a portion of the Presidio Parkway Alternative would be in a tunnel at this location. Tunnel portal noise would be evidenced only at the extreme western and eastern ends of the cemetery boundary with the Presidio Parkway Alternative.

Site 44, located at the northwest corner of Building 129/Enlisted Family Quarters, represents the noise levels that this residential area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be approached or exceeded by the Replace and Widen Alternative by 3 dBA. The Presidio Parkway Alternatives are expected to be substantially lower due to the proximity of a tunnel and a slightly depressed roadway in this area.

Site 45, located at the northwest corner of Building 122/Gymnasium (Main Post Community Center), represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be approached or exceeded by the No-Build and Replace and Widen Alternatives by 2 to 3 dBA. The Presidio Parkway Alternatives are expected to be substantially lower due to the proximity of a tunnel and a slightly depressed roadway in this area.

Site 46, located at the northwest corner of Building 108/Storage-Electrical, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be approached or exceeded by the No-Build and Replace and Widen Alternatives by 2 to 3 dBA. The Presidio Parkway Alternatives are expected to be substantially lower due to the proximity of a tunnel and a slightly depressed roadway in this area.

Site 47, located at the northwest corner of Building 107/Switching Station, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be approached or exceeded by the No-Build and Replace and Widen Alternatives by 3 to 5 dBA. The Presidio Parkway Alternatives are expected to be substantially lower due to the proximity of a tunnel and a slightly depressed roadway in this area.

Site 48, located at the northwest corner of Building 104/Barracks and Mess Hall, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would not be approached or exceeded by the No-Build and Replace and Widen Alternatives. The Presidio Parkway Alternatives are expected to be substantially lower due to the proximity of a tunnel and a slightly depressed roadway in this area.

Site 49, located at the northwest corner of Building 105/Barracks and Mess Hall, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by all alternatives by 2 to 8 dBA with the No-Build Alternative having the greatest noise level.

Site 50, located at the northwest corner of Building 106/Band Barracks (Union Pacific offices), represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by all alternatives by 1 to 8 dBA, with the No-Build Alternative having the greatest noise level.

Site 51, located at the northwest corner of Building 211 (former Burger King), represents the noise levels that this area south of Doyle Drive would expect. The NAC would be exceeded by the No-Build and Replace and Widen Alternatives by 1 to 3 dBA with the No-Build Alternative having the greatest noise level. The Presidio Parkway Alternatives would be substantially quieter due to the fact that a portion of Doyle Drive would be in a tunnel at this location.

Site 52, located at the northwest corner of Building 204/Presidio Thrift Shop, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives with the Presidio Parkway Alternatives being substantially lower than the other Alternatives due to the fact that a portion of Doyle Drive would be in a tunnel at this location.

Site 53, located at the northwest corner of Building 210/Guard House, represents the noise levels that this area south of Doyle Drive would expect. The NAC would be approached by the No-Build and Replace and Widen Alternatives. The Presidio Parkway Alternatives would be substantially quieter due to the fact that a portion of Doyle Drive would be in a tunnel at this location.

Site 54, located at the northwest corner of Building 201/Exchange Store, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives and the building would be removed under the Presidio Parkway Alternatives.

Site 55, located at the northwest corner of Building 220/Bakers and Cooks Shop, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives with the Presidio Parkway Alternatives being substantially lower than the other alternatives due to the fact that a portion of Doyle Drive would be in a tunnel at this location.

Site 56, located at the northwest corner of Building 231/Exchange Gas Service Station, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives. The noise from the Presidio Parkway Alternatives would be more noticeable as this is beyond the tunnels location.

Site 57, located at the northwest corner of Building 228/Bakery, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 58, located at the northwest corner of Building 227/Warehouse, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 59, located at the northeast corner of Building 223/Warehouse, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 60, located at the northwest corner of Building 230/Warehouse, represents the noise levels that this area south of Doyle Drive would expect. The NAC would be not be approached or exceeded by any of the alternatives. This building would be removed during construction of the Presidio Parkway Alternative.

Site 61, located at the northwest corner of Building 1029/Swords to Plowshares, represents the noise levels that this residential area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 62, located at the northwest corner of Building 1030/Swords to Plowshares, represents the noise levels that this residential area south of Doyle Drive would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 63, located at the northwest corner of Building 1063/Medical Supply, represents the noise levels that this area south of Doyle Drive and west of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 64, located at the northwest corner of Building 1062/Quartermaster, represents the noise levels that this area south of Doyle Drive and west of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 65, located at the northwest corner of Building 1060/Medical Supply, represents the noise levels that this area south of Doyle Drive and west of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 66, located at the northwest corner of Building 1167/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 67, located at the northwest corner of Building 1163/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 68, located at the northwest corner of Building 1169/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 69, located at the northwest corner of Building 1162/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 70, located on the east side of Building 1170/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be approached or equaled by the Replace and Widen and Presidio Parkway Alternatives.

Site 71, located on the east side of Building 1161/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be not be approached or exceeded by any of the alternatives.

Site 72, located at the northeast corner of Building 1160/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be approached or equaled by all alternatives.

Site 73, located at the northeast corner of Building 1152/Presidio YMCA, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be approached or equaled by all alternatives.

Site 74, located on the east side of Building 1151/Presidio YMCA, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be exceeded by 1 to 3 dBA by the No-Build Alternative, Replace and Widen Alternative, and the Presidio Parkway Alternative Diamond option. This building would be removed under the Presidio Parkway Alternative Circle option.

Site 75, located at the southeast corner of Building 1004/Officers Quarters, represents the noise levels that this area west of Richardson Avenue and at the corner of O'Reilly Avenue and Edie Road would expect. The NAC would not be approached or exceeded by any of the alternatives.

Site 76, located at the center of the residential building at 3234 Lyon Street at the corner of Lyon Street and Richardson Avenue, represents the noise levels that this residential area east of Richardson Avenue would expect. The NAC would be exceeded by all alternatives by 1 to 4 dBA.

All buildings and public use areas within the Doyle Drive corridor that could be impacted by traffic noise from the Doyle Drive project were evaluated. Specific concerns related to the impacts on the Crissy Field Center, Stilwell Hall, the National Cemetery, the Cavalry Stables, and Crissy Field were reviewed in detail. The Crissy Field Center is a community environmental facility that offers a wide variety of programs such as workshops and special events. The Center also houses a media lab, arts workshop, urban ecology lab, and resource library and is used for many educational functions such as summer programs. Concerns about the continued operation of the Center during and following construction of any of the "Build" alternatives have been raised. Based on the results of the traffic noise modeling effort completed as part of this study, no basic increase in traffic noise is expected over the No-Build scenario with any build alternative and a predicted decrease with the Presidio Parkway Alternative due to the use of tunnels in the vicinity of the Center. Existing noise levels in the area of the Center were measured at 72 dBA, above those predicted for traffic noise alone. Much of this noise is a direct result of background activities in the area such as active children at play, traffic on Mason Street, and noise coming from the waterfront area, not to mention the high winds that frequently blow through this area of the Bay. Since many of the activities are conducted indoors, the building envelope creates at least a 20 dB reduction over outdoor noise levels. When this level is subtracted from the predicted noise levels it is apparent that interior noise levels generated by traffic would be well below the NAC. Based on field observations of the use of the exterior area of the Center, the area immediately around the Center is not used for substantial periods of time. For the most part, the exterior area is used for parking and is traversed to a crossing of Mason Street to reach the Crissy Field marsh and shoreline areas.

The Crissy Field area north of Mason Street likewise would not be adversely impacted by traffic noise from any of the alternatives related to Doyle Drive. Existing levels in the area of the tidal marsh were measured and found to be quite high, not from traffic noise, but from activities of people and the high winds that frequently occur in this area. It is not anticipated that traffic noise would have any adverse impact on either human or non-human use of the Crissy Field area, especially with the Presidio Parkway Alternatives since much of it would be in a tunnel in this area.

The Cavalry Stables area within the Presidio currently experiences typical traffic noise levels in the 64 dBA range. The predicted noise levels are not expected to have a noticeable increase, and may actually experience a noticeable decrease if the Presidio Parkway Alternative is constructed, depending upon which Park Presidio interchange design is used. An investigation of the potential impact of the Park Presidio interchange options also shows no change in the traffic noise impact even though the on-ramp would be as close as 35 to 50 meters from the stables. Since the existing and future levels are anticipated to be nearly the same, traffic noise impacts are not anticipated.

Like the stables, Stilwell Hall, anticipated to be used for lodging in the future, was a location of concern relative to traffic noise impacts. Noise predictions for all alternatives at the back of Stilwell Hall showed that none of the alternatives are expected to approach or exceed the NAC for the proposed usage. This is largely due to the high viaduct section used to convey Doyle Drive traffic in this area, which tends to serve as a noise barrier for sounds directed to the area immediately adjacent to the structure, such as Stilwell Hall.

As previously identified, the potential noise impact on the National Cemetery by the various build alternatives for Doyle Drive has led to a substantial concern on the part of the NPS and the Trust. Table 6-1 shows that noise impacts can be expected with the No-Build and Replace and Widen Alternatives that would exceed the NAC by 5 to 6 dBA. The construction of the Presidio Parkway Alternative would actually reduce the noise levels over those that currently exist in the area of the cemetery. This is largely due to the fact that a portion of Doyle Drive would be in either a cut section or in a tunnel bordering the cemetery. Potential portal noise impacts are discussed in Section 6.1.3.2.

As seen in Table 6-2, the Merchant Road Slip-Ramp Option would increase the noise level for Receptors 17 and 19-25 in the Armistead Road area by 2 to 4 dBA above the level anticipated to be generated by the Presidio Parkway Alternative Diamond option. This increase can largely be attributed to the reconfiguration which would move traffic further to the north and closer to residences and buildings along Armistead Road. If the Slip-Ramp Option was constructed, it is anticipated that six (6) residential units (four buildings) along Armistead Road would be removed, which would alter the number of impacted sites shown in Table 6-1.

TABLE 6-2
PREDICTED TRAFFIC NOISE LEVELS FOR
PRESIDIO PARKWAY DESIGN OPTIONS AT SELECT LOCATIONS

Receptor[1]	Site Description	NAC Approach[2]	Alternative	Design Options	
			Presidio Parkway Diamond 2030	Merchant Road Slip Ramp Option	Park Presidio Hook Ramp
				PM[3]	AM[4]
17	Landrum Ct.	66	65	**67***	65
18	1253 Armistead Rd	66	**77***	**77***	**77***
19	Garage	71	59	62	58
20	Garage	71	60	64	60
21	Film Vault	71	65	67	65
22	Radio Receiver	71	66	67	65
23	Officer Residence	66	64	**67***	64
24	Officer Residence	66	63	**66***	63
25	Officer Residence	66	62	**66***	62
26	Bldg.1659/Data Center	71	**75***	**75***	**75***
Number of sites approaching or exceeding the NAC based on impact of these design options.			2	6	2

Source: ESA 2004

Notes: [1]For details regarding the receptor location, see Appendix E.

[2]FHWA noise abatement criterion approach based on existing or anticipated land use. Approach is defined by Caltrans as being within one 1dBA of the noise abatement criterion

[3]PM peak traffic chosen to represent the loudest hour based on traffic patterns. Presidio Parkway Alternative Diamond option layout used for this analysis.

[4]AM peak traffic chosen to represent the loudest hour based on traffic patterns. Presidio Parkway Alternative Diamond layout used for this analysis.

***Bolded** numbers indicate a noise level that approaches, equals, or exceeds the NAC.

Note: The number of impacted sites may be reduced for the Merchant Road option due to removal of selected residences for construction.

Until a design option is selected, the number of impacted sites will generally remain as currently shown to avoid confusion.

The Park Presidio Hook Ramp option shows no changes in noise levels predicted between the ramp option and the base alternative, even though the ramp would be physically closer to several receptors, such as the Cavalry Stables. The explanation for this is that the ramp design would alter the height of the ramp compared to the other ramp option and would also not extend as far to the east. There was also a difference in the traffic projections under the two alternative interchange designs that had some influence on the overall noise impact.

Section 7 (Abatement Alternatives) provides a discussion of abatement measures considered for the receptors and alternatives predicted to have noise levels that approach, equal or exceed the NAC.

6.1.3 Presidio Parkway Alternative Tunnel Noise Impacts

6.1.3.1 Exhaust Fan Noise

A noise impact of concern related to the operation of either Presidio Parkway Alternative (Diamond or Circle options) was the operation of exhaust fans within the tunnels. After considerable review of fan sizing, location, and operating methods, it has been determined that ceiling-mounted fans that force air in either direction without the need for exhaust vents would most likely be used. This would eliminate the noise associated with typical tunnel exhaust fans since these fans would exhaust directly through the portals. The exhaust fans anticipated for use in the Presidio Parkway Alternative would be placed at locations within the tunnels that would preclude fan noise from being noticeable at the portal areas.

6.1.3.2 Tunnel Portal Noise

A second operational concern related to the Presidio Parkway Alternative is the noise generated at the tunnel portals and its impact on adjacent receptors. After consultation with USDOT and Caltrans technical staff, it was determined that modeling the portal noise impact using TNM is not possible. However, research conducted by Jim O'Conner of the Minnesota Department of Transportation showed that noise levels measured in front of tunnel portals was insignificant beyond 18 to 21 meter (60 to 70 feet). Mr. O'Conner also found that noise levels were insignificant beyond 9 to 12 meters (30 to 40 feet) with receptor locations on top of the tunnel. Therefore, tunnel portal noise is going to be very limited in its impact.

Based on the anticipated tunnel locations associated with the Presidio Parkway Alternatives, very limited areas of the project corridor are anticipated to even notice the portal noise. Those locations are small parts of the National Cemetery, Battery Blaney, and Battery Sherwood and Building 231/Service Station. Calculation of the surface area of each site that would notice portal noise shows that approximately 692 square meters (7,449 square feet) of Building 231(Site 56), Battery Blaney (Site 10), the National Cemetery (Site 43), and Battery Sherwood (Site 12) would receive up to 3 dBA additional traffic noise. No other noise sensitive areas along the proposed Presidio Parkway Alternative are within a 21 meter (70 foot) radius of the portals. Therefore tunnel portal noise is not expected to have a substantial noise impact on the overall traffic noise levels within the Doyle Drive corridor. The potential for abatement of tunnel portal noise is discussed in Section 7.

SECTION 7: NOISE ABATEMENT ALTERNATIVES

Consistent with 23 CFR 772, noise abatement must be considered for Type I projects when the predicted noise level approaches or exceeds the NAC or when the project results in a substantial noise increase (defined by Caltrans as an increase of 12 dBA or more). Section 6 (Future Noise Environment) identified 35 locations where traffic noise exposure currently is, or is anticipated to approach, equal, or exceed the NAC. Consistent with Caltrans protocol and FHWA requirements, noise abatement is only considered where noise impacts are predicted and where frequent human use occurs and a lowered noise level would be of benefit. This approach gives primary consideration to exterior areas. If there are no exterior activities that are affected by traffic noise, then the interior criterion shown in Category E of the FHWA regulations will be used as the basis for determining whether noise abatement is reasonable and feasible.

The abatement measures considered for the operational phase of all build alternatives to reduce the predicted exterior traffic noise impacts were:

- Traffic management measures,
- Alteration of horizontal and vertical roadway alignment, and
- Noise barriers,
- Retrofitting of windows,
- Alternative paving materials, and.
- Absorptive tunnel linings,

In keeping with the nature of the area surrounding Doyle Drive, every effort was made to incorporate the concepts embodied in the NPS Director's Order #47 dealing with preservation or enhancement of the soundscape within the NPS park system. Therefore, special attention was paid to the reduction of traffic noise to levels below those that currently exist within many areas of the project corridor.

7.1 TRAFFIC MANAGEMENT

Traffic management measures that limit motor vehicle speeds and reduce volumes can be effective noise abatement measures. However, the measures also negate a project's ability to accommodate forecast traffic volumes. For example, if the posted speed on Doyle Drive were reduced, the capacity of the roadway to handle the forecast motor vehicle demand would also be reduced. Therefore, reducing traffic speeds and/or traffic volumes is inconsistent with the goal of improving the ability of the roadway to handle the forecast volumes. Although feasible, traffic management measures would not be a reasonable noise abatement measure because it would interfere with the purpose of the project.

7.2 ALTERATION OF HORIZONTAL AND VERTICAL ALIGNMENT

Alterations to the horizontal and/or vertical alignment of the roadway would have to be extreme to affect a substantial change in the predicted traffic noise levels at the receptor locations where noise levels approach or exceed the NAC. As such, although feasible, changes in the horizontal and vertical alignment would not be a reasonable noise abatement measure.

7.3 NOISE BARRIERS

When evaluating noise barriers, a number of factors must be considered including:

- Lateral clearances (sufficient distances from the traveled way to the barrier),

- Sight distance requirements (providing for sufficient stopping sight distance),
- Access requirements for the properties being protected,
- Barrier dimensions (length and height),
- Construction materials, and
- Aesthetics

Construction of noise barriers at receptor locations that are on local streets such as Richardson Avenue, Lyon Street, Marina Boulevard, Mason Street, Lincoln Boulevard, Gorgas Avenue, Montgomery Street, Girard Road and Halleck Street, would not be feasible because driveways would need to be maintained to provide access to those properties. As such, there appear to be no reasonable measures to reduce the predicted traffic noise with the Doyle Drive alternatives at Receptors 1 and 2 (the Palace of Fine Arts Building), Receptors 70 and 72 (Gorgas Avenue Warehouses, Receptors 73 and 74 (YMCA Buildings) and at Receptor 76 (residential area along Lyon St. and Richardson Avenue).

Receptors 10-13 (the Battery area), 17-18 (Armistead Road area), 27 (the Log Cabin area), 29-36 (residences along Storey Avenue) and 43 (the National Cemetery) have the potential to be benefited by the construction of noise barriers along the various alternatives under consideration, depending upon cost and effectiveness considerations. To determine whether noise barriers would be reasonable and feasible for these locations, the Caltrans protocol was applied to a series of noise barrier options for each site. The Caltrans protocol identifies a reasonable noise barrier as one that provides at least 5 dBA of traffic noise reduction at a reasonable cost. The cost effectiveness of a noise barrier is determined by a base allowance of $17,000 per benefited receiver that is adjusted upwards based on the absolute noise levels predicted to occur, the increase between the Build and No-Build Alternatives, the amount of noise reduction that can be achieved, and the antiquity of the impacted receptors in the project corridor. This provides for a total noise abatement allowance for noise barriers that are considered feasible. This protocol was applied to the noise barrier concepts discussed below.

Since the Caltrans protocol is based on a noise barrier wall design, all noise barriers were treated as though a wall was used. In fact, this may not actually be the final decision as the project progresses towards final design and construction. There are a wide variety of noise barrier options, in terms of both material and design, than can minimize the visual impact as well as reducing the traffic noise level. The primary options include a rigid wall, an earth berm, or a combination of the two. There are also variations of the earth berm concept such as crib walls or living walls, which are typically a concrete structure in a triangular shape filled with soil and planted to resemble a mount of earth. The advantage of this design over an earth berm is that less horizontal space is required to achieve a similar height, which can be important in a limited space environment such as the Doyle Drive corridor.

Within the rigid wall concept, which is probably the most common structural noise abatement method employed, there are a number of combinations of design elements including glass, plastic, metal, concrete, steel, and other materials. The details of the noise abatement option would be coordinated during the design phase for any noise barrier option that is determined to be preliminarily reasonable and feasible. This would give all interested parties the opportunity to provide input into the aesthetics of the barrier as well as the materials to be employed. Due to the constraints that may be placed on noise barrier design such as utility locations, drainage, structural loading limits, and maintenance issues, the specific type of barrier material to be used and the exact placement of the barrier can only be estimated at this time. Where visual impacts could result from the placement of a noise barrier, a decision would have to be made as to what constitutes a reasonable compromise between the two in order to accommodate both desires.

The following is a discussion of where noise abatement, in the form of noise barrier walls, was investigated in detail. Table 7-1 illustrates the results of this effort.

For the Replace and Widen Alternative, a noise barrier 278 meter (912 feet) long and 4.27 meters (14 feet) high along the south side shoulder of Doyle Drive from the east end of the high viaduct section eastward to the western end of the National Cemetery would provide noise reduction on the order of 2 to 11 dBA along

TABLE 7-1
NOISE BARRIER PRELIMINARY REASONABLENESS DETERMINATION

Alternative	Location	Length (m)	Height (m)	Preliminary Reasonable Cost Allowance Per Benefited Unit[1]	Number of Benefited Units[2]	Preliminary Reasonable Barrier Total Construction Cost Allowance	Estimated Barrier Construction Cost[3]	Preliminary Reasonable (Yes/No)
Replace and Widen	National Cemetery Station 12+62 to 15+40[4]	278	4.27	$33,000	8 *	$264,000	$207,736	Yes
Replace and Widen	National Cemetery area Station 12+62 to 16+60[5]	398	4.88	$33,000	9 *	$297,000	$339,892	No / (Yes if a lower cost wall material such as wood were used)
Replace and Widen	Armistead Rd. area Station 1+60 to 4+78	318	3.05	$35,000	7	$245,000	$169,733	Yes
Presidio Parkway	Armistead Rd. area Station 1+60 to 4+78	318	3.05	$39,000	7	$273,000	$169,733	Yes
Replace and Widen, and Presidio Parkway	Storey Ave. area Station 2+00 to 7+65	565	4.88	$31,000	0	$0	$482,510	No
Replace and Widen	Battery area Station 11+40 to 15+20	380	3.05	$37,000	7 *	$259,000	$202,825	Yes

Source: Environmental Science Associates, 2004

Notes:
[1]Based on Caltrans TNAP, October 1998 as modified.
[2]Residential units that receive 5 dBA reduction or more.
[3]Barrier cost is based on Caltrans TNAP value of $175/meter^2 for a standard masonary block wall.
[4]This barrier designed to protect the frontage area of the National Cemetery only.
[5]This barrier designed to protect the frontage area of the National Cemetery and residential and office buildings located east of the cemetery.
*The number of benefited units is based on a frontage factor of 30.5 meters being equivalent to one residential lot where the area will receive a reduction of 5 dBA or more based on Caltrans TNAP.

the frontage area of the National Cemetery. The barrier would be preliminarily reasonable and feasible following the Caltrans protocol. Extending the barrier to the vicinity of Building 106 was also investigated to determine if additional impacted receivers would be benefited. A barrier along the shoulder of the viaduct section was tested up to 4.88 meters (16 feet). The results indicate that only Building 128 would receive at least 5 or more decibels of noise reduction from such a wall design. Due to the additional cost and the design limitations of the viaduct section to be able to support the wind and dead load of such a wall, it was determined that extending the wall was not a reasonable abatement effort unless a lower cost wall material design (such as wood) was considered. This option would be investigated during the design phase should the Replace and Widen Alternative be selected in conjunction with the impacted property owners. Under the Presidio Parkway Alternative, abatement in this section of the Presidio was also investigated. The design of the Parkway within much of this location would be in a cut (depressed) section with a concrete overhang and safety barrier to support the relocated section of Lincoln Boulevard. The overhang would effectively reduce traffic noise from most of this section of Doyle Drive and eliminate the need for additional abatement. Traffic noise from Lincoln Boulevard would be more noticeable in this area than would the noise from Doyle Drive. However, due to space limitations and safety concerns, placement of a noise barrier along Lincoln Boulevard was not considered a viable option.

A noise barrier along the westbound on-ramp from Park Presidio Boulevard to Doyle Drive westward to the Merchant Road area was investigated to determine if abatement would be reasonable and feasible for the areas impacted by both the Presidio Parkway and Replace and Widen Alternatives. A 3.05 meter high (10 foot) noise barrier, 318 meters long (1,043 feet) placed along the edge of the Doyle Drive right-of-way line in this area could provide a noise reduction on the order of 10 dBA to the five impacted residential receptors located north of Doyle Drive in the area along Armistead Road. Following the Caltrans protocol, this barrier would be considered preliminarily reasonable and feasible. However, if the Merchant Road Slip Ramp option were to be selected, it is anticipated that most of the noise sensitive residences along this portion of Doyle Drive would be removed and the need for the noise barrier may be eliminated or modified in terms of impacted receptors and the height and length of noise barrier needed. Therefore, the reasonableness of constructing this noise barrier would be determined during design once the interchange option (if any) is selected.

A noise barrier along the south side of the eastbound section of Doyle Drive from west of the Log Cabin area that extended partially down the southbound Park Presidio off-ramp was investigated for both the Presidio Parkway and Replace and Widen Alternatives to determine if it might provide relief for the receptors along Storey Avenue (Receptors 27 through 36). Due to the topographic conditions of the area, a shoulder barrier along this section of Doyle Drive for all build alternatives would not be effective. The average reduction to the impacted receptors with a 4.88 meter high (16 foot) wall was only 1.7 dBA, well below the required 5 dBA reduction to be considered feasible. A barrier placed outside of the right-of-way along the top of the ridge bordering Doyle Drive in this area may prove effective but would require additional right-of-way in the area of the Log Cabin site that contains identified protected plant species that could be adversely affected. Therefore, abatement at this location was not considered reasonable or feasible.

Noise abatement in the form of a noise barrier was also investigated for the Replace and Widen Alternative in the area of Battery Blaney, Slaughter, Sherwood and Baldwin. A noise barrier extending 380 meter (1,246 feet) along the frontage of the Battery area that is 3.05 meters (10 feet) tall along the shoulder of Doyle Drive would provide a noise reduction in the range of 2 to 11 dBA. Following the Caltrans protocol, this noise barrier concept is considered to be preliminarily reasonable and feasible.

Receptors 45-47, 49-51, 53 and 60 within the Main Post area of the Presidio are all considered Category C land uses and had no evidence of frequent human use of exterior areas that would benefit from noise abatement. The use of several of the buildings is for storage and electrical switching equipment, neither of which are noise sensitive. While noise abatement in the form of a noise barrier wall may be feasible for some of these receptors, it does not appear to be a reasonable course of action due to the lack of exterior noise sensitive activities. Interior noise levels would be reduced by the building envelope (generally 20 decibels or more, depending upon the building construction), which would bring all of these sites within the interior NAC.

With the Presidio Parkway Alternative, the use of tunnels would provide substantial traffic noise reduction to a number of receptors along the project corridor, including the Battery area, much of the Main Post area, and some of those along the Mason Street area. An investigation of tunnel portal noise reduction was conducted for the very same areas that could potentially be impacted by the increase noise levels associated with the combination of traffic noise and the portal noise created by reverberation within the tunnels. The placement of a small length of noise barrier wall along the top of the portal areas that extends away from the portal for a distance of approximately 20 meters (66 feet) and 1.83 meters tall (6 feet) would be sufficient to reduce the potential portal noise from impacting the noise sensitive sections of the National Cemetery and the Battery area, thereby maintaining or enhancing the soundscape for both of these areas.

The views of the impacted residents and property owners would be a major consideration in reaching a final decision on the reasonableness of abatement measures to be provided. The opinions of these residents and property owners would be obtained through the use of public involvement techniques that may include public hearings, community meetings, or other means as appropriate.

7.4 RETROFIT OF WINDOWS AT RESIDENCES EXCEEDING NAC

Many of the residences along Richardson Avenue appear to already have modern windows that likely have a high Sound Transmission Class (STC). As part of the remodeling of residential units along parts of Storey Avenue, double pane windows have been installed, which would improve the interior noise levels. Continued retrofitting of windows for those residences within the Presidio by the Trust that do not have modern windows (similar to what they have completely along portions of Storey Avenue) could result in a beneficial noise reduction to the interior of these homes. However, the federal requirements of 23CFR Part 772.13(c)(6) limit federal participation in the funding of such abatement to public use or nonprofit institutional use. Therefore, residential usage would normally not qualify for federal funding. Caltrans policy states that noise insulation will not normally be provided in private residential dwellings, and only when severe traffic noise impacts are anticipated. None of the residences are expected to receive severe traffic noise as a result of any of the proposed alternatives. In most cases (as shown in Table 6-1) there would be very little increase in residential noise levels over those that currently exist or are expected to occur without the construction of any of the build alternatives.

Three buildings within the Presidio (Nos. 105, 106, and 211) are expected to receive noise levels under one or more alternative that would cause the exterior noise level to equal or exceed 75 dBA. Under Caltrans procedure, these buildings could be considered severely impacted and the preliminary reasonableness of providing noise abatement in the form of insulation was investigated. Since the current use of two of the buildings within the Presidio (Nos. 105 and 211) are not noise sensitive (storage of data and vacant), acoustical retrofit is not appropriate for those buildings. At Building 106, currently used as office space, noise insulation may be considered beneficial. The preliminary reasonableness of providing noise insulation to this building would be discussed with the Trust prior to the development of final plans and estimates. Should the buildings be converted in the future to noise-sensitive National Park Service or non-profit organizational use, it would be appropriate for the NPS or the Trust to evaluate the potential for interior effects and appropriateness of acoustical retrofit.

7.5 ALTERNATIVE PAVING MATERIALS

The use of alternative paving materials such as open-graded asphaltic concrete or rubberized asphalt will be considered for application on those roadway segments that are not on structure. FHWA policy demands that these materials cannot be used to obtain credit for noise abatement unless long-term testing determines that the noise reduction characteristics are maintained throughout an extensive period of time. Caltrans is currently conducting several test cases involving the use of alternative paving materials to achieve noise reduction. While reduction up to 4 dBA have been demonstrated by some studies conducted by the Arizona Department of Transportation, there is some speculation regarding the transient longevity of these benefits over time, as the material is slowly eroded away. Pending the results of current studies being conducted under the FHWA Quiet Pavement Pilot Program, the use of alternative paving materials would not be considered a reasonable abatement option, however they may be considered for use as pavement material during the pavement design analysis conducted as part of the project design phase.

7.6 ABSORPTIVE TUNNEL LININGS

The possibility of lining portions of the proposed Presidio Parkway Alternative tunnels is another noise abatement consideration. Typically an absorptive wall surface can be expected to result in a noise level reduction of 3 dBA or more, depending upon the material used, the nature of the traffic, the size of the tunnel, and the distance to the receiver of the traffic noise. Since tunnel noise is a momentary experience for the motorist passing through the tunnel, maintenance issues frequently override the reasonableness of placing absorptive surface material in a tunnel. However, the application of an absorptive surface at the tunnel portals may prove to be an effective method of reducing the reverberation typically occurring at portals and the resultant noise impact of those receptor locations within close proximity to the tunnel portal. Therefore, it is anticipated that the application of a sound absorptive surface will be investigated in detail during the design phase should the Presidio Parkway Alternative be selected.

In addition to the areas identified for noise abatement, a number of areas were identified where noise abatement does not appear to be reasonable or feasible or where circumstances do not warrant abatement consideration. A number of those sites have been previously identified, especially those along Richardson Avenue, Lyon Street, Marina Boulevard, Mason Street, Lincoln Boulevard, Gorgas Avenue, Montgomery Street, Girard Road and Halleck Street. Most of these sites were either not particularly noise sensitive land uses (warehouses, service stations, retail stores, etc.). Two buildings of concern were the Crissy Field Center and the Cross Cultural Environmental Education Center. In both cases, the noise levels anticipated with the proposed project would not be expected to increase more than 1 dBA above the No Build Alternative, and in the case of the Cross Cultural Environmental Education Center, the exterior noise levels are not expected to approach or exceed the NAC. However, due to the educational orientation of both buildings, a look at the potential impact on interior noise levels was also investigated. The nature of the construction of the Crissy Field Center (masonry with limited windows) provides a very effective noise reduction envelope. It is expected that traffic noise levels associated with Doyle Drive would not cause any speech or task interference under any of the alternatives under consideration. This same expectation holds true for the Cross Cultural Environmental Education Center, where the major noise source is traffic on Park Presidio Boulevard, which would not be modified in this area. Therefore, traffic noise abatement is not considered reasonable for either of these locations. Exterior activities at both of these locations would be able to continue as they currently do without any noticeable increase in traffic noise levels from any of the alternatives under consideration.

If pertinent parameters change substantially during the final project design, the preliminary noise abatement design could be changed or eliminated from the final project design. A final decision of the construction of the noise abatement would be made upon completion of the project design.

SECTION 8: CONSTRUCTION NOISE

The extent of exposure to construction noise would vary depending on the alternative selected and the distance sensitive receivers are from the noise sources. With the exception of the No Build Alternative, all other alternatives would generate construction noise. Construction would be carried out in several reasonably discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. Construction would involve clearing, construction of temporary structures, cut-and-fill activities, demolition of old structures, placing piles (piling) for new foundations and piers, importing fill, constructing new structures, and paving. Maximum noise levels of construction equipment under all build alternatives would be similar to typical maximum construction equipment noise levels presented in Table 8-1. Detour traffic during construction could also temporarily affect nearby receptors.

TABLE 8-1
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 15 meters [49 feet])
Dump Truck	88
Portable Air Compressor	81
Scraper	85
Concrete Mixer (Truck)	89
Jack Hammer	88
Dozer	85
Paver	89
Generator	81
Pile Driver	101
Backhoe	80

Source: U.S. Department of Transportation, 1995.

Construction noise would be intermittent, occurring during a multi-year construction period. Construction noise levels would depend on the type, amount, and location of construction activities.

Construction noise outside of the Presidio is regulated by the City of San Francisco (San Francisco Police Code Article 29, Section 2907). The San Francisco Noise Ordinance regulates construction noise by restricting nighttime construction activity and by establishing noise standards for individual pieces of construction equipment. Except by permit granted by the Director of Public Works, construction work is prohibited between the hours of 8:00 p.m. and 7:00 a.m. if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line. No single piece of powered construction equipment is to generate more than 80 dBA at a distance of 30 meters (100 feet).

Generally, construction activities that abide by the noise ordinance do not cause a substantial impact; however, the ordinance does not apply within the Presidio. Temporary construction activities that generate consistently loud conditions over a prolonged period of time in one location can have a negative effect by making it difficult to conduct ordinary activities at that location over the prolonged period. FHWA does not define any construction noise impact criteria, but provides guidance to analyze construction noise using an

8-hour Leq and to minimize impact using mitigation. Noise has been found to cause physiological stress at levels above 90 dBA and appreciable task interference at levels above 75 dBA (EPA, 1971). The FHWA NAC of 67 dBA is based on speech interference between adults conducting a normal conversation. While there is not an established noise impact criteria for temporary construction impact noise, the above information on noise levels support the following observations:

- There is no negative effect for temporary construction noise levels below 67 dBA;
- As noise levels approach 75 dBA, there is potential for negative effects as the duration of the activity increases; and
- Above 90 dBA, there is potential for substantial negative effect from activities of prolonged duration.

Drilled or non-driven pile shafts would be used in place of driven piles in the great majority of proposed construction (see Section 9, Vibration, for more detail on where pile driving would be avoided), substantially reducing maximum noise levels that would result during project construction (Table 8-2). On average, using drilled or non-driven piles reduces noise levels by approximately 15 dBA. With drilled or non-driven piles, piling would not be the loudest construction activity for the Doyle Drive Project. The loudest activities on the Doyle Drive Project would likely be associated with demolition of the existing roadway structures. Pavement breakers, often the loudest piece of equipment during demolition, have been measured with an average Leq of 85 dBA at 15 meters (50 feet) during operation. In areas nearest to sensitive receptors, the viaduct could be broken in sections and moved away from noise sensitive areas for demolition.

TABLE 8-2
NOISE LEVELS ASSOCIATED WITH PILE PLACEMENT

Activity	Noise Level (Leq) and Distance
Driven Piles[1]	95-99 dBA (15 meters)
Driven Sheet Pile[2]	105 dBA (5 meters)
Bauer BG22 Pile Bore Rig[2]	90 dBA (5 meters)
Impact Pile Driver[3]	98 dBA (operator location)
Drilled Pile[3]	83 dBA (operator location)

References: [1]FHWA, 1982; [2]WACEP, 1998; [3]WCBBC, 2000

The land uses most sensitive to noise occur near the eastern and western limits of the Project. Within the areas to the east, there are residential land uses. The Palace of Fine Arts is also located with this area. At the western limits of the Project, residential enclaves are located immediately north and south of the potential construction activity. North of Doyle Drive throughout the construction limits, most of the property includes commercial, warehousing and industrial uses that are less noise sensitive to construction noise. An exception in this area is the Crissy Field Center. The concerns of the Center regarding construction noise has been noted in the past and special consideration of this issue will be taken. With the possible exception of pile driving, most construction noise levels would be in range of 85 to 90 dBA within 15 meters (50 feet). Major concerns are the type of construction activities, the type of equipment to be used, and the duration of the activity. A review of the construction phasing and the need for detour routes for each alternative has revealed that impacts to receptors like the Crissy Field Center would vary greatly in terms of type and duration.

8.1 CONSTRUCTION PHASING IMPACTS

8.1.1 Construction and Demolition Impacts

Construction activities for the Doyle Drive Project would be completed in stages over several years. Each stage would include various activities localized to portions of the project area. Some stages would also require detour routes for traffic. During each stage of construction, equipment would move as each area is completed. For example, a pile bore rig would operate between a few days and several weeks in the area where each of the viaduct piers are to be constructed, then would move to the next location.

Typical demolition and construction activities might include the following equipment and associated noise levels:

> Demolition of existing viaduct structure: pavement breaker (85 dBA at 15 meters [50 feet]), loader (85 dBA at 15 meters [50 feet]), and dump truck (85 dBA at 15 meters [50 feet]). This operation would create a combined noise level of 90 dBA at 15 meters (50 feet) when all three pieces of equipment are operating simultaneously. The noise level would decrease with distance to approximately 84 dBA at 30 meters (100 feet), 76 dBA at 61 meters (200 feet) and 68 dBA at 122 meters (400 feet). At most times, not all equipment would be operating at full speed/throttle; therefore, the average noise level would be less than these values. At any one time, these activities would be occurring in a limited area and would move along the alignment over the duration of the demolition phase; therefore, the noise exposure area at any point in time would be a circle around the operating equipment.
>
> Placement of piles: pile bore rig (80 dBA at 15 meters [50 feet]) and concrete truck/pump (80 dBA at 15 meters [50 feet]). This operation would create a combined noise level of 83 dBA at 15 meters (50 feet) when both pieces of equipment are operating. The noise level would decrease with distance to approximately 76 dBA at 30 meters (100 feet), 69 dBA at 61 meters (200 feet) and 62 dBA at 122 meters (400 feet). At any one time, these activities would be occurring in a limited area and would move from one pier location to the next over the duration of the piling phase.
>
> Construction of new viaduct (placement of girders): two cranes (82 dBA at 15 meters [50 feet] each), pneumatic wrenches or welding machine (70 dBA at 15 meters [50 feet]), and an air compressor (83 dBA at 15 meters [50 feet]). This operation would create a combined noise level of 87 dBA at 15 meters (50 feet) when both pieces of equipment are operating. The noise level would decrease with distance to approximately 80 dBA at 30 meters (100 feet), 73 dBA at 61 meters (200 feet) and 66 dBA at 122 meters (400 feet).

Noise levels inside of buildings would be between 10 and 30 dBA less than the values discussed above, depending if doors and windows are open and the building's style and quality of construction. With closed windows and doors, most buildings would reduce noise levels between 20 and 30 dBA. For example, typical demolition noise levels at a building located 61 meters (200 feet) from a viaduct being demolished would be approximately 75 dBA outside and 56 dBA inside. These noise levels would be experienced for a few weeks while demolition activities are nearest to the building, and would decrease as activities move further from the building.

During the different phases of construction of any of the build alternatives, noise-generating construction activities would vary greatly in terms of type and duration. The generalized impacts for each build alternative are listed below. Methods to eliminate or minimize these impacts are discussed below.

- For the Replace and Widen Alternative, there would be two substantial construction options: Detour Option and No Detour Option. For the Replace and Widen Alternative – No Detour Option, the Stages and Phases within the area from Battery Blaney to Marina Boulevard would follow this general sequence.
- Stage 1, Phase 1 – Construct Doyle Drive by widening the outside structures and construct a minor detour on-ramp from northbound Richardson Avenue on to Doyle Drive to the outside of the existing ramp.

- Stage 2, Phase 2 – This phase would see the construction of a temporary detour from Doyle Drive to Richardson Avenue in the vicinity of the Palace of Fine Arts and the removal of the detour ramp constructed in Phase 1 above once the reconstruction of Doyle Drive was completed in this area.
- Stage 3, Phase 1 – Add a minor detour at the intersection of the detour by the Palace of Fine Arts and Richardson Avenue to include a traffic signal. Complete all work on Doyle Drive in this section.
- Stage 4, Phase 1 – Remove all detours within this section and return traffic to its original pattern.

A discussion of the phasing and impacts associated with the Replace and Widen – with Detour Option includes:

- Stage 1, Phase 1 – Construct Doyle Drive detour structures on the north side from the vicinity of Building 610 westward to the vicinity of Battery Blaney and along the south side in the same area. This activity would have the potential to impact Building 610 (Sports Basement), Battery Blaney, the National Cemetery, and buildings along Lincoln Boulevard. Construction would include the erection of a new viaduct section and would include minor demolition work.
- Stage 1, Phase 2 – This would include demolition of the section of Doyle Drive detoured above in Phase 1 and a shift for traffic to the detour structures. This typically requires the use of jack hammers, pavement breaking equipment, and other related equipment.
- Stage 1, Phase 3 – During this phase the segment of Doyle Drive by-passed by the detours would be reconstructed using normal construction techniques and noise-generating equipment.
- Stage 2, Phase 1 – During this phase the construction of the major detour from Marina Boulevard to Building 610 would occur along with the construction of a new off-on ramp to Richardson Avenue. It is this phase that would potentially be most disruptive to both traffic patterns and to the adjacent land uses. If the detour were built, a number of buildings along Mason Street and Doyle Drive would be removed, including several of the warehouse buildings along Mason Street. Once the detour was constructed the widening of Doyle Drive would take place in this area and the traffic would be shifted on to the detours. (Note: This traffic shift was considered to be the most extensive and was used as the basis for construction traffic noise impacts in the modeling effort.)
- Stage 3, Phase 1 – During this phase the existing Doyle Drive from Marina Boulevard to Building 610 would be demolished and traffic along Richardson Avenue, Halleck Street and Marshall Street would be altered considerably.
- Stage 4, Phase 1 – Construct the remaining portions of Doyle Drive in the area and shift traffic to the new section once it is complete. Then the detour segments would be removed.

For both Replace and Widen options, staging and phasing on the western end of the project would be identical.

- Stage 1, Phase 1 – During this stage reconstruction of Doyle Drive from the Park Presidio Boulevard interchange eastward to the Battery Blaney area would take place along the eastbound segments of Doyle Drive. A minor detour along the eastbound Doyle Drive off-ramp to Park Presidio would be constructed.
- Stage 2, Phase 1 – All traffic would be returned to the reconstructed Doyle Drive and ramp demolition at Park Presidio would take place.
- Stage 2, Phase 2 – During this phase reconstruction of the interchange at Park Presidio Boulevard would proceed and some reconstruction of eastbound Doyle Drive would continue in the vicinity of the Batteries.
- Stage 3, Phase 1 – Construction of temporary detours for westbound Doyle Drive in this segment of the project would take place.
- Stage 3, Phase 2 – Reconstruction of westbound Doyle Drive would take place and the ramp to Park Presidio would be completed.
- Stage 4, Phase 1 – Remove all detours and return traffic to its original pattern.

For the Presidio Parkway Alternative, the process would be substantially different to those listed for the Replace and Widen options noted below. Details on the construction process anticipated for this alternative are outlined in the *SPUR Alternative Feasibility Study*.

- Stage 1 – Existing Doyle Drive is maintained in its existing state and temporary detour construction takes place in the vicinity of the Park Presidio interchange and in the Richardson Avenue and Girard Road areas. Permanent construction of segments of the Presidio Parkway begin.
- Stage 2 – Construction of the permanent segments of the Presidio Parkway continue, especially in the vicinity of the Park Presidio interchange and the Girard Road intersection. Demolition of segments of the Richardson Avenue on and off-ramps takes place as well as ramps at the Park Presidio interchange. Some temporary construction takes place adjacent to westbound Doyle Drive west of the Park Presidio interchange.
- Stage 3 – Construction continues, primarily in the area west of the Park Presidio area and temporary detour and demolition work at both ends of the project.
- Stage 4 – Construction activities are focused on the two interchange areas on either end of the project.
- Stage 5 – Construction activities continue to focus on the two interchanges with traffic patterns changed at both interchanges to begin using the newly constructed segments of the Presidio Parkway. Minor demolition work also takes place along with some minor detour work at both interchanges.
- Stage 6 – Major shifts of traffic on to newly constructed segments of eastbound Doyle Drive takes place with most new construction taking place to the east of the Park Presidio interchange area.
- Stage 7 – Major construction of the westbound tunnels take place during this stage and westbound traffic is diverted to the top of the eastbound Battery Tunnel. The connection to Marina Boulevard is constructed as well has ramps on Girard Road and Richardson Avenue.
- Stage 8 – All remaining new construction on Doyle Drive is completed during this stage and demolition of some detours takes place as well as the removal of some of the original Doyle Drive roadway and structures that remain.
- Stage 9 - Demolition of the remaining segments of the original Doyle Drive takes place along with the removal of temporary detours and Halleck Street is constructed over the top of the eastern-most tunnel. All traffic is diverted to the new roadway.

As noted above, the equipment used, the duration of the activity, and the location, would all influence the level of construction noise impact for any receptor along the project alignment. While specific levels cannot be expressed for each receptor, a generalized level in the mid to upper 80 dBA at various times during the construction period can be expected for those receptors within 30 meters (100 feet) of the project construction limits. Although there are some residential uses within this area, most of the property in close proximity to the construction activity is sparsely developed. Based on the equipment noise levels presented in Table 8-1, residences along Richardson Avenue and Marina Boulevard could be exposed to construction noise in excess of 89 dBA while activities are conducted at the eastern end of the alignment during construction of the build alternatives.

Several specific sites have been identified where construction noise impacts are of special concern. One of those sites is the Crissy Field marsh and shoreline areas. Due to the distance from most construction activities and the active nature of the use of this site, any potential construction noise impacts would be of short duration and can be minimized or eliminated by the application of abatement options shown in the listing of abatement options in this section. Vibration concerns likewise are addressed in the Vibration section of this report and are not anticipated to create conditions which would adversely impact the area.

At the Crissy Field Center, construction noise impacts are not expected to adversely impact the use and function of the center unless pile driving activities take place. Since numerous options exist to eliminate the need for pile driving, no extended duration impacts are anticipated. No other sources of construction noise impacts are anticipated in this area although short-term impacts could occur. Coordination between the management of the Crissy Field Center and the Construction Contractor can aid in reducing or eliminating potential noise impacts.

Potential construction impacts at the Cavalry Stables area would vary greatly depending upon the alternative selected and the construction methods employed. As noted above, pile driving is not anticipated to be part of the project although demolition activities could create short term higher noise levels that could cause a startle reaction in the horses. To minimize this potential, the Contractor may be required to use quieter removal techniques during the demolition process.

Finally, the area around Stilwell Hall was identified as an area where construction noise impacts would be of concern. Located in the vicinity of the Cavalry Stables, any special efforts to reduce construction or demolition noise for the stables would have a positive benefit for the area around Stilwell Hall. Because of the close proximity of construction activities to the building, care will be taken to ensure that the use of Stilwell Hall can be maintained throughout the construction phase.

8.1.2 Construction Equipment Staging Area Noise

Construction equipment staging is anticipated to take place at various locations within the project area and would have an influence on the noise levels in the immediate vicinity of the sites. Currently two primary areas are envisioned, all located at the eastern end of the project. For the Replace and Widen Alternative – No Detour Option, the two proposed staging areas are:

- The parking lot of between Building 610/Post Commissary/Sports Basement and the PX Building on the north side of Doyle Drive, and
- The parking lot west of Gorgas Avenue.

For the Replace and Widen Alternative – with Detour Option, the two proposed staging areas are:

- The space between where Building 610/Post Commissary/Sports Basement was (it is to be removed) and Building 603/Crissy Field Center (with the PX Building to be removed) on the north side of Doyle Drive, and
- The parking lot west of Gorgas Avenue.

For the Presidio Parkway Alternative, the two proposed staging areas are:

- The parking lot of between Building 610/Post Commissary/Sports Basement and Building 603/Crissy Field Center (with the PX Building to be removed) on the north side of Doyle Drive, and
- The parking lot west of Gorgas Avenue.

The various equipment staging options would have the greatest potential to impact the Crissy Field Center and the Post Commissary/Sports Basement, especially in terms of the loss of parking and the noise and dust would be part of the activities. Back up alarms could be one of, if not the most annoying noise source, and for which there are limited control options due to legal requirements. Should this become a substantial issue, the Contractor may be required to use alternatives to the standard alarm systems.

A detailed construction noise abatement plan will be developed as part of the plans, specifications, and estimate package prior to construction authorization. This plan will highlight the requirements of the San Francisco Noise Ordinance, the NPS Director's Order #47, and the key elements of the Presidio Trust Management Plan. It may also contain special provisions that the Contractor will have to adhere to, such as limits on equipment noise levels, methods of demolition, use of pile driving, and similar controls. Until the preferred alternative is selected and the design features of the project are clearly defined, detailed noise abatement techniques for construction control are premature and subject to extensive modification. Close coordination between the design of the project and the requirements of the noise ordinance, Order 47, and the PTMP will result in a design and construction package that will ensure that construction noise is limited to the extent that is reasonable.

Potential noise impacts to wildlife are an additional important consideration that is addressed in the Natural Environment Study (NES). Please refer to that study for a discussion of noise impacts on natural resources.

8.1.3 Operational Traffic Noise Levels during the 2010 Construction Phases

During the construction phases of the Doyle Drive project, traffic patterns would be altered considerably from time to time. In an attempt to depict the types of noise impacts these pattern shifts could have on operational noise levels, a representative construction phase was selected for each build alternative and compared with the No-Build Alternative for the same time period. In each case, a phase was selected that appears to represent a condition where traffic noise impacts would have the greatest potential to increase for many of the receptor locations. Construction phase operations would be temporary and occur only while the detour facilities are in use. Table 8-3 illustrates the operational traffic noise impacts during the major construction phase. As seen in Table 8-3, a number of sites would experience noticeable shifts in traffic noise during the peak construction phase of the various alternatives, sometimes increasing and sometimes decreasing. For instance, under the Replace and Widen Alternative with detours, a number of receptors would be removed to make way for the construction of the detours. In other cases, the same shift of alignment to provide the temporary detour route would bring the traffic closer to other receptors and increase their noise level. This temporary noise impact would be highly dependent upon the final alternative that is selected.

8.1.4 Measures to Minimize Construction Noise

A number of measures could be taken to reduce construction noise exposure at noise sensitive sites and to meet appropriate requirements. These measures would be consistent with Caltrans and NPS policies, and could include the following:

- Equipment used for construction activities should not exceed 86 dBA (Lmax) at a distance of 15 meters (50 feet) based on the Caltrans Traffic Noise Analysis Protocol, and no piece of construction equipment should exceed 80 dBA at a distance of 30 meters (100 feet) based on the San Francisco Noise Ordinance.
- Impact tools and equipment should be equipped with intake and exhaust mufflers recommended by manufacturers and approved by the City of San Francisco Department of Public Works (based on the San Francisco Noise Ordinance).
- Pavement breakers and jackhammers should be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the City of San Francisco Department of Public Works.
- Construction activity between the hours of 8:00 p.m. and 7:00 a.m. should be prohibited if the noise level created is greater than 5 dBA above the ambient at the nearest property line. It should be noted that under certain circumstances, a special permit could be granted by the City of San Francisco Department of Public Works if nighttime construction is required.
- The Contractor shall coordinate with facility users, such as the Crissy Field Center, to identify times and dates when especially noise sensitive construction activities might take place so that schedules can be adjusted as appropriate.
- To the extent feasible, demolition activities in the vicinity of the Cavalry Stables and Stilwell Hall may take advantage of noise reduction methods for demolition, such as cutting and removal techniques rather than blasting or the use of jack hammers or hoe rams.

To minimize noise impacts from pile driving and other construction equipment, consideration is being given to the use of alternate construction methods when near sensitive receptor locations. Examples are pre-drilling of pile holes, avoiding cracking and seating methods for resurfacing concrete near sensitive receptors, and the use of rubber tired as opposed to tracked vehicles.

TABLE 8-3
PREDICTED OPERATIONAL TRAFFIC NOISE LEVELS DURING THE CONSTRUCTION PHASE

Receptor[1]	Site Description	NAC Approach[2]	Alternatives			
			No Build 2010	Replace & Widen with Detour 2010	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
1	Palace of Fine Arts	66	**71***	62	**69***	**68***
2	Palace of Fine Arts	66	**68***	58	61	61
3	Mason St. Warehouse Building 1187/1188	71	68	Gone[3]	56	56
4	Mason St. Warehouse Building 1182	71	65	Gone	55	55
5	Mason St. Warehouse Building 1183/1186	71	63	Gone	56	56
6	Mason St. Warehouse Building 1184/1185	71	68	60	59	58
7	Building 603/Crissy Interpretative Center	66	68	60	56	56
8	PX Building	71	70	Gone	58	59
9	Building 610/Post Commissary	71	69	65	69	70
10	Battery Blaney	66	**75***	**70***	**69***	**68***
11	Battery Slaughter	66	**80***	**79***	65	65
12	Battery Sherwood	66	**77***	**75***	64	65
13	Battery Baldwin	66	**67***	64	**67***	**67***
14	Building 644/Unit Motor Pool	71	63	60	59	60
15	Building 649/Army Reserves	66	61	60	60	60
16	Building 650/Stilwell Hall	66	61	59	59	58
17	Landrum Court/ Officers Quarters	66	64	65	64	64

Receptor[1]	Site Description	NAC Approach[2]	Alternatives			
			No Build 2010	**Replace & Widen with Detour 2010**	**Presidio Parkway Diamond 2030**	**Presidio Parkway Circle 2030**
18	1253 Armistead Road	66	**71***	**72***	**76***	**76***
19	Building 969/Garage	71	53	52	58	58
20	Building 968/Garage	71	54	54	59	59
21	Building 967/Film Vault	71	56	56	65	65
22	Building 966/Radio Receiver Station	71	56	56	65	65
23	Building 964/Officer Family Housing	66	54	54	63	63
24	Building 963/Officer Family Housing	66	55	55	63	62
25	Building 962/Officer Family Housing	66	54	54	62	61
26	Building 1659/Data Center	71	56	57	**74***	**74***
27	Log Cabin Picnic Area	66	**69***	**68***	**68***	**68***
28	Ft. Scott Chapel	66	62	62	67	67
29	1298 Storey Ave./ Enlisted Family Housing	66	**68***	**67***	**66***	**66***
30	1297 Storey Ave./ Enlisted Family Housing	66	**71***	**68***	**68***	**68***
31	1295 Storey Ave./ Enlisted Family Housing	66	**70***	**70***	**70***	**70***
32	1294 Storey Ave./ Enlisted Family Housing	66	**72***	**72***	**71***	**70***
33	1293 Storey Ave./ Enlisted Family Housing	66	**73***	**73***	**72***	**71***

Receptor[1]	Site Description	NAC Approach[2]	Alternatives			
			No Build 2010	Replace & Widen with Detour 2010	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
34	1291 Storey Ave./ Enlisted Family Housing	66	**74***	**73***	**72***	**72***
35	1290 Storey Ave./ Enlisted Family Housing	66	**73***	**73***	**73***	**74***
36	1289 Storey Ave./Enlisted Family Housing	66	**71***	**71***	**72***	**73***
37	1263 Storey Ave./ Enlisted Family Housing	66	**66***	**67***	**68***	**69***
38	Building 682/Cross Cultural Center	66	63	63	64	65
39	Building 661/Cavalry Stables	71	66	65	60	60
40	Building 662/Cavalry Stables	66	**66***	65	62	62
41	Building 663/Cavalry Stables	66	65	65	63	63
42	Building 667/Cavalry Stables	71	66	64	67	67
43	National Cemetery Grave Site	66	**72***	**74***	63	64
44	Building 129/Enlisted Family Quarters	66	65	60	57	58
45	Building 122/Gym	71	**74***	**70***	61	62
46	Building 108/Storage/ Electrical Shop	71	**75***	68	61	62
47	Building 107/ Switching Station	71	**76***	67	66	67
48	Building 104/Barracks and Mess Hall	71	70	64	58	58

Receptor[1]	Site Description	NAC Approach[2]	Alternatives			
			No Build 2010	Replace & Widen with Detour 2010	Presidio Parkway Diamond 2030	Presidio Parkway Circle 2030
49	Building 105/Barracks and Mess Hall	71	**76***	67	**72***	**73***
50	Building 106/Band Barracks	71	**80***	65	**71***	**72***
51	Building 211/former Burger King	71	**75***	66	65	65
52	Building 204/ Exchange Store	71	69	64	58	59
53	Building 210/Guard House	71	**71***	63	61	62
54	Building 201/ Exchange Store	71	66	64	Gone[3]	Gone[3]
55	Building 220/Bakers and Cooks School	71	64	60	54	54
56	Building 231/ Exchange Gas Station	71	66	62	66	66
57	Building 228/Bakery	71	65	61	63	63
58	Building 227/ Warehouse	71	64	60	61	61
59	Building 223/ Warehouse	71	59	58	58	58
60	Building 230/ Warehouse	71	66	63	Gone[3]	Gone[3]
61	Building 1029/Swords to Plowshares	66	63	59	60	60
62	Building 1030/Swords to Plowshares	66	61	58	57	57
63	Building 1063/Medical Supply Warehouse	71	61	60	61	69
64	Building 1062/ Quartermaster Shop	71	59	58	58	58

Receptor[1]	Site Description	NAC Approach[2]	Alternatives			
			No Build 2010	**Replace & Widen with Detour 2010**	**Presidio Parkway Diamond 2030**	**Presidio Parkway Circle 2030**
65	Building 1060/Medical Supply Warehouse	71	58	58	58	58
66	Building 1167/Gorgas Warehouse	71	64	59	64	64
67	Building 1163/Gorgas Warehouse	71	62	61	64	64
68	Building 1169/Gorgas Warehouse	71	65	60	64	64
69	Building 1162/Gorgas Warehouse	71	62	61	62	62
70	Building 1170/Gorgas Warehouse	71	68	63	**71***	**71***
71	Building 1161/Gorgas Warehouse	71	65	67	66	66
72	Building 1160/Gorgas Warehouse	71	**71***	**73***	**71***	**71***
73	Building 1152/Presidio YMCA Gym	66	**70***	**70***	**71***	**70***
74	Building 1151/Presidio YMCA Pool	66	**73***	**72***	**72***	Gone[3]
75	Building 1004/Officers Quarters	71	55	56	56	56
76	3234 Lyon Street	66	**75***	**72***	**74***	**72***
Number of sites approaching or exceeding the NAC			30	20	22	21

Source: ESA, 2004.

Notes: [1]For details regarding the receptor location, see Appendix E.

[2]FHWA noise abatement criterion approach based on anticipated land use. Approach is defined by Caltrans as being within one 1dBA of the noise abatement criterion.

[3]Indicates that this building is anticipated to be removed as part of the construction project.

***Bolded** numbers indicate noise levels that approach, equal, or exceed the NAC.

SECTION 9: VIBRATION

9.1 STUDY METHODOLOGY

9.1.1 Methodology

This vibration impact assessment was completed by Wilson, Ihrig & Associates (WIA). The assessment has considered the potential disturbance and potential structural damage issues due to vibration generated by construction activities, and vibration generated by future traffic on Doyle Drive and other roadways in the study area.

The assessment was based on reviews of the plans of the existing Doyle Drive alignment, the preliminary plans of the Modified Replace and Widen and the Presidio Parkway Alternatives, and the proposed temporary construction route options. Existing and projected future traffic volumes on Doyle Drive and other roadways within the study area for the alternatives was also reviewed. Site visits were carried out to view the study area and potentially affected structures.

The assessment of vibration impacts due to future traffic on Doyle Drive was based in part on vibration data obtained during the 2002 study into existing vibration levels near historical buildings in the Presidio, and on published traffic-generated vibration data and file data. The 2002 study found that the existing vibration levels at one of the historical buildings close to Doyle Drive marginally exceeded the threshold of human perception but were well below the levels that could cause even cosmetic building damage.

The assessment of vibration impacts due to the construction procedures that are likely to be utilized on the project were based on discussions with the project design team, and on published construction vibration data and file data. Preliminary, conservative buffer distances from impact pile driving, based on minimizing the risk of damage to the many historical buildings in the Presidio, were developed during the initial stages of the study. Based on this information, the lead consultants concluded that conventional impact pile-driving procedures would only find limited application on this project, and that alternate pile-driving procedures producing lower vibration would need to be utilized in most areas

9.1.2 Regulatory Setting

9.1.2.1 Building Damage Criteria

There are no specific City or State regulations or standards for ground vibration due to construction or transportation sources. However, City and State agencies, such as the Department of Public Works and Caltrans, normally include vibration limits in their construction contracts to minimize the risk of damage to potentially affected buildings and civil structures. These limits are usually presented in terms of the Peak Particle Velocity (PPV).

PPV is the term for the highest velocity attained during a vibratory event. The velocity of open ground near a structure has traditionally been used as the basis for measuring the PPV and evaluating the likelihood of building damage. The measurement of exterior vibration eliminates the variability of the response of specific building structures and the variability of results that can be obtained at different measurement locations within a building.

The use of particle velocity as the basis for damage criteria, which was first proposed around 1960, was firmly established in 1971 with the publication of the Bureau of Mines study “Blasting Vibrations and Their Effects on Structures.” In this investigation, the researchers examined a pool of damage data from several different studies and concluded that the particle velocity for a given degree of damage is constant over a significantly broad frequency range. In contrast, equivalent acceleration or displacement measures depend on the frequency of the vibration. The report investigators recommended 50 millimeters per second (mm/sec) [2.0 inches per second (in/sec)] as a safe (threshold of damage) blasting criterion.

The 50 mm/sec (2.0 in/sec) criterion put forth by the Bureau of Mines in 1971 was widely adopted by the mining and construction industries. However, over the past several decades these industries have moved towards progressively lower limits to ensure a very small probability of even cosmetic damage, which is defined as:

> *The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces, or the formation of hairline cracks in mortar joints of brick/concrete block construction.*

A 1984 U. S. Bureau of Mines study (Stagg et al.) reported measurements of wall strains in a test house due to the effects of environmental and everyday activities. This study found that environmental changes (temperature and humidity) alone correlated with PPV of 30 to 75 mm/sec (1.2 to 3.0 in/sec). Walking and heel drops were found to correspond to a PPV of 0.8 mm/sec (0.03 in/sec), while that for jumping was 7 mm/sec (0.28 in/sec), slamming a door was 13 mm/sec (0.50 in./sec) and pounding nails was found to be 22 mm/sec (0.88 in/sec). Thus, typical interior activities or environmental factors can either generate relatively high, localized vibration levels, or produce similar effects.

Another U. S. Bureau of Mines study (Siskind et al., 1980) indicated a lower limit of 13 mm/sec (0.5 in/sec) PPV, below which no cosmetic cracking had been observed. Other vibration damage standards developed by the Germans (DIN 4150 – Part 3: 1986) indicate that with the exception of “ruins, historic monuments in poor state of repair or buildings of historic interest,” the limit to avoid all potential damage is a PPV of 5 mm/sec (0.2 in/sec). These damage thresholds are typically much more restrictive than the damage thresholds actually observed or predicted, undoubtedly to provide a “margin of safety.” For structures that might be considered “ruins or historical monuments,” the limit is a PPV of 2 mm/sec 0.08 in/sec. These limits of 5 mm/sec (0.2 in/sec PPV) for conventional buildings and 2 mm/sec (0.08 in/sec) for historical buildings are consistent with those used by Caltrans in evaluating the potential effects of continuous vibration, including vibration generated by road traffic and by most construction activities.

9.1.2.2 Human Comfort Criteria

The actual perception of motion or vibration may not, in itself, be disturbing or annoying. A person’s response to the perception of whether the vibration is “normal” or “abnormal” depends very strongly on previous experience and expectations. For example, the vibration that a person responds to as “normal” in an automobile, bus or train is considerably higher than what is perceived as “normal” in an office or home.

Building damage assessment is normally accomplished by evaluating the PPV of the ground surface. For assessment of people’s response to vibration, the root-mean-square or RMS vibration velocity level is generally used and most instrumentation for these types of analyses are RMS responding devices. Depending on the nature of the vibration, the PPV is almost always greater than the RMS velocity. The RMS vibration velocity level in decibels, or dB (re 10^{-6} in/sec) is a metric commonly used in the measurement and assessment of “feelable” vibration, with a vibration velocity level of about 65 to 70 dB considered to be the threshold of most people’s perception. The threshold of people’s perception in terms of PPV is on the order of approximately 0.15 mm/sec (0.006 in/sec).

The levels of building vibration that start to cause disturbance to people vary considerably depending on people’s activities, their location and their attitude toward the source of the vibration. People in their homes tend to be disturbed by almost any vibration that they can feel, which corresponds to vibration velocity levels of slightly above 70 dB. In an office environment people tend to be slightly more tolerant of building vibration than they would be at home, and in public buildings (such as shopping centers) or on structures such as pedestrian bridges, people are far more tolerant of vibration.

9.1.2.3 Comparison of Building Damage and Human Comfort Criteria

Human sensitivity is such that vibrations can be felt by the occupants of buildings and produce complaints even though no physical damage is caused. This phenomenon is evident from the data in Table 9-1, which provides a summary of the effect of continuous vibrations on people and building structures (developed from research carried out by the Transport and Road Research Laboratory in England). These criteria indicate that the vibration can become unpleasant and lead to major complaints well before there is any substantial risk of even superficial structural damage to most buildings.

TABLE 9-1
REACTION OF PEOPLE AND EFFECT ON BUILDINGS DUE TO CONTINUOUS VIBRATION

Vibration Level (Peak Particle Velocity) mm/s	in/sec	Human Reaction	Effect on Buildings
0.15 – 0.30	0.006 – 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type.
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected.
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of “architectural” damage to normal buildings.
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of “architectural” damage to normal dwelling – houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatments, etc., would minimize “architectural” damage.
10-15	0.4 – 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage.

Source: “A Survey of Traffic-induced Vibrations” by Whiffen and Leonard, Transport and Road Research Laboratory, RRL Report LR418, Crowthorne, Berkshire, England, 1971.

Note: The vibration levels are based on peak particle velocity in the vertical direction. Where human reactions are concerned, the value is at the point at which the person is situated. For buildings, the value refers to the ground motion. No allowance is included for the amplifying effect, if any, of structural components.

The criteria in Table 9-1 are also used by Caltrans to assess the severity of road traffic and construction vibration. Caltrans notes that the 2 mm/sec (0.08 in/sec) criterion included in Table 9-1 for ruins and historical monuments could also be applied to the buildings of historic interest. This 2 mm/sec (0.08 in/sec) criterion could therefore be applied to the historical buildings in the Presidio, particularly those that are more susceptible to damage, such as the buildings of masonry construction. A 2 mm/sec (0.08 in/sec) criterion is still very conservative in terms of structural damage risk, particularly for intermittent events (including sustained pile-driving). However ground vibration of this magnitude could produce building floor vibration levels high enough to cause disturbance to the occupants. Thus, a ground vibration velocity not exceeding 2 mm/sec (0.08 in/sec) PPV was used to establish preliminary buffer distances from impact pile driving.

9.2 ENVIRONMENTAL SETTING

9.2.1 Vibration Measurement Procedure

Measurements of existing vibration levels were obtained on Thursday, April 11, 2002 in the early afternoon during a period when traffic was freely flowing on both Doyle Drive and Park Presidio.

The first measurement location was chosen to characterize the existing vibration in the vicinity of the historical wood-frame buildings immediately adjacent to the existing Doyle Drive, near Halleck Street. These buildings are identified as Buildings 201, 204 and 230. The second measurement location was chosen to characterize the existing vibration in the vicinity of the historic brick buildings at the Main Post. These buildings are identified as Buildings 105, 106 and 107. The third measurement location was immediately above the existing Park Presidio tunnel on Washington Boulevard. Two vibration measurement locations spaced 15 m (50 ft) apart were used over the top of the tunnel to ensure that maximum levels of vibration were obtained. The measured data were similar and have been averaged for presentation in this report.

Table 9-2 provides descriptions of these measurement locations.

TABLE 9-2
MEASUREMENT LOCATION DESCRIPTIONS

Designation	Description
Location 1A	At the foundation base of the northwest corner of Building 201, approximately 8 m (27 ft) from the curb of Halleck Street and approximately 17 m (55 ft) from the nearest support column of Doyle Drive.
Location 1B	At the base of a southern support column of Doyle Drive, approximately 17 m (55 ft) north of Location 1a.
Location 2	At the foundation base of the northeast corner of Building 105, approximately 5 m (15 ft) from the curb of Lincoln Boulevard, immediately west of Doyle Drive.
Location 3	On the concrete curb of Washington Boulevard, directly over the top of the Park Presidio Tunnel.

The vibration data were recorded by means of a calibrated multi-channel digital audio tape (DAT) recorder equipped with one or two piezoelectric accelerometers for measuring vertical vibration, along with an associated amplification system. The tape recordings were later statistically analyzed in the WIA laboratory to obtain overall vibration velocity levels and 1/3-octave band levels of vibration velocity.

9.2.2 Measurement Results

Ambient vibration measurements were obtained for a period of 15 minutes at each measurement location. As indicated, the ambient vibration data were statistically analyzed over the measurement period where L_X indicates the level exceeded X% of time. Thus L_1 represents the level exceeded 1% of the time and is usually referred to as the typical maximum level. For a 15-minute sample the L_1 represents the level exceeded for a total of 9 seconds. Figures 9-1 through 9-4 present the statistically analyzed RMS vibration velocity data in terms of 1/3-octave band levels. These figures also present the statistically analyzed overall RMS vibration velocity levels on the left side of the graph in each figure. Summarizing, the typical maximum RMS vibration velocity level at each measurement location was: Location 1A = 71 dB; Location 1B = 76 dB; Location 2 = 61 dB and Location 3 = 57 dB. Overall RMS vibration velocity levels that are approximately 70 dB are generally barely feelable.

Thus, the only locations where the L_1 vibration levels approached or exceeded the threshold of human perception were at the base of the Doyle Drive support column (Location 1B) and at the NW corner of Building 201 (Location 1A). The highest PPV recorded at Location 1B was approximately 2 mm/sec (0.09 in/sec). The highest PPV recorded at Location 1A was approximately 0.5 mm/sec (0.02 in/sec), well below the conservative 2 mm/sec (0.08 in/sec) threshold damage limit for historical buildings.

These findings are consistent with those of other studies, including extensive investigations carried out by Caltrans, which has determined that traffic-generated ground vibration is not normally of sufficient magnitude to cause any appreciable risk of structural damage to adjacent buildings. Figure 9-5 is a plot showing maximum ground vibration levels generated by highway truck traffic versus the distance from the centerline of the near lane of at-grade freeways. The graph shows the maximum values recorded from previous Caltrans studies. It indicates that the highest PPV measured on the freeway shoulders (5 meters, or approximately 5 m (16-½ ft) from the center of the near lane) have never exceeded the 2 mm/sec (0.8 in/sec) limit for historical buildings with the worst combinations of heavy trucks. Experience with elevated rapid transit system structures and elevated freeway structures indicates that the ground vibration is generally lower at a given distance from the elevated structure than it would be from an at-grade alignment.

9.3 IMPACTS AND MITIGATION MEASURES

9.3.1 Construction Related Vibration Impacts to Structures

Construction activities can result in substantial levels of ground vibration, depending on the equipment and the construction procedures utilized and the distance to the observer. Buildings in the vicinity of the construction activities respond to the vibration with varying results, ranging from no perceptible effects at the lowest levels, feelable vibrations at moderate levels, and the possibility of slight damage at generally far higher levels.

Criteria relating to both feelable vibration and potential structural damage due to building vibration are presented in Section 9.1.2 of the report. Based on the criteria discussed in Section 9.1.2, a ground vibration PPV of 2 mm/sec (0.08 in/sec) would be a conservative, but appropriate limit for the historical buildings that are more susceptible to damage, including those in a poor structural condition and those of masonry construction. The buildings in the Main Post area of the Presidio are mostly of masonry construction and would therefore fall into this category. In addition, visual observation of the buildings under consideration in this study indicates some existing differential settlement and cracks in the facades of the brick buildings (Figure 9-6). However, most of the other historical buildings in the Presidio are wood-framed structures, which are substantially less susceptible to damage from vibration. For most of these buildings, a higher PPV of 5 mm/sec (0.2 in/sec) would be an appropriate, conservative limit for construction vibration. The exterior facades of some of these wood-framed buildings (such as the Mason Street warehouses) are in a poor condition (Figure 9-7), although it is understood that these buildings are structurally sound.

FIGURE 9-1
VIBRATION VELOCITY LEVELS AT LOCATION 1A
15-MINUTE SAMPLE BEGINNING AT 12:20 PM – 4/11/02

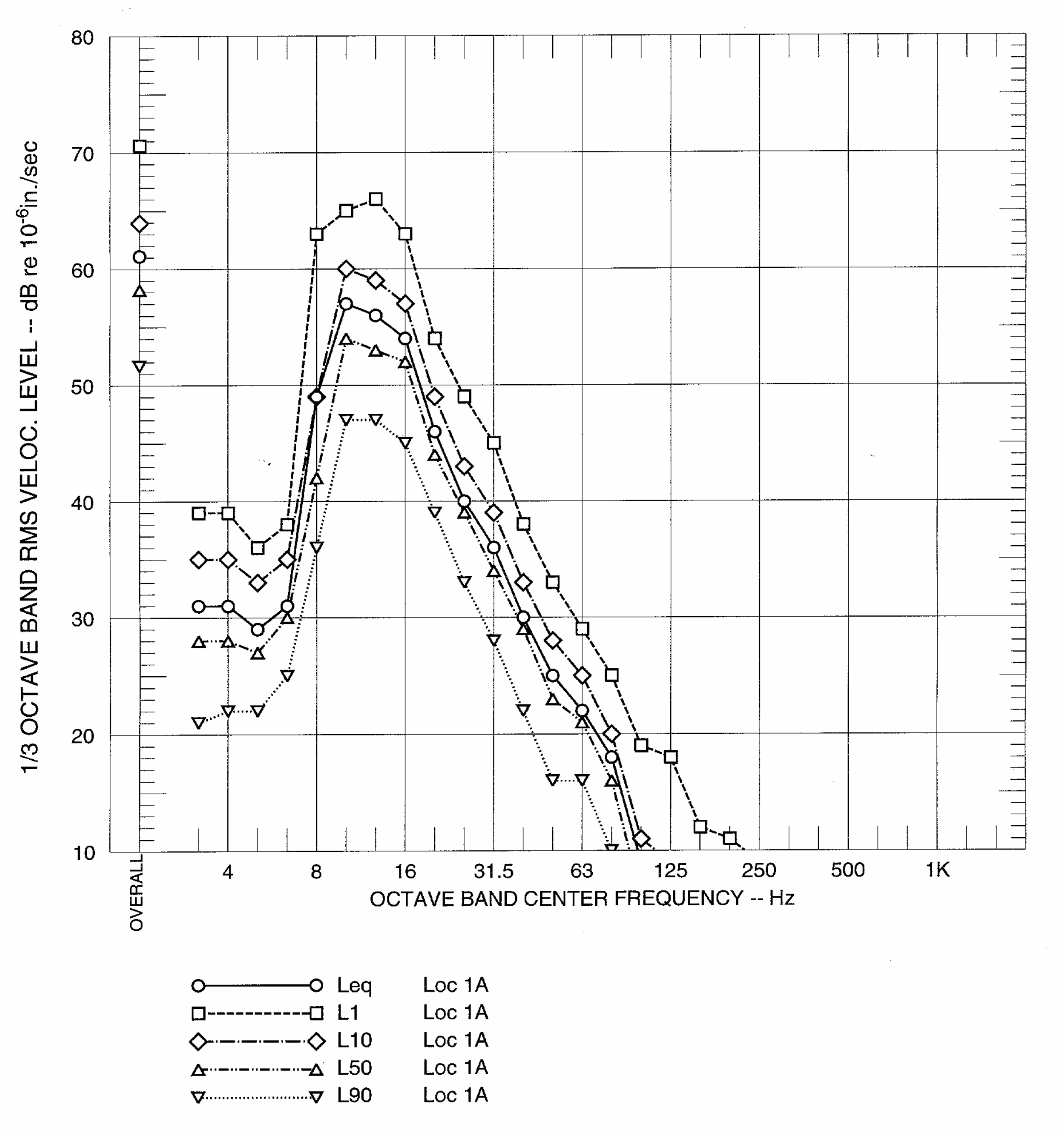


FIGURE 9-2
VIBRATION VELOCITY LEVELS AT LOCATION 1B
15-MINUTE SAMPLE BEGINNING AT 12:20 PM – 4/11/02

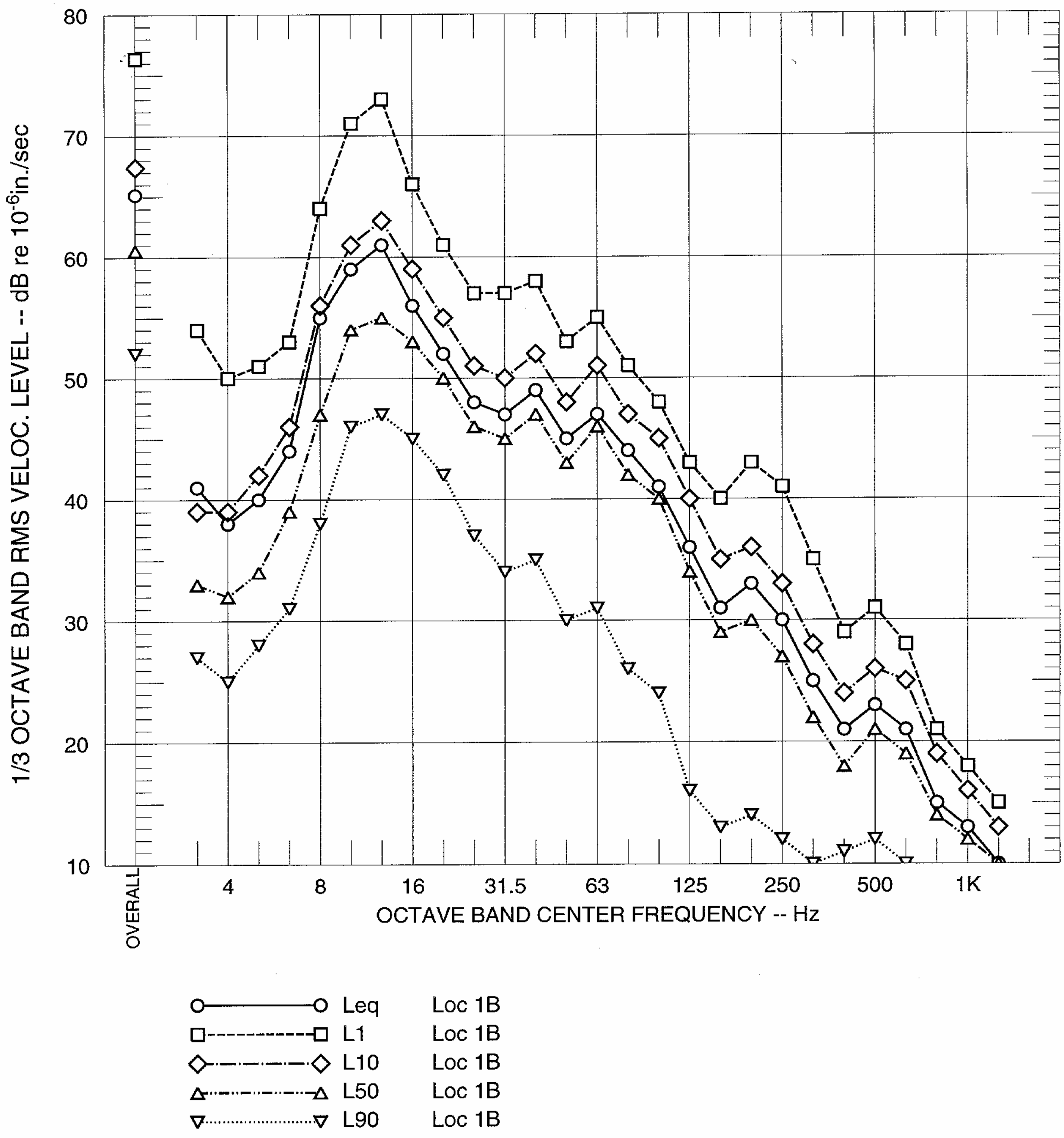


FIGURE 9-3
VIBRATION VELOCITY LEVELS AT LOCATION 2
15-MINUTE SAMPLE BEGINNING AT 1:21 PM – 4/11/02

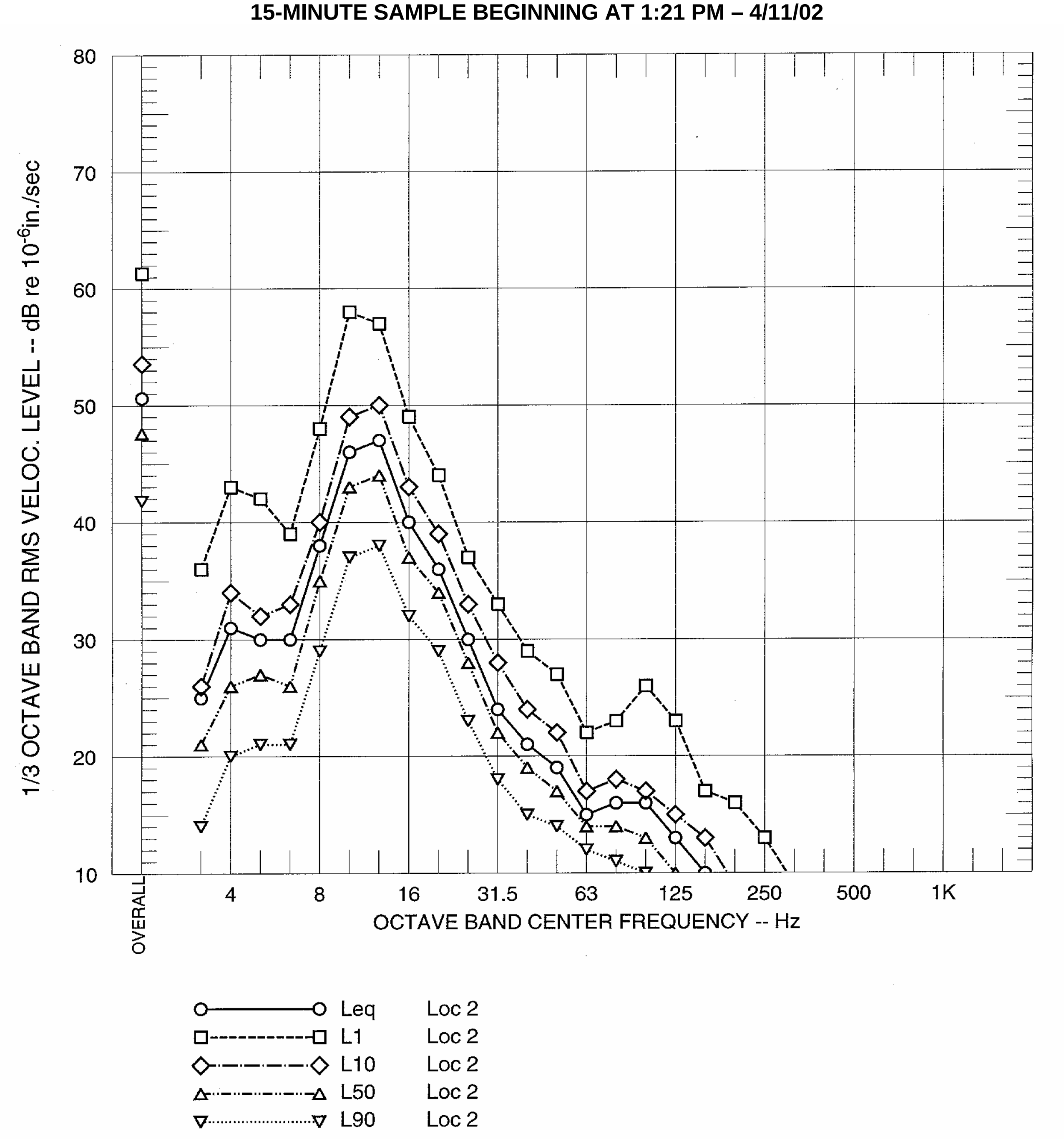


FIGURE 9-4
VIBRATION VELOCITY LEVELS AT LOCATION 3
15-MINUTE SAMPLE BEGINNING AT 2:04 PM – 4/11/02

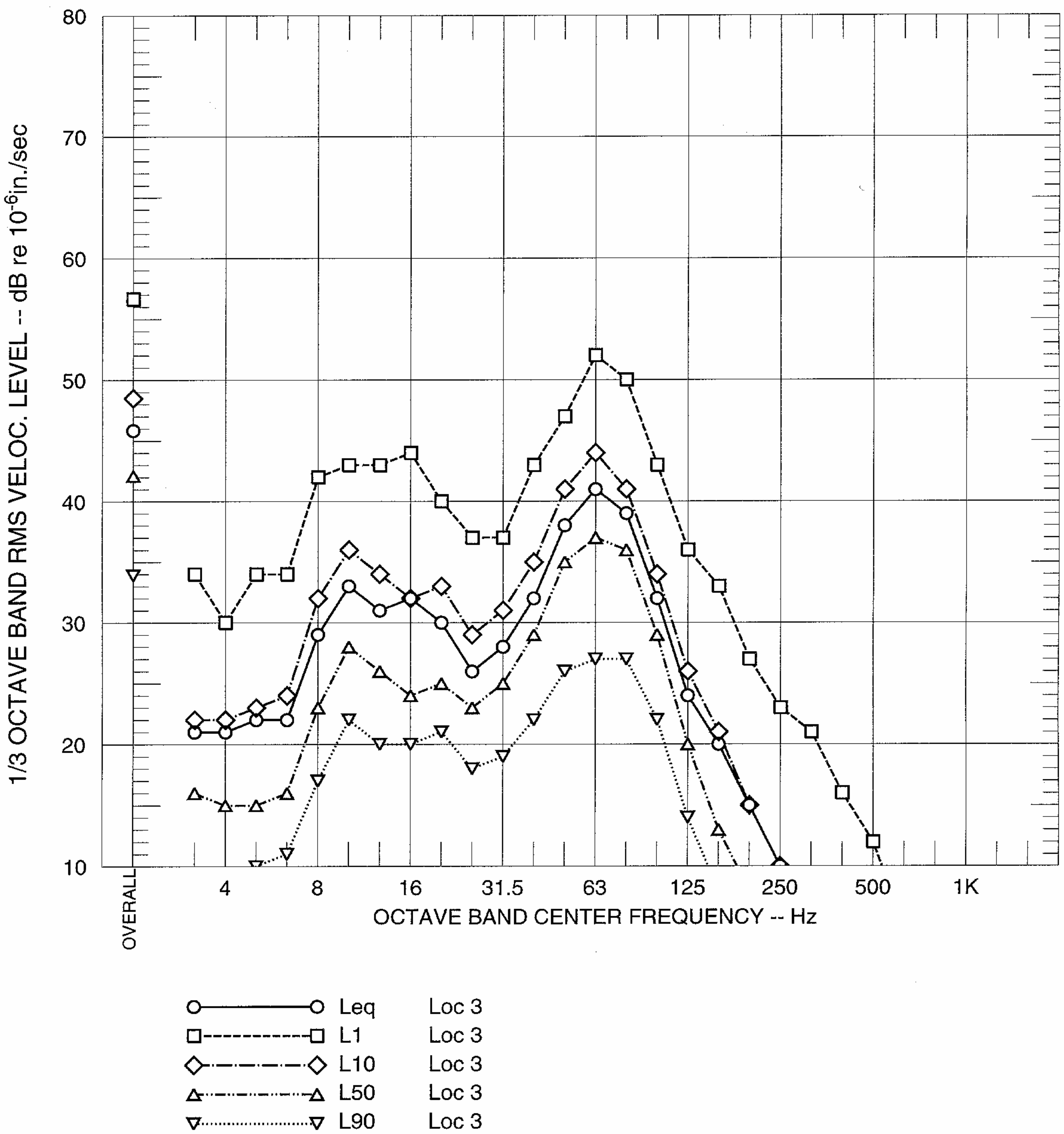
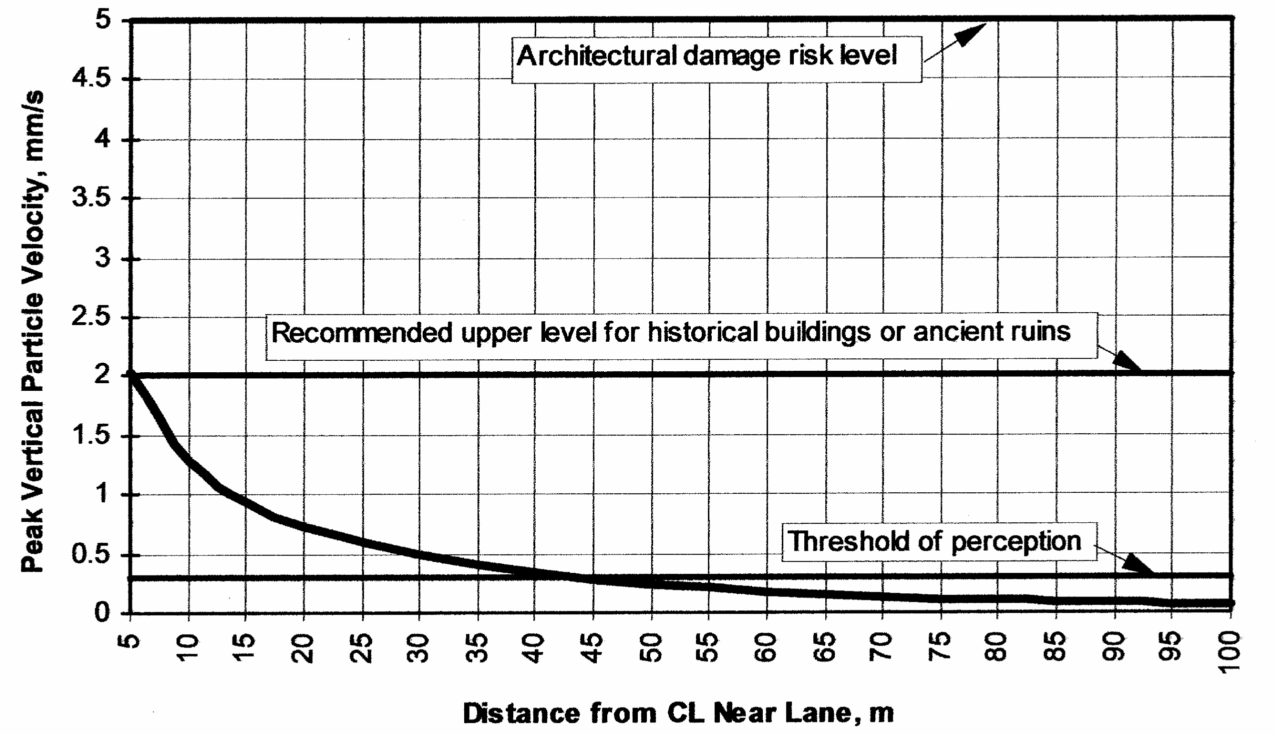


FIGURE 9-5
MAXIMUM HIGHWAY TRUCK VIBRATION LEVELS VERSUS DISTANCE



Source: Caltrans Technical Advisory, Vibration, TAV-02-01-R9601, "Transportation Related Earthborne Vibrations (Caltrans Experiences)," February 20, 2002.

The construction vibration activities that typically generate the highest levels of ground vibration are blasting, impact pile driving, and dynamic compaction. Pile driving would be required along much of the route, including the section of tunnel adjacent to the Main Post, proposed by the Presidio Parkway Alternative. The tunnel road structure would need to be supported by piles, and sheet piling would be installed during the excavation of the tunnel adjacent to the Main Post. The proposed underground parking garage near the Mason Street Warehouses would also need piles to support the floor slab.

Dynamic compaction of the road surfaces using vibratory rollers would also be required along much of the route. Compaction would be required where existing roads are reconstructed as part of the Presidio Parkway Alternative, including Palace Drive (adjacent to the Palace of Fine Arts), Halleck Street, Girard Road and Gorgas Avenue, and in the formation of temporary construction (haul) roads. A number of other existing roads, including Lincoln Boulevard and Crissy Field Avenue, would also be reconstructed.

It is understood that a decision has not yet been made on whether blasting would be permitted on this project. Blasting is generally a more cost-effective means of breaking rock and can reduce the duration of exposure to the noise otherwise produced by alternate means of rock breaking. If it is permitted, blasting might be used in the area of the Park Presidio interchange. If that is the case, the blast weights and blast design would need to be based on achieving compliance with conservative ground vibration limits at the closest buildings. Vibration monitoring should be carried out during preliminary test blasts, using low charge weights, to assist in the blast design. Vibration monitoring should also be carried out during the subsequent blasting, as well as pre-construction and post-construction surveys of potentially affected structures. If blasting is not permitted, some form of mechanical means of rock breaking and extraction would be utilized in the Park Presidio interchange area.

FIGURE 9-6
BUILDING 106 (MAIN POST) SHOWING TYPICAL EXISTING CRACKS IN EXTERIOR WALLS

(PHOTOS TAKEN 8/28/04)

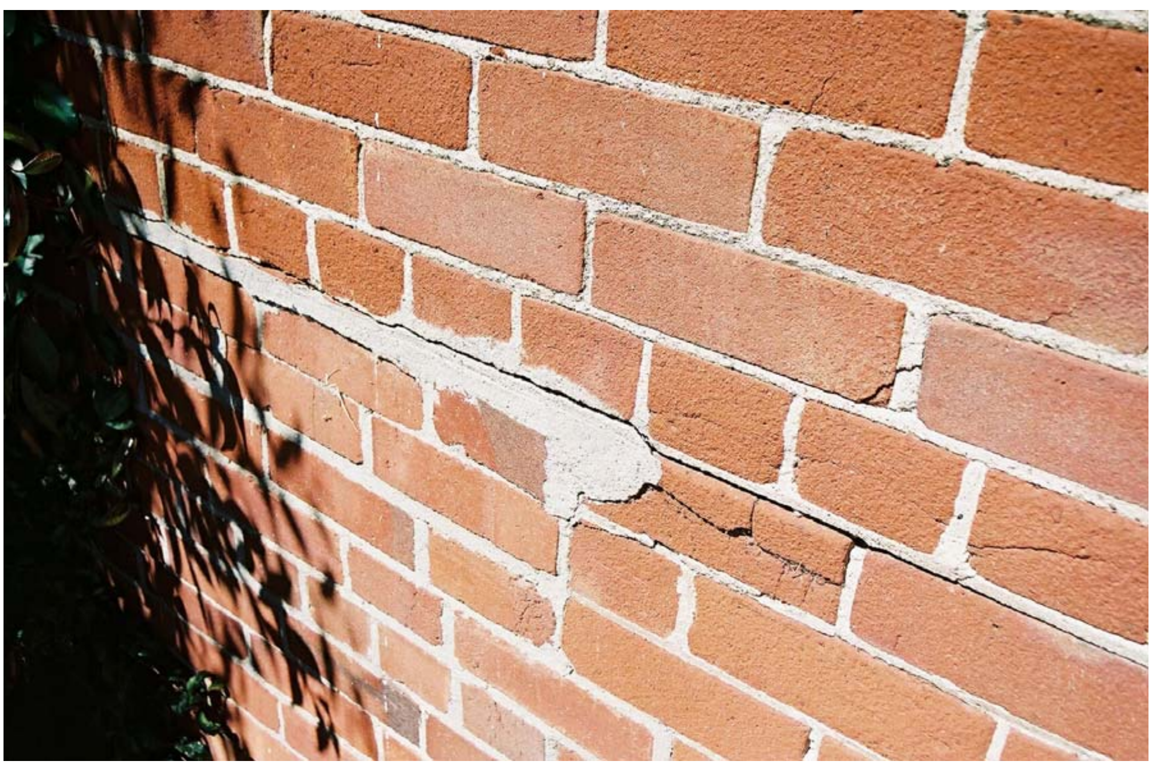


FIGURE 9-7
BUILDING 1184 - ONE OF THE MASON STREET WAREHOUSES CLOSEST TO DOYLE DRIVE

(PHOTOS TAKEN 8/28/04)

Table 9-3 provides a summary of typical ground vibration levels at 7.5 m (25 ft) from various items of construction equipment. Although the table generally gives one level for each item of equipment, there is considerable variation in reported ground vibration levels from construction activities in practice.

TABLE 9-3
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment		PPV at 7.5 m (25 ft) [in mm/sec in/sec]	Approximate L_v^* at 7.5 m (25 ft)
Pile Driver (impact)	upper range	38.6 (1.518)	112
	typical	16.4 (0.644)	104
Pile Driver (sonic)	upper range	18.6 (0.734)	105
	typical	4.3 (0.170)	93
Clam shovel drop (slurry wall)		5.1 (0.202)	94
Hydromill (slurry wall)	in soil	0.2 (0.008)	66
	in rock	0.4 (0.017)	75
Large bulldozer		2.3 (0.089)	87
Caisson drilling		2.3 (0.089)	87
Loaded trucks		1.9 (0.076)	86
Jackhammer		0.9 (0.035)	79
Small bulldozer		0.08 (0.003)	58

Source: "Transit Noise and Vibration Impact Assessment," Final Report, prepared by Harris Miller Miller and Hanson Inc. for the Federal Transit Administration, US Department of Transportation, April 1995.

Note: $^*L_V$ is the Vibration Velocity Level in dB re 10^{-6} in/sec.

Based on this information and file data, the expected worst-case ground vibration velocity from impact pile driving is less than 2 mm/sec (0.08 in/sec) PPV at a distance of 60 m (200 ft), and less than 5 mm/sec (0.2 in/sec) PPV at 30 m (100 ft), even allowing for soil conditions that tend to assist the vibration propagation. This information was provided to the project design team during the initial stages of the study.

Alternate means of pile driving would be used within a 60 m (200 ft) buffer zone from the historical buildings within the Presidio. These alternate measures would include vibratory piling, use of drilled piles, and pile jacking (where the piles are pressed into the ground by means of a hydraulic system, resulting in far less vibration). Although vibratory pile driving generally produces less vibration than conventional impact pile driving, file data indicate that vibratory pile driving could still generate ground vibration levels exceeding 2 mm/sec (0.08 in/sec) within about 30 m (100 feet), and could exceed 5 mm/sec (0.2 in/sec) within about 15 m (50 feet). Vibratory pile drivers usually generate the highest vibration levels during start-up and shut-down. "Resonant-Free" (or variable eccentric moment) vibrators avoid this problem, by shifting the eccentric weights out of phase during start-up and shut-down and shifting the weights into phase after the vibrator reaches full speed, and might therefore find application on this project in situations where impact or standard vibratory pile driving cannot be used due to vibration.

Where drilled piles are utilized, steel casings would first need to be put in place to prevent or minimize groundwater seepage, and that the casings would be installed by a vibratory process or by jacking. Where drilled piles are utilized due to vibration considerations, it is recommended that the steel casings be put in place by jacking rather than a standard vibratory process.

By the nature of their operation, vibratory rollers can also give rise to relatively high levels of ground vibration. The maximum expected levels range up to about 2 mm/sec (0.08 in/sec) at distances of 20 m (70 ft). The highest levels of vibration usually occur as the roller is brought to rest and the frequency of the centrifugal forces passes through the natural frequency of the roller/ground/structure. Higher levels could occur at closer distances, however no damage would be expected for any building at distances greater than approximately 20 m (70 ft) (from a medium-to-heavy roller). In areas where soil compaction is required adjacent to any of the historical buildings more susceptible to damage (i.e., the masonry structures or buildings in a poor structural condition) at distances closer than about 20 m (70 ft), particularly with a heavy roller, vibration monitoring at those structures should be carried out and consideration given to the use of a lighter roller. To avoid resonance effects, vibratory rollers should not be stopped or started in proximity to sensitive premises.

Other activities that could generate relatively high levels of vibration include the demolition of the existing elevated roadway structures. Demolition techniques that are being considered for the low viaduct area involve cutting the structure into sections that would be progressively dropped to the ground, resulting in high levels of vibration. Operations of this type might need to be modified (e.g., lowering by crane rather than dropping the components to the ground) if they occur in close proximity to the historical buildings more susceptible to damage. Measures to reduce the impacts, such as dropping the components onto earthen “cushions,” could be considered but this type of approach would not necessarily attenuate the low frequency ground vibration generated by the impacts. Before demolition procedures such as this are carried out in close proximity to historical buildings, measurements could be carried out in less sensitive areas of the project to evaluate the vibration from dropping sections of the structure onto the ground (with and without an earthen cushion).

Breaking up the existing reinforced concrete structures on the ground by using hoe rams or other hydraulic breakers could also produce substantial vibration, although the vibration levels are likely to be appreciably lower than those generated by dropping the components onto the ground in the first place. In areas close to historical buildings where it might be necessary to lower the components to the ground by crane, the components should be placed as far as possible from the buildings before they are broken up. Alternately, if earthen cushions are found to be effective in mitigating the vibration from dropping the reinforced concrete structures onto the ground, they might also be effective in reducing the vibration from subsequently breaking up these components on the ground.

The data in Table 9-3 indicate that vibration from bulldozers and other earthmoving equipment involved in excavating the tunnels, and from jackhammers and similar equipment used to break up miscellaneous existing reinforced concrete structures such as retaining walls, curbs and gutters, should not generally be an issue in terms of potential structural damage.

The vibration from the hydraulic power units associated with the pile driving equipment, and from other continuously operating mechanical equipment such as compressors, should not be an issue in terms of potential structural damage, particularly since such equipment can be strategically located to reduce both noise and vibration at sensitive buildings.

Figure 9-5 indicates that the ground vibration adjacent to truck movements on temporary construction routes (at distances of greater than about 5 m (15 ft) from the center of the near lane, or greater than about 3 m (10 ft) from the edge of the road) would not normally give rise to any substantial risk of vibration-induced damage to adjacent historical buildings, although the vibration might be quite noticeable to the building occupants. However, the vibration levels can be very substantially increased if there are discontinuities in the road pavement due to poorly maintained surfaces. It will therefore be important to maintain the surfaces of roads used as temporary construction routes in good condition.

With respect to which alternative has the greatest potential impacts in terms of construction vibration, the Presidio Parkway Alternative would have the greatest potential impacts in areas to the south of Doyle Drive (such as the Main Post), due to the general shift in alignment towards the south. It is likely that several existing historical buildings to the south of Doyle Drive – namely Buildings 670, 204, 201, 230, and 1151 – would in fact be demolished as part of the Presidio Parkway Alternative. The Presidio Parkway Alternative also involves more work on other roads in the study area, particularly near the east end of the project. Nonetheless, implementing appropriate vibration management procedures - as discussed in the following section - can minimize the risk of structural damage to the historical buildings, although the Presidio Parkway Alternative would likely require more extensive vibration mitigation measures than the Replace and Widen Alternative.

9.3.2 Construction Related Vibration Impacts to Soils

Construction vibration can cause soil liquefaction phenomena and soil settlement, and can therefore indirectly result in structural damage due to these effects. The project geotechnical engineers have provided the following assessment indicating vibration-induced settlement is unlikely to be a substantial adverse issue:

> "*Vibration induced settlements arising out of pile driving has been discussed in NCHRP Synthesis 253 (Dynamic Effects of Pile Installations on Adjacent Structures) published in 1997. This publication indicates that settlement of loose sands during pile driving is clearly a problem and that settlements in cohesive soils are unlikely, except under special circumstances. The publication further states that simple methods of estimating the magnitude of settlement are not available. Several examples of pile driving induced settlements are presented. Though by no means definitive, significant settlements are not likely to occur beyond 200 feet from the pile location even for most adverse soil conditions. Settlements are also likely to increase when a large number of piles are driven in the vicinity, as well as when a sized (high energy) hammer is used.*
>
> *The loose deposits of the Historic Tidal Marsh between Stations 17+00 and 28+00 are possibly the only soils at the project site vulnerable to pile driving induced settlements. A more definitive assessment of the vibration induced settlement issue may be made during Final Design. At that time, the construction plans will be finalized; therefore, the locations of the foundation, including the number and type of piles to be driven at each location will be established. The type of hammer, including hammer energy will be known, and improved information on the distribution of the loose sandy soils and their properties will be available."*

The Final Preliminary Geotechnical Report, 2004 contains a full discussion of all project-related geotechnical and soil impacts.

9.3.3 Construction Vibration Mitigation Measures

Provided appropriate vibration limits are incorporated in the construction contracts and the vibration levels are controlled to within those limits by utilizing alternate demolition and construction procedures where necessary (as described in Section 9.3.1), there would be minimal risk of damage to the historical buildings within the Presidio due to construction-induced building vibration.

The following vibration management measures will be required to reduce vibration to acceptable levels:

1. Appropriate construction vibration limits shall be incorporated in the construction documents. The recommended ground vibration limits are a PPV not exceeding 5 mm/sec (0.20 in/sec) adjacent to the closest facades of wood-framed historical buildings in good condition, and a PPV not exceeding 0.08 in/sec adjacent to the closest facades of historical buildings more susceptible to damage (buildings of masonry construction, and other buildings in a poor structural condition).

2. Impact pile driving shall not be used within 60 meters (200 feet) of fragile historic structures.

3. In areas where soil compaction is required adjacent to any of the historical buildings more susceptible to damage (i.e., the masonry structures or buildings in poor structural condition) at distances closer than about 20 m (65 feet), particularly with a heavy roller, vibration monitoring at those structures shall be

carried out and consideration given to the use of a lighter roller. To avoid resonance effects, vibratory rollers shall not be stopped or started in proximity to sensitive premises.

4. To reduce potential vibration impacts in close proximity to the historical buildings from the dropping demolished viaduct structures onto the ground, the demolition operations shall modified as necessary. Alternative approaches include lowering demolished viaduct structures by crane (as opposed to dropping), or the use of earthen cushions. If earthen cushions are used, their effectiveness in reducing vibration would first be evaluated in less sensitive areas of the project site.

5. To reduce potential vibration impacts to historic buildings from breaking up reinforced concrete structures on the ground, the components shall be placed as far as possible from the buildings before they are broken up.

6. Pre-construction surveys of potentially affected buildings shall be carried out prior to the commencement of any demolition or construction activities that might affect the structural integrity of the buildings. The surveys shall be thoroughly document the existing conditions of the building foundation, floors, walls, ceilings, roof, and other building elements, and shall record any internal and external cracks, settlement, leakage, and other deficiencies. Existing cracks found in buildings shall be measured by ruler and photographed by means of still photographs and video recordings. Crack monitors shall be installed where any substantial existing cosmetic or structural cracks are found in the pre-construction surveys, and shall be regularly checked as construction proceeds. Post-construction surveys shall also be carried out immediately after the completion of the construction activities that might affect specific buildings. It may also be necessary to carry out more than one pre-construction (and post-construction) survey in each building, particularly when there are substantial periods of time between different construction activities that might affect a given building.

7. Ground vibration monitoring shall be carried out adjacent to the closest facades of potentially affected historical buildings, by independent consultants, before and during construction activities generating potentially high levels of ground vibration. The vibration monitoring shall be carried out using calibrated seismographs providing electronic or paper recordings of the maximum PPV recorded in each of three orthogonal directions, over intervals not exceeding one minute. The seismograph sensors shall be firmly set in undisturbed soil or firmly mounted on at-grade concrete slabs or asphalt pavement. The seismographs shall also be capable of activating immediate audible or visual alarms or electronic transmission if the vibration exceeds a pre-set limit, thus alerting the Contractor’s representative of any exceedences of the vibration limit. If the limits are exceeded, the construction work causing the exceedences must immediately cease. The Contractor would then be required to investigate modifications to the construction procedure or alternate procedures to reduce vibration, before the work is permitted to re-start.

8. If blasting is permitted, the blast weights and blast design shall be based on achieving compliance with conservative ground vibration limits at the closest buildings. Vibration monitoring shall be carried out during preliminary test blasts, using low charge weights, to assist in the blast design. Vibration monitoring shall also be carried out during the subsequent blasting, as well as pre-construction and post-construction surveys of potentially affected structures.

In addition, the Presidio Trust and the occupants of potentially affected buildings (particularly people living in the Riley Avenue and Ruckmann Avenue residential areas) shall be fully informed about the construction schedule, its progress, and the hours of work. Residents and building occupants shall be given adequate advance notice before work is carried out in their vicinity. They shall be advised that they might experience some disruptions due to construction noise and “feelable” vibration, but that extensive measures have been taken to carefully monitor and control the vibration to below the levels that could cause any damage to the buildings.

9.3.3 Long-Term (Permanent) Impacts

This section of the report considers the potential disturbance to building occupants and the potential risk of structural damage due to any increased ground and building vibration resulting from increased future traffic on Doyle Drive and other roads on the study area. The effects of moving the elevated roadway support columns closer to some of the historical buildings with the Replace and Widen Alternative, and changing the alignment with the Presidio Parkway Alternative, have also been considered.

Table 9-4 summarizes the existing two-way morning and afternoon peak traffic volumes at representative locations on Doyle Drive, and the projected future morning and afternoon peak-hour traffic volumes for the No Build, Replace and Widen, and Presidio Parkway Alternatives (including the Diamond and Circle options).

TABLE 9-4
EXISTING AND FUTURE AM AND PM PEAK HOUR TRAFFIC VOLUMES ON DOYLE DRIVE

Location	Time	Base Case (2000)	No Build (2030)	Replace & Widen (2030)	Presidio Parkway Circle (2030)	Presidio Parkway Diamond (2030)
Toll Plaza to Park Presidio	AM Peak Hour	9,140	11,460	11,430	11,650	11,640
Toll Plaza to Park Presidio	PM Peak Hour	8,770	11,290	12,000	11,700	12,060
Park Presidio to Richardson Avenue	AM Peak Hour	7,250	7,930	7,980	7,840	7,950
Park Presidio to Richardson Avenue	PM Peak Hour	7,230	8,400	8,650	8,630	8,710

Source: DKS Associates, 2004

Note: Traffic volumes shown in the table are two-way (i.e., Eastbound and Westbound)

The data indicate that there would be relatively modest increases in traffic volumes on Doyle Drive from the present time to 2030, with little difference between the No Build scenario and the build alternatives. Assuming that the traffic mix (i.e., percentage of trucks and other heavy vehicles) is much the same, there would not be any substantial changes in traffic-induced vibration due to increased future traffic.

Due to their weight, trucks are the main cause of the maximum vibration levels experienced adjacent to freeways. Caltrans Technical Advisory TAV-02-01-R9601 notes:

> "Because of the rapid dropoffs with distance, even trucks traveling close together often do not increase peak vibration levels substantially. In general, more trucks will show up as <u>more</u> peaks, not necessarily <u>higher</u> peaks. Wavefronts emanating from several trucks close together may either cancel or partially cancel (destructive interference) or reinforce or partially reinforce (constructive interference) each other, depending on their phases and frequencies. Since traffic vibrations can be considered random, the probabilities of total destructive or constructive interference are extremely small. Coupled with the fact that two trucks cannot occupy the same space and the rapid drop-off rates, it is understandable that two or more trucks normally do not contribute significantly to each other's peaks."

With the No Build scenario, even if future traffic volumes on Doyle Drive substantially increased above the current levels, it is unlikely that there would be any substantial increases in the maximum vibration levels, although the number of the higher-level vibration events could increase in proportion with the traffic volumes. Thus, increased traffic is by itself unlikely to substantially increase the maximum vibration levels.

Moving the elevated roadway support columns closer to some of the historical buildings with the Replace and Widen Alternative, or moving the whole alignment closer with the Presidio Parkway Alternative, could increase the resulting building vibration levels in some areas. As a guide to the increases that could be expected, a halving in distance (e.g., from 50 ft to 25 ft) could approximately double the maximum ground vibration PPV generated by a given truck. Another factor that could increase the resulting vibration levels in some areas is changing the current elevated alignments to at-grade alignments with the Presidio Parkway Alternative. Thus, the levels of vibration experienced in the closer buildings might increase in some areas, particularly with the Presidio Parkway Alternative, but the vibration would remain well below conservative criteria based on minimizing the risk of structural damage.

It is difficult to predict whether the Replace and Widen or Presidio Parkway Alternatives would lead to any substantial adverse impacts in terms of "feelable" vibration, without knowledge of the final design. The current levels of ground vibration outside the historical buildings close to Doyle Drive are unlikely to be of sufficient magnitude to cause "feelable" floor vibration inside the buildings. Thus increased future ground vibration would not necessarily result in noticeable vibration within the buildings.

The closest building in the Main Post area to the Presidio Parkway Alternative alignment is Building 106, which will continue to be used as offices. The preliminary plans of the Presidio Parkway Alternative indicate that the closest corner of Building 106 would be about 8 meters horizontal distance from the center of the nearest traffic lane, although the near lanes would be at least 4 meters below grade. The values plotted in Figure 9-5 indicate that the worst-case ground vibration velocity could be up to about 1.4 mm/sec (0.06 in./sec) PPV at 8 meters from the center of the nearest freeway lane; this substantially exceeds the threshold of perception. However, Figure 9-5 is based on the highest values that have ever been recorded in Caltrans' studies, and are thus are very conservative predictions. Provided the road surface is smooth (i.e., there are no substantial irregularities), the ground vibration produced by trucks is unlikely to substantially exceed 0.5 mm/sec (0.02 in./sec) PPV near the closest corner of the building. Older, heavier buildings like Building 106 exhibit higher coupling losses and react less to the vibration than the lighter, more modern structures. The floor vibration levels inside Building 106 would be substantially lower than the ground vibration levels outside the closest corner of the building. Even if the vibration is at times "feelable," it is expected that the vibration velocity level in the areas within Building 106 closest to Doyle Drive would comply with the Federal Transit Administration's 75 dB (re 10^{-6} in/sec) criterion used for assessing the acceptability of frequent vibration events in institutional and "quiet" office buildings.

SECTION 10.0: REFERENCES

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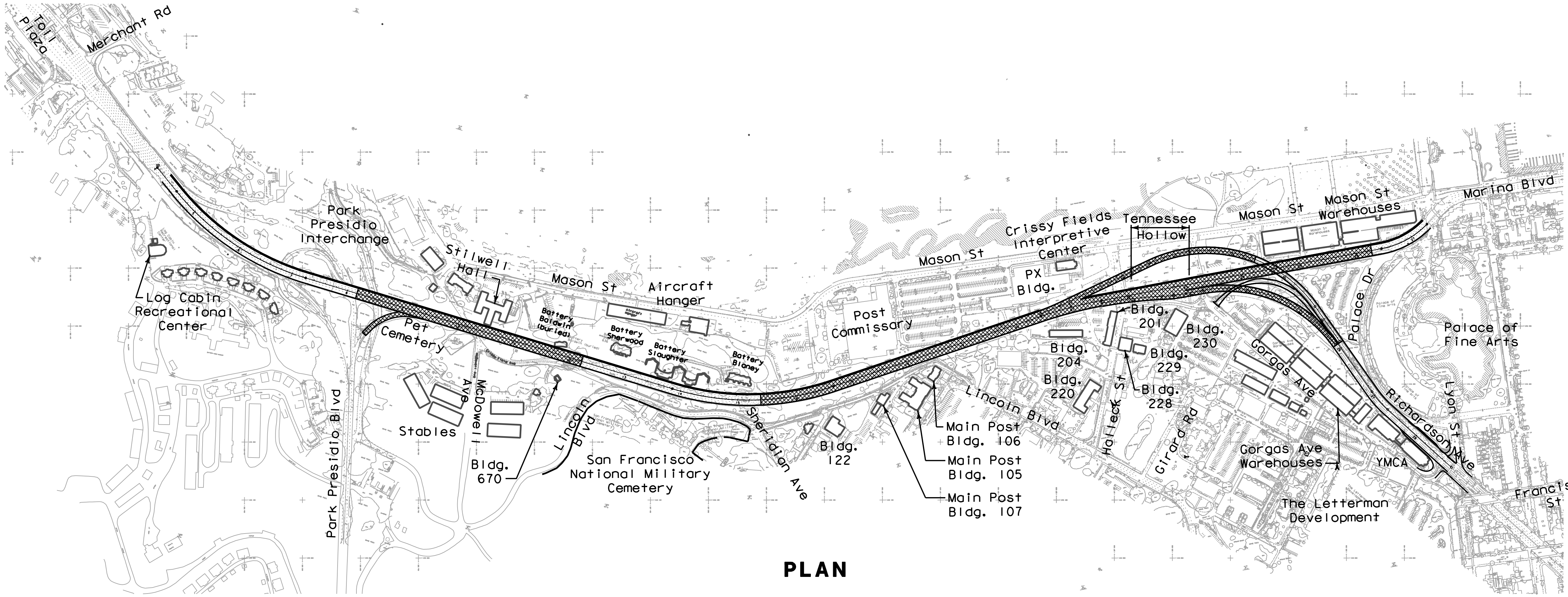
APPENDIX A

DETAILED ALTERNATIVE AND DESIGN OPTION DRAWINGS

1. No Build



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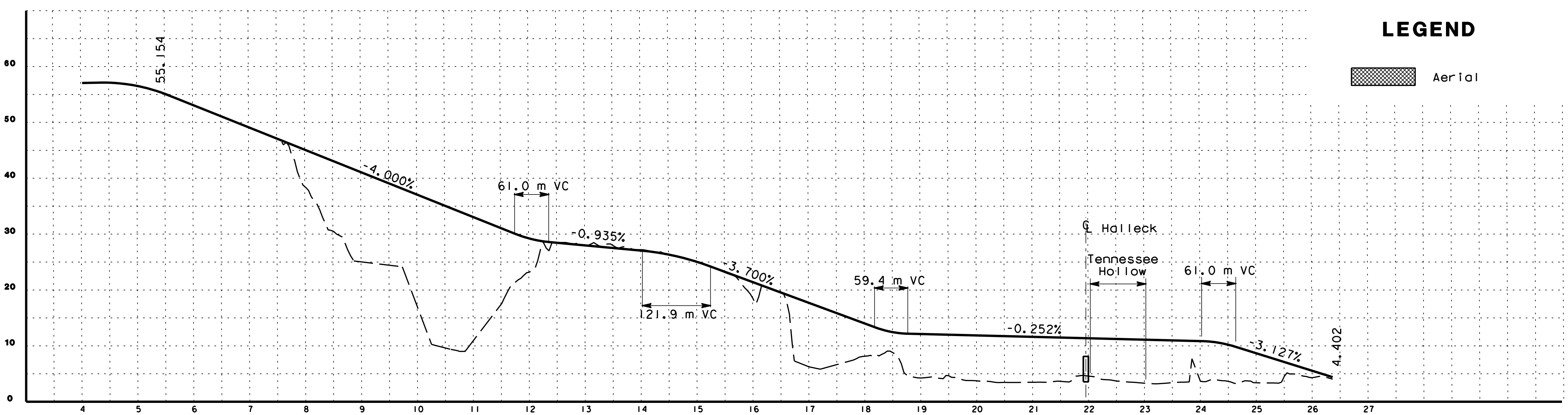

PROFILE

LEGEND

Aerial

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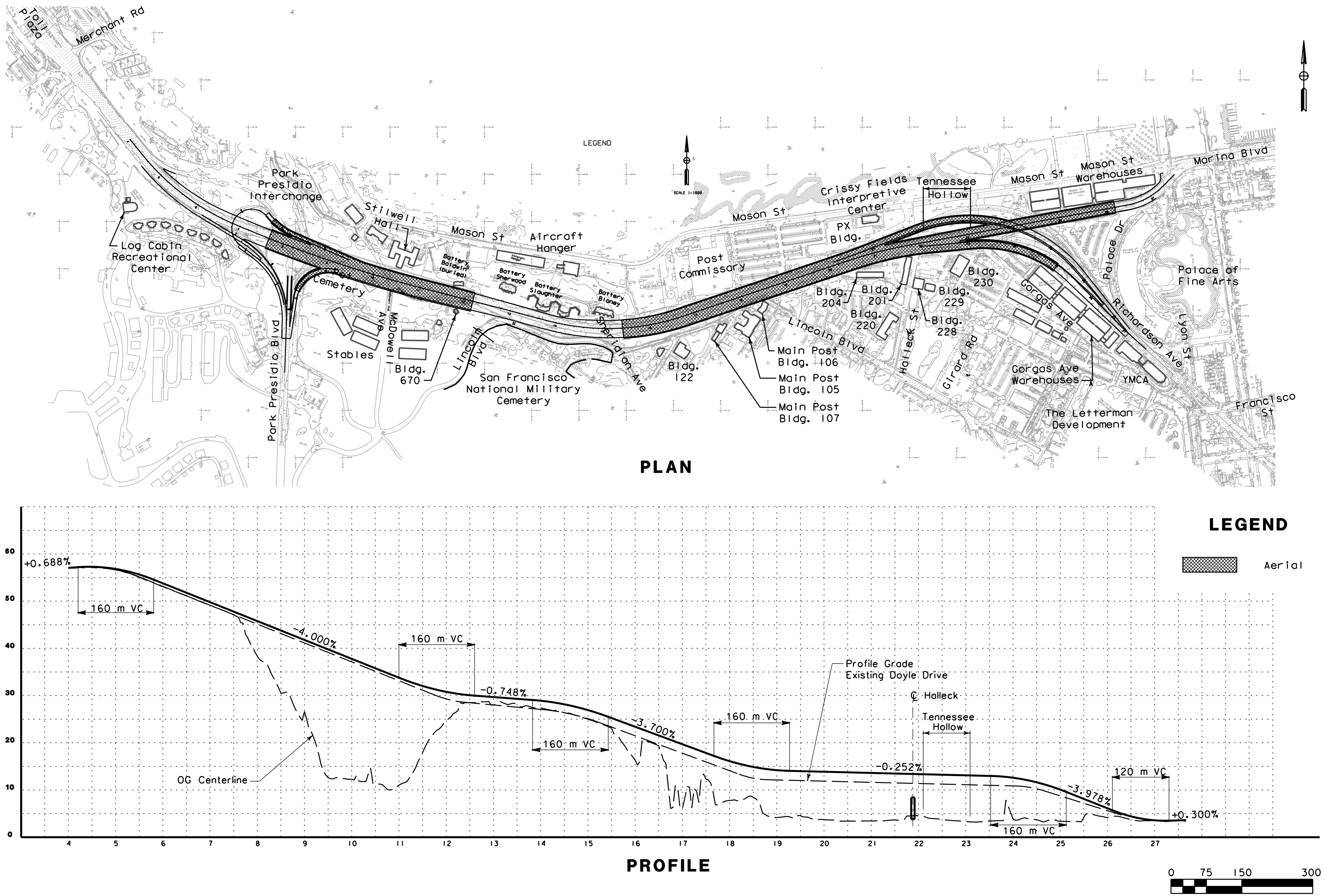
South Access to the Golden Gate Bridge

2. Replace and Widen - No Detour



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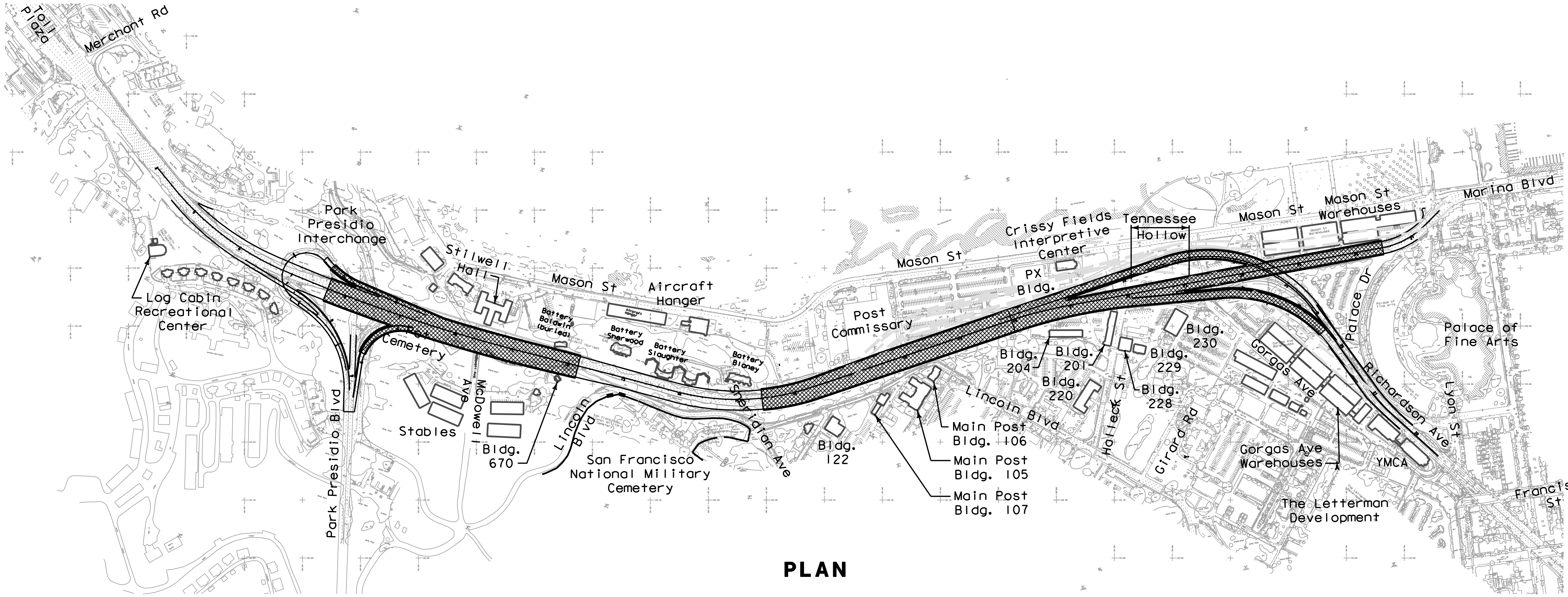

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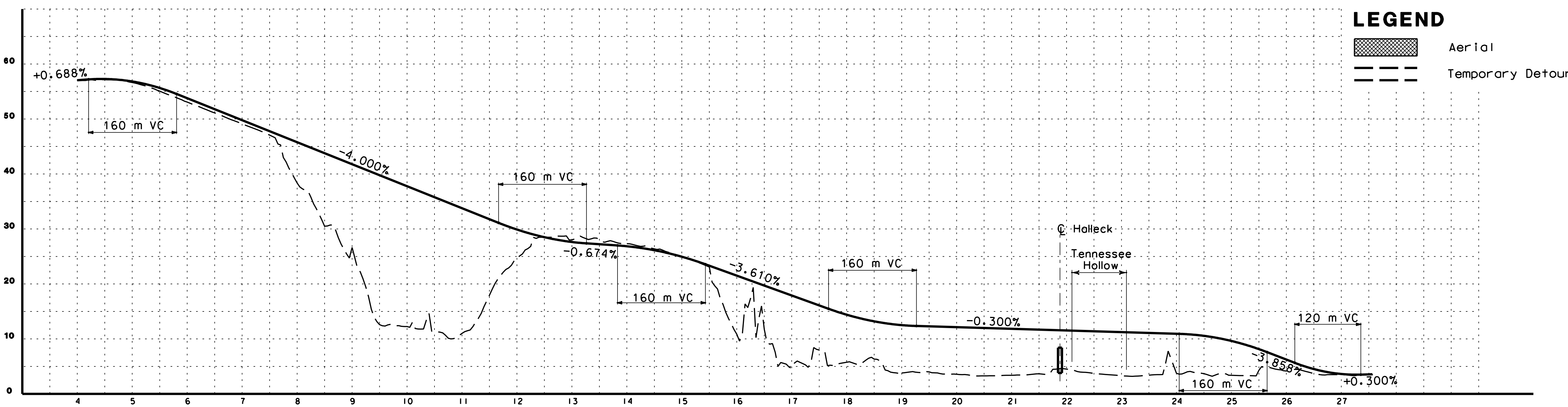

PROFILE

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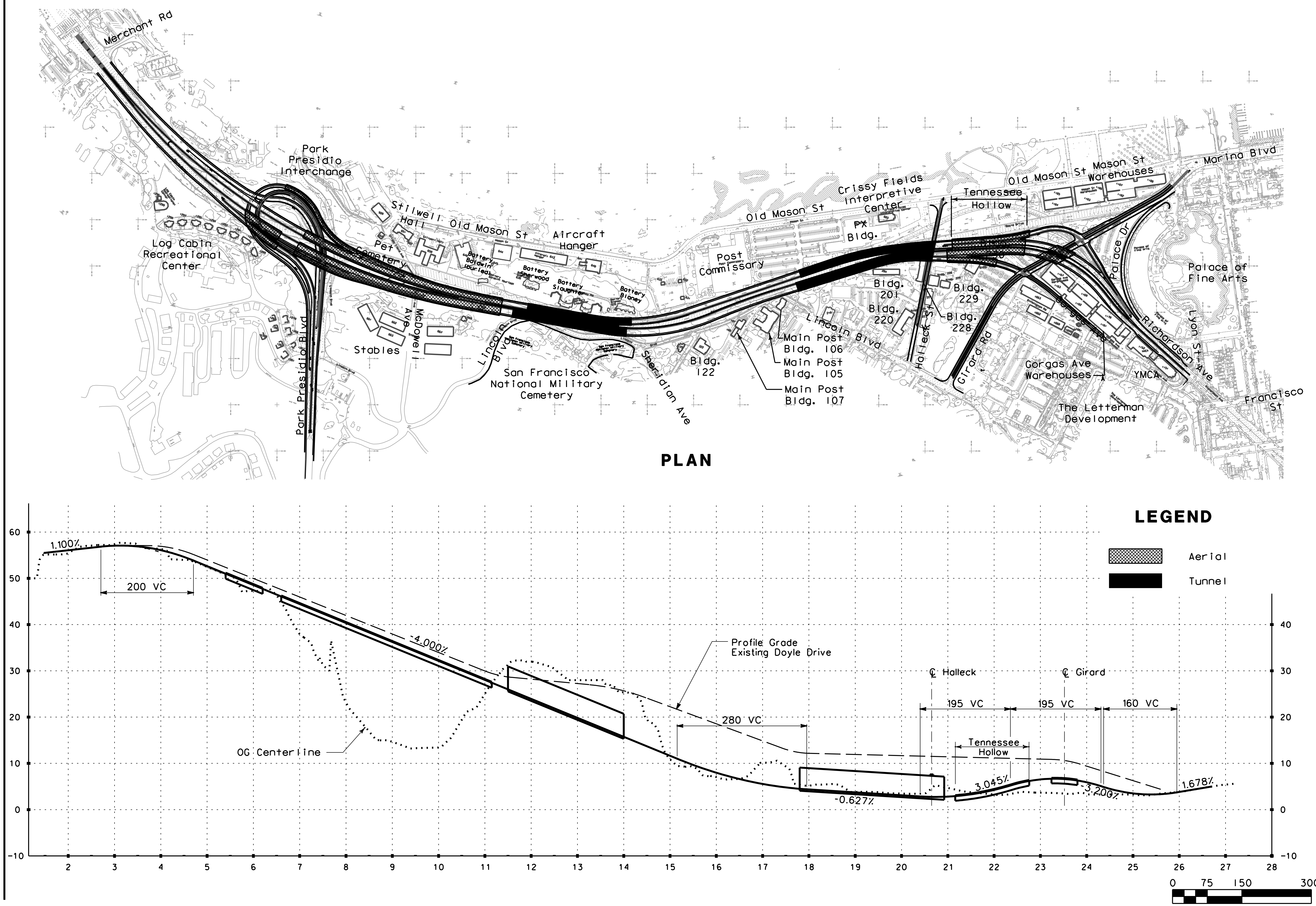
5. Presidio Parkway



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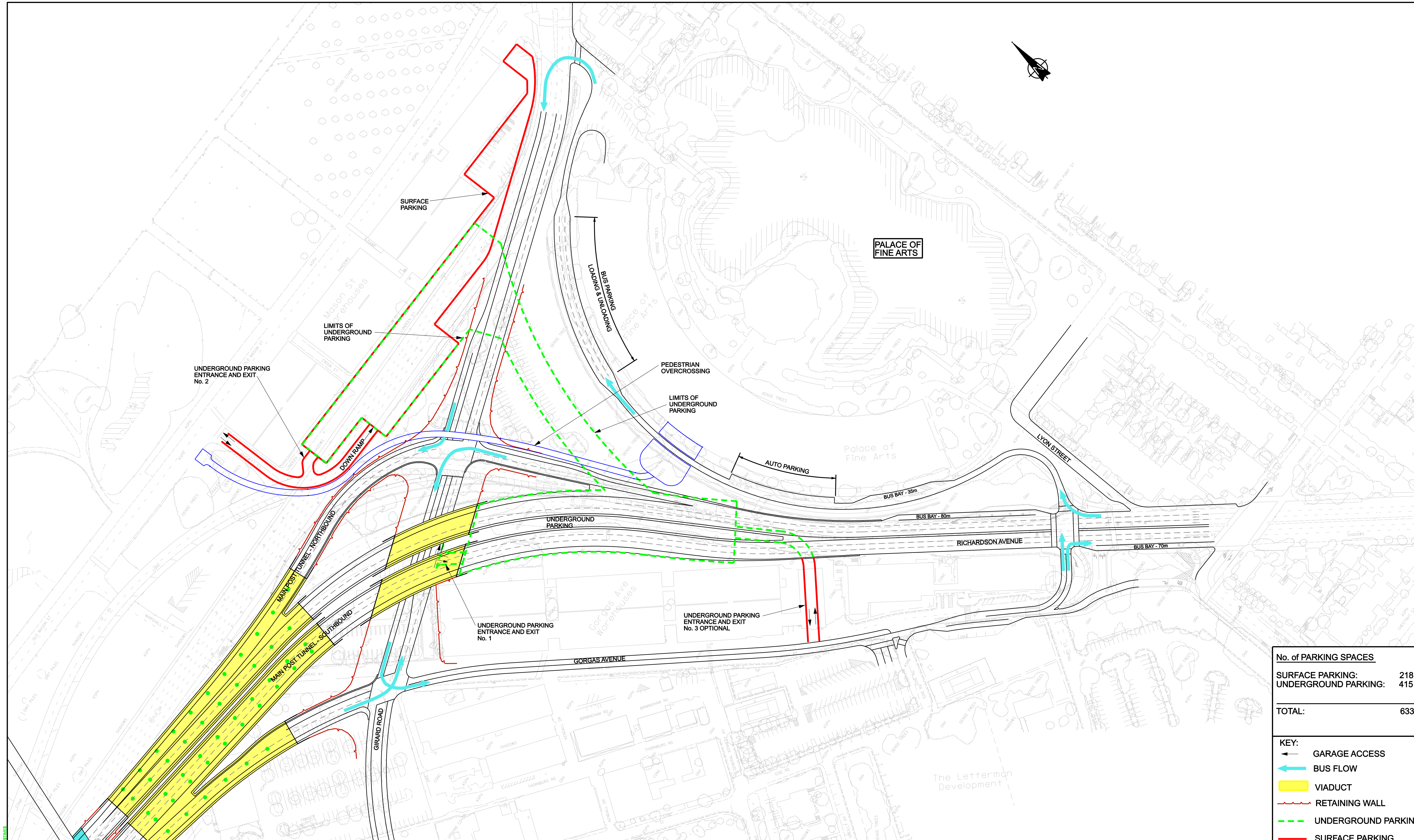

No. of PARKING SPACES	
SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

KEY:
- GARAGE ACCESS
- BUS FLOW
- VIADUCT
- RETAINING WALL
- UNDERGROUND PARKING
- SURFACE PARKING

NOTES.
1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:
1m Structure
3m Min

Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
DIAMOND OPTION
EAST END
PARKING & CIRCULATION

Scale: 1:1000
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Drawing Status DRAFT
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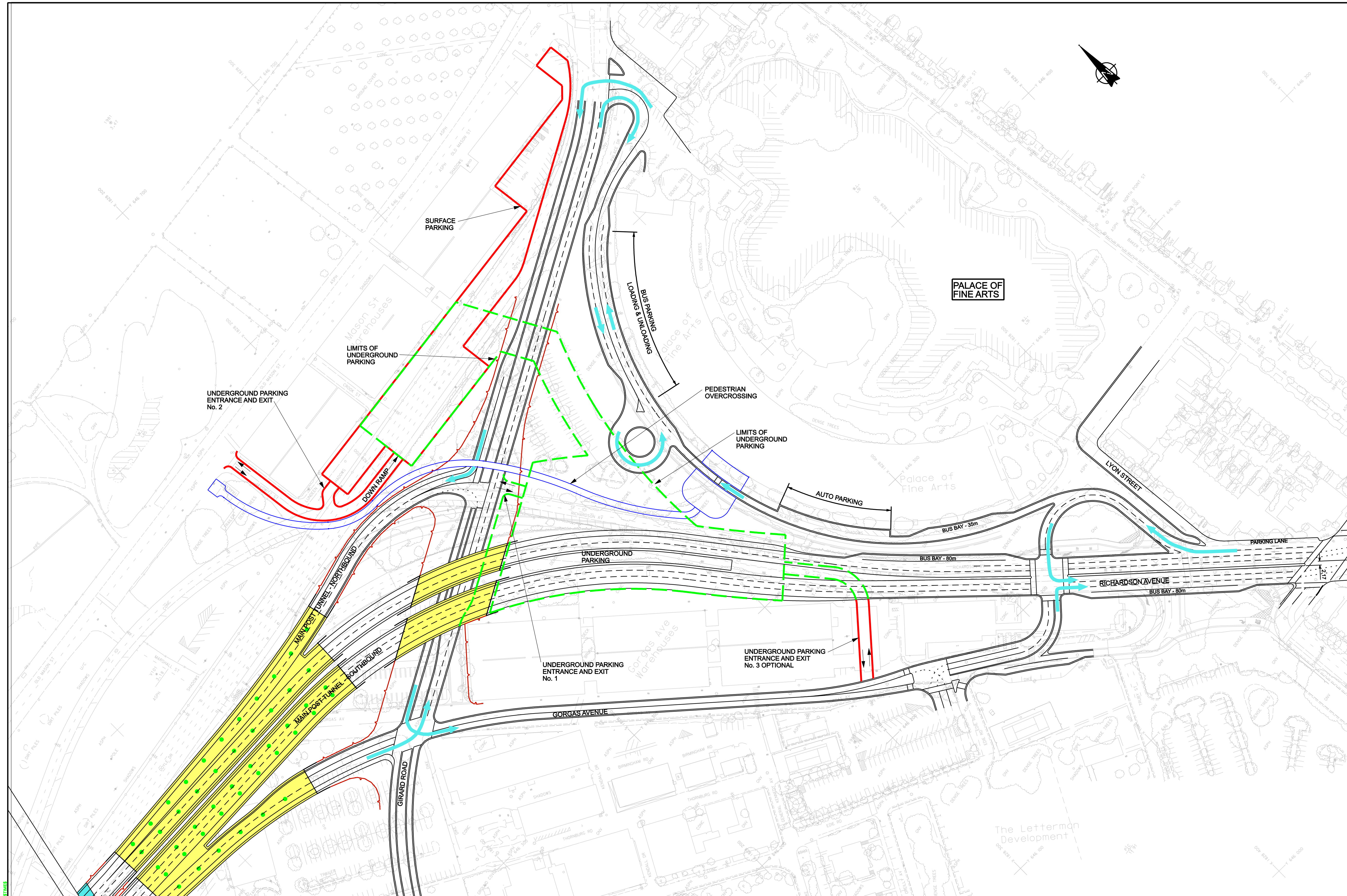
Drawing No SFSK-052
Issue -



No. of PARKING SPACES	
SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

KEY:

- GARAGE ACCESS
- BUS FLOW
- VIADUCT
- RETAINING WALL
- UNDERGROUND PARKING
- SURFACE PARKING

NOTES.

1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:

1m Structure

3m Min

Issue	Date	By	Chkd	Appd

Job Title: ALTERNATIVE 5 PRESIDIO PARKWAY

Drawing Title: LAYOUT PLAN CIRCLE DRIVE EAST END PARKING & CIRCULATION

Scale: 1:1000

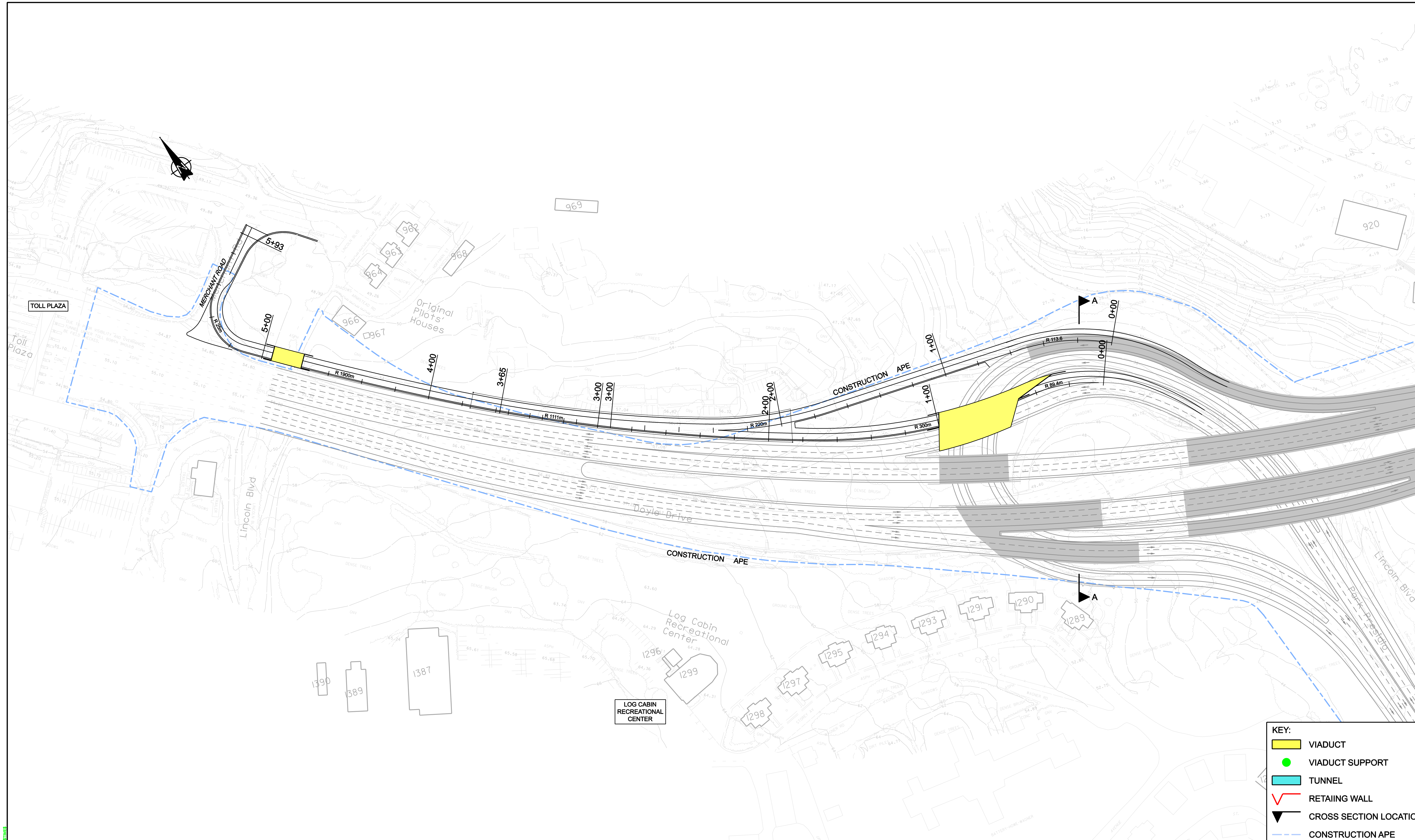
File Name: SFSK-051.DGN

Drawing Status: DRAFT

Job No: 130168-00

Drawing No: SFSK-051

Issue: -



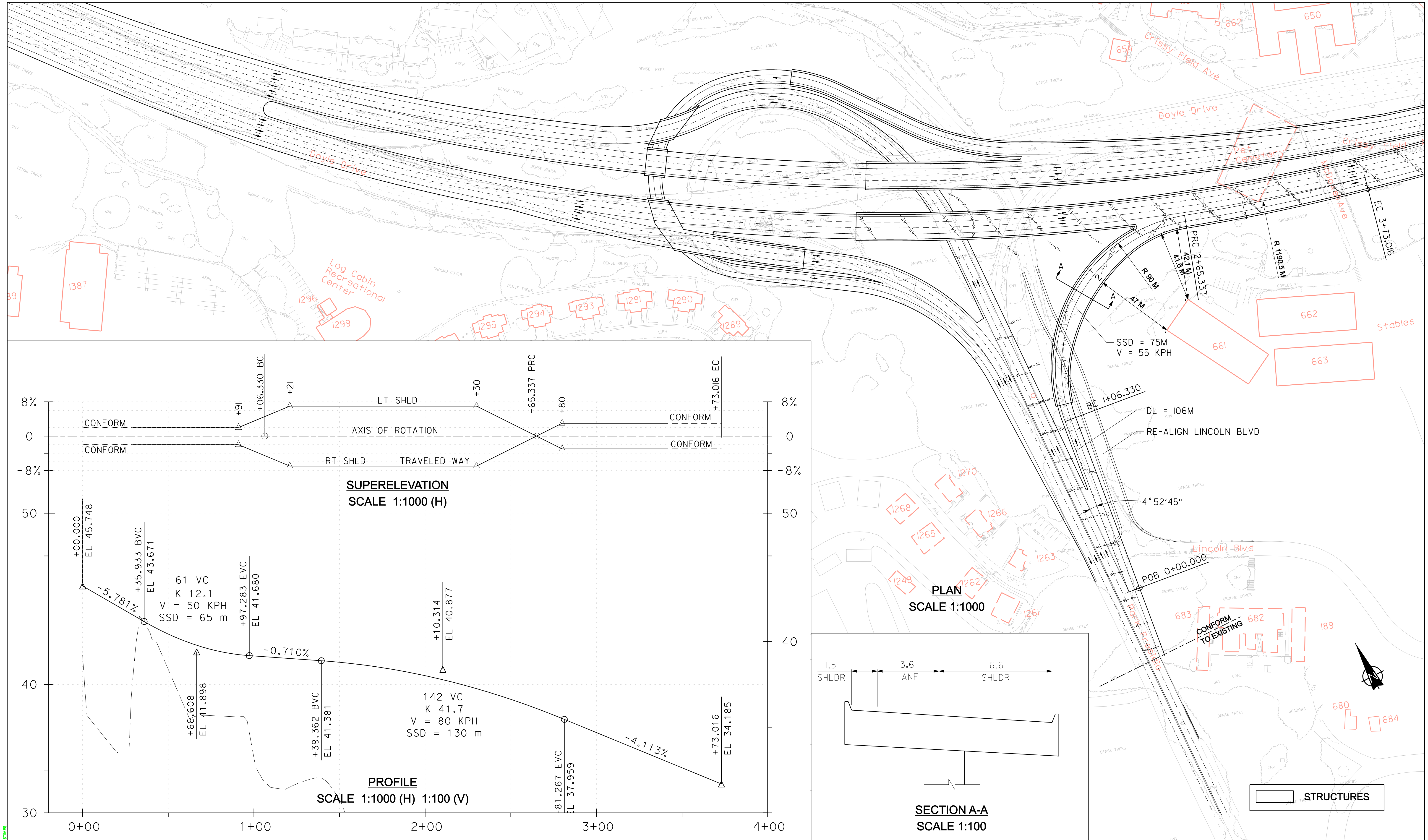
Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
MERCHANT ROAD OFF-RAMP

Scale: 1:1000
File Name SFSK-M01.DGN
Drawing Status
DRAFT

Job No	Drawing No	Issue
130168-00	SFSK-M01	-



Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
OPTION 2: HOOK RAMP (WITH GEOMETRIC REFINEMENTS)

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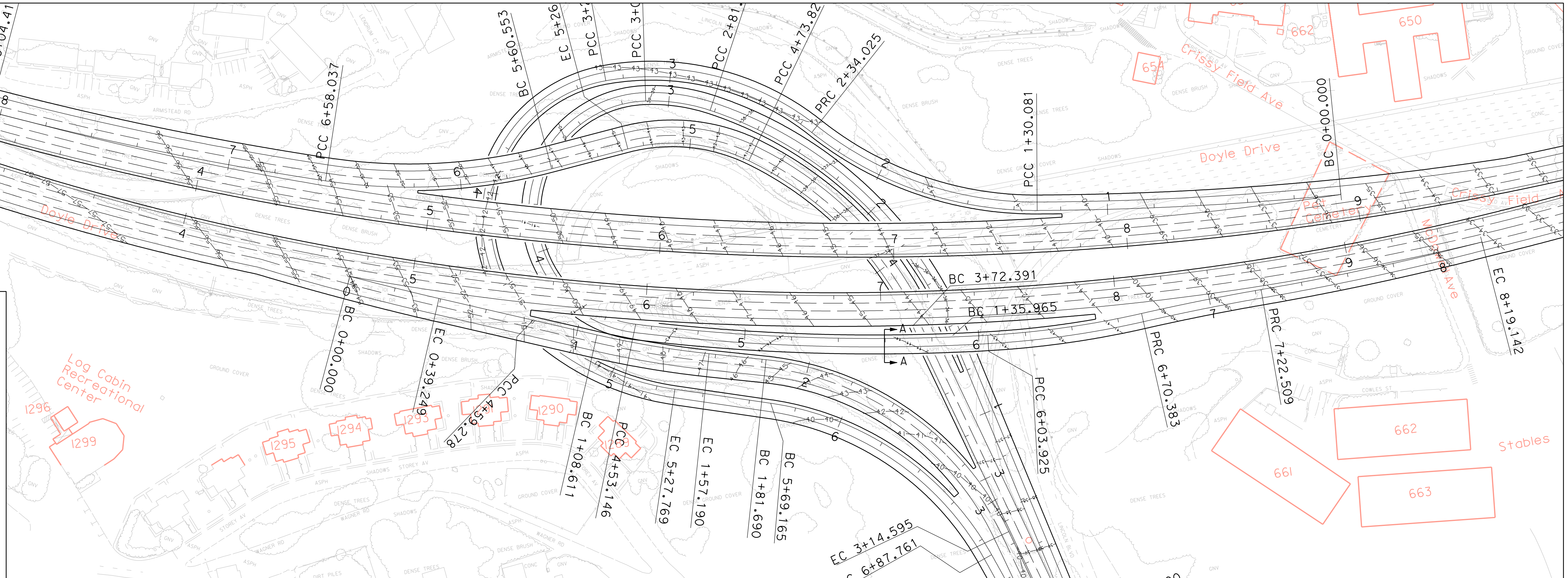
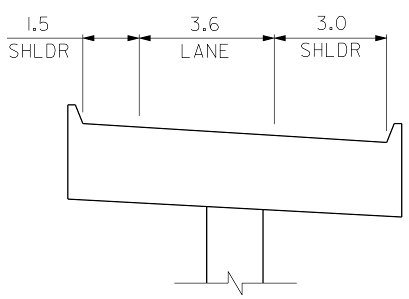
File Name
Drawing Status: PERLIMINARY
Job No: 130168-00
Drawing No: SFSK-054
Issue





SECTION A-A
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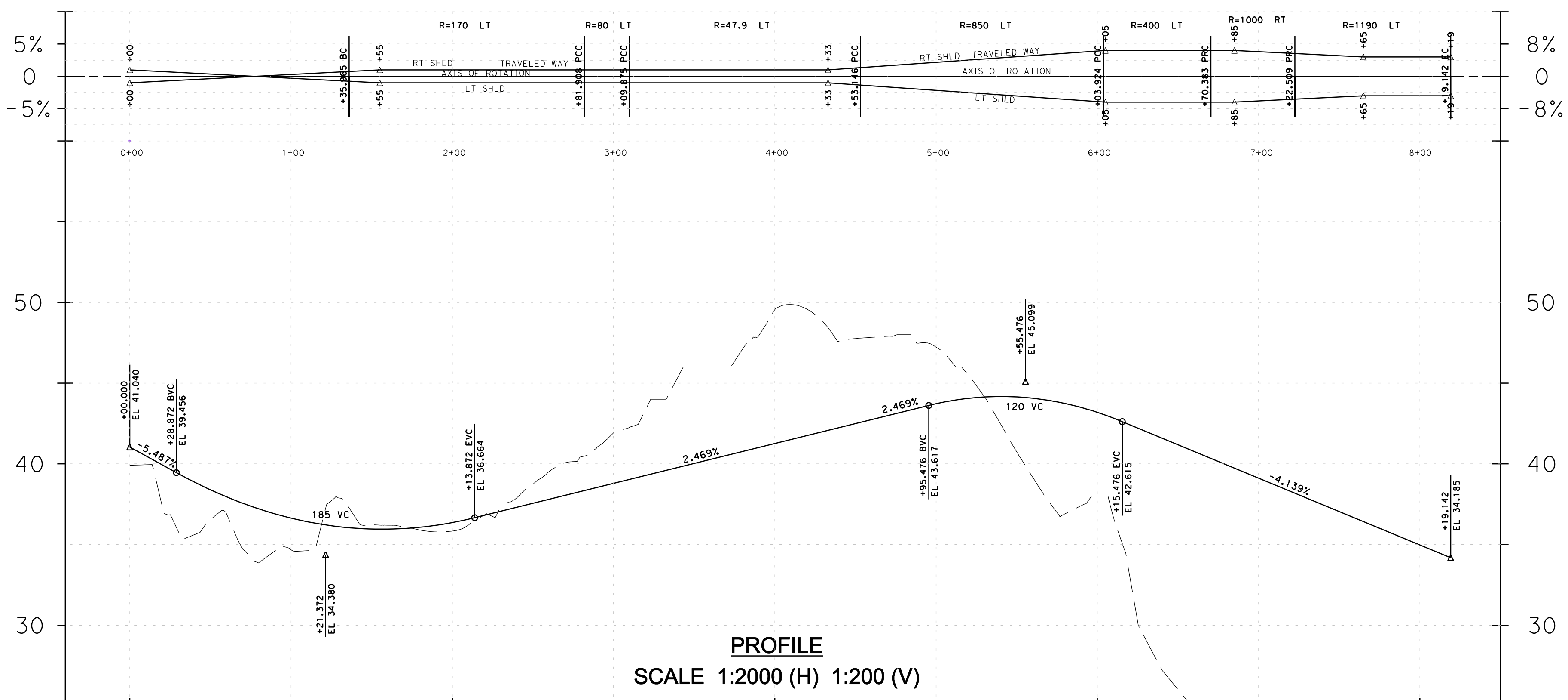


PROFILE
SCALE 1:2000 (H) 1:200 (V)

PLAN
SCALE 1:1000

Issue	Date	By	Chkd	Appd

Job Title: ALTERNATIVE 5 PRESIDIO PARKWAY

Drawing Title: OPTION 1: LOOP RAMP

Scale: AS SHOWN

File Name

Drawing Status: PRELIMINARY

Job No	Drawing No	Issue
130168-00	SFSK-054A	

APPENDIX B

FIELD EQUIPMENT USED

FIELD EQUIPMENT USED

The following is a listing of the equipment used during the performance of the field noise measurements associated with the Doyle Drive Project.

Noise Meter:	Larson-Davis Sound Level Meter Model 700, Serial Number 2041, with microphone and windscreen. This meter was factory calibrated October 22, 2003.
Calibrator:	Larson Davis CA250, Serial Number 1655. This calibrator was factory certified October 22, 2003.
Tripod:	Ambico Adjustable
Radar:	Stalker Solo Plus
Weather:	Kestrel 3000 Pocket Weather Meter, which documented wind speed, maximum wind speed, average wind speed, temperature, wind chill, relative humidity, heat stress index, and dew point.
Compass:	Engineer Directional Compass by Apex
Traffic Counts:	Denominator

APPENDIX C

TRAFFIC DATA SUMMARIZED FROM TRAFFIC MODEL

Doyle Drive

Volumes by Scenario

AM Peak Hour

EB: towards City

WB: towards bridge

		Base Case 2000		No Build 2030		Replace and Widen 2030		Parkway Circle 2030		Parkway Diamond 2030	
Roadway	**Segment**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**
Lincoln	Kobbe to Washington	416	311	626	443	621	448	579	401	585	386
	Washington to Merchant	409	321	654	7	650	450	605	401	613	388
	Merchant to Storey	353	67	556	117	280	118	522	155	528	154
	Storey to Vista Acc	338	68	554	78	567	81	511	105	518	105
	Vista Acc to Hoffman	45	18	60	83	62	69	49	72	50	72
	Hoffman to Crissy Field	42	13	58	79	59	64	45	66	46	666
	Crissy Field to Storey	31		53	3	55	4	39	4	39	4
	Storey to McDowell	36	10	75	18	777	18	50	21	49	21
	McDowell to Crissy Field	75	23	102	29	101	28	76	32	74	30
	Crissy Field to Cemetery	74	55	100	137	100	120	75	123	72	121
	Cemetery to Sheridon	75	62	99	140	99	123	74	126	72	124
	Sheridon to Montgomery		49		87		57		60		57
	Montgomery to Roberts	50	89	87	139	88	109	63	112	60	113
	Funston to Girard	72	133	122	192	122	249	472	214	495	242
	Girard to Letterman	82	154	154	264	152	319	515	258	513	293
Letterman	Lincoln to Lombard		1	0	0	0	1	25	6	27	0
Presidio	Lincoln to Lombard	166	243	246	374	243	427	578	365	570	404
Lombard	Presidio to Letterman	394	510	490	531	467	543	458	182	461	218
	Letterman to Lyon	395	512	496	527	473	540	490	185	498	217
Doyle	Toll Plaza to Park Presidio	6149	2994	6441	5019	6414	5013	6556	5096	6550	5091
	WB off ramp to PP		448		383		386		331		354
	EB off ramp to PP	1932		2096		2099		2479		2451	
	at interchange w/ PP (through)	4217	1393	4345	2564	5314	2593	4295	2948	4328	2994
	Park Presidio to Richardson	5203	2049	4981	2947	4996	2979	4888	2948	4951	2994
	Marina on/off ramps	486	606	1656	806	1676	770	1203	196	1271	230
Mason	Crissy to Roberts	3		10		10		3	1	3	1
	Roberts to Halleck	0	0	1	0	1		3	1	3	1
	Halleck to Marshall	13	14	17	8	12	11	9	7	8	7
	Marshell to Crook	15	16	25	10	12	73	9	7	8	7
	Crook to Lyon	8	23	13	9	10	73	12	7	11	6
Marina	Lyon to Baker	1468	623	1516	803	1527	834	1197	203	1261	234
Baker	Marina to Jefferson	1	285	3	292	6	262	0	40	0	85
	Jefferson to Beach	1	20	36	9	35	10	0	2	0	3
	Beach to Bay	1	3	8	118	10	126	0	6	0	8
Lyon	Marina to Bay		20		141		151	0	0	0	0
Montgomery	Sheridon to Lincoln	50	40	87	53	88	52	63	52	60	56
Storey	Lincoln to Ralston	10	5	22	15	23	15	15	21	14	21
	Ralston to Ruckman	12	5	26	12	27	11	0	12	20	59
	Ruckman to Lincoln	24	8	27	53	27	52	13	12	20	60
Park Presidio	NB	2379		3092		3101		3072		3073	
	SB		2380		2480		2485		2592		2576
	off ramp to Doyle EB	986		637		381		593		623	
	off ramp to Doyle WB		1601		2455		2420		2479		2451
McDowell	Lincoln to Crissy Field	11	1	23	4	23	4	23	10	23	10
Girard	Lincoln to	24	13	85	47	86	46	95	438	111	79
Gorgas	Helleck to Marshall	1	20	32	27	118	14				
	Marshall to Stenburg	3	22	189	20	179	14				
	Stenburg to Truby	17	56	65	241	148	244	226	62	385	36
Merchant	Lincoln to Battery Cranston	60	257	126	358	98	360	119	282	122	270
	EB ramps	158	284	220	401	191	402	217	310	220	298
	WB ramps	220	334	558	956	214	618	241	562	242	569
	Ramps to Vista Acc	220	334	208	606	214	618	241	562	242	569
Vista Acc	Merchant to Lincoln	103	346	124	612	130	623	104	568	141	577
Halleck	Lincoln to Gorgas	28	23	66	25	150	19	35	8	33	8
	Gorgas to Mason	39	16	48	12	41	14	35	9	34	8
Richardson	Ramps to Francisco	3717	1237	3325	212	3320	2208	3138	2188	3130	2818
	Francisco to Lombard		1193	3094	2259	3087	2161	2443	1874	2451	1862

Doyle Drive

Volumes by Scenario
PM Peak Hour

EB: towards City
WB: towards bridge

		Base Case 2000		No Build 2030		Replace and Widen 2030		Parkway Circle 2030		Parkway Diamond 2030	
Roadway	**Segment**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**
Lincoln	Kobbe to Washington	433	398	508	634	509	617	501	662	479	592
	Washington to Merchant	449	392	532	640	475	607	524	665	504	596
	Merchant to Storey	350	139	449	136	499	611	454	127	426	150
	Storey to Vista Acc	337	108	423	123	425	144	430	118	400	144
	Vista Acc to Hoffman	21	262	72	177	57	50	112	156	53	51
	Hoffman to Crissy Field	16	261	69	172	53	44	110	152	49	45
	Crissy Field to Storey	19	2	68	2	52	2	111	2	48	2
	Storey to McDowell	26	23	90	41	71	34	135	42	66	31
	McDowell to Crissy Field	43	80	112	107	100	124	155	114	96	112
	Crissy Field to Cemetery	50	334	121	291	108	180	164	282	104	170
	Cemetery to Sheridon	55	336	127	296	114	185	170	286	110	174
	Sheridon to Montgomery		285		246		143		241		132
	Montgomery to Roberts	109	334	103	295	66	196	103	295	61	188
	Funston to Girard	146	358	182	439	462	410	174	415	151	293
	Girard to Letterman	165	366	239	494	501	440	235	469	507	440
Letterman	Lincoln to Lombard		14		45	36	38		16	44	42
Presidio	Lincoln to Lombard	329	509	410	604	624	573	404	611	622	568
Lombard	Presidio to Letterman	290	475	309	564	276	290	335	604	284	288
	Letterman to Lyon	287	493	303	615	310	339	328	624	326	341
Doyle	Toll Plaza to Park Presidio	3120	5649	5074	6219	5572	6431	5437	6263	5612	6448
	WB off ramp to PP		1014		790		672	726			671
	EB off ramp to PP	1236		2145		2400			2258		2400
	at interchange w/ PP (through)	1884	3605	2929	4016	3163	4230	3180	4068	3190	4252
	Park Presidio to Richardson	2607	4619	3590	4806	3752	4902	3838	4795	3785	4924
	Marina on/off ramps	873	1817	1047	1875	820	1233	1178	1787	890	1283
Mason	Crissy to Roberts	15	1	22		8	1	22		7	0
	Roberts to Halleck	1	1		2	2	1	2	1	7	0
	Halleck to Marshall	45	10	142	17	32	14	32	10	26	14
	Marshell to Crook	75	12	147	18	32	14	39	39	26	14
	Crook to Lyon	75	4	153	8	43	10	48	34	38	8
Marina	Lyon to Baker	887	1760	1055	1759	582	1233	1134	1779	917	1271
Baker	Marina to Jefferson	497	2	474	15	15	4	483	67	38	2
	Jefferson to Beach	191	3	28	4	2	3	107	9	1	2
	Beach to Bay	30	10	33	14	6	6	112	21	4	3
Lyon	Marina to Bay				1				50	9	0
Montgomery	Sheridon to Lincoln	74	37	103	49	66	54	103	55	61	56
Storey	Lincoln to Ralston	8	21	22	39	22	35	25	40	22	32
	Ralston to Ruckman	8	25	18	33		25	19	32		23
	Ruckman to Lincoln		41	55	42	55	37	53	39	57	37
Park Presidio	NB	2768		2864		2790		2853		2792	
	SB		2250		2935		3080		2984		3094
	off ramp to Doyle EB	724		661		589		658		596	
	off ramp to Doyle WB		2044		2203		2201		2194		2196
McDowell	Lincoln to Crissy Field	7	4	14	23	14	39	14	24	14	39
Girard	Lincoln to	18	30	87	89	246	452	93	100	91	115
Gorgas	Helleck to Marshall	1	19	22	46			80	23		
	Marshall to Stenburg	3	46	118	31	119	201	110	35	222	154
	Stenburg to Truby	18	53	415	129			396	128	222	154
Merchant	Lincoln to Battery Cranston	118	273	108	529	101	494	91	559	105	473
	EB ramps	414	296	631	833	376	528	363	657	381	503
	WB ramps	306	546	330	561	352	413	320	548	363	415
	Ramps to Vista Acc	306	546	330	561	352	413	320	548	363	415
Vista Acc	Merchant to Lincoln	102	572	167	572	167	423	204	560	172	425
Halleck	Lincoln to Gorgas	42	43	154	73	30	37	105	50	21	34
	Gorgas to Mason	57	41	142	37	30	37	33	31	23	35
Richardson	Ramps to Francisco	1604	2474	2543	3047	2665	3418	2611	2468	2398	3401
	Francisco to Lombard	1390	2185	2523	2491	2109	2399	2014	2249	2633	3402

Doyle Drive

Construction Volumes by Scenario
AM Peak Hour

EB: towards City
WB: towards bridge

		Base Case 2010		Replace and Widen 2010 A		Parkway Circle 2010a	
Roadway	**Segment**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**
Lincoln	Kobbe to Washington	483	213	506	382	477	357
	Washington to Merchant	493	216	518	387	487	359
	Merchant to Storey	448	76	101	269	420	255
	Storey to Vista Acc	440	61	94	253	412	234
	Vista Acc to Hoffman	41	21	53	21	27	25
	Hoffman to Crissy Field	37	18	48	19	22	23
	Crissy Field to Storey	32	1	43	1	17	2
	Storey to McDowell	41	7	52	8	23	11
	McDowell to Crissy Field	81	20	85	22	56	28
	Crissy Field to Cemetery	77	50	81	52	54	60
	Cemetery to Sheridon	74	66	78	67	49	76
	Sheridon to Montgomery		48		50		58
	Montgomery to Roberts	49	91	53	93	42	111
	Funston to Girard	70	114	70	121	61	172
	Girard to Letterman	88	154	88	173	469	161
Letterman	Lincoln to Lombard	5	2		3	9	
Presidio	Lincoln to Lombard	162	244	165	261	527	265
Lombard	Presidio to Letterman	466	556	472	564	424	223
	Letterman to Lyon	473	558	472	565	434	222
Doyle	Toll Plaza to Park Presidio	5954	3467	6594	4264	6070	3714
	WB off ramp to PP		432		1955		2091
	EB off ramp to PP	1856					
	at interchange w/ PP (through)	4098	1812	4639	1997	3979	1978
	Park Presidio to Richardson	5029	2244	4639	1997	4797	1978
	Marina on/off ramps	1450	585	1362	505	1229	443
Mason	Crissy to Roberts	3		1		4	2
	Roberts to Halleck			1		4	2
	Halleck to Marshall	5	23	4	10	7	17
	Marshell to Crook	5	29	4	10	7	17
	Crook to Lyon	5	29	3	10	8	17
Marina	Lyon to Baker	1429	589		512	1233	459
Baker	Marina to Jefferson	1	182		95	5	33
	Jefferson to Beach	1	0	1	1	5	3
	Beach to Bay	36	1	1	1	4	6
Lyon	Marina to Bay				4		
Montgomery	Sheridon to Lincoln	49	43	53	43	42	53
Storey	Lincoln to Ralston	9	6	9	7	8	10
	Ralston to Ruckman	11	7	10	7		9
	Ruckman to Lincoln	16	23	15	23	11	25
Park Presidio	NB	2586		22		2553	
	SB		2888		1955		2091
	off ramp to Doyle EB	931				817	
	off ramp to Doyle WB		1655		2267		1736
McDowell	Lincoln to Crissy Field	10	1	10	4	13	4
Girard	Lincoln to	44	23	59	24	62	30
Gorgas	Helleck to Marshall	2	4	7	7		
	Marshall to Stenburg	8	4	7	7		
	Stenburg to Truby	67	213	65	203		
Merchant	Lincoln to Battery Cranston	59	153	430	131	82	118
	EB ramps	155	175	764	335	230	125
	WB ramps	187	442	634	100	413	418
	Ramps to Vista Acc	187	442	634	100	413	418
Vista Acc	Merchant to Lincoln	89	448	_97	106	249	425
Halleck	Lincoln to Gorgas	12	20	23	16	16	466
	Gorgas to Mason	14	19	21	14		
Richardson	Ramps to Francisco	2658	1448	2861	1477	3048	1630
	Francisco to Lombard	2367	1328	2370	1230	2453	1249

Doyle Drive

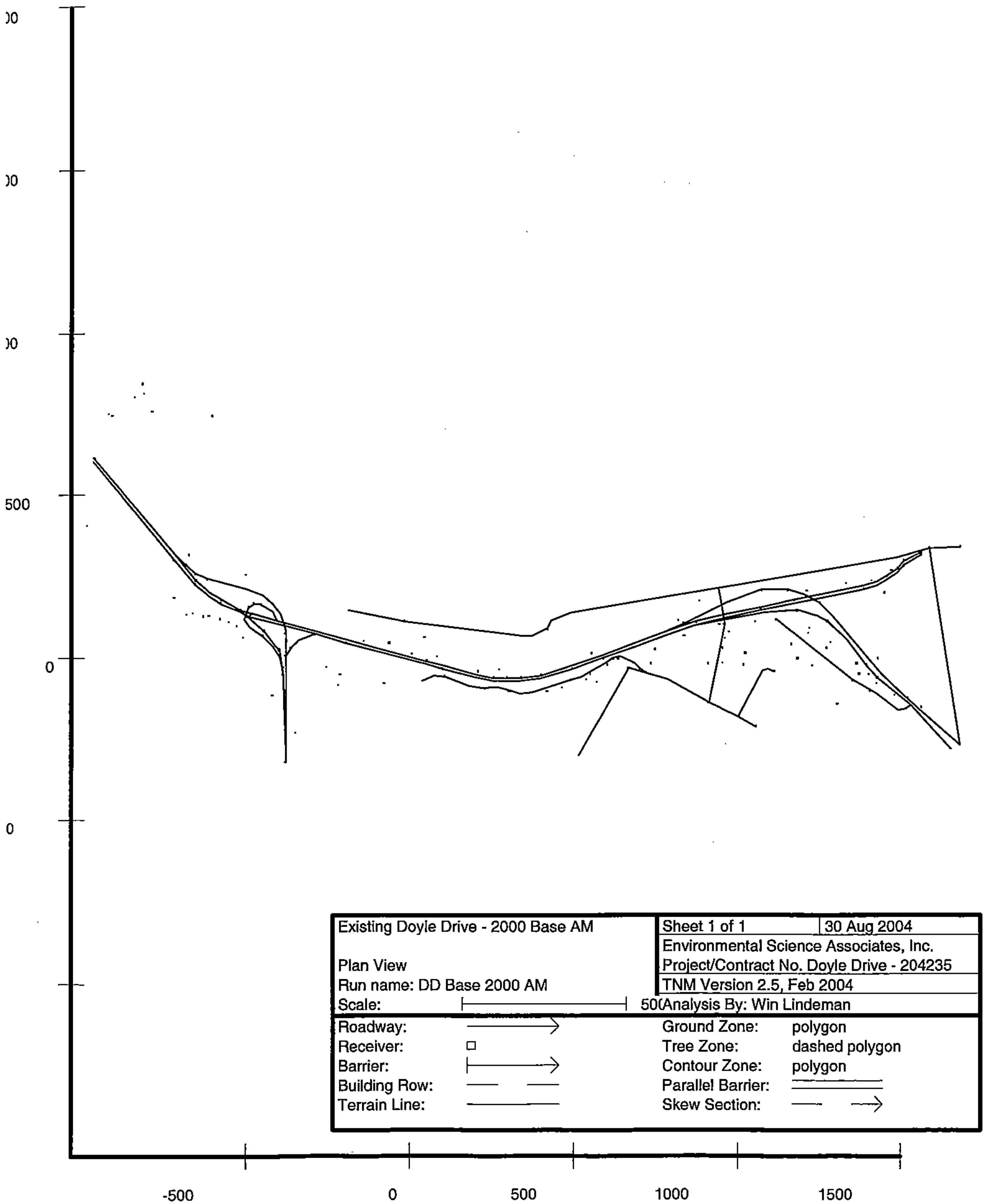
Construction Volumes by Scenario
PM Peak Hour

EB: towards City
WB: towards bridge

		Base Case 2010		Replace and Widen 2010 A		Parkway Circle 2010a	
Roadway	**Segment**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**
Lincoln	Kobbe to Washington	398	484	511	494	444	357
	Washington to Merchant	410	488	526	497	456	359
	Merchant to Storey	308	144	146	404	283	279
	Storey to Vista Acc	293	127	133	381	269	246
	Vista Acc to Hoffman	27	202	30	98	25	351
	Hoffman to Crissy Field	23	198	27	96	22	349
	Crissy Field to Storey	19	2	24	2	20	31
	Storey to McDowell	25	23	31	31	22	64
	McDowell to Crissy Field	48	87	54	133	53	202
	Crissy Field to Cemetery	57	279	62	219	60	504
	Cemetery to Sheridon	77	290	83	231	78	513
	Sheridon to Montgomery		243		185		467
	Montgomery to Roberts	90	280	102	222	89	501
	Funston to Girard	139	307	149	255	326	511
	Girard to Letterman	178	328	189	270	360	509
Letterman	Lincoln to Lombard		7		7	10	47
Presidio	Lincoln to Lombard	344	469	355	415	485	620
Lombard	Presidio to Letterman	376	534	455	549	235	430
	Letterman to Lyon	377	549			241	479
Doyle	Toll Plaza to Park Presidio	3923	5705	4664	6457	4305	5848
	WB off ramp to PP		908	445	553		
	EB off ramp to PP	1603		2038		2048	
	at interchange w/ PP (through)	2320	3816	2626	4257	2256	3681
	Park Presidio to Richardson	3073	4724	2626	4257	2806	3681
	Marina on/off ramps	964	1846	824	1553	583	1091
Mason	Crissy to Roberts	11		3	4	3	18
	Roberts to Halleck	1		3	4	3	18
	Halleck to Marshall	22	15	12	8	16	23
	Marshell to Crook	22	15	16	7	16	23
	Crook to Lyon	28	15	16	7	18	19
Marina	Lyon to Baker	955	1789			596	1105
Baker	Marina to Jefferson	499		296		10	1
	Jefferson to Beach	148	3	3	3	4	1
	Beach to Bay	14	11	4	9	8	2
Lyon	Marina to Bay	37					
Montgomery	Sheridon to Lincoln	90	36	102	36	89	33
Storey	Lincoln to Ralston	7	21	7	29	6	37
	Ralston to Ruckman	10	23	10	29		36
	Ruckman to Lincoln	28	31	36	35	22	41
Park Presidio	NB	2642		2200		2716	
	SB		2511		2038		2048
	off ramp to Doyle EB	753				549	
	off ramp to Doyle WB		1889		2200		2166
McDowell	Lincoln to Crissy Field	7	2	6	10	9	18
Girard	Lincoln to	36	53	63	87	54	90
Gorgas	Helleck to Marshall	4	20	7	20		
	Marshall to Stenburg	4	20	7	20		
	Stenburg to Truby	231	149	196	118		
Merchant	Lincoln to Battery Cranston	119	361	431	144	193	101
	EB ramps	396	371			594	106
	WB ramps	334	446	787	169	526	517
	Ramps to Vista Acc	334	446	787	169	526	517
Vista Acc	Merchant to Lincoln	135	476		200	240	589
Halleck	Lincoln to Gorgas	20	39	22	37	51	258
	Gorgas to Mason	21	23	21	23		
Richardson	Ramps to Francisco	1827	2439	1658	2409	2120	2617
	Francisco to Lombard	1690	2204		2168	1647	1994

APPENDIX D

TNM MODEL INPUT AND RESULTS



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Existing Doyle Drive - 2000 Base AM
Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Plan View
Project/Contract No. Doyle Drive - 204235
Run name: DD Base 2000 AM
TNM Version 2.5, Feb 2004
Scale:
50(
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - 2000 Base AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	9.1	N End	1	-966.0	608.0	53.00				Average	
		1	2	-720.0	302.0	56.00				Average	
		2	3	-654.0	228.0	53.00				Average	
		3	4	-610.0	192.0	50.00				Average	
		5	6	-576.0	170.0	46.00				Average	
		6	7	-516.0	144.0	46.00				Average	Y
		7	8	-488.0	130.0	45.00				Average	Y
		8	9	-380.0	100.0	41.00				Average	Y
		9	10	-292.0	76.0	41.00				Average	Y
		10	11	-194.0	47.0	37.00				Average	Y
		12	13	49.0	-18.0	29.00				Average	Y
		13	14	50.0	-18.0	29.00				Average	
		14	15	98.0	-32.0	28.00				Average	
		15	16	196.0	-58.0	27.00				Average	
		16	17	232.0	-66.0	26.50				Average	
		17	18	252.0	-70.0	26.00				Average	
		19	20	333.0	-70.0	24.00				Average	
		20	21	334.0	-70.0	24.00				Average	Y
		21	22	396.0	-60.0	21.40				Average	Y
		22	23	492.0	-32.0	17.80				Average	Y
		23	24	586.0	0.0	14.00				Average	Y
		24	25	680.0	35.0	12.00				Average	Y
		25	26	776.0	70.0	12.00				Average	Y
		26	27	868.0	102.0	11.80				Average	Y
		27	28	968.0	126.0	11.20				Average	Y

		28	29	1,068.0	150.0	11.20				Average	Y
		30	31	1,381.0	213.0	5.00				Average	Y
		31	32	1,382.0	213.0	5.00				Average	
		32	33	1,422.0	224.0	5.00				Average	
		33	34	1,450.0	240.0	4.00				Average	
		34	35	1,486.0	264.0	4.00				Average	
		35	36	1,504.0	286.0	4.00				Average	
		36	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	9.1	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,382.0	224.0	5.00				Average	Y
		8	46	1,166.0	178.0	10.80				Average	Y
		9	47	1,068.0	157.0	11.20				Average	Y
		10	48	968.0	136.0	11.20				Average	Y
		11	49	868.0	111.0	11.80				Average	Y
		12	50	776.0	80.0	12.00				Average	Y
		13	51	680.0	44.0	12.00				Average	Y
		14	52	586.0	10.0	14.00				Average	Y
		15	53	492.0	-22.0	17.80				Average	Y
		16	54	396.0	-52.0	21.40				Average	Y
		17	55	335.0	-60.0	24.00				Average	Y
		18	56	334.0	-60.0	24.00				Average	
		19	57	294.0	-60.0	25.00				Average	
		20	58	252.0	-60.0	26.00				Average	
		21	59	232.0	-56.0	26.50				Average	
		22	60	196.0	-50.0	27.00				Average	
		23	61	98.0	-22.0	28.00				Average	
		24	62	50.0	-8.0	28.40				Average	
		25	63	49.0	-8.0	28.40				Average	Y
		26	64	-98.0	30.0	33.00				Average	Y
		27	65	-194.0	58.0	37.00				Average	Y
		28	66	-292.0	86.0	41.00				Average	Y
		29	67	-380.0	110.0	45.00				Average	Y
		30	68	-406.0	118.0	45.60				Average	Y
		31	69	-407.0	118.0	45.60				Average	

		32	70	-487.0	138.5	49.20				Average	
		33	71	-488.0	138.5	49.20				Average	Y
		34	72	-516.0	150.0	51.00				Average	Y
		35	73	-517.0	150.0	51.00				Average	
		36	74	-576.0	182.0	49.00				Average	
		37	75	-610.0	204.0	50.00				Average	
		38	192	-654.0	242.0	53.00				Average	
		39	193	-720.0	322.0	56.00				Average	
		40	76	-966.0	620.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	868.0	102.0	11.80				Average	Y
		2	78	1,078.0	140.0	10.00				Average	Y
		3	79	1,178.0	147.0	7.00				Average	Y
		4	80	1,233.0	132.0	5.00				Average	Y
		5	81	1,234.0	132.0	5.00				Average	
		6	82	1,270.0	114.0	2.00				Average	
		7	83	1,330.0	57.0	2.00				Average	
		8	84	1,388.0	-20.0	2.00				Average	
		9	85	1,424.0	-60.0	2.00				Average	
		10	86	1,528.0	-146.0	4.00				Average	
		11	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,436.0	-50.0	2.00				Average	
		4	91	1,285.0	130.0	2.00				Average	
		5	92	1,244.0	172.0	3.00				Average	
		6	93	1,200.0	196.0	4.00				Average	
		7	94	1,149.0	210.0	7.00				Average	
		8	95	1,150.0	210.0	7.00				Average	Y
		9	96	1,068.0	210.0	10.00				Average	Y
		10	97	968.0	172.0	11.00				Average	Y
		11	98	830.0	106.0	12.00				Average	Y
		12	99	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-406.0	118.0	45.60				Average	
		2	101	-420.0	144.0	46.00				Average	
		3	102	-456.0	170.0	41.00				Average	
		4	103	-478.0	170.0	40.00				Average	
		5	104	-494.0	158.0	39.00				Average	
		6	105	-505.0	120.0	39.00				Average	

		7	106	-488.0	96.0	39.00				Average	
		8	107	-450.0	70.0	38.00				Average	
		9	108	-418.0	36.0	38.00				Average	
		10	109	-398.0	5.0	38.00				Average	
		11	110	-390.0	-26.0	37.00				Average	
		12	111	-388.0	-50.0	37.00				Average	
		13	112	-380.0	-320.0	37.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-515.0	143.9	51.00				Average	Y
		2	114	-495.0	130.0	50.00				Average	Y
		3	115	-494.0	130.0	50.00				Average	
		4	116	-476.0	112.0	49.00				Average	
		5	117	-447.0	86.0	46.00				Average	
		6	118	-410.0	38.0	47.00				Average	
		7	119	-400.0	27.0	37.00				Average	
		8	120	-390.0	-26.0	37.00				Average	
		9	121	-388.0	-27.0	37.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	123	-380.0	10.0	37.00				Average	
		3	124	-380.0	80.0	37.00				Average	
		4	125	-384.0	98.0	38.00				Average	
		5	126	-396.0	138.0	38.00				Average	
		6	127	-418.0	170.0	41.00				Average	
		7	128	-450.0	196.0	44.00				Average	
		8	129	-500.0	216.0	47.50				Average	
		9	130	-620.0	246.0	54.00				Average	
		10	131	-656.0	262.0	57.00				Average	
		11	132	-686.0	290.0	58.00				Average	
		12	191	-703.0	306.0	58.00				Average	
		13	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00				Average	
		2	135	-364.0	34.0	38.00				Average	
		3	136	-338.0	58.0	39.00				Average	
		4	137	-306.0	70.0	40.00				Average	
		5	138	-292.0	76.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	

		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - 2000 Base AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	5952	88	61	88	12	88	61	88	61	88
	1	2	5952	88	61	88	12	88	61	88	61	88
	2	3	5952	88	61	88	12	88	61	88	61	88
	3	4	5952	88	61	88	12	88	61	88	61	88
	5	6	4082	88	42	88	8	88	42	88	42	88
	6	7	4082	88	42	88	8	88	42	88	42	88
	7	8	4082	88	42	88	8	88	42	88	42	88
	8	9	4082	88	42	88	8	88	42	88	42	88
	9	10	5037	88	52	88	10	88	52	88	52	88
	10	11	5037	88	52	88	10	88	52	88	52	88
	12	13	5037	88	52	88	10	88	52	88	52	88
	13	14	5037	88	52	88	10	88	52	88	52	88
	14	15	5037	88	52	88	10	88	52	88	52	88
	15	16	5037	88	52	88	10	88	52	88	52	88
	16	17	5037	88	52	88	10	88	52	88	52	88
	17	18	5037	88	52	88	10	88	52	88	52	88
	19	20	5037	88	52	88	10	88	52	88	52	88
	20	21	5037	88	52	88	10	88	52	88	52	88
	21	22	5037	88	52	88	10	88	52	88	52	88
	22	23	5037	88	52	88	10	88	52	88	52	88
	23	24	5037	88	52	88	10	88	52	88	52	88

	24	25	5037	88	52	88	10	88	52	88	52	88
	25	26	5037	88	52	88	10	88	52	88	52	88
	26	27	470	88	5	88	1	88	5	88	5	88
	27	28	470	88	5	88	1	88	5	88	5	88
	28	29	470	88	5	88	1	88	5	88	5	88
	30	31	470	88	5	88	1	88	5	88	5	88
	31	32	470	56	5	56	1	56	5	56	5	56
	32	33	470	56	5	56	1	56	5	56	5	56
	33	34	470	56	5	56	1	56	5	56	5	56
	34	35	470	56	5	56	1	56	5	56	5	56
	35	36	470	56	5	56	1	56	5	56	5	56
	36	37										
WB Doyle Drive from Marina to 0+00	1	39	582	56	6	56	8	56	4	56	6	56
	2	40	582	56	6	56	8	56	4	56	6	56
	3	41	582	56	6	56	9	56	4	56	6	56
	4	42	582	56	6	56	8	56	4	56	6	56
	5	43	582	88	6	88	8	88	4	88	6	88
	6	44	582	88	6	88	8	88	4	88	6	88
	8	46	582	88	6	88	8	88	4	88	6	88
	9	47	582	88	6	88	8	88	4	88	6	88
	10	48	582	88	6	88	8	88	4	88	6	88
	11	49	582	88	6	88	8	88	4	88	6	88
	12	50	1969	88	20	88	27	88	12	88	20	88
	13	51	1969	88	20	88	27	88	12	88	20	88
	14	52	1969	88	20	88	27	88	12	88	20	88
	15	53	1969	88	20	88	27	88	12	88	20	88
	16	54	1969	88	20	88	27	88	12	88	20	88
	17	55	1969	88	20	88	27	88	12	88	20	88
	18	56	1969	88	20	88	27	88	12	88	20	88
	19	57	1969	88	20	88	27	88	12	88	20	88
	20	58	1969	88	20	88	27	88	12	88	20	88
	21	59	1969	88	20	88	27	88	12	88	20	88
	22	60	1969	88	20	88	27	88	12	88	20	88
	23	61	1969	88	20	88	27	88	12	88	20	88

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	24	62	1969	88	20	88	27	88	12	88	20	88
	25	63	1969	88	20	88	27	88	12	88	20	88
	26	64	1969	88	20	88	27	88	12	88	20	88
	27	65	1969	88	20	88	27	88	12	88	20	88
	28	66	1969	88	20	88	27	88	12	88	20	88
	29	67	1339	88	14	88	18	88	8	88	14	88
	30	68	1339	88	14	88	18	88	8	88	14	88
	31	69	1339	88	14	88	18	88	8	88	14	88
	32	70	1339	88	14	88	18	88	8	88	14	88
	33	71	1339	88	14	88	18	88	8	88	14	88
	34	72	1339	88	14	88	18	88	8	88	14	88
	35	73	1339	88	14	88	18	88	8	88	14	88
	36	74	1339	88	14	88	18	88	8	88	14	88
	37	75	1339	88	14	88	18	88	8	88	14	88
	38	192	1339	88	14	88	18	88	8	88	14	88
	39	193	2877	88	30	88	39	88	18	88	30	88
	40	76										
SB/EB Richardson from Doyle to Francis	1	77	3598	56	37	56	7	56	37	56	37	56
	2	78	3598	56	37	56	7	56	37	56	37	56
	3	79	3598	56	37	56	7	56	37	56	37	56
	4	80	3598	56	37	56	7	56	37	56	37	56
	5	81	3598	56	37	56	7	56	37	56	37	56
	6	82	3598	56	37	56	7	56	37	56	37	56
	7	83	3598	56	37	56	7	56	37	56	37	56
	8	84	3598	56	37	56	7	56	37	56	37	56
	9	85	3598	56	37	56	7	56	37	56	37	56
	10	86	3598	56	37	56	7	56	37	56	37	56
	11	87										
NB/WB Richardson from Francisco to DD	1	88	1189	56	12	56	18	56	7	56	12	56
	2	89	1189	56	12	56	18	56	7	56	12	56
	3	90	1189	56	12	56	18	56	7	56	12	56
	4	91	1189	56	12	56	18	56	7	56	12	56
	5	92	1189	56	12	56	18	56	7	56	12	56
	6	93	1189	56	12	56	18	56	7	56	12	56

	7	94	1189	56	12	56	18	56	7	56	12	56
	8	95	1189	56	12	56	18	56	7	56	12	56
	9	96	1189	56	12	56	18	56	7	56	12	56
	10	97	1189	56	12	56	18	56	7	56	12	56
	11	98	1189	56	12	56	18	56	7	56	12	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	431	56	4	56	6	56	3	56	4	56
	2	101	431	56	4	56	6	56	3	56	4	56
	3	102	431	56	4	56	6	56	3	56	4	56
	4	103	431	56	4	56	6	56	3	56	4	56
	5	104	431	56	4	56	6	56	3	56	4	56
	6	105	431	56	4	56	6	56	3	56	4	56
	7	106	431	56	4	56	6	56	3	56	4	56
	8	107	431	56	4	56	6	56	3	56	4	56
	9	108	431	56	4	56	6	56	3	56	4	56
	10	109	431	56	4	56	6	56	3	56	4	56
	11	110	2316	56	24	56	24	56	0	0	17	56
	12	111	431	56	4	56	6	56	3	56	4	56
	13	112										
SB PP Ramp from EB Doyle Drive	1	113	1870	56	19	56	4	56	19	56	19	56
	2	114	1870	56	19	56	4	56	19	56	19	56
	3	115	1870	56	19	56	4	56	19	56	19	56
	4	116	1870	56	19	56	4	56	19	56	19	56
	5	117	1870	56	19	56	4	56	19	56	19	56
	6	118	1870	56	19	56	4	56	19	56	19	56
	7	119	1870	56	19	56	4	56	19	56	19	56
	8	120	1870	56	19	56	4	56	19	56	19	56
	9	121										
NB Park Presidio to WB Doyle Drive	1	122	2298	56	17	56	24	56	24	56	17	56
	2	123	1558	56	16	56	16	56	0	0	11	56
	3	124	1558	56	16	56	16	56	0	0	11	56
	4	125	1558	56	16	56	16	56	0	0	11	56
	5	126	1558	56	16	56	16	56	0	0	11	56
	6	127	1558	56	16	56	16	56	0	0	11	56

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	7	128	1558	56	16	56	16	56	0	0	11	56
	8	129	1558	56	16	56	16	56	0	0	11	56
	9	130	1558	56	16	56	16	56	0	0	11	56
	10	131	1558	56	16	56	16	56	0	0	11	56
	11	132	1558	56	16	56	16	56	0	0	11	56
	12	191	1558	56	16	56	16	56	0	0	11	56
	13	133										
NB PP ramp to EB Doyle Drive	1	134	952	56	7	56	10	56	10	56	7	56
	2	135	952	56	7	56	10	56	10	56	7	56
	3	136	952	56	7	56	10	56	10	56	7	56
	4	137	952	56	7	56	10	56	10	56	7	56
	5	138										
Mason Street	1	139	3	32	0	0	0	0	0	0	0	0
	2	140	3	32	0	0	0	0	0	0	0	0
	3	141	3	32	0	0	0	0	0	0	0	0
	4	142	3	32	0	0	0	0	0	0	0	0
	5	143	3	32	0	0	0	0	0	0	0	0
	6	144	3	32	0	0	0	0	0	0	0	0
	7	145	3	32	0	0	0	0	0	0	0	0
	8	194	31	32	0	0	0	0	0	0	0	0
	9	146	31	32	0	0	0	0	0	0	0	0
	10	147	2091	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	123	32	2	32	0	0	2	32	2	32
	2	150	133	32	2	32	0	0	2	32	2	32
	3	151	133	32	2	32	0	0	2	32	2	32
	4	152	133	32	2	32	0	0	2	32	2	32
	5	153	133	32	2	32	0	0	2	32	2	32
	6	154	133	32	2	32	0	0	2	32	2	32
	7	155	133	32	2	32	0	0	2	32	2	32
	8	156	133	32	2	32	0	0	2	32	2	32
	9	157	47	32	1	32	0	0	1	32	1	32
	10	158	47	32	1	32	0	0	1	32	1	32
	11	159	47	32	1	32	0	0	1	32	1	32

	12	160	47	32	1	32	0	0	1	32	1	32
	13	161	47	32	1	32	0	0	1	32	1	32
	14	162	47	32	1	32	0	0	1	32	1	32
	15	163	47	32	1	32	0	0	1	32	1	32
	16	164	47	32	1	32	0	0	1	32	1	32
	17	165	47	32	1	32	0	0	1	32	1	32
	18	166	47	32	1	32	0	0	1	32	1	32
	19	167	161	32	2	32	0	0	2	32	2	32
	20	168	161	32	2	32	0	0	2	32	2	32
	21	169	199	32	2	32	0	0	2	32	2	32
	22	170	228	32	3	32	0	0	3	32	3	32
	23	171										
Gorgas Avenue	1	172	73	32	0	0	0	0	0	0	0	0
	2	173	73	32	0	0	0	0	0	0	0	0
	3	174	73	32	0	0	0	0	0	0	0	0
	4	175	73	32	0	0	0	0	0	0	0	0
	5	176	73	32	0	0	0	0	0	0	0	0
	6	177	73	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	51	32	0	0	0	0	0	0	0	0
	2	180	51	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	37	32	0	0	0	0	0	0	0	0
	2	183	37	32	0	0	0	0	0	0	0	0
	3	184	37	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	277	32	3	32	0	0	0	0	3	32
	2	187										
Montgomery Street	1	188	85	32	2	32	0	0	2	32	2	32
	2	189	85	32	2	32	0	0	2	32	2	32
	3	190										

Environmental Science Associates, Inc 30 August 2004
Win Lindeman TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - 2000 Base AM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS **Doyle Drive - 204235**

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

Doyle Drive - 204235

58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,360.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - 2000 Base AM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	67.3	66	67.3	12	Snd Lvl	67.3	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	62.9	66	62.9	12	—	62.9	0.0	10	-10.0
3-Building 1187/1188	3	0	81.0	64.6	71	-16.4	12	—	64.6	0.0	10	-10.0
4-Building 1182	5	0	81.0	64.6	71	-16.4	12	—	64.6	0.0	10	-10.0
5-Building 1183/1186	6	0	81.0	64.4	71	-16.6	12	—	64.4	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	67.1	71	-13.9	12	—	67.1	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	65.6	71	-6.4	12	—	65.6	0.0	10	-10.0
8-PX Building	9	0	0.0	68.5	71	68.5	12	—	68.5	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	67.1	71	-1.9	12	—	67.1	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	73.2	66	5.2	12	Snd Lvl	73.2	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	78.2	66	10.2	12	Snd Lvl	78.2	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	75.6	66	7.6	12	Snd Lvl	75.6	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	65.9	66	-2.1	12	—	65.9	0.0	10	-10.0
14-Building 644	15	0	0.0	63.3	71	63.3	12	—	63.3	0.0	10	-10.0
15-Building 649	16	0	0.0	60.1	66	60.1	12	—	60.1	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	59.5	66	-10.5	12	—	59.5	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	62.2	66	-3.8	12	—	62.2	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	69.5	66	3.5	12	Snd Lvl	69.5	0.0	10	-10.0
19-Building 969	20	0	0.0	50.8	71	50.8	12	—	50.8	0.0	10	-10.0
20-Building 968	21	0	0.0	52.5	71	52.5	12	—	52.5	0.0	10	-10.0
21-Building 967	22	0	0.0	54.5	71	54.5	12	—	54.5	0.0	10	-10.0
22-Building 966	23	0	0.0	54.3	71	54.3	12	—	54.3	0.0	10	-10.0
23-Building 964	24	1	0.0	52.3	66	52.3	12	—	52.3	0.0	10	-10.0

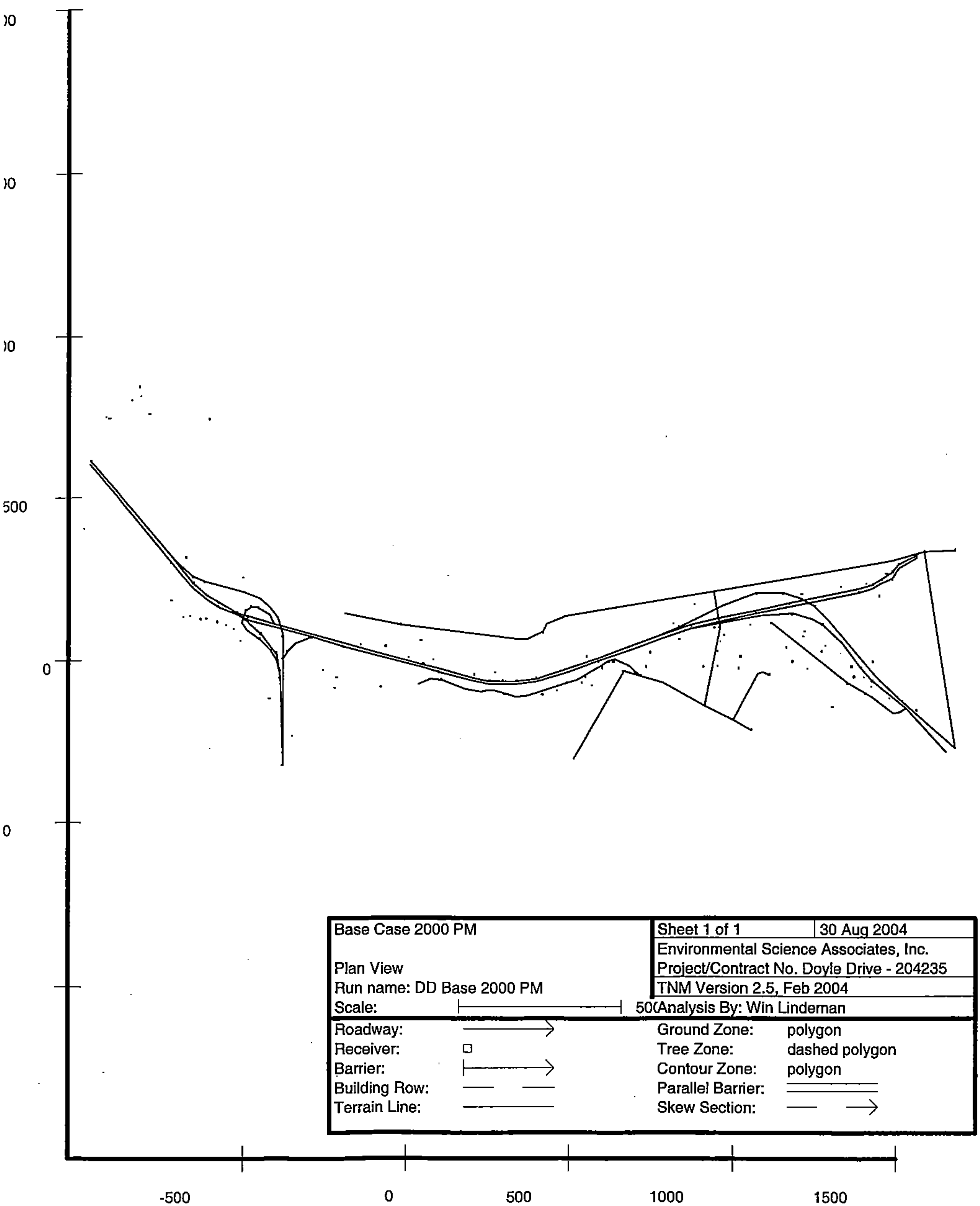
24-Building 963	25	1	0.0	53.0	66	53.0	12	—	53.0	0.0	10	-10.0
25-Building 962	26	1	0.0	53.1	66	53.1	12	—	53.1	0.0	10	-10.0
26-Unknown Building	27	0	0.0	55.2	71	55.2	12	—	55.2	0.0	10	-10.0
27-Log Cabin	28	0	63.0	67.1	66	4.1	12	Snd Lvl	67.1	0.0	10	-10.0
28-Unknown Building	29	0	0.0	60.4	71	60.4	12	—	60.4	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	65.6	66	-0.9	12	—	65.6	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	67.2	66	0.7	12	Snd Lvl	67.2	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	68.8	66	2.3	12	Snd Lvl	68.8	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	70.5	66	4.0	12	Snd Lvl	70.5	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	71.7	66	5.2	12	Snd Lvl	71.7	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	71.9	66	5.4	12	Snd Lvl	71.9	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	71.6	66	5.1	12	Snd Lvl	71.6	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	69.1	66	2.6	12	Snd Lvl	69.1	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	66.1	66	66.1	12	Snd Lvl	66.1	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.4	66	-2.1	12	—	63.4	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	65.8	71	1.8	12	—	65.8	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	65.7	71	1.7	12	—	65.7	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	64.6	71	0.6	12	—	64.6	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	66.1	71	2.1	12	—	66.1	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	74.0	66	5.0	12	Snd Lvl	74.0	0.0	10	-10.0
44-Building 129	45	1	0.0	62.3	66	62.3	12	—	62.3	0.0	10	-10.0
45-Building 122	46	0	0.0	72.2	71	72.2	12	Snd Lvl	72.2	0.0	10	-10.0
46-Building 108	47	0	0.0	72.3	71	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
47-Building 107	48	0	0.0	74.2	71	74.2	12	Snd Lvl	74.2	0.0	10	-10.0
48-Building 104	49	0	74.0	69.9	71	-4.1	12	—	69.9	0.0	10	-10.0
49-Building 105	50	0	74.0	76.0	71	2.0	12	Snd Lvl	76.0	0.0	10	-10.0
50-Building 106	51	0	76.0	77.4	71	1.4	12	Snd Lvl	77.4	0.0	10	-10.0
51-Building 211	52	0	0.0	75.2	71	75.2	12	Snd Lvl	75.2	0.0	10	-10.0
52-Building 204	53	0	0.0	67.8	71	67.8	12	—	67.8	0.0	10	-10.0
53-Building 210	54	0	0.0	70.9	71	70.9	12	—	70.9	0.0	10	-10.0
54-Building 201	55	0	0.0	64.7	71	64.7	12	—	64.7	0.0	10	-10.0
55-Building 220	56	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
56-Building 231	57	0	0.0	65.2	71	65.2	12	—	65.2	0.0	10	-10.0
57-Building 228	58	0	0.0	64.3	71	64.3	12	—	64.3	0.0	10	-10.0
58-Building 229	60	0	0.0	63.1	71	63.1	12	—	63.1	0.0	10	-10.0
59-Building 223	61	0	0.0	59.0	71	59.0	12	—	59.0	0.0	10	-10.0
60-Building 230	62	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	61.8	66	4.8	12	—	61.8	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	59.9	66	2.9	12	—	59.9	0.0	10	-10.0
63-Building 1063	66	0	68.5	60.4	71	-8.1	12	—	60.4	0.0	10	-10.0

RESULTS: SOUND LEVELS

Doyle Drive - 204235

64-Building 1062	68	0	68.5	58.2	71	-10.3	12	—	58.2	0.0	10	-10.0
65-Building 1060	69	0	68.5	57.3	71	-11.2	12	—	57.3	0.0	10	-10.0
66-Building 1167	70	0	68.0	64.9	71	-3.1	12	—	64.9	0.0	10	-10.0
67-Building 1163	71	0	0.0	63.2	71	63.2	12	—	63.2	0.0	10	-10.0
68-Building 1169	72	0	68.0	65.9	71	-2.1	12	—	65.9	0.0	10	-10.0
69-Building 1162	73	0	0:0	62.4	71	62.4	12	—	62.4	0.0	10	-10.0
70-Building 1170	74	0	68.0	69.2	71	1.2	12	—	69.2	0.0	10	-10.0
71-Building 1161	75	0	0.0	66.3	71	66.3	12	—	66.3	0.0	10	-10.0
72-Building 1160	76	0	0.0	71.3	71	71.3	12	Snd Lvl	71.3	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	70.4	66	70.4	12	Snd Lvl	70.4	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	73.2	66	73.2	12	Snd Lvl	73.2	0.0	10	-10.0
75-Building 1004	79	0	0.0	54.6	71	54.6	12	—	54.6	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	71.1	66	-5.4	12	Snd Lvl	71.1	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	25	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Base Case 2000 PM

Plan View
Run name: DD Base 2000 PM
Scale: 50(

Sheet 1 of 1 | 30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base Case 2000 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	11.0	N End	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-654.0	228.0	53.00				Average	
		4	4	-610.0	192.0	50.00				Average	
		5	6	-576.0	170.0	46.00				Average	
		6	7	-516.0	144.0	46.00				Average	Y
		7	8	-488.0	130.0	45.00				Average	Y
		8	9	-380.0	100.0	41.00				Average	Y
		9	10	-292.0	76.0	41.00				Average	Y
		10	11	-194.0	47.0	37.00				Average	Y
		11	13	49.0	-18.0	29.00				Average	Y
		12	14	50.0	-18.0	29.00				Average	
		13	15	98.0	-32.0	28.00				Average	
		14	16	196.0	-58.0	27.00				Average	
		15	17	232.0	-66.0	26.50				Average	
		16	18	252.0	-70.0	26.00				Average	
		17	20	333.0	-70.0	24.00				Average	
		18	21	334.0	-70.0	24.00				Average	Y
		19	22	396.0	-60.0	21.40				Average	Y
		20	23	492.0	-32.0	17.80				Average	Y
		21	24	586.0	0.0	14.00				Average	Y
		22	25	680.0	35.0	12.00				Average	Y
		23	26	776.0	70.0	12.00				Average	Y
		24	27	868.0	102.0	11.80				Average	Y
		25	28	968.0	126.0	11.20				Average	Y

		26	29	1,068.0	150.0	11.20				Average	Y
		27	31	1,381.0	213.0	5.00				Average	
		28	32	1,382.0	213.0	5.00				Average	
		29	33	1,422.0	224.0	5.00				Average	
		30	34	1,450.0	240.0	4.00				Average	
			35	1,486.0	254.0	4.00				Average	
			36	1,504.0	286.0	4.00				Average	
			37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	11.0	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,382.0	224.0	5.00				Average	Y
		7	46	1,166.0	178.0	10.80				Average	Y
		8	47	1,068.0	157.0	11.20				Average	Y
		9	48	968.0	136.0	11.20				Average	Y
		10	49	868.0	111.0	11.80				Average	Y
		11	50	776.0	80.0	12.00				Average	Y
		12	51	680.0	44.0	12.00				Average	Y
		13	52	586.0	10.0	14.00				Average	Y
		14	53	492.0	-22.0	17.80				Average	Y
		15	54	396.0	-52.0	21.40				Average	Y
		16	55	335.0	-60.0	24.00				Average	Y
		17	56	334.0	-60.0	24.00				Average	Y
		18	57	294.0	-60.0	25.00				Average	
		19	58	252.0	-60.0	26.00				Average	
		20	59	232.0	-56.0	26.50				Average	
		21	60	196.0	-50.0	27.00				Average	
		22	61	98.0	-22.0	28.00				Average	
		23	62	50.0	-8.0	28.40				Average	
		24	63	49.0	-8.0	28.40				Average	Y
		25	64	-98.0	30.0	33.00				Average	Y
		26	65	-194.0	58.0	37.00				Average	Y
		27	66	-292.0	86.0	41.00				Average	Y
		28	67	-380.0	110.0	45.00				Average	Y
		29	68	-406.0	118.0	45.60				Average	Y
		30	69	-407.0	118.0	45.60				Average	

		31	70	-487.0	138.5	49.20				Average	
		32	71	-488.0	138.5	49.20				Average	Y
		33	72	-516.0	150.0	51.00				Average	Y
			73	-517.0	150.0	51.00				Average	
			74	-576.0	182.0	49.00				Average	
			75	-610.0	204.0	50.00				Average	
			192	-654.0	242.0	53.00				Average	
			193	-720.0	322.0	56.00				Average	
			76	-966.0	620.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	868.0	102.0	11.80				Average	Y
		2	78	1,078.0	140.0	10.00				Average	Y
		3	79	1,178.0	147.0	7.00				Average	Y
		4	80	1,233.0	132.0	5.00				Average	Y
		5	81	1,234.0	132.0	5.00				Average	
		6	82	1,270.0	114.0	2.00				Average	
		7	83	1,330.0	57.0	2.00				Average	
		8	84	1,388.0	-20.0	2.00				Average	
		9	85	1,424.0	-60.0	2.00				Average	
		10	86	1,528.0	-146.0	4.00				Average	
		11	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,436.0	-50.0	2.00				Average	
		4	91	1,285.0	130.0	2.00				Average	
		5	92	1,244.0	172.0	3.00				Average	
		6	93	1,200.0	196.0	4.00				Average	
		7	94	1,149.0	210.0	7.00				Average	
		8	95	1,150.0	210.0	7.00				Average	Y
		9	96	1,068.0	210.0	10.00				Average	Y
		10	97	968.0	172.0	11.00				Average	Y
		11	98	830.0	106.0	12.00				Average	Y
		12	99	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-406.0	118.0	45.60				Average	
		2	101	-420.0	144.0	46.00				Average	
		3	102	-456.0	170.0	41.00				Average	
		4	103	-478.0	170.0	40.00				Average	
		5	104	-494.0	158.0	39.00				Average	
		6	105	-505.0	120.0	39.00				Average	

		7	106	-488.0	96.0	39.00				Average	
		8	107	-450.0	70.0	38.00				Average	
		9	108	-418.0	36.0	38.00				Average	
		10	109	-398.0	5.0	38.00				Average	
		11	110	-390.0	-26.0	37.00				Average	
		12	111	-388.0	-50.0	37.00				Average	
		13	112	-380.0	-320.0	37.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-515.0	143.9	51.00				Average	Y
		2	114	-495.0	130.0	50.00				Average	Y
		3	115	-494.0	130.0	50.00				Average	
		4	116	-476.0	112.0	49.00				Average	
		5	117	-447.0	86.0	46.00				Average	
		6	118	-410.0	38.0	47.00				Average	
		7	119	-400.0	27.0	37.00				Average	
		8	120	-390.0	-26.0	37.00				Average	
		9	121	-388.0	-27.0	37.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	123	-380.0	10.0	37.00				Average	
		3	124	-380.0	80.0	37.00				Average	
		4	125	-384.0	98.0	38.00				Average	
		5	126	-396.0	138.0	38.00				Average	
		6	127	-418.0	170.0	41.00				Average	
		7	128	-450.0	196.0	44.00				Average	
		8	129	-500.0	216.0	47.50				Average	
		9	130	-620.0	246.0	54.00				Average	
		10	131	-656.0	262.0	57.00				Average	
		11	132	-686.0	290.0	58.00				Average	
		12	191	-703.0	306.0	58.00				Average	
		13	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00				Average	
		2	135	-364.0	34.0	38.00				Average	
		3	136	-338.0	58.0	39.00				Average	
		4	137	-306.0	70.0	40.00				Average	
		5	138	-292.0	76.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	

		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base Case 2000 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle Drive to Marina	N End	1	2908	88	16	88	23	88	42	88	31	88	
	2	2	2908	88	16	88	23	88	42	88	31	88	
	3	3	2908	88	16	88	23	88	42	88	31	88	
	4	4	2908	88	16	88	23	88	42	88	31	88	
	5	6	1820	88	9	88	14	88	25	88	16	88	
	6	7	1820	88	9	88	14	88	25	88	16	88	
	7	8	1820	88	9	88	14	88	25	88	16	88	
	8	9	1820	88	9	88	14	88	25	88	16	88	
	9	10	2517	88	13	88	20	88	35	88	22	88	
	10	11	2517	88	13	88	20	88	35	88	22	88	
	11	13	2517	88	13	88	20	88	35	88	22	88	
	12	14	2517	88	13	88	20	88	35	88	22	88	
	13	15	2517	88	13	88	20	88	35	88	22	88	
	14	16	2517	88	13	88	20	88	35	88	22	88	
	15	17	2517	88	13	88	20	88	35	88	22	88	
	16	18	2517	88	13	88	20	88	35	88	22	88	
	17	20	2517	88	13	88	20	88	35	88	22	88	
	18	21	2517	88	13	88	20	88	35	88	22	88	
	19	22	2517	88	13	88	20	88	35	88	22	88	
	20	23	2517	88	13	88	20	88	35	88	22	88	
	21	24	2517	88	13	88	20	88	35	88	22	88	

	22	25	2517	88	13	88	20	88	35	88	22	88
	23	26	2517	88	13	88	20	88	35	88	22	88
	24	27	843	88	4	88	7	88	12	88	7	88
	25	28	843	88	4	88	7	88	12	88	7	88
	26	29	843	88	4	88	7	88	12	88	7	88
	27	31	843	88	4	88	7	88	12	88	7	88
	28	32	843	56	4	56	7	56	12	56	7	56
	29	33	843	56	4	56	7	56	12	56	7	56
	30	34	843	56	4	56	7	56	12	56	7	56
		35	843	56	4	56	7	56	12	56	7	56
		36	843	56	4	56	7	56	12	56	7	56
		37										
WB Doyle Drive from Marina to 0+00	1	39	1746	56	0	0	4	56	49	56	18	56
	2	40	1746	56	0	0	4	56	49	56	18	56
	3	41	1746	56	0	0	4	56	49	56	18	56
	4	42	1746	56	0	0	4	56	49	56	18	56
	5	43	1746	88	0	0	4	88	49	88	18	88
	6	44	1746	88	0	0	4	88	49	88	18	88
	7	46	1746	88	0	0	4	88	49	88	18	88
	8	47	1746	88	0	0	4	88	49	88	18	88
	9	48	1746	88	0	0	4	88	49	88	18	88
	10	49	1746	88	0	0	4	88	49	88	18	88
	11	50	4439	88	0	0	9	88	125	88	46	88
	12	51	4439	88	0	0	9	88	125	88	46	88
	13	52	4439	88	0	0	9	88	125	88	46	88
	14	53	4439	88	0	0	9	88	125	88	46	88
	15	54	4439	88	0	0	9	88	125	88	46	88
	16	55	4439	88	0	0	9	88	125	88	46	88
	17	56	4439	88	0	0	9	88	125	88	46	88
	18	57	4439	88	0	0	9	88	125	88	46	88
	19	58	4439	88	0	0	9	88	125	88	46	88
	20	59	4439	88	0	0	9	88	125	88	46	88
	21	60	4439	88	0	0	9	88	125	88	46	88
	22	61	4439	88	0	0	9	88	125	88	46	88

	23	62	4439	88	0	0	9	88	125	88	46	88
	24	63	4439	88	0	0	9	88	125	88	46	88
	25	64	4439	88	0	0	9	88	125	88	46	88
	26	65	4439	88	0	0	9	88	125	88	46	88
	27	66	4439	88	0	0	9	88	125	88	46	88
	28	67	3464	88	0	0	7	88	97	88	36	88
	29	68	3464	88	0	0	7	88	97	88	36	88
	30	69	3464	88	0	0	7	88	97	88	36	88
	31	70	3464	88	0	0	7	88	97	88	36	88
	32	71	3464	88	0	0	7	88	97	88	36	88
	33	72	3464	88	0	0	7	88	97	88	36	88
		73	3464	88	0	0	7	88	97	88	36	88
		74	3464	88	0	0	7	88	97	88	36	88
		75	3464	88	0	0	7	88	97	88	36	88
		192	3464	88	0	0	7	88	97	88	36	88
		193	5429	88	0	0	11	88	153	88	56	88
		76										
SB/EB Richardson from Doyle to Francis	1	77	1549	56	8	56	12	56	22	56	13	56
	2	78	1549	56	8	56	12	56	22	56	13	56
	3	79	1549	56	8	56	12	56	22	56	13	56
	4	80	1549	56	8	56	12	56	22	56	13	56
	5	81	1549	56	8	56	12	56	22	56	13	56
	6	82	1549	56	8	56	12	56	22	56	13	56
	7	83	1549	56	8	56	12	56	22	56	13	56
	8	84	1549	56	8	56	12	56	22	56	13	56
	9	85	1549	56	8	56	12	56	22	56	13	56
	10	86	1549	56	8	56	12	56	22	56	13	56
	11	87										
NB/WB Richardson from Francisco to DD	1	88	2378	56	0	0	4	56	59	56	22	56
	2	89	2378	56	0	0	4	56	59	56	22	56
	3	90	2378	56	0	0	4	56	59	56	22	56
	4	91	2378	56	0	0	4	56	59	56	22	56
	5	92	2378	56	0	0	4	56	59	56	22	56
	6	93	2378	56	0	0	4	56	59	56	22	56

	7	94	2378	56	0	0	4	56	59	56	22	56
	8	95	2378	56	0	0	4	56	59	56	22	56
	9	96	2378	56	0	0	4	56	59	56	22	56
	10	97	2378	56	0	0	4	56	59	56	22	56
	11	98	2378	56	0	0	4	56	59	56	22	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	974	56	0	0	2	56	27	56	10	56
	2	101	974	56	0	0	2	56	27	56	10	56
	3	102	974	56	0	0	2	56	27	56	10	56
	4	103	974	56	0	0	2	56	27	56	10	56
	5	104	974	56	0	0	2	56	27	56	10	56
	6	105	974	56	0	0	2	56	27	56	10	56
	7	106	974	56	0	0	2	56	27	56	10	56
	8	107	974	56	0	0	2	56	27	56	10	56
	9	108	974	56	0	0	2	56	27	56	10	56
	10	109	974	56	0	0	2	56	27	56	10	56
	11	110	974	56	0	0	2	56	27	56	10	56
	12	111	974	56	0	0	2	56	27	56	10	56
	13	112										
SB PP Ramp from EB Doyle Drive	1	113	1194	56	6	56	9	56	17	56	10	56
	2	114	1194	56	6	56	9	56	17	56	10	56
	3	115	1194	56	6	56	9	56	17	56	10	56
	4	116	1194	56	6	56	9	56	17	56	10	56
	5	117	1194	56	6	56	9	56	17	56	10	56
	6	118	1194	56	6	56	9	56	17	56	10	56
	7	119	1194	56	6	56	9	56	17	56	10	56
	8	120	1194	56	6	56	9	56	17	56	10	56
	9	121										
NB Park Presidio to WB Doyle Drive	1	122	1993	56	0	0	8	56	20	56	22	56
	2	123	1993	56	0	0	8	56	20	56	22	56
	3	124	1993	56	0	0	8	56	20	56	22	56
	4	125	1993	56	0	0	8	56	20	56	22	56
	5	126	1993	56	0	0	8	56	20	56	22	56
	6	127	1993	56	0	0	8	56	20	56	22	56

	7	128	1993	56	0	0	8	56	20	56	22	56
	8	129	1993	56	0	0	8	56	20	56	22	56
	9	130	1993	56	0	0	8	56	20	56	22	56
	10	131	1993	56	0	0	8	56	20	56	22	56
	11	132	1993	56	0	0	8	56	20	56	22	56
	12	191	1993	56	0	0	8	56	20	56	22	56
	13	133										
NB PP ramp to EB Doyle Drive	1	134	704	56	4	56	5	56	4	56	7	56
	2	135	704	56	4	56	5	56	4	56	7	56
	3	136	704	56	4	56	5	56	4	56	7	56
	4	137	704	56	4	56	5	56	4	56	7	56
	5	138										
Mason Street	1	139	12	32	1	32	1	32	1	32	1	32
	2	140	12	32	1	32	1	32	1	32	1	32
	3	141	12	32	1	32	1	32	1	32	1	32
	4	142	12	32	1	32	1	32	1	32	1	32
	5	143	12	32	1	32	1	32	1	32	1	32
	6	144	12	32	1	32	1	32	1	32	1	32
	7	145	12	32	1	32	1	32	1	32	1	32
	8	194	50	32	1	32	1	32	2	32	1	32
	9	146	80	32	2	32	1	32	2	32	3	32
	10	147	81	32	2	32	1	32	2	32	3	32
	11	148										
Lincoln Blvd.	1	149	117	32	2	32	0	0	2	32	2	32
	2	150	372	32	4	32	0	0	4	32	4	32
	3	151	372	32	4	32	0	0	4	32	4	32
	4	152	372	32	4	32	0	0	4	32	4	32
	5	153	372	32	4	32	0	0	4	32	4	32
	6	154	372	32	4	32	0	0	4	32	4	32
	7	155	372	32	4	32	0	0	4	32	4	32
	8	156	372	32	4	32	0	0	4	32	4	32
	9	157	379	32	4	32	0	0	4	32	4	32
	10	158	276	32	3	32	0	0	3	32	3	32
	11	159	276	32	3	32	0	0	3	32	3	32

	12	160	276	32	3	32	0	0	3	32	3	32
	13	161	276	32	3	32	0	0	3	32	3	32
	14	162	276	32	3	32	0	0	3	32	3	32
	15	163	276	32	3	32	0	0	3	32	3	32
	16	164	276	32	3	32	0	0	3	32	3	32
	17	165	276	32	3	32	0	0	3	32	3	32
	18	166	276	32	3	32	0	0	3	32	3	32
	19	167	455	32	4	32	0	0	4	32	4	32
	20	168	455	32	4	32	0	0	4	32	4	32
	21	169	491	32	5	32	0	0	5	32	5	32
	22	170	516	32	5	32	0	0	5	32	5	32
	23	171										
Gorgas Avenue	1	172	71	32	0	0	0	0	0	0	0	0
	2	173	71	32	0	0	0	0	0	0	0	0
	3	174	71	32	0	0	0	0	0	0	0	0
	4	175	71	32	0	0	0	0	0	0	0	0
	5	176	49	32	0	0	0	0	0	0	0	0
	6	177	20	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	85	32	0	0	0	0	0	0	0	0
	2	180	98	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	48	32	0	0	0	0	0	0	0	0
	2	183	48	32	0	0	0	0	0	0	0	0
	3	184	48	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	489	32	5	32	0	0	0	0	5	32
	2	187										
Montgomery Street	1	188	103	32	2	32	2	32	2	32	2	32
	2	189	103	32	2	32	2	32	2	32	2	32
	3	190										

Environmental Science Associates, Inc
Win Lindeman

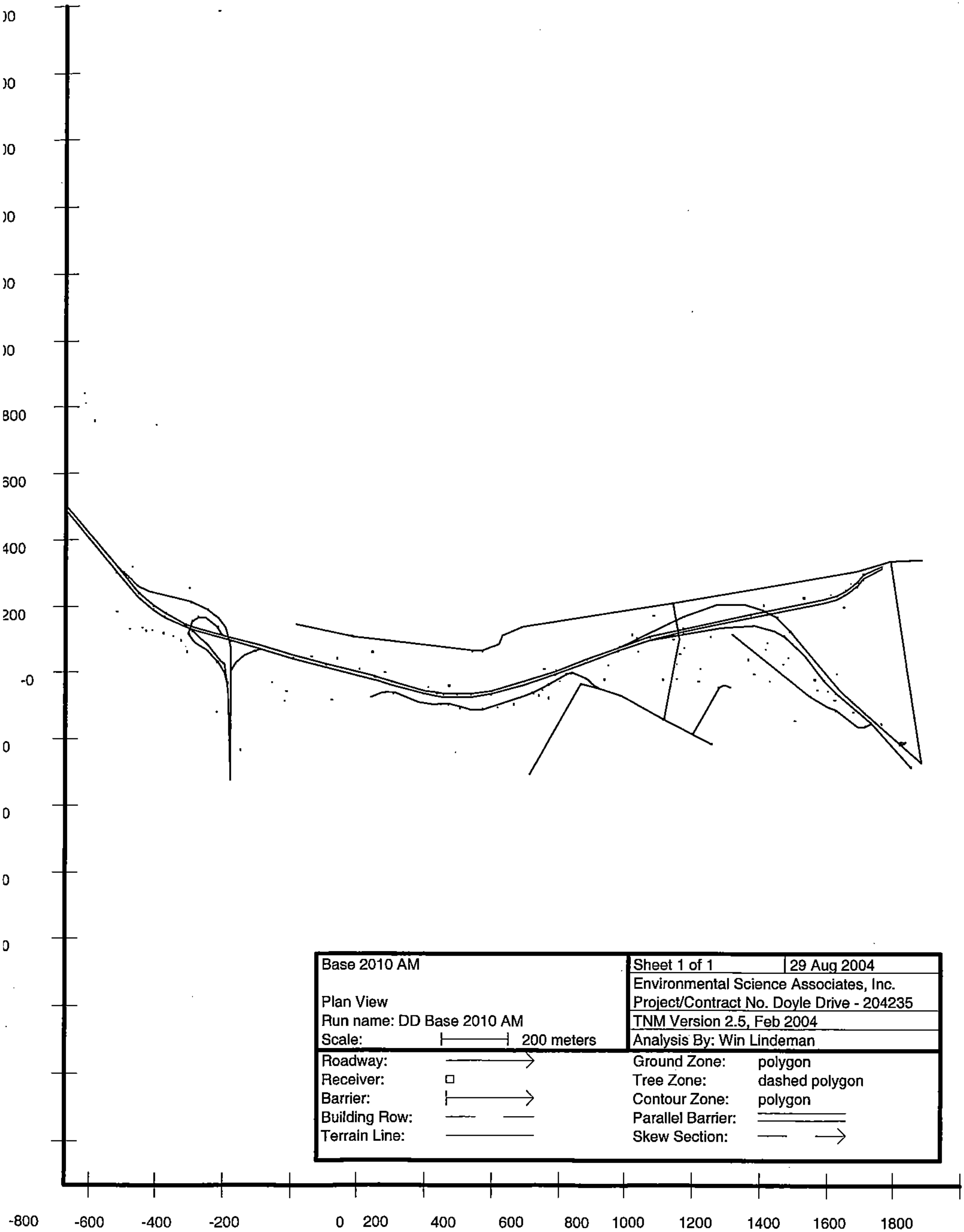
30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base Case 2000 PM

Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y



Base 2010 AM
Plan View
Run name: DD Base 2010 AM
Scale: 200 meters
Sheet 1 of 1
29 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
800
600
400
200
-0
-800
-600
-400
-200
0
200
400
600
800
1000
1200
1400
1600
1800

Environmental Science Associates, Inc.
Win Lindeman

29 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	9.1	1	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-654.0	228.0	53.00				Average	
		4	4	-610.0	192.0	50.00				Average	
		5	5	-576.0	170.0	46.00				Average	
		6	6	-516.0	144.0	49.00				Average	Y
		7	7	-488.0	130.0	45.00				Average	Y
		8	8	-380.0	100.0	41.00				Average	Y
		9	9	-292.0	76.0	41.00				Average	Y
		10	10	-194.0	47.0	37.00				Average	Y
		11	11	49.0	-18.0	29.00				Average	Y
		12	12	50.0	-18.0	29.00				Average	
		13	13	98.0	-32.0	28.00				Average	
		14	14	196.0	-58.0	27.00				Average	
		15	15	232.0	-66.0	26.50				Average	
		16	16	252.0	-70.0	26.00				Average	
		17	17	333.0	-70.0	24.00				Average	
		18	18	334.0	-70.0	24.00				Average	Y
		19	19	396.0	-60.0	21.40				Average	Y
		20	20	492.0	-32.0	17.80				Average	Y
		21	21	586.0	0.0	14.00				Average	Y
		22	22	680.0	35.0	12.00				Average	Y
		23	23	776.0	70.0	12.00				Average	Y
		24	24	868.0	102.0	11.80				Average	Y
		25	25	968.0	126.0	11.20				Average	Y

		26	26	1,068.0	150.0	11.20				Average	Y
		27	27	1,381.0	213.0	5.00				Average	Y
		28	28	1,382.0	213.0	5.00				Average	
		29	29	1,422.0	224.0	5.00				Average	
		30	30	1,450.0	240.0	4.00				Average	
		31	31	1,486.0	264.0	4.00				Average	
		32	32	1,504.0	286.0	4.00				Average	
		33	33	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to Toll Gate	9.1	1	37	1,560.0	326.0	4.00				Average	
		2	38	1,504.0	300.0	4.00				Average	
		3	39	1,486.0	276.0	4.00				Average	
		4	40	1,450.0	251.0	4.00				Average	
		5	41	1,422.0	234.0	5.00				Average	
		6	42	1,382.0	224.0	5.00				Average	Y
		7	43	1,166.0	178.0	10.80				Average	Y
		8	44	1,068.0	157.0	11.20				Average	Y
		9	45	968.0	136.0	11.20				Average	Y
		10	46	868.0	111.0	11.80				Average	Y
		11	47	776.0	80.0	12.00				Average	Y
		12	48	680.0	44.0	12.00				Average	Y
		13	49	586.0	10.0	14.00				Average	Y
		14	50	492.0	-22.0	17.80				Average	Y
		15	51	396.0	-52.0	21.40				Average	Y
		15	52	335.0	-60.0	24.00				Average	Y
		17	53	334.0	-60.0	24.00				Average	
		18	54	294.0	-60.0	25.00				Average	
		19	55	252.0	-60.0	26.00				Average	
		20	56	232.0	-56.0	26.50				Average	
		21	57	196.0	-50.0	27.00				Average	
		22	58	98.0	-22.0	28.00				Average	
		23	59	49.0	-8.0	28.40				Average	
		24	60	50.0	-8.0	28.40				Average	Y
		25	61	-98.0	30.0	33.00				Average	Y
		26	62	-194.0	58.0	37.00				Average	Y
		27	63	-292.0	86.0	41.00				Average	Y
		28	64	-380.0	110.0	45.00				Average	Y
		29	65	-406.0	118.0	45.00				Average	Y
		30	66	-407.0	118.0	45.00				Average	

		31	67	-487.0	138.5	49.20				Average	
		32	68	-488.0	138.5	49.20				Average	Y
		33	69	-516.0	150.0	51.00				Average	Y
		34	70	-517.0	150.0	51.00				Average	
		35	71	-576.0	182.0	49.00				Average	
		36	72	-610.0	204.0	50.00				Average	
		37	73	-654.0	242.0	53.00				Average	
		38	74	-720.0	322.0	56.00				Average	
		39	75	-966.0	620.0	53.00					
SB Richardson fro Doyle to Francisco	11.0	1	76	868.0	102.0	11.80				Average	Y
		2	77	1,078.0	140.0	10.00				Average	Y
		3	78	1,178.0	147.0	7.00				Average	Y
		4	79	1,233.0	132.0	5.00				Average	Y
		5	80	1,234.0	132.0	5.00				Average	
		6	81	1,270.0	114.0	2.00				Average	
		7	82	1,330.0	57.0	2.00				Average	
		8	83	1,388.0	-20.0	2.00				Average	
		9	84	1,424.0	-60.0	2.00				Average	
		10	85	1,528.0	-146.0	4.00				Average	
		11	86	1,650.0	-280.0	4.00					
NB Richardson from Francisco to Doyle	11.0	1	87	1,680.0	-266.0	4.00				Average	
		2	88	1,514.0	-122.0	4.00				Average	
		3	89	1,436.0	-50.0	2.00				Average	
		4	90	1,285.0	130.0	2.00				Average	
		5	91	1,244.0	172.0	3.00				Average	
		6	92	1,200.0	196.0	4.00				Average	
		7	93	1,149.0	210.0	7.00				Average	
		8	94	1,150.0	210.0	7.00				Average	Y
		9	95	1,068.0	210.0	10.00				Average	Y
		10	96	968.0	172.0	11.00				Average	Y
		11	97	830.0	106.0	12.00				Average	Y
		12	98	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	99	-406.0	118.0	45.60				Average	
		2	100	-420.0	144.0	46.00				Average	
		3	101	-456.0	170.0	41.00				Average	
		4	102	-478.0	170.0	40.00				Average	
		5	103	-494.0	158.0	39.00				Average	
		6	104	-505.0	120.0	39.00				Average	

		7	105	-488.0	96.0	39.00				Average	
		8	106	-450.0	70.0	38.00				Average	
		9	107	-418.0	36.0	38.00				Average	
		10	108	-398.0	5.0	38.00				Average	
		11	109	-390.0	-26.0	37.00				Average	
		12	110	-388.0	-50.0	37.00				Average	
		13	111	-380.0	-320.0	37.00					
SB PP from EB Doyle Drive	4.6	1	112	-515.0	143.9	51.00				Average	Y
		2	113	-495.0	130.0	50.00				Average	Y
		3	114	-494.0	130.0	50.00				Average	
		4	115	-476.0	112.0	49.00				Average	
		5	116	-447.0	86.0	46.00				Average	
		6	117	-410.0	38.0	47.00				Average	
		7	118	-400.0	30.0	37.00				Average	
		8	119	-390.0	-26.0	37.00				Average	
		9	120	-388.0	-27.0	37.00					
NB PP to WB Doyle Drive	4.6	1	121	-380.0	-320.0	37.00				Average	
		2	122	-380.0	10.0	37.00				Average	
		3	123	-380.0	80.0	37.00				Average	
		4	124	-384.0	98.0	38.00				Average	
		5	125	-396.0	138.0	38.00				Average	
		6	126	-418.0	170.0	41.00				Average	
		7	127	-450.0	196.0	44.00				Average	
		8	128	-500.0	216.0	47.50				Average	
		9	129	-620.0	246.0	54.00				Average	
		10	130	-656.0	262.0	57.00				Average	
		11	131	-686.0	290.0	58.00				Average	
		12	132	-703.0	306.0	58.00				Average	
		13	133	-720.0	322.0	56.00					
NB PP Ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00				Average	
		2	135	-364.0	34.0	38.00				Average	
		3	136	-338.0	58.0	39.00				Average	
		4	137	-306.0	70.0	40.00				Average	
		5	138	-292.0	76.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	146	938.0	214.0	4.00				Average	
		9	147	1,486.0	310.0	4.00				Average	
		10	148	1,584.0	340.0	4.00				Average	
		11	149	1,680.0	344.0	4.00					
Lincoln Blvd. from McDowell to Letterma	7.3	1	150	36.0	-70.0	33.00				Average	
		2	151	74.0	-53.0	33.00				Average	
		3	152	106.0	-56.0	32.00				Average	
		4	153	180.0	-86.0	30.00				Average	
		5	154	226.0	-92.0	29.00				Average	
		6	155	246.0	-90.0	29.00				Average	
		7	156	268.0	-90.0	29.00				Average	
		8	157	308.0	-100.0	29.00				Average	
		9	158	334.0	-108.0	27.00				Average	
		10	159	368.0	-105.0	26.00				Average	
		11	160	490.0	-66.0	19.00				Average	
		12	161	520.0	-56.0	17.00				Average	
		13	162	568.0	-30.0	16.00				Average	
		14	163	596.0	-14.0	13.00				Average	
		15	164	620.0	0.0	14.00				Average	
		16	165	636.0	6.0	12.00				Average	
		17	166	680.0	-14.0	13.00				Average	
		18	167	700.0	-34.0	14.00				Average	
		19	168	718.0	-44.0	14.00				Average	
		20	169	784.0	-66.0	15.00				Average	
		21	170	910.0	-136.0	14.00				Average	
		22	190	998.0	-180.0	14.00				Average	
		22	171	1,054.0	-210.0	14.00					
Gorgas Avenue	7.3	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	191	1,344.0	-66.0	2.00				Average	
		7	177	1,112.0	120.0	3.00					
Halleck Street	7.3	1	178	910.0	-136.0	14.00				Average	

		2	179	957.0	106.0	6.00				Average	
		3	180	938.0	214.0	4.00					
Girard Road	7.3	1	181	998.0	-180.0	14.00				Average	
		2	182	1,074.0	-38.0	3.00				Average	
		3	183	1,090.0	-33.0	4.00				Average	
		4	184	1,108.0	-40.0	5.00					
Baker Street	7.3	1	185	1,680.0	-266.0	4.00				Average	
		2	186	1,584.0	340.0	4.00					
Montgomery Street	7.3	1	187	510.0	-300.0	15.00				Average	
		2	188	664.0	-30.0	12.00				Average	
		3	189	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 29 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle Drive to Marina	1	1	5763	88	60	88	12	88	60	88	60	88	
	2	2	5763	88	60	88	12	88	60	88	60	88	
	3	3	5763	88	60	88	12	88	60	88	60	88	
	4	4	5763	88	60	88	12	88	60	88	60	88	
	5	5	5763	88	60	88	12	88	60	88	60	88	
	6	6	3967	88	41	88	8	88	41	88	41	88	
	7	7	3967	88	41	88	8	88	41	88	41	88	
	8	8	3967	88	41	88	8	88	41	88	41	88	
	9	9	4868	88	50	88	10	88	50	88	50	88	
	10	10	4868	88	50	88	10	88	50	88	50	88	
	11	11	4868	88	50	88	10	88	50	88	50	88	
	12	12	4868	88	50	88	10	88	50	88	50	88	
	13	13	4868	88	50	88	10	88	50	88	50	88	
	14	14	4868	88	50	88	10	88	50	88	50	88	
	15	15	4868	88	50	88	10	88	50	88	50	88	
	16	16	4868	88	50	88	10	88	50	88	50	88	
	17	17	4868	88	50	88	10	88	50	88	50	88	
	18	18	4868	88	50	88	10	88	50	88	50	88	
	19	19	4868	88	50	88	10	88	50	88	50	88	
	20	20	4868	88	50	88	10	88	50	88	50	88	
	21	21	4868	88	50	88	10	88	50	88	50	88	

	22	22	4868	88	50	88	10	88	50	88	50	88
	23	23	4868	88	50	88	10	88	50	88	50	88
	24	24	1450	88	0	0	0	0	0	0	0	0
	25	25	1450	88	0	0	0	0	0	0	0	0
	26	26	1450	56	0	0	0	0	0	0	0	0
	27	27	1450	56	0	0	0	0	0	0	0	0
	28	28	1450	56	0	0	0	0	0	0	0	0
	29	29	1450	56	0	0	0	0	0	0	0	0
	30	30	1450	56	0	0	0	0	0	0	0	0
	31	31	1450	56	0	0	0	0	0	0	0	0
	32	32	1450	56	0	0	0	0	0	0	0	0
	33	33										
WB Doyle Drive from Marina to Toll Gate	1	37	585	56	0	0	0	0	0	0	0	0
	2	38	585	56	0	0	0	0	0	0	0	0
	3	39	585	56	0	0	0	0	0	0	0	0
	4	40	585	56	0	0	0	0	0	0	0	0
	5	41	585	56	0	0	0	0	0	0	0	0
	6	42	585	56	0	0	0	0	0	0	0	0
	7	43	585	88	0	0	0	0	0	0	0	0
	8	44	585	88	0	0	0	0	0	0	0	0
	9	45	585	88	0	0	0	0	0	0	0	0
	10	46	585	88	0	0	0	0	0	0	0	0
	11	47	2156	88	22	88	29	88	13	88	22	88
	12	48	2156	88	22	88	29	88	13	88	22	88
	13	49	2156	88	22	88	29	88	13	88	22	88
	14	50	2156	88	22	88	29	88	13	88	22	88
	15	51	2156	88	22	88	29	88	13	88	22	88
	15	52	2156	88	22	88	29	88	13	88	22	88
	17	53	2156	88	22	88	29	88	13	88	22	88
	18	54	2156	88	22	88	29	88	13	88	22	88
	19	55	2156	88	22	88	29	88	13	88	22	88
	20	56	2156	88	22	88	29	88	13	88	22	88
	21	57	2156	88	22	88	29	88	13	88	22	88
	22	58	2156	88	22	88	29	88	13	88	22	88

	23	59	2156	88	22	88	29	88	13	88	22	88
	24	60	2156	88	22	88	29	88	13	88	22	88
	25	61	2156	88	22	88	29	88	13	88	22	88
	26	62	2156	88	22	88	29	88	13	88	22	88
	27	63	2156	88	22	88	29	88	13	88	22	88
	28	64	2156	88	22	88	29	88	13	88	22	88
	29	65	1741	88	18	88	24	88	11	88	18	88
	30	66	1741	88	18	88	24	88	11	88	18	88
	31	67	1741	88	18	88	24	88	11	88	18	88
	32	68	1741	88	18	88	24	88	11	88	18	88
	33	69	1741	88	18	88	24	88	11	88	18	88
	34	70	1741	88	18	88	24	88	11	88	18	88
	35	71	1741	88	18	88	24	88	11	88	18	88
	36	72	1741	88	18	88	24	88	11	88	18	88
	37	73	1741	88	18	88	24	88	11	88	18	88
	38	74	3332	88	35	88	45	88	21	88	35	88
	39	75										
SB Richardson fro Doyle to Francisco	1	76	2658	56	27	56	5	56	27	56	27	56
	2	77	2658	56	27	56	5	56	27	56	27	56
	3	78	2658	56	27	56	5	56	27	56	27	56
	4	79	2658	56	27	56	5	56	27	56	27	56
	5	80	2658	56	27	56	5	56	27	56	27	56
	6	81	2658	56	27	56	5	56	27	56	27	56
	7	82	2658	56	27	56	5	56	27	56	27	56
	8	83	2658	56	27	56	5	56	27	56	27	56
	9	84	2658	56	27	56	5	56	27	56	27	56
	10	85	2658	56	27	56	5	56	27	56	27	56
	11	86										
NB Richardson from Francisco to Doyle	1	87	1392	56	14	56	19	56	9	56	14	56
	2	88	1392	56	14	56	19	56	9	56	14	56
	3	89	1392	56	14	56	19	56	9	56	14	56
	4	90	1392	56	14	56	19	56	9	56	14	56
	5	91	1392	56	14	56	19	56	9	56	14	56
	6	92	1392	56	14	56	19	56	9	56	14	56

	7	93	1392	56	14	56	19	56	9	56	14	56
	8	94	1392	56	14	56	19	56	9	56	14	56
	9	95	1392	56	14	56	19	56	9	56	14	56
	10	96	1392	56	14	56	19	56	9	56	14	56
	11	97	1392	56	14	56	19	56	9	56	14	56
	12	98										
SB PP Ramp from WB Doyle Drive	1	99	415	56	4	56	6	56	3	56	4	56
	2	100	415	56	4	56	6	56	3	56	4	56
	3	101	415	56	4	56	6	56	3	56	4	56
	4	102	415	56	4	56	6	56	3	56	4	56
	5	103	415	56	4	56	6	56	3	56	4	56
	6	104	415	56	4	56	6	56	3	56	4	56
	7	105	415	56	4	56	6	56	3	56	4	56
	8	106	415	56	4	56	6	56	3	56	4	56
	9	107	415	56	4	56	6	56	3	56	4	56
	10	108	415	56	4	56	6	56	3	56	4	56
	11	109	415	56	4	56	6	56	3	56	4	56
	12	110	415	56	4	56	6	56	3	56	4	56
	13	111										
SB PP from EB Doyle Drive	1	112	1797	56	19	56	4	56	19	56	19	56
	2	113	1797	56	19	56	4	56	19	56	19	56
	3	114	1797	56	19	56	4	56	19	56	19	56
	4	115	1797	56	19	56	4	56	19	56	19	56
	5	116	1797	56	19	56	4	56	19	56	19	56
	6	117	1797	56	19	56	4	56	19	56	19	56
	7	118	1797	56	19	56	4	56	19	56	19	56
	8	119	1797	56	19	56	4	56	19	56	19	56
	9	120										
NB PP to WB Doyle Drive	1	121	1620	56	17	56	17	56	0	0	12	56
	2	122	1620	56	17	56	17	56	0	0	12	56
	3	123	1620	56	17	56	17	56	0	0	12	56
	4	124	1620	56	17	56	17	56	0	0	12	56
	5	125	1620	56	17	56	17	56	0	0	12	56
	6	126	1620	56	17	56	17	56	0	0	12	56

	7	127	1620	56	17	56	17	56	0	0	12	56
	8	128	1620	56	17	56	17	56	0	0	12	56
	9	129	1620	56	17	56	17	56	0	0	12	56
	10	130	1620	56	17	56	17	56	0	0	12	56
	11	131	1620	56	17	56	17	56	0	0	12	56
	12	132	1620	56	17	56	17	56	0	0	12	56
	13	133										
NB PP Ramp to EB Doyle Drive	1	134	899	56	7	56	9	56	9	56	7	56
	2	135	899	56	7	56	9	56	9	56	7	56
	3	136	899	56	7	56	9	56	9	56	7	56
	4	137	899	56	7	56	9	56	9	56	7	56
	5	138										
Mason Street	1	139	3	32	0	0	0	0	0	0	0	0
	2	140	3	32	0	0	0	0	0	0	0	0
	3	141	3	32	0	0	0	0	0	0	0	0
	4	142	3	32	0	0	0	0	0	0	0	0
	5	143	3	32	0	0	0	0	0	0	0	0
	6	144	3	32	0	0	0	0	0	0	0	0
	7	145	3	32	0	0	0	0	0	0	0	0
	8	146	28	32	0	0	0	0	0	0	0	0
	9	147	34	32	0	0	0	0	0	0	0	0
	10	148	34	32	0	0	0	0	0	0	0	0
	11	149										
Lincoln Blvd. from McDowell to Letterma	1	150	99	32	1	32	0	0	1	32	0	0
	2	151	124	32	1	32	0	0	1	32	0	0
	3	152	124	32	1	32	0	0	1	32	0	0
	4	153	124	32	1	32	0	0	1	32	0	0
	5	154	124	32	1	32	0	0	1	32	0	0
	6	155	124	32	1	32	0	0	1	32	0	0
	7	156	124	32	1	32	0	0	1	32	0	0
	8	157	138	32	1	32	0	0	1	32	0	0
	9	158	46	32	1	32	0	0	1	32	0	0
	10	159	46	32	1	32	0	0	1	32	0	0
	11	160	46	32	1	32	0	0	1	32	0	0

	12	161	46	32	1	32	0	0	1	32	0	0
	13	162	46	32	1	32	0	0	1	32	0	0
	14	163	46	32	1	32	0	0	1	32	0	0
	15	164	46	32	1	32	0	0	1	32	0	0
	16	165	46	32	1	32	0	0	1	32	0	0
	17	166	46	32	1	32	0	0	1	32	0	0
	18	167	46	32	1	32	0	0	1	32	0	0
	19	168	138	32	1	32	0	0	1	32	0	0
	20	169	149	32	2	32	0	0	2	32	0	0
	21	170	180	32	2	32	0	0	2	32	0	0
	22	190	237	32	2	32	0	0	2	32	0	0
	22	171										
Gorgas Avenue	1	172	280	32	0	0	0	0	0	0	0	0
	2	173	280	32	0	0	0	0	0	0	0	0
	3	174	280	32	0	0	0	0	0	0	0	0
	4	175	12	32	0	0	0	0	0	0	0	0
	5	176	6	32	0	0	0	0	0	0	0	0
	6	191	67	32	0	0	0	0	0	0	0	0
	7	177										
Halleck Street	1	178	32	32	0	0	0	0	0	0	0	0
	2	179	33	32	0	0	0	0	0	0	0	0
	3	180										
Girard Road	1	181	67	32	0	0	0	0	0	0	0	0
	2	182	67	32	0	0	0	0	0	0	0	0
	3	183	67	32	0	0	0	0	0	0	0	0
	4	184										
Baker Street	1	185	183	32	0	0	0	0	0	0	0	0
	2	186										
Montgomery Street	1	187	92	32	0	0	0	0	0	0	0	0
	2	188	92	32	0	0	0	0	0	0	0	0
	3	189										

Environmental Science Associates, Inc
Win Lindeman

29 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 AM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Ricardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	3	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Building 1187/1188	4	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10 Battery Blaney	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 Armistead Rd. 1253	18	2	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Armistead Rd. residence	19	2	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	66	12.0	10.0	Y

23 Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Storey Ave. 1298	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Storey Ave. 1297	31	2	-644.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Storey Ave. 1295	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Storey Ave. 1294	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Storey Ave. 1293	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Storey Ave 1291	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Storey Ave. 1290	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Storey Ave. 1289	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Storey Ave. 1263	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stables	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stables	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	46	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	47	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	48	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	49	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	50	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	51	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	52	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	53	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	54	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	55	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	56	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	57	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	58	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	59	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	65	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	66	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	67	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	68	0	1,216.0	94.0	2.00	1.50	68.50	71	12.0	10.0	Y
67 Building 1163	69	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	70	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	71	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	72	0	1,360.0	-16.0	2.00	1.50	0.00	71	12.0	10.0	Y
71 Building 1161	73	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	74	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	75	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	76	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	77	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residence at 3234 Lyon St.	79	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

29 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 AM
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 20 deg C, 50% RH

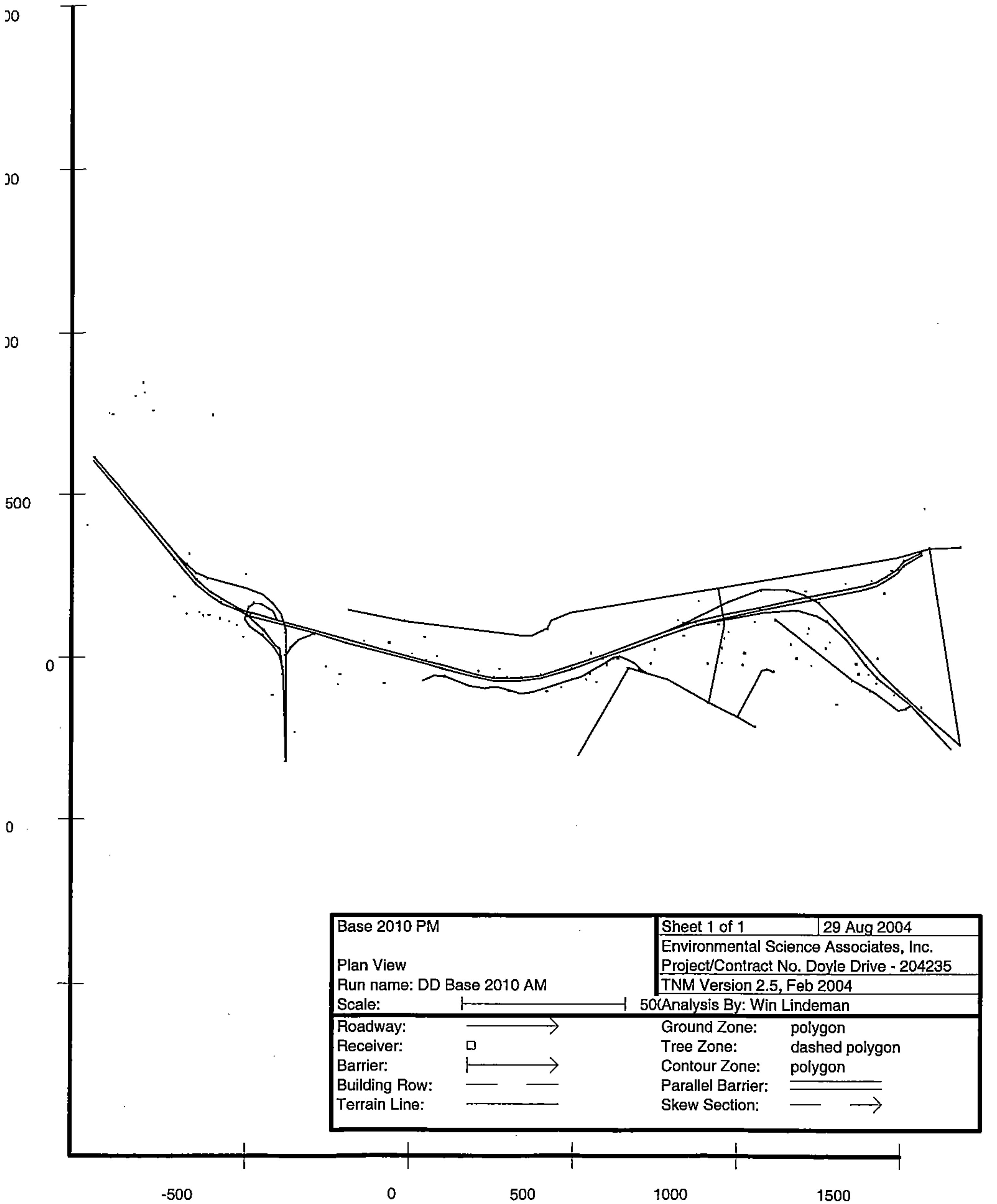
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Ricardson	1	0	0.0	66.8	66	66.8	12	Snd Lvl	66.8	0.0	10	-10.0
2 Palace of Fine Arts near Girard	3	0	0.0	62.5	66	62.5	12	—	62.5	0.0	10	-10.0
3 Building 1187/1188	4	0	81.0	64.5	71	-16.5	12	—	64.5	0.0	10	-10.0
4 Building 1182	5	0	81.0	60.6	71	-20.4	12	—	60.6	0.0	10	-10.0
5 Building 1183/1186	6	0	81.0	60.9	71	-20.1	12	—	60.9	0.0	10	-10.0
6 Building 1184/1185	7	0	81.0	66.3	71	-14.7	12	—	66.3	0.0	10	-10.0
7 Building 603/Crissy Center	8	0	72.0	65.7	71	-6.3	12	—	65.7	0.0	10	-10.0
8 PX Building	9	0	0.0	68.3	71	68.3	12	—	68.3	0.0	10	-10.0
9 Post Commissary/Sports Basement	10	0	69.0	67.1	71	-1.9	12	—	67.1	0.0	10	-10.0
10 Battery Blaney	11	0	68.0	73.3	66	5.3	12	Snd Lvl	73.3	0.0	10	-10.0
11 Battery Slaughter	12	0	68.0	78.3	66	10.3	12	Snd Lvl	78.3	0.0	10	-10.0
12 Battery Sherwood	13	0	68.0	75.6	66	7.6	12	Snd Lvl	75.6	0.0	10	-10.0
13 Battery Baldwin	14	0	68.0	65.9	66	-2.1	12	—	65.9	0.0	10	-10.0
14 Building 644	15	0	0.0	63.3	71	63.3	12	—	63.3	0.0	10	-10.0
15 Building 649	16	0	0.0	60.2	66	60.2	12	—	60.2	0.0	10	-10.0
16 Building 650/Stilwell Hall	17	0	70.0	59.5	66	-10.5	12	—	59.5	0.0	10	-10.0
17 Armistead Rd. 1253	18	2	66.0	62.6	66	-3.4	12	—	62.6	0.0	10	-10.0
18 Armistead Rd. residence	19	2	66.0	69.7	66	3.7	12	Snd Lvl	69.7	0.0	10	-10.0
19 Building 969	20	0	0.0	51.1	71	51.1	12	—	51.1	0.0	10	-10.0
20 Building 968	21	0	0.0	52.9	71	52.9	12	—	52.9	0.0	10	-10.0
21 Building 967	22	0	0.0	54.9	71	54.9	12	—	54.9	0.0	10	-10.0
22 Building 966	23	0	0.0	54.7	66	54.7	12	—	54.7	0.0	10	-10.0
23 Building 964	24	1	0.0	52.6	66	52.6	12	—	52.6	0.0	10	-10.0

24 Building 963	25	1	0.0	53.3	66	53.3	12	—	53.3	0.0	10	-10.0
25 Building 962	26	1	0.0	53.3	66	53.3	12	—	53.3	0.0	10	-10.0
26 Unknown Building	27	0	0.0	55.4	71	55.4	12	—	55.4	0.0	10	-10.0
27 Log Cabin	28	0	63.0	67.4	66	4.4	12	Snd Lvl	67.4	0.0	10	-10.0
28 Unknown Building	29	0	0.0	60.8	71	60.8	12	—	60.8	0.0	10	-10.0
29 Storey Ave. 1298	30	2	66.5	66.0	66	-0.5	12	Snd Lvl	66.0	0.0	10	-10.0
30 Storey Ave. 1297	31	2	66.5	69.4	66	2.9	12	Snd Lvl	69.4	0.0	10	-10.0
31 Storey Ave. 1295	32	2	66.5	69.2	66	2.7	12	Snd Lvl	69.2	0.0	10	-10.0
32 Storey Ave. 1294	33	2	66.5	71.0	66	4.5	12	Snd Lvl	71.0	0.0	10	-10.0
33 Storey Ave. 1293	34	2	66.5	72.4	66	5.9	12	Snd Lvl	72.4	0.0	10	-10.0
34 Storey Ave 1291	35	2	66.5	72.6	66	6.1	12	Snd Lvl	72.6	0.0	10	-10.0
35 Storey Ave. 1290	36	2	66.5	72.1	66	5.6	12	Snd Lvl	72.1	0.0	10	-10.0
36 Storey Ave. 1289	37	2	66.5	69.4	66	2.9	12	Snd Lvl	69.4	0.0	10	-10.0
37 Storey Ave. 1263	38	2	0.0	65.6	66	65.6	12	—	65.6	0.0	10	-10.0
38 Building 682/Cross Cultural Center	39	0	65.5	62.2	66	-3.3	12	—	62.2	0.0	10	-10.0
39 Building 661/Cavalry Stables Pen	40	0	64.0	65.8	71	1.8	12	—	65.8	0.0	10	-10.0
40 Building 662/Cavalry Stables	41	0	64.0	65.7	71	1.7	12	—	65.7	0.0	10	-10.0
41 Building 663/Cavalry Stables	42	0	64.0	64.6	71	0.6	12	—	64.6	0.0	10	-10.0
42 Building 667/Cavalry Stable	43	0	64.0	66.1	71	2.1	12	—	66.1	0.0	10	-10.0
43 National Cemetery Grave Site	44	0	69.0	73.9	66	4.9	12	Snd Lvl	73.9	0.0	10	-10.0
44 Building 129	46	1	0.0	62.3	66	62.3	12	—	62.3	0.0	10	-10.0
45 Building 122	47	0	0.0	72.2	71	72.2	12	Snd Lvl	72.2	0.0	10	-10.0
46 Building 108	48	0	0.0	72.3	71	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
47 Building 107	49	0	0.0	74.1	71	74.1	12	Snd Lvl	74.1	0.0	10	-10.0
48 Building 104	50	0	74.0	69.9	71	-4.1	12	—	69.9	0.0	10	-10.0
49 Building 105	51	0	74.0	75.9	71	1.9	12	Snd Lvl	75.9	0.0	10	-10.0
50 Building 106	52	0	76.0	77.4	71	1.4	12	Snd Lvl	77.4	0.0	10	-10.0
51 Building 211	53	0	0.0	75.1	71	75.1	12	Snd Lvl	75.1	0.0	10	-10.0
52 Building 204	54	0	0.0	67.7	71	67.7	12	—	67.7	0.0	10	-10.0
53 Building 210	55	0	0.0	70.8	71	70.8	12	—	70.8	0.0	10	-10.0
54 Building 201	56	0	0.0	64.6	71	64.6	12	—	64.6	0.0	10	-10.0
55 Building 220	57	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
56 Building 231	58	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
57 Building 228	59	0	0.0	64.4	71	64.4	12	—	64.4	0.0	10	-10.0
58 Building 229	60	0	0.0	63.2	71	63.2	12	—	63.2	0.0	10	-10.0
59 Building 223	61	0	0.0	59.0	71	59.0	12	—	59.0	0.0	10	-10.0
60 Building 230	62	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	63	100	57.0	61.9	66	4.9	12	—	61.9	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	64	100	57.0	60.0	66	3.0	12	—	60.0	0.0	10	-10.0
63 Building 1063	65	0	68.5	59.8	71	-8.7	12	—	59.8	0.0	10	-10.0

64 Building 1062	66	0	68.5	57.8	71	-10.7	12	—	57.8	0.0	10	-10.0
65 Building 1060	67	0	68.5	56.9	71	-11.6	12	—	56.9	0.0	10	-10.0
66 Building 1167	68	0	68.5	63.7	71	-4.8	12	—	63.7	0.0	10	-10.0
67 Building 1163	69	0	0.0	62.0	71	62.0	12	—	62.0	0.0	10	-10.0
68 Building 1169	70	0	68.0	65.0	71	-3.0	12	—	65.0	0.0	10	-10.0
69 Building 1162	71	0	0.0	61.5	71	61.5	12	—	61.5	0.0	10	-10.0
70 Building 1170	72	0	0.0	68.3	71	68.3	12	—	68.3	0.0	10	-10.0
71 Building 1161	73	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
72 Building 1160	74	0	0.0	70.2	71	70.2	12	—	70.2	0.0	10	-10.0
73 Building 1152/YMCA	75	0	0.0	69.4	66	69.4	12	Snd Lvl	69.4	0.0	10	-10.0
74 Building 1151/YMCA Pool	76	0	0.0	72.2	66	72.2	12	Snd Lvl	72.2	0.0	10	-10.0
75 Building 1004	77	0	0.0	54.2	71	54.2	12	—	54.2	0.0	10	-10.0
76 Residence at 3234 Lyon St.	79	8	76.5	70.9	66	-5.6	12	Snd Lvl	70.9	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	234	0.0	0.0	0.0
All Impacted	26	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



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Base 2010 PM
Plan View
Run name: DD Base 2010 AM
Scale:
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Sheet 1 of 1
29 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
-500
0
500
1000
1500

Environmental Science Associates, Inc.
Win Lindeman

29 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	9.1	1	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-654.0	228.0	53.00				Average	
		4	4	-610.0	192.0	50.00				Average	
		5	5	-576.0	170.0	46.00				Average	
		6	6	-516.0	144.0	49.00				Average	Y
		7	7	-488.0	130.0	45.00				Average	Y
		8	8	-380.0	100.0	41.00				Average	Y
		9	9	-292.0	76.0	41.00				Average	Y
		10	10	-194.0	47.0	37.00				Average	Y
		11	11	49.0	-18.0	29.00				Average	Y
		12	12	50.0	-18.0	29.00				Average	
		13	13	98.0	-32.0	28.00				Average	
		14	14	196.0	-58.0	27.00				Average	
		15	15	232.0	-66.0	26.50				Average	
		16	16	252.0	-70.0	26.00				Average	
		17	17	333.0	-70.0	24.00				Average	
		18	18	334.0	-70.0	24.00				Average	Y
		19	19	396.0	-60.0	21.40				Average	Y
		20	20	492.0	-32.0	17.80				Average	Y
		21	21	586.0	0.0	14.00				Average	Y
		22	22	680.0	35.0	12.00				Average	Y
		23	23	776.0	70.0	12.00				Average	Y
		24	24	868.0	102.0	11.80				Average	Y
		25	25	968.0	126.0	11.20				Average	Y

		26	26	1,068.0	150.0	11.20				Average	Y
		27	27	1,381.0	213.0	5.00				Average	Y
		28	28	1,382.0	213.0	5.00				Average	
		29	29	1,422.0	224.0	5.00				Average	
		30	30	1,450.0	240.0	4.00				Average	
		31	31	1,486.0	264.0	4.00				Average	
		32	32	1,504.0	286.0	4.00				Average	
		33	33	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to Toll Gate	9.1	1	37	1,560.0	326.0	4.00				Average	
		2	38	1,504.0	300.0	4.00				Average	
		3	39	1,486.0	276.0	4.00				Average	
		4	40	1,450.0	251.0	4.00				Average	
		5	41	1,422.0	234.0	5.00				Average	
		6	42	1,382.0	224.0	5.00				Average	Y
		7	43	1,166.0	178.0	10.80				Average	Y
		8	44	1,068.0	157.0	11.20				Average	Y
		9	45	968.0	136.0	11.20				Average	Y
		10	46	868.0	111.0	11.80				Average	Y
		11	47	776.0	80.0	12.00				Average	Y
		12	48	680.0	44.0	12.00				Average	Y
		13	49	586.0	10.0	14.00				Average	Y
		14	50	492.0	-22.0	17.80				Average	Y
		15	51	396.0	-52.0	21.40				Average	Y
		15	52	335.0	-60.0	24.00				Average	Y
		17	53	334.0	-60.0	24.00				Average	
		18	54	294.0	-60.0	25.00				Average	
		19	55	252.0	-60.0	26.00				Average	
		20	56	232.0	-56.0	26.50				Average	
		21	57	196.0	-50.0	27.00				Average	
		22	58	98.0	-22.0	28.00				Average	
		23	59	49.0	-8.0	28.40				Average	
		24	60	50.0	-8.0	28.40				Average	Y
		25	61	-98.0	30.0	33.00				Average	Y
		26	62	-194.0	58.0	37.00				Average	Y
		27	63	-292.0	86.0	41.00				Average	Y
		28	64	-380.0	110.0	45.00				Average	Y
		29	65	-406.0	118.0	45.00				Average	Y
		30	66	-407.0	118.0	45.00				Average	

		31	67	-487.0	138.5	49.20				Average	
		32	68	-488.0	138.5	49.20				Average	Y
		33	69	-516.0	150.0	51.00				Average	Y
		34	70	-517.0	150.0	51.00				Average	
		35	71	-576.0	182.0	49.00				Average	
		36	72	-610.0	204.0	50.00				Average	
		37	73	-654.0	242.0	53.00				Average	
		38	74	-720.0	322.0	56.00				Average	
		39	75	-966.0	620.0	53.00					
SB Richardson from Doyle to Francisco	11.0	1	76	868.0	102.0	11.80				Average	Y
		2	77	1,078.0	140.0	10.00				Average	Y
		3	78	1,178.0	147.0	7.00				Average	Y
		4	79	1,233.0	132.0	5.00				Average	Y
		5	80	1,234.0	132.0	5.00				Average	
		6	81	1,270.0	114.0	2.00				Average	
		7	82	1,330.0	57.0	2.00				Average	
		8	83	1,388.0	-20.0	2.00				Average	
		9	84	1,424.0	-60.0	2.00				Average	
		10	85	1,528.0	-146.0	4.00				Average	
		11	86	1,650.0	-280.0	4.00					
NB Richardson from Francisco to Doyle	11.0	1	87	1,680.0	-266.0	4.00				Average	
		2	88	1,514.0	-122.0	4.00				Average	
		3	89	1,436.0	-50.0	2.00				Average	
		4	90	1,285.0	130.0	2.00				Average	
		5	91	1,244.0	172.0	3.00				Average	
		6	92	1,200.0	196.0	4.00				Average	
		7	93	1,149.0	210.0	7.00				Average	
		8	94	1,150.0	210.0	7.00				Average	Y
		9	95	1,068.0	210.0	10.00				Average	Y
		10	96	968.0	172.0	11.00				Average	Y
		11	97	830.0	106.0	12.00				Average	Y
		12	98	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	99	-406.0	118.0	45.60				Average	
		2	100	-420.0	144.0	46.00				Average	
		3	101	-456.0	170.0	41.00				Average	
		4	102	-478.0	170.0	40.00				Average	
		5	103	-494.0	158.0	39.00				Average	
		6	104	-505.0	120.0	39.00				Average	

		7	105	-488.0	96.0	39.00				Average	
		8	106	-450.0	70.0	38.00				Average	
		9	107	-418.0	36.0	38.00				Average	
		10	108	-398.0	5.0	38.00				Average	
		11	109	-390.0	-26.0	37.00				Average	
		12	110	-388.0	-50.0	37.00				Average	
		13	111	-380.0	-320.0	37.00					
SB PP from EB Doyle Drive	4.6	1	112	-515.0	143.9	51.00				Average	Y
		2	113	-495.0	130.0	50.00				Average	Y
		3	114	-494.0	130.0	50.00				Average	
		4	115	-476.0	112.0	49.00				Average	
		5	116	-447.0	86.0	46.00				Average	
		6	117	-410.0	38.0	47.00				Average	
		7	118	-400.0	30.0	37.00				Average	
		8	119	-390.0	-26.0	37.00				Average	
		9	120	-388.0	-27.0	37.00					
NB PP to WB Doyle Drive	4.6	1	121	-380.0	-320.0	37.00				Average	
		2	122	-380.0	10.0	37.00				Average	
		3	123	-380.0	80.0	37.00				Average	
		4	124	-384.0	98.0	38.00				Average	
		5	125	-396.0	138.0	38.00				Average	
		6	126	-418.0	170.0	41.00				Average	
		7	127	-450.0	196.0	44.00				Average	
		8	128	-500.0	216.0	47.50				Average	
		9	129	-620.0	246.0	54.00				Average	
		10	130	-656.0	262.0	57.00				Average	
		11	131	-686.0	290.0	58.00				Average	
		12	132	-703.0	306.0	58.00				Average	
		13	133	-720.0	322.0	56.00					
NB PP Ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00				Average	
		2	135	-364.0	34.0	38.00				Average	
		3	136	-338.0	58.0	39.00				Average	
		4	137	-306.0	70.0	40.00				Average	
		5	138	-292.0	76.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	146	938.0	214.0	4.00				Average	
		9	147	1,486.0	310.0	4.00				Average	
		10	148	1,584.0	340.0	4.00				Average	
		11	149	1,680.0	344.0	4.00					
Lincoln Blvd. from McDowell to Letterma	7.3	1	150	36.0	-70.0	33.00				Average	
		2	151	74.0	-53.0	33.00				Average	
		3	152	106.0	-56.0	32.00				Average	
		4	153	180.0	-86.0	30.00				Average	
		5	154	226.0	-92.0	29.00				Average	
		6	155	246.0	-90.0	29.00				Average	
		7	156	268.0	-90.0	29.00				Average	
		8	157	308.0	-100.0	29.00				Average	
		9	158	334.0	-108.0	27.00				Average	
		10	159	368.0	-105.0	26.00				Average	
		11	160	490.0	-66.0	19.00				Average	
		12	161	520.0	-56.0	17.00				Average	
		13	162	568.0	-30.0	16.00				Average	
		14	163	596.0	-14.0	13.00				Average	
		15	164	620.0	0.0	14.00				Average	
		16	165	636.0	6.0	12.00				Average	
		17	166	680.0	-14.0	13.00				Average	
		18	167	700.0	-34.0	14.00				Average	
		19	168	718.0	-44.0	14.00				Average	
		20	169	784.0	-66.0	15.00				Average	
		21	170	910.0	-136.0	14.00				Average	
		22	190	998.0	-180.0	14.00				Average	
		22	171	1,054.0	-210.0	14.00					
Gorgas Avenue	7.3	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	191	1,344.0	-66.0	2.00				Average	
		7	177	1,112.0	120.0	3.00					
Halleck Street	7.3	1	178	910.0	-136.0	14.00				Average	

		2	179	957.0	106.0	6.00				Average	
		3	180	938.0	214.0	4.00					
Glrard Road	7.3	1	181	998.0	-180.0	14.00				Average	
		2	182	1,074.0	-38.0	3.00				Average	
		3	183	1,090.0	-33.0	4.00				Average	
		4	184	1,108.0	-40.0	5.00					
Baker Street	7.3	1	185	1,680.0	-266.0	4.00				Average	
		2	186	1,584.0	340.0	4.00					
Montgomery Street	7.3	1	187	510.0	-300.0	15.00				Average	
		2	188	664.0	-30.0	12.00				Average	
		3	189	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 29 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	1	1	3801	88	12	88	51	88	43	88	12	88
	2	2	3801	88	12	88	51	88	43	88	12	88
	3	3	3801	88	12	88	51	88	43	88	12	88
	4	4	3801	88	12	88	51	88	43	88	12	88
	5	5	3801	88	12	88	51	88	43	88	12	88
	6	6	2248	88	7	88	30	88	26	88	7	88
	7	7	2248	88	7	88	30	88	26	88	7	88
	8	8	2248	88	7	88	30	88	26	88	7	88
	9	9	2978	88	9	88	40	88	34	88	9	88
	10	10	2978	88	9	88	40	88	34	88	9	88
	11	11	2978	88	9	88	40	88	34	88	9	88
	12	12	2978	88	9	88	40	88	34	88	9	88
	13	13	2978	88	9	88	40	88	34	88	9	88
	14	14	2978	88	9	88	40	88	34	88	9	88
	15	15	2978	88	9	88	40	88	34	88	9	88
	16	16	2978	88	9	88	40	88	34	88	9	88
	17	17	2978	88	9	88	40	88	34	88	9	88
	18	18	2978	88	9	88	40	88	34	88	9	88
	19	19	2978	88	9	88	40	88	34	88	9	88
	20	20	2978	88	9	88	40	88	34	88	9	88
	21	21	2978	88	9	88	40	88	34	88	9	88

	22	22	2978	88	9	88	40	88	34	88	9	88
	23	23	2978	88	9	88	40	88	34	88	9	88
	24	24	964	88	0	0	0	0	0	0	0	0
	25	25	964	88	0	0	0	0	0	0	0	0
	26	26	964	56	0	0	0	0	0	0	0	0
	27	27	964	56	0	0	0	0	0	0	0	0
	28	28	964	56	0	0	0	0	0	0	0	0
	29	29	964	56	0	0	0	0	0	0	0	0
	30	30	964	56	0	0	0	0	0	0	0	0
	31	31	964	56	0	0	0	0	0	0	0	0
	32	32	964	56	0	0	0	0	0	0	0	0
	33	33										
WB Doyle Drive from Marina to Toll Gate	1	37	1846	56	0	0	0	0	0	0	0	0
	2	38	1846	56	0	0	0	0	0	0	0	0
	3	39	1846	56	0	0	0	0	0	0	0	0
	4	40	1846	88	0	0	0	0	0	0	0	0
	5	41	1846	56	0	0	0	0	0	0	0	0
	6	42	1846	56	0	0	0	0	0	0	0	0
	7	43	1846	88	0	0	0	0	0	0	0	0
	8	44	1846	88	0	0	0	0	0	0	0	0
	9	45	1846	88	0	0	0	0	0	0	0	0
	10	46	1846	88	0	0	0	0	0	0	0	0
	11	47	4540	88	0	0	9	88	128	88	47	88
	12	48	4540	88	0	0	9	88	128	88	47	88
	13	49	4540	88	0	0	9	88	128	88	47	88
	14	50	4540	88	0	0	9	88	128	88	47	88
	15	51	4540	88	0	0	9	88	128	88	47	88
	15	52	4540	88	0	0	9	88	128	88	47	88
	17	53	4540	88	0	0	9	88	128	88	47	88
	18	54	4540	88	0	0	9	88	128	88	47	88
	19	55	4540	88	0	0	9	88	128	88	47	88
	20	56	4540	88	0	0	9	88	128	88	47	88
	21	57	4540	88	0	0	9	88	128	88	47	88
	22	58	4540	88	0	0	9	88	128	88	47	88

	23	59	4540	88	0	0	9	88	128	88	47	88
	24	60	4540	88	0	0	9	88	128	88	47	88
	25	61	4540	88	0	0	9	88	128	88	47	88
	26	62	4540	88	0	0	9	88	128	88	47	88
	27	63	4540	88	0	0	9	88	128	88	47	88
	28	64	4540	88	0	0	9	88	128	88	47	88
	29	65	3667	88	0	0	8	88	103	88	38	88
	30	66	3667	88	0	0	8	88	103	88	38	88
	31	67	3667	88	0	0	8	88	103	88	38	88
	32	68	3667	88	0	0	8	88	103	88	38	88
	33	69	3667	88	0	0	8	88	103	88	38	88
	34	70	3667	88	0	0	8	88	103	88	38	88
	35	71	3667	88	0	0	8	88	103	88	38	88
	36	72	3667	88	0	0	8	88	103	88	38	88
	37	73	3667	88	0	0	8	88	103	88	38	88
	38	74	5483	88	0	0	11	88	154	88	57	88
	39	75										
SB Richardson from Doyle to Francisco	1	76	1770	56	5	56	24	56	20	56	5	56
	2	77	1770	56	5	56	24	56	20	56	5	56
	3	78	1770	56	5	56	24	56	20	56	5	56
	4	79	1770	56	5	56	24	56	20	56	5	56
	5	80	1770	56	5	56	24	56	20	56	5	56
	6	81	1770	56	5	56	24	56	20	56	5	56
	7	82	1770	56	5	56	24	56	20	56	5	56
	8	83	1770	56	5	56	24	56	20	56	5	56
	9	84	1770	56	5	56	24	56	20	56	5	56
	10	85	1770	56	5	56	24	56	20	56	5	56
	11	86										
NB Richardson from Francisco to Doyle	1	87	2344	56	0	0	5	56	66	56	24	56
	2	88	2344	56	0	0	5	56	66	56	24	56
	3	89	2344	56	0	0	5	56	66	56	24	56
	4	90	2344	56	0	0	5	56	66	56	24	56
	5	91	2344	56	0	0	5	56	66	56	24	56
	6	92	2344	56	0	0	5	56	66	56	24	56

	7	93	2344	56	0	0	5	56	66	56	24	56
	8	94	2344	56	0	0	5	56	66	56	24	56
	9	95	2344	56	0	0	5	56	66	56	24	56
	10	96	2344	56	0	0	5	56	66	56	24	56
	11	97	2344	56	0	0	5	56	66	56	24	56
	12	98										
SB PP Ramp from WB Doyle Drive	1	99	873	56	0	0	2	56	25	56	9	56
	2	100	873	56	0	0	2	56	25	56	9	56
	3	101	873	56	0	0	2	56	25	56	9	56
	4	102	873	56	0	0	2	56	25	56	9	56
	5	103	873	56	0	0	2	56	25	56	9	56
	6	104	873	56	0	0	2	56	25	56	9	56
	7	105	873	56	0	0	2	56	25	56	9	56
	8	106	873	56	0	0	2	56	25	56	9	56
	9	107	873	56	0	0	2	56	25	56	9	56
	10	108	873	56	0	0	2	56	25	56	9	56
	11	109	873	56	0	0	2	56	25	56	9	56
	12	110	873	56	0	0	2	56	25	56	9	56
	13	111										
SB PP from EB Doyle Drive	1	112	1553	56	5	56	21	56	18	56	5	56
	2	113	1553	56	5	56	21	56	18	56	5	56
	3	114	1553	56	5	56	21	56	18	56	5	56
	4	115	1553	56	5	56	21	56	18	56	5	56
	5	116	1553	56	5	56	21	56	18	56	5	56
	6	117	1553	56	5	56	21	56	18	56	5	56
	7	118	1553	56	5	56	21	56	18	56	5	56
	8	119	1553	56	5	56	21	56	18	56	5	56
	9	120										
NB PP to WB Doyle Drive	1	121	1842	56	0	0	8	56	19	56	21	56
	2	122	1842	56	0	0	8	56	19	56	21	56
	3	123	1842	56	0	0	8	56	19	56	21	56
	4	124	1842	56	0	0	8	56	19	56	21	56
	5	125	1842	56	0	0	8	56	19	56	21	56
	6	126	1842	56	0	0	8	56	19	56	21	56

	7	127	1842	56	0	0	8	56	19	56	21	56
	8	128	1842	56	0	0	8	56	19	56	21	56
	9	129	1842	56	0	0	8	56	19	56	21	56
	10	130	1842	56	0	0	8	56	19	56	21	56
	11	131	1842	56	0	0	8	56	19	56	21	56
	12	132	1842	56	0	0	8	56	19	56	21	56
	13	133										
NB PP Ramp to EB Doyle Drive	1	134	734	56	3	56	3	56	5	56	8	56
	2	135	734	56	3	56	3	56	5	56	8	56
	3	136	734	56	3	56	3	56	5	56	8	56
	4	137	734	56	3	56	3	56	5	56	8	56
	5	138										
Mason Street	1	139	11	32	0	0	0	0	0	0	0	0
	2	140	11	32	0	0	0	0	0	0	0	0
	3	141	11	32	0	0	0	0	0	0	0	0
	4	142	11	32	0	0	0	0	0	0	0	0
	5	143	11	32	0	0	0	0	0	0	0	0
	6	144	11	32	0	0	0	0	0	0	0	0
	7	145	11	32	0	0	0	0	0	0	0	0
	8	146	37	32	0	0	0	0	0	0	0	0
	9	147	43	32	0	0	0	0	0	0	0	0
	10	148	43	32	0	0	0	0	0	0	0	0
	11	149										
Lincoln Blvd. from McDowell to Letterma	1	150	133	32	1	32	0	0	1	32	0	0
	2	151	329	32	3	32	0	0	3	32	0	0
	3	152	329	32	3	32	0	0	3	32	0	0
	4	153	329	32	3	32	0	0	3	32	0	0
	5	154	329	32	3	32	0	0	3	32	0	0
	6	155	329	32	3	32	0	0	3	32	0	0
	7	156	329	32	3	32	0	0	3	32	0	0
	8	157	329	32	3	32	0	0	3	32	0	0
	9	158	360	32	3	32	0	0	3	32	0	0
	10	159	238	32	2	32	0	0	2	32	0	0
	11	160	238	32	2	32	0	0	2	32	0	0

	12	161	238	32	2	32	0	0	2	32	0	0
	13	162	238	32	2	32	0	0	2	32	0	0
	14	163	238	32	2	32	0	0	2	32	0	0
	15	164	238	32	2	32	0	0	2	32	0	0
	16	165	238	32	2	32	0	0	2	32	0	0
	17	166	238	32	2	32	0	0	2	32	0	0
	18	167	238	32	2	32	0	0	2	32	0	0
	19	168	362	32	4	32	0	0	4	32	0	0
	20	169	396	32	4	32	0	0	4	32	0	0
	21	170	437	32	4	32	0	0	4	32	0	0
	22	190	496	32	5	32	0	0	5	32	0	0
	22	171										
Gorgas Avenue	1	172	380	32	0	0	0	0	0	0	0	0
	2	173	380	32	0	0	0	0	0	0	0	0
	3	174	380	32	0	0	0	0	0	0	0	0
	4	175	24	32	0	0	0	0	0	0	0	0
	5	176	24	32	0	0	0	0	0	0	0	0
	6	191	89	32	0	0	0	0	0	0	0	0
	7	177										
Halleck Street	1	178	59	32	0	0	0	0	0	0	0	0
	2	179	44	32	0	0	0	0	0	0	0	0
	3	180										
Girard Road	1	181	89	32	0	0	0	0	0	0	0	0
	2	182	89	32	0	0	0	0	0	0	0	0
	3	183	89	32	0	0	0	0	0	0	0	0
	4	184										
Baker Street	1	185	499	32	0	0	0	0	0	0	0	0
	2	186										
Montgomery Street	1	187	126	32	0	0	0	0	0	0	0	0
	2	188	92	32	0	0	0	0	0	0	0	0
	3	189										

Environmental Science Associates, Inc
Win Lindeman

29 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Ricardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	3	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Building 1187/1188	4	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10 Battery Blaney	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 Armistead Rd. 1253	18	2	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Armistead Rd. residence	19	2	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	66	12.0	10.0	Y

23 Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Storey Ave. 1298	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Storey Ave. 1297	31	2	-644.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Storey Ave. 1295	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Storey Ave. 1294	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Storey Ave. 1293	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Storey Ave 1291	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Storey Ave. 1290	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Storey Ave. 1289	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Storey Ave. 1263	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stables	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stables	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	46	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	47	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	48	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	49	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	50	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	51	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	52	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	53	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	54	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	55	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	56	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	57	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	58	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	59	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	65	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	66	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	67	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	68	0	1,216.0	94.0	2.00	1.50	68.50	71	12.0	10.0	Y
67 Building 1163	69	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	70	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	71	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	72	0	1,360.0	-16.0	2.00	1.50	0.00	71	12.0	10.0	Y
71 Building 1161	73	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	74	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	75	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	76	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	77	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residence at 3234 Lyon St.	79	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

29 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Base 2010 PM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

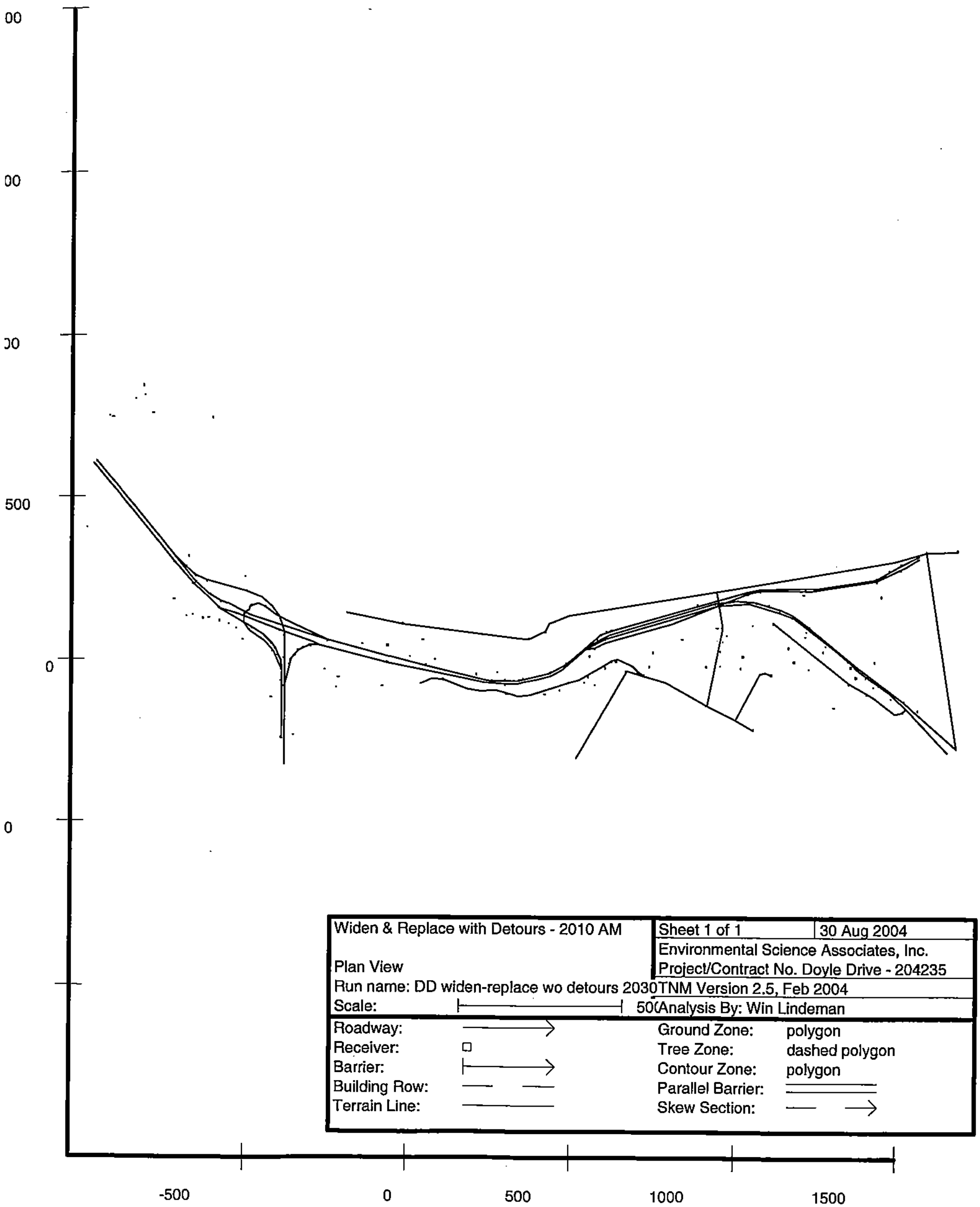
ATMOSPHERICS: 20 deg C, 50% RH

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Ricardson	1	0	0.0	67.6	66	67.6	12	Snd Lvl	67.6	0.0	10	-10.0
2 Palace of Fine Arts near Girard	3	0	0.0	64.9	66	64.9	12	—	64.9	0.0	10	-10.0
3 Building 1187/1188	4	0	81.0	67.7	71	-13.3	12	—	67.7	0.0	10	-10.0
4 Building 1182	5	0	81.0	65.3	71	-15.7	12	—	65.3	0.0	10	-10.0
5 Building 1183/1186	6	0	81.0	62.5	71	-18.5	12	—	62.5	0.0	10	-10.0
6 Building 1184/1185	7	0	81.0	67.9	71	-13.1	12	—	67.9	0.0	10	-10.0
7 Building 603/Crissy Center	8	0	72.0	66.2	71	-5.8	12	—	66.2	0.0	10	-10.0
8 PX Building	9	0	0.0	67.5	71	67.5	12	—	67.5	0.0	10	-10.0
9 Post Commissary/Sports Basement	10	0	69.0	66.8	71	-2.2	12	—	66.8	0.0	10	-10.0
10 Battery Blaney	11	0	68.0	74.6	66	6.6	12	Snd Lvl	74.6	0.0	10	-10.0
11 Battery Slaughter	12	0	68.0	79.2	66	11.2	12	Snd Lvl	79.2	0.0	10	-10.0
12 Battery Sherwood	13	0	68.0	76.5	66	8.5	12	Snd Lvl	76.5	0.0	10	-10.0
13 Battery Baldwin	14	0	68.0	66.3	66	-1.7	12	Snd Lvl	66.3	0.0	10	-10.0
14 Building 644	15	0	0.0	63.4	71	63.4	12	—	63.4	0.0	10	-10.0
15 Building 649	16	0	0.0	60.5	66	60.5	12	—	60.5	0.0	10	-10.0
16 Building 650/Stilwell Hall	17	0	70.0	59.9	66	-10.1	12	—	59.9	0.0	10	-10.0
17 Armistead Rd. 1253	18	2	66.0	63.4	66	-2.6	12	—	63.4	0.0	10	-10.0
18 Armistead Rd. residence	19	2	66.0	70.1	66	4.1	12	Snd Lvl	70.1	0.0	10	-10.0
19 Building 969	20	0	0.0	52.0	71	52.0	12	—	52.0	0.0	10	-10.0
20 Building 968	21	0	0.0	53.7	71	53.7	12	—	53.7	0.0	10	-10.0
21 Building 967	22	0	0.0	55.7	71	55.7	12	—	55.7	0.0	10	-10.0
22 Building 966	23	0	0.0	55.5	66	55.5	12	—	55.5	0.0	10	-10.0
23 Building 964	24	1	0.0	52.8	66	52.8	12	—	52.8	0.0	10	-10.0

24 Building 963	25	1	0.0	53.8	66	53.8	12	—	53.8	0.0	10	-10.0
25 Building 962	26	1	0.0	53.6	66	53.6	12	—	53.6	0.0	10	-10.0
26 Unknown Building	27	0	0.0	55.5	71	55.5	12	—	55.5	0.0	10	-10.0
27 Log Cabin	28	0	63.0	67.9	66	4.9	12	Snd Lvl	67.9	0.0	10	-10.0
28 Unknown Building	29	0	0.0	61.6	71	61.6	12	—	61.6	0.0	10	-10.0
29 Storey Ave. 1298	30	2	66.5	66.9	66	0.4	12	Snd Lvl	66.9	0.0	10	-10.0
30 Storey Ave. 1297	31	2	66.5	69.8	66	3.3	12	Snd Lvl	69.8	0.0	10	-10.0
31 Storey Ave. 1295	32	2	66.5	69.6	66	3.1	12	Snd Lvl	69.6	0.0	10	-10.0
32 Storey Ave. 1294	33	2	66.5	71.2	66	4.7	12	Snd Lvl	71.2	0.0	10	-10.0
33 Storey Ave. 1293	34	2	66.5	72.5	66	6.0	12	Snd Lvl	72.5	0.0	10	-10.0
34 Storey Ave 1291	35	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
35 Storey Ave. 1290	36	2	66.5	72.5	66	6.0	12	Snd Lvl	72.5	0.0	10	-10.0
36 Storey Ave. 1289	37	2	66.5	69.8	66	3.3	12	Snd Lvl	69.8	0.0	10	-10.0
37 Storey Ave. 1263	38	2	0.0	66.1	66	66.1	12	Snd Lvl	66.1	0.0	10	-10.0
38 Building 682/Cross Cultural Center	39	0	65.5	63.0	66	-2.5	12	—	63.0	0.0	10	-10.0
39 Building 661/Cavalry Stables Pen	40	0	64.0	65.9	71	1.9	12	—	65.9	0.0	10	-10.0
40 Building 662/Cavalry Stables	41	0	64.0	65.8	71	1.8	12	—	65.8	0.0	10	-10.0
41 Building 663/Cavalry Stables	42	0	64.0	64.7	71	0.7	12	—	64.7	0.0	10	-10.0
42 Building 667/Cavalry Stable	43	0	64.0	66.2	71	2.2	12	—	66.2	0.0	10	-10.0
43 National Cemetery Grave Site	44	0	69.0	74.0	66	5.0	12	Snd Lvl	74.0	0.0	10	-10.0
44 Building 129	46	1	0.0	62.7	66	62.7	12	—	62.7	0.0	10	-10.0
45 Building 122	47	0	0.0	72.1	71	72.1	12	Snd Lvl	72.1	0.0	10	-10.0
46 Building 108	48	0	0.0	72.3	71	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
47 Building 107	49	0	0.0	74.0	71	74.0	12	Snd Lvl	74.0	0.0	10	-10.0
48 Building 104	50	0	74.0	69.8	71	-4.2	12	—	69.8	0.0	10	-10.0
49 Building 105	51	0	74.0	75.8	71	1.8	12	Snd Lvl	75.8	0.0	10	-10.0
50 Building 106	52	0	76.0	77.2	71	1.2	12	Snd Lvl	77.2	0.0	10	-10.0
51 Building 211	53	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
52 Building 204	54	0	0.0	68.5	71	68.5	12	—	68.5	0.0	10	-10.0
53 Building 210	55	0	0.0	70.6	71	70.6	12	—	70.6	0.0	10	-10.0
54 Building 201	56	0	0.0	66.3	71	66.3	12	—	66.3	0.0	10	-10.0
55 Building 220	57	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
56 Building 231	58	0	0.0	65.9	71	65.9	12	—	65.9	0.0	10	-10.0
57 Building 228	59	0	0.0	64.9	71	64.9	12	—	64.9	0.0	10	-10.0
58 Building 229	60	0	0.0	63.6	71	63.6	12	—	63.6	0.0	10	-10.0
59 Building 223	61	0	0.0	59.4	71	59.4	12	—	59.4	0.0	10	-10.0
60 Building 230	62	0	0.0	66.3	71	66.3	12	—	66.3	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	63	100	57.0	62.5	66	5.5	12	—	62.5	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	64	100	57.0	60.6	66	3.6	12	—	60.6	0.0	10	-10.0
63 Building 1063	65	0	68.5	60.6	71	-7.9	12	—	60.6	0.0	10	-10.0

64 Building 1062	66	0	68.5	58.6	71	-9.9	12	—	58.6	0.0	10	-10.0
65 Building 1060	67	0	68.5	57.8	71	-10.7	12	—	57.8	0.0	10	-10.0
66 Building 1167	68	0	68.5	63.8	71	-4.7	12	—	63.8	0.0	10	-10.0
67 Building 1163	69	0	0.0	62.4	71	62.4	12	—	62.4	0.0	10	-10.0
68 Building 1169	70	0	68.0	64.8	71	-3.2	12	—	64.8	0.0	10	-10.0
69 Building 1162	71	0	0.0	61.7	71	61.7	12	—	61.7	0.0	10	-10.0
70 Building 1170	72	0	0.0	68.0	71	68.0	12	—	68.0	0.0	10	-10.0
71 Building 1161	73	0	0.0	65.2	71	65.2	12	—	65.2	0.0	10	-10.0
72 Building 1160	74	0	0.0	69.8	71	69.8	12	—	69.8	0.0	10	-10.0
73 Building 1152/YMCA	75	0	0.0	69.0	66	69.0	12	Snd Lvl	69.0	0.0	10	-10.0
74 Building 1151/YMCA Pool	76	0	0.0	71.7	66	71.7	12	Snd Lvl	71.7	0.0	10	-10.0
75 Building 1004	77	0	0.0	54.9	71	54.9	12	—	54.9	0.0	10	-10.0
76 Residence at 3234 Lyon St.	79	8	76.5	71.9	66	-4.6	12	Snd Lvl	71.9	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	234	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



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Widen & Replace with Detours - 2010 AM
Plan View
Run name: DD widen-replace wo detours 2030
Scale:
50(
Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Defours - 2010 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	11.0	N End	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-660.0	234.0	57.00				Average	
		4	4	-614.0	196.0	55.00				Average	
		5	6	-580.0	162.0	53.00				Average	
		6	7	-579.0	162.0	53.00				Average	Y
		7	8	-526.0	144.0	51.00				Average	Y
		8	9	-392.0	92.0	46.00				Average	Y
		9	10	-298.0	60.0	42.00				Average	Y
		9a	210	-274.0	49.0	41.00				Average	Y
		10	11	-200.0	30.0	37.00				Average	Y
		11	13	-64.0	-4.0	29.00				Average	Y
		12	14	-63.0	-4.0	29.00				Average	
		13	15	196.0	-58.0	29.00				Average	
		14	16	232.0	-66.0	28.00				Average	
		15	17	294.0	-71.0	27.00				Average	
		16	18	334.0	-70.0	24.00				Average	
		17	20	335.0	-70.0	24.00				Average	Y
		18	21	348.0	-66.0	23.00				Average	Y
		19	22	390.0	-56.0	21.40				Average	Y
		20	23	432.0	-44.0	20.00				Average	Y
		21	24	468.0	-26.0	18.40				Average	Y
		22	25	540.0	38.0	14.80				Average	Y
		23	26	566.0	40.0	13.40				Average	Y
		24	27	600.0	58.0	13.00				Average	Y

		25	28	804.0	118.0	15.00				Average	Y
		26	29	1,036.0	210.0	18.80				Average	Y
		27	31	1,074.0	218.0	18.80				Average	Y
		28	32	1,230.0	220.0	12.00				Average	
		29	33	1,430.0	250.0	6.00				Average	
		30	35	1,504.0	286.0	4.00				Average	
		31	36	1,520.0	296.0	4.00				Average	
		32	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	11.0	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,468.0	280.0	5.00				Average	
		4	42	1,428.0	256.0	6.00				Average	
		5	43	1,250.0	228.0	10.00				Average	
		6	44	1,212.0	226.0	16.00				Average	
		7	46	1,074.0	224.0	18.40				Average	Y
		8	47	1,034.0	214.0	18.80				Average	Y
		9	48	616.0	94.0	13.00				Average	Y
		10	49	602.0	90.0	13.40				Average	Y
		11	50	584.0	80.0	13.50				Average	Y
		12	51	570.0	68.0	14.00				Average	Y
		13	52	540.0	42.0	14.80				Average	Y
		14	53	480.0	-8.0	17.00				Average	Y
		15	54	430.0	-36.0	20.00				Average	Y
		16	55	350.0	-56.0	22.00				Average	Y
		17	56	335.0	-60.0	26.00				Average	Y
		18	57	334.0	-60.0	26.00				Average	
		19	58	294.0	-60.0	28.00				Average	
		20	59	252.0	-60.0	29.00				Average	
		21	60	232.0	-56.0	29.00				Average	
		22	61	50.0	-12.0	29.00				Average	
		23	62	-60.0	14.0	29.00				Average	
		24	63	-61.0	14.0	29.00				Average	Y
		25	64	-250.0	64.0	41.00				Average	Y
		26	65	-484.0	142.0	50.00				Average	Y
		27	66	-554.0	176.0	51.00				Average	Y
		28	67	-555.0	176.0	51.00				Average	
		29	68	-576.0	182.0	49.00				Average	
		30	69	-610.0	204.0	50.00				Average	

		31	70	-654.0	242.0	53.00				Average	
		32	71	-720.0	322.0	56.00				Average	
		33	198	-960.0	614.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	540.0	38.0	14.80				Average	Y
		2	78	600.0	68.0	13.00				Average	Y
		3	79	942.0	174.0	19.00				Average	Y
		4	80	1,036.0	180.0	18.80				Average	Y
		5	81	1,134.0	154.0	18.40				Average	Y
		6	82	1,175.0	138.0	17.40				Average	Y
		7	83	1,298.0	40.0	12.00				Average	Y
		8	84	1,344.0	0.0	12.00				Average	
		9	85	1,374.0	-24.0	4.00				Average	
		10	86	1,405.0	-48.0	2.00				Average	
		11	195	1,439.0	-73.0	2.00				Average	
		12	196	1,470.0	-94.0	4.00				Average	
		13	197	1,522.0	-146.0	4.00				Average	
		14	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,374.0	-18.0	4.00				Average	
		4	91	1,220.0	110.0	15.00				Average	Y
		5	92	1,172.0	144.0	17.40				Average	Y
		6	93	1,136.0	160.0	18.40				Average	Y
		7	94	1,098.0	174.0	18.60				Average	Y
		8	95	1,058.0	182.0	18.80				Average	Y
		9	96	996.0	188.0	18.80				Average	Y
		10	97	976.0	184.0	19.00				Average	Y
		11	208	934.0	178.0	19.00				Average	Y
		12	209	610.0	80.0	13.00				Average	Y
		13	98	574.0	62.0	13.40				Average	Y
		14	99	540.0	42.0	14.80					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-250.0	64.0	41.00				Average	Y
		2	101	-376.0	124.0	45.00				Average	Y
		3	102	-410.0	144.0	45.00				Average	Y
		4	103	-411.0	144.0	45.00				Average	
		5	104	-440.0	170.0	44.20				Average	
		6	105	-460.0	176.0	44.00				Average	
		7	106	-484.0	170.0	44.00				Average	

		8	107	-490.0	156.0	44.00				Average	
		9	108	-504.0	144.0	44.50				Average	
		10	109	-504.0	117.0	45.00				Average	
		11	110	-488.0	94.0	43.50				Average	
		12	111	-440.0	60.0	42.50				Average	
		13	203	-416.0	30.0	42.00				Average	
		14	202	-406.0	14.0	41.00				Average	
		15	204	-388.0	-28.0	38.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-579.0	160.0	53.00				Average	Y
		2	114	-479.0	100.0	49.00				Average	Y
		3	115	-478.0	100.0	49.00				Average	
		4	116	-446.0	80.0	49.00				Average	
		5	117	-420.0	54.0	48.00				Average	
		6	118	-408.0	36.0	44.00				Average	
		7	119	-400.0	17.0	40.00				Average	
		8	120	-390.0	0.0	39.00				Average	
		9	205	-388.0	-28.0	38.00				Average	
		10	206	-388.0	-62.0	38.00				Average	
		11	121	-388.0	-238.0	38.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	207	-380.0	-74.0	40.00				Average	
		3	123	-380.0	10.0	37.00				Average	
		4	124	-380.0	80.0	37.00				Average	
		5	125	-384.0	98.0	38.00				Average	
		6	126	-396.0	138.0	38.00				Average	
		7	127	-418.0	170.0	41.00				Average	
		8	128	-450.0	196.0	44.00				Average	
		9	129	-500.0	216.0	47.50				Average	
		10	130	-620.0	246.0	54.00				Average	
		11	131	-656.0	262.0	57.00				Average	
		12	132	-686.0	290.0	58.00				Average	
		13	191	-703.0	306.0	58.00				Average	
		14	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	-74.0	40.00				Average	
		2	199	-364.0	-10.0	38.20				Average	
		3	200	-360.0	5.0	38.80				Average	
		4	201	-348.0	20.0	40.20				Average	
		5	135	-336.0	34.0	41.40				Average	

		6	136	-320.0	42.0	41.80				Average	
		7	137	-300.0	48.0	41.20				Average	
		8	138	-274.0	49.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	
		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,522.0	-146.0	4.00				Average	

		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	
		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle Drive to Marina	N End	1	6383	88	66	88	13	88	66	88	66	88	
	2	2	6383	88	66	88	13	88	66	88	66	88	
	3	3	6383	88	66	88	13	88	66	88	66	88	
	4	4	6383	88	66	88	13	88	66	88	66	88	
	5	6	4490	88	46	88	9	88	46	88	46	88	
	6	7	4490	88	46	88	9	88	46	88	46	88	
	7	8	4490	88	46	88	9	88	46	88	46	88	
	8	9	4490	88	46	88	9	88	46	88	46	88	
	9	10	4490	88	46	88	9	88	46	88	46	88	
	9a	210	4490	88	46	88	9	88	46	88	46	88	
	10	11	4490	88	46	88	9	88	46	88	46	88	
	11	13	4490	88	46	88	9	88	46	88	46	88	
	12	14	4490	88	46	88	9	88	46	88	46	88	
	13	15	4490	88	46	88	9	88	46	88	46	88	
	14	16	4490	88	46	88	9	88	46	88	46	88	
	15	17	4490	88	46	88	9	88	46	88	46	88	
	16	18	4490	88	46	88	9	88	46	88	46	88	
	17	20	4490	88	46	88	9	88	46	88	46	88	
	18	21	4490	88	46	88	9	88	46	88	46	88	
	19	22	4490	88	46	88	9	88	46	88	46	88	
	20	23	4490	88	46	88	9	88	46	88	46	88	

	21	24	4490	88	46	88	9	88	46	88	46	88
	22	25	1362	88	0	0	0	0	0	0	0	0
	23	26	1362	88	0	0	0	0	0	0	0	0
	24	27	1362	88	0	0	0	0	0	0	0	0
	25	28	1362	88	0	0	0	0	0	0	0	0
	26	29	1362	56	0	0	0	0	0	0	0	0
	27	31	1362	56	0	0	0	0	0	0	0	0
	28	32	1362	56	0	0	0	0	0	0	0	0
	29	33	1362	56	0	0	0	0	0	0	0	0
	30	35	1362	56	0	0	0	0	0	0	0	0
	31	36	1362	56	0	0	0	0	0	0	0	0
	32	37										
WB Doyle Drive from Marina to 0+00	1	39	505	56	0	0	0	0	0	0	0	0
	2	40	505	56	0	0	0	0	0	0	0	0
	3	41	505	56	0	0	0	0	0	0	0	0
	4	42	505	56	0	0	0	0	0	0	0	0
	5	43	505	56	0	0	0	0	0	0	0	0
	6	44	505	56	0	0	0	0	0	0	0	0
	7	46	505	56	0	0	0	0	0	0	0	0
	8	47	505	88	0	0	0	0	0	0	0	0
	9	48	505	88	0	0	0	0	0	0	0	0
	10	49	505	88	0	0	0	0	0	0	0	0
	11	50	505	88	0	0	0	0	0	0	0	0
	12	51	505	88	0	0	0	0	0	0	0	0
	13	52	1919	88	20	88	26	88	12	88	20	88
	14	53	1919	88	20	88	26	88	12	88	20	88
	15	54	1919	88	20	88	26	88	12	88	20	88
	16	55	1919	88	20	88	26	88	12	88	20	88
	17	56	1919	88	20	88	26	88	12	88	20	88
	18	57	1919	88	20	88	26	88	12	88	20	88
	19	58	1919	88	20	88	26	88	12	88	20	88
	20	59	1919	88	20	88	26	88	12	88	20	88
	21	60	1919	88	20	88	26	88	12	88	20	88
	22	61	1919	88	20	88	26	88	12	88	20	88

	23	62	1919	88	20	88	26	88	12	88	20	88
	24	63	1919	88	20	88	26	88	12	88	20	88
	25	64	1919	88	20	88	26	88	12	88	20	88
	26	65	1919	88	20	88	26	88	12	88	20	88
	27	66	1919	88	20	88	26	88	12	88	20	88
	28	67	1919	88	20	88	26	88	12	88	20	88
	29	68	1919	88	20	88	26	88	12	88	20	88
	30	69	1919	88	20	88	26	88	12	88	20	88
	31	70	1919	88	20	88	26	88	12	88	20	88
	32	71	4098	88	41	88	55	88	26	88	41	88
	33	198										
SB/EB Richardson from Doyle to Francis	1	77	2769	56	28	56	6	56	28	56	28	56
	2	78	2769	56	28	56	6	56	28	56	28	56
	3	79	2769	56	28	56	6	56	28	56	28	56
	4	80	2769	56	28	56	6	56	28	56	28	56
	5	81	2769	56	28	56	6	56	28	56	28	56
	6	82	2769	56	28	56	6	56	28	56	28	56
	7	83	2769	56	28	56	6	56	28	56	28	56
	8	84	2769	56	28	56	6	56	28	56	28	56
	9	85	2769	56	28	56	6	56	28	56	28	56
	10	86	2769	56	28	56	6	56	28	56	28	56
	11	195	2769	56	28	56	6	56	28	56	28	56
	12	196	2769	56	28	56	6	56	28	56	28	56
	13	197	2769	56	28	56	6	56	28	56	28	56
	14	87										
NB/WB Richardson from Francisco to DD	1	88	1419	56	15	56	18	56	9	56	15	56
	2	89	1419	56	15	56	18	56	9	56	15	56
	3	90	1419	56	15	56	18	56	9	56	15	56
	4	91	1419	56	15	56	18	56	9	56	15	56
	5	92	1419	56	15	56	18	56	9	56	15	56
	6	93	1419	56	15	56	18	56	9	56	15	56
	7	94	1419	56	15	56	18	56	9	56	15	56
	8	95	1419	56	15	56	18	56	9	56	15	56
	9	96	1419	56	15	56	18	56	9	56	15	56

	10	97	1419	56	15	56	18	56	9	56	15	56
	11	208	1419	56	15	56	18	56	9	56	15	56
	12	209	1419	56	15	56	18	56	9	56	15	56
	13	98	1419	56	15	56	18	56	9	56	15	56
	14	99										
SB PP Ramp from WB Doyle Drive	1	100	1879	56	20	56	25	56	12	56	20	56
	2	101	1879	56	20	56	25	56	12	56	20	56
	3	102	1879	56	20	56	25	56	12	56	20	56
	4	103	1879	56	20	56	25	56	12	56	20	56
	5	104	1879	56	20	56	25	56	12	56	20	56
	6	105	1879	56	20	56	25	56	12	56	20	56
	7	106	1879	56	20	56	25	56	12	56	20	56
	8	107	1879	56	20	56	25	56	12	56	20	56
	9	108	1879	56	20	56	25	56	12	56	20	56
	10	109	1879	56	20	56	25	56	12	56	20	56
	11	110	1879	56	20	56	25	56	12	56	20	56
	12	111	1879	56	20	56	25	56	12	56	20	56
	13	203	1879	56	20	56	25	56	12	56	20	56
	14	202	1879	56	20	56	25	56	12	56	20	56
	15	204										
SB PP Ramp from EB Doyle Drive	1	113	1	1	0	0	0	0	0	0	0	0
	2	114	1	1	0	0	0	0	0	0	0	0
	3	115	1	1	0	0	0	0	0	0	0	0
	4	116	1	1	0	0	0	0	0	0	0	0
	5	117	1	1	0	0	0	0	0	0	0	0
	6	118	1	1	0	0	0	0	0	0	0	0
	7	119	1	1	0	0	0	0	0	0	0	0
	8	120	1	1	0	0	0	0	0	0	0	0
	9	205	1	1	0	0	0	0	0	0	0	0
	10	206	1	1	0	0	0	0	0	0	0	0
	11	121										
NB Park Presidio to WB Doyle Drive	1	122	2206	56	23	56	23	56	0	0	16	56
	2	207	2206	56	23	56	23	56	0	0	16	56
	3	123	2206	56	23	56	23	56	0	0	16	56

	4	124	2206	56	23	56	23	56	0	0	16	56
	5	125	2206	56	23	56	23	56	0	0	16	56
	6	126	2206	56	23	56	23	56	0	0	16	56
	7	127	2206	56	23	56	23	56	0	0	16	56
	8	128	2206	56	23	56	23	56	0	0	16	56
	9	129	2206	56	23	56	23	56	0	0	16	56
	10	130	2206	56	23	56	23	56	0	0	16	56
	11	131	2206	56	23	56	23	56	0	0	16	56
	12	132	2206	56	23	56	23	56	0	0	16	56
	13	191	2206	56	23	56	23	56	0	0	16	56
	14	133										
NB PP ramp to EB Doyle Drive	1	134	1	1	0	0	0	0	0	0	0	0
	2	199	1	1	0	0	0	0	0	0	0	0
	3	200	1	1	0	0	0	0	0	0	0	0
	4	201	1	1	0	0	0	0	0	0	0	0
	5	135	1	1	0	0	0	0	0	0	0	0
	6	136	1	1	0	0	0	0	0	0	0	0
	7	137	1	1	0	0	0	0	0	0	0	0
	8	138										
Mason Street	1	139	1	32	0	0	0	0	0	0	0	0
	2	140	1	32	0	0	0	0	0	0	0	0
	3	141	1	32	0	0	0	0	0	0	0	0
	4	142	1	32	0	0	0	0	0	0	0	0
	5	143	1	32	0	0	0	0	0	0	0	0
	6	144	1	32	0	0	0	0	0	0	0	0
	7	145	1	32	0	0	0	0	0	0	0	0
	8	194	14	32	0	0	0	0	0	0	0	0
	9	146	14	32	0	0	0	0	0	0	0	0
	10	147	13	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	105	32	1	32	0	0	1	32	0	0
	2	150	131	32	1	32	0	0	1	32	0	0
	3	151	131	32	1	32	0	0	1	32	0	0
	4	152	131	32	1	32	0	0	1	32	0	0

	5	153	131	32	1	32	0	0	1	32	0	0
	6	154	131	32	1	32	0	0	1	32	0	0
	7	155	131	32	1	32	0	0	1	32	0	0
	8	156	143	32	1	32	0	0	1	32	0	0
	9	157	48	32	1	32	0	0	1	32	0	0
	10	158	48	32	1	32	0	0	1	32	0	0
	11	159	48	32	1	32	0	0	1	32	0	0
	12	160	48	32	1	32	0	0	1	32	0	0
	13	161	48	32	1	32	0	0	1	32	0	0
	14	162	48	32	1	32	0	0	1	32	0	0
	15	163	48	32	1	32	0	0	1	32	0	0
	16	164	48	32	1	32	0	0	1	32	0	0
	17	165	48	32	1	32	0	0	1	32	0	0
	18	166	48	32	1	32	0	0	1	32	0	0
	19	167	144	32	1	32	0	0	1	32	0	0
	20	168	172	32	2	32	0	0	2	32	0	0
	21	169	187	32	2	32	0	0	2	32	0	0
	22	170	256	32	3	32	0	0	3	32	0	0
	23	171										
Gorgas Avenue	1	172	268	32	0	0	0	0	0	0	0	0
	2	173	268	32	0	0	0	0	0	0	0	0
	3	174	268	32	0	0	0	0	0	0	0	0
	4	175	14	32	0	0	0	0	0	0	0	0
	5	176	14	32	0	0	0	0	0	0	0	0
	6	177	14	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	39	32	0	0	0	0	0	0	0	0
	2	180	35	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	83	32	0	0	0	0	0	0	0	0
	2	183	83	32	0	0	0	0	0	0	0	0
	3	184	83	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	95	32	3	32	0	0	0	0	3	32

	2	187										
Montgomery Street	1	188	96	32	0	0	0	0	0	0	0	0
	2	189	96	32	0	0	0	0	0	0	0	0
	3	190										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 AM

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y
23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y

27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y
58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y

62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,275.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,352.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 AM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact		Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	61.9	66	61.9	12	—	61.9	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	57.6	66	57.6	12	—	57.6	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	60.0	71	-21.0	12	—	60.0	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	59.5	71	-12.5	12	—	59.5	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	64.5	71	-4.5	12	—	64.5	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	68.3	66	0.3	12	Snd Lvl	68.3	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	78.1	66	10.1	12	Snd Lvl	78.1	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	74.3	66	6.3	12	Snd Lvl	74.3	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	63.5	66	-4.5	12	—	63.5	0.0	10	-10.0
14-Building 644	15	0	0.0	59.4	71	59.4	12	—	59.4	0.0	10	-10.0
15-Building 649	16	0	0.0	59.0	66	59.0	12	—	59.0	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	58.8	66	-11.2	12	—	58.8	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	65.2	66	-0.8	12	—	65.2	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	72.1	66	6.1	12	Snd Lvl	72.1	0.0	10	-10.0
19-Building 969	20	0	0.0	51.7	71	51.7	12	—	51.7	0.0	10	-10.0
20-Building 968	21	0	0.0	53.3	71	53.3	12	—	53.3	0.0	10	-10.0
21-Building 967	22	0	0.0	55.3	71	55.3	12	—	55.3	0.0	10	-10.0
22-Building 966	23	0	0.0	55.4	71	55.4	12	—	55.4	0.0	10	-10.0
23-Building 964	24	1	0.0	53.3	66	53.3	12	—	53.3	0.0	10	-10.0
24-Building 963	25	1	0.0	54.1	66	54.1	12	—	54.1	0.0	10	-10.0
25-Building 962	26	1	0.0	54.0	66	54.0	12	—	54.0	0.0	10	-10.0
26-Unknown Building	27	0	0.0	57.2	71	57.2	12	—	57.2	0.0	10	-10.0
27-Log Cabin	28	0	63.0	67.7	66	4.7	12	Snd Lvl	67.7	0.0	10	-10.0

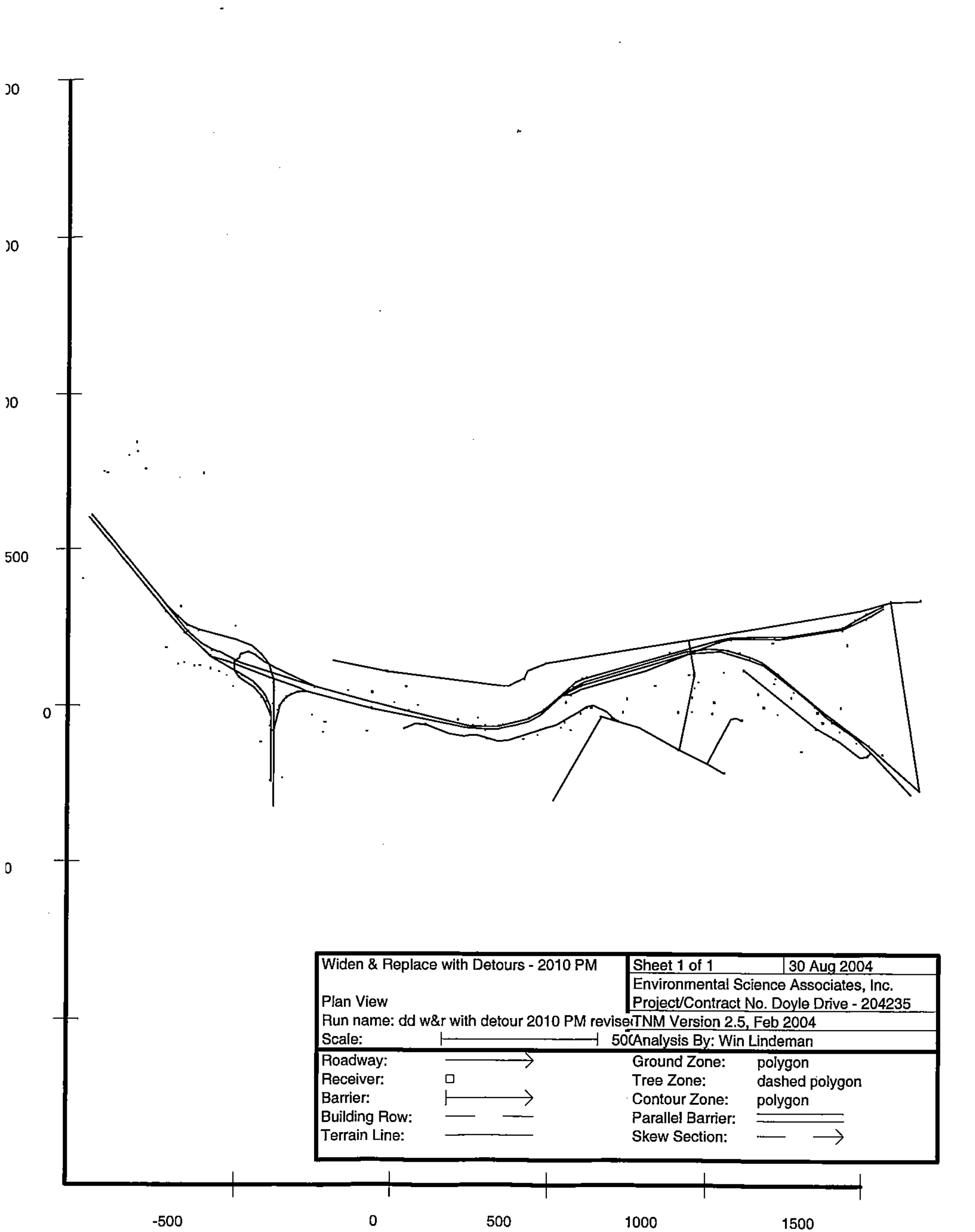
RESULTS: SOUND LEVELS

Doyle Drive - 204235

28-Unknown Building	29	0	0.0	61.0	71	61.0	12	—	61.0	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	68.3	66	1.8	12	Snd Lvl	68.3	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	70.3	66	3.8	12	Snd Lvl	70.3	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	73.2	66	6.7	12	Snd Lvl	73.2	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	73.3	66	6.8	12	Snd Lvl	73.3	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	73.4	66	6.9	12	Snd Lvl	73.4	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	70.9	66	4.4	12	Snd Lvl	70.9	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	66.6	66	66.6	12	Snd Lvl	66.6	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	62.5	66	-3.0	12	—	62.5	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	65.1	71	1.1	12	—	65.1	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	65.3	71	1.3	12	—	65.3	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	64.2	71	0.2	12	—	64.2	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	64.4	71	0.4	12	—	64.4	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	74.2	66	5.2	12	Snd Lvl	74.2	0.0	10	-10.0
44-Building 129	45	1	0.0	60.0	66	60.0	12	—	60.0	0.0	10	-10.0
45-Building 122	46	0	0.0	70.6	71	70.6	12	—	70.6	0.0	10	-10.0
46-Building 108	47	0	0.0	67.7	71	67.7	12	—	67.7	0.0	10	-10.0
47-Building 107	48	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
48-Building 104	49	0	74.0	64.2	71	-9.8	12	—	64.2	0.0	10	-10.0
49-Building 105	50	0	74.0	67.0	71	-7.0	12	—	67.0	0.0	10	-10.0
50-Building 106	51	0	76.0	65.2	71	-10.8	12	—	65.2	0.0	10	-10.0
51-Building 211	52	0	0.0	65.9	71	65.9	12	—	65.9	0.0	10	-10.0
52-Building 204	53	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
53-Building 210	54	0	0.0	62.5	71	62.5	12	—	62.5	0.0	10	-10.0
54-Building 201	55	0	0.0	63.1	71	63.1	12	—	63.1	0.0	10	-10.0
55-Building 220	56	0	0.0	59.6	71	59.6	12	—	59.6	0.0	10	-10.0
56-Building 231	57	0	0.0	61.7	71	61.7	12	—	61.7	0.0	10	-10.0
57-Building 228	58	0	0.0	60.7	71	60.7	12	—	60.7	0.0	10	-10.0
58-Building 229	60	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
59-Building 223	61	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
60-Building 230	62	0	0.0	62.6	71	62.6	12	—	62.6	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	59.1	66	2.1	12	—	59.1	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	57.7	66	0.7	12	—	57.7	0.0	10	-10.0
63-Building 1063	66	0	68.5	59.6	71	-8.9	12	—	59.6	0.0	10	-10.0
64-Building 1062	68	0	68.5	58.4	71	-10.1	12	—	58.4	0.0	10	-10.0
65-Building 1060	69	0	68.5	58.4	71	-10.1	12	—	58.4	0.0	10	-10.0
66-Building 1167	70	0	68.0	59.4	71	-8.6	12	—	59.4	0.0	10	-10.0
67-Building 1163	71	0	0.0	60.6	71	60.6	12	—	60.6	0.0	10	-10.0

68-Building 1169	72	0	68.0	59.7	71	-8.3	12	—	59.7	0.0	10	-10.0
69-Building 1162	73	0	0.0	60.9	71	60.9	12	—	60.9	0.0	10	-10.0
70-Building 1170	74	0	68.0	63.0	71	-5.0	12	—	63.0	0.0	10	-10.0
71-Building 1161	75	0	0.0	66.8	71	66.8	12	—	66.8	0.0	10	-10.0
72-Building 1160	76	0	0.0	73.4	71	73.4	12	Snd Lvl	73.4	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	69.5	66	69.5	12	Snd Lvl	69.5	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	72.0	66	72.0	12	Snd Lvl	72.0	0.0	10	-10.0
75-Building 1004	79	0	0.0	56.0	71	56.0	12	—	56.0	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	70.7	66	-5.8	12	Snd Lvl	70.7	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Widen & Replace with Detours - 2010 PM

Plan View

Run name: dd w&r with detour 2010 PM revise

Scale: 500

Sheet 1 of 1 | 30 Aug 2004

Environmental Science Associates, Inc.

Project/Contract No. Doyle Drive - 204235

TNM Version 2.5, Feb 2004

Analysis By: Win Lindeman

Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	11.0	N End	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-660.0	234.0	57.00				Average	
		4	4	-614.0	196.0	55.00				Average	
		5	6	-580.0	162.0	53.00				Average	
		6	7	-579.0	162.0	53.00				Average	Y
		7	8	-526.0	144.0	51.00				Average	Y
		8	9	-392.0	92.0	46.00				Average	Y
		9	10	-298.0	60.0	42.00				Average	Y
		9a	210	-274.0	49.0	41.00				Average	Y
		10	11	-200.0	30.0	37.00				Average	Y
		11	13	-64.0	-4.0	29.00				Average	Y
		12	14	-63.0	-4.0	29.00				Average	
		13	15	196.0	-58.0	29.00				Average	
		14	16	232.0	-66.0	28.00				Average	
		15	17	294.0	-71.0	27.00				Average	
		16	18	334.0	-70.0	24.00				Average	
		17	20	335.0	-70.0	24.00				Average	Y
		18	21	348.0	-66.0	23.00				Average	Y
		19	22	390.0	-56.0	21.40				Average	Y
		20	23	432.0	-44.0	20.00				Average	Y
		21	24	468.0	-26.0	18.40				Average	Y
		22	25	540.0	38.0	14.80				Average	Y
		23	26	566.0	40.0	13.40				Average	Y
		24	27	600.0	58.0	13.00				Average	Y

		25	28	804.0	118.0	15.00				Average	Y
		26	29	1,036.0	210.0	18.80				Average	Y
		27	31	1,074.0	218.0	18.80				Average	Y
		28	32	1,230.0	220.0	12.00				Average	
		29	33	1,430.0	250.0	6.00				Average	
		30	35	1,504.0	286.0	4.00				Average	
		31	36	1,520.0	296.0	4.00				Average	
		32	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	11.0	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,468.0	280.0	5.00				Average	
		4	42	1,428.0	256.0	6.00				Average	
		5	43	1,250.0	228.0	10.00				Average	
		6	44	1,212.0	226.0	16.00				Average	
		7	46	1,074.0	224.0	18.40				Average	Y
		8	47	1,034.0	214.0	18.80				Average	Y
		9	48	616.0	94.0	13.00				Average	Y
		10	49	602.0	90.0	13.40				Average	Y
		11	50	584.0	80.0	13.50				Average	Y
		12	51	570.0	68.0	14.00				Average	Y
		13	52	540.0	42.0	14.80				Average	Y
		14	53	480.0	-8.0	17.00				Average	Y
		15	54	430.0	-36.0	20.00				Average	Y
		16	55	350.0	-56.0	22.00				Average	Y
		17	56	335.0	-60.0	26.00				Average	Y
		18	57	334.0	-60.0	26.00				Average	
		19	58	294.0	-60.0	28.00				Average	
		20	59	252.0	-60.0	29.00				Average	
		21	60	232.0	-56.0	29.00				Average	
		22	61	50.0	-12.0	29.00				Average	
		23	62	-60.0	14.0	29.00				Average	
		24	63	-61.0	14.0	29.00				Average	Y
		25	64	-250.0	64.0	41.00				Average	Y
		26	65	-484.0	142.0	50.00				Average	Y
		27	66	-554.0	176.0	51.00				Average	Y
		28	67	-555.0	176.0	51.00				Average	
		29	68	-576.0	182.0	49.00				Average	
		30	69	-610.0	204.0	50.00				Average	

		31	70	-654.0	242.0	53.00				Average	
		32	71	-720.0	322.0	56.00				Average	
		33	198	-960.0	614.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	540.0	38.0	14.80				Average	Y
		2	78	600.0	68.0	13.00				Average	Y
		3	79	942.0	174.0	19.00				Average	Y
		4	80	1,036.0	180.0	18.80				Average	Y
		5	81	1,134.0	154.0	18.40				Average	Y
		6	82	1,175.0	138.0	17.40				Average	Y
		7	83	1,298.0	40.0	12.00				Average	Y
		8	84	1,344.0	0.0	12.00				Average	
		9	85	1,374.0	-24.0	4.00				Average	
		10	86	1,405.0	-48.0	2.00				Average	
		11	195	1,439.0	-73.0	2.00				Average	
		12	196	1,470.0	-94.0	4.00				Average	
		13	197	1,522.0	-146.0	4.00				Average	
		14	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,374.0	-18.0	4.00				Average	
		4	91	1,220.0	110.0	15.00				Average	Y
		5	92	1,172.0	144.0	17.40				Average	Y
		6	93	1,136.0	160.0	18.40				Average	Y
		7	94	1,098.0	174.0	18.60				Average	Y
		8	95	1,058.0	182.0	18.80				Average	Y
		9	96	996.0	188.0	18.80				Average	Y
		10	97	976.0	184.0	19.00				Average	Y
		11	208	934.0	178.0	19.00				Average	Y
		12	209	610.0	80.0	13.00				Average	Y
		13	98	574.0	62.0	13.40				Average	Y
		14	99	540.0	42.0	14.80					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-250.0	64.0	41.00				Average	Y
		2	101	-376.0	124.0	45.00				Average	Y
		3	102	-410.0	144.0	45.00				Average	Y
		4	103	-411.0	144.0	45.00				Average	
		5	104	-440.0	170.0	44.20				Average	
		6	105	-460.0	176.0	44.00				Average	
		7	106	-484.0	170.0	44.00				Average	

		8	107	-490.0	156.0	44.00				Average	
		9	108	-504.0	144.0	44.50				Average	
		10	109	-504.0	117.0	45.00				Average	
		11	110	-488.0	94.0	43.50				Average	
		12	111	-440.0	60.0	42.50				Average	
		13	203	-416.0	30.0	42.00				Average	
		14	202	-406.0	14.0	41.00				Average	
		15	204	-388.0	-28.0	38.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-579.0	160.0	53.00				Average	Y
		2	114	-479.0	100.0	49.00				Average	Y
		3	115	-478.0	100.0	49.00				Average	
		4	116	-446.0	80.0	49.00				Average	
		5	117	-420.0	54.0	48.00				Average	
		6	118	-408.0	36.0	44.00				Average	
		7	119	-400.0	17.0	40.00				Average	
		8	120	-390.0	0.0	39.00				Average	
		9	205	-388.0	-28.0	38.00				Average	
		10	206	-388.0	-62.0	38.00				Average	
		11	121	-388.0	-238.0	38.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	207	-380.0	-74.0	40.00				Average	
		3	123	-380.0	10.0	37.00				Average	
		4	124	-380.0	80.0	37.00				Average	
		5	125	-384.0	98.0	38.00				Average	
		6	126	-396.0	138.0	38.00				Average	
		7	127	-418.0	170.0	41.00				Average	
		8	128	-450.0	196.0	44.00				Average	
		9	129	-500.0	216.0	47.50				Average	
		10	130	-620.0	246.0	54.00				Average	
		11	131	-656.0	262.0	57.00				Average	
		12	132	-686.0	290.0	58.00				Average	
		13	191	-703.0	306.0	58.00				Average	
		14	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	-74.0	40.00				Average	
		2	199	-364.0	-10.0	38.20				Average	
		3	200	-360.0	5.0	38.80				Average	
		4	201	-348.0	20.0	40.20				Average	
		5	135	-336.0	34.0	41.40				Average	

		6	136	-320.0	42.0	41.80				Average	
		7	137	-300.0	48.0	41.20				Average	
		8	138	-274.0	49.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	
		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,522.0	-146.0	4.00				Average	

		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	
		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 PM

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	4519	88	14	88	61	88	51	88	14	88
	2	2	4519	88	14	88	61	88	51	88	14	88
	3	3	4519	88	14	88	61	88	51	88	14	88
	4	4	4519	88	14	88	61	88	51	88	14	88
	5	6	2545	88	8	88	34	88	29	88	8	88
	6	7	2545	88	8	88	34	88	29	88	8	88
	7	8	2545	88	8	88	34	88	29	88	8	88
	8	9	2545	88	8	88	34	88	29	88	8	88
	9	10	2545	88	8	88	34	88	29	88	8	88
	9a	210	2545	88	8	88	34	88	29	88	8	88
	10	11	2545	88	8	88	34	88	29	88	8	88
	11	13	2545	88	8	88	34	88	29	88	8	88
	12	14	2545	88	8	88	34	88	29	88	8	88
	13	15	2545	88	8	88	34	88	29	88	8	88
	14	16	2545	88	8	88	34	88	29	88	8	88
	15	17	2545	88	8	88	34	88	29	88	8	88
	16	18	2545	88	8	88	34	88	29	88	8	88
	17	20	2545	88	8	88	34	88	29	88	8	88
	18	21	2545	88	8	88	34	88	29	88	8	88
	19	22	2545	88	8	88	34	88	29	88	8	88
	20	23	2545	88	8	88	34	88	29	88	8	88

	21	24	2545	88	8	88	34	88	29	88	8	88
	22	25	824	88	0	0	0	0	0	0	0	0
	23	26	824	88	0	0	0	0	0	0	0	0
	24	27	824	88	0	0	0	0	0	0	0	0
	25	28	824	88	0	0	0	0	0	0	0	0
	26	29	824	56	0	0	0	0	0	0	0	0
	27	31	824	56	0	0	0	0	0	0	0	0
	28	32	824	56	0	0	0	0	0	0	0	0
	29	33	824	56	0	0	0	0	0	0	0	0
	30	35	824	56	0	0	0	0	0	0	0	0
	31	36	824	56	0	0	0	0	0	0	0	0
	32	37										
WB Doyle Drive from Marina to 0+00	1	39	1553	56	0	0	0	0	0	0	0	0
	2	40	1553	56	0	0	0	0	0	0	0	0
	3	41	1553	56	0	0	0	0	0	0	0	0
	4	42	1553	56	0	0	0	0	0	0	0	0
	5	43	1553	56	0	0	0	0	0	0	0	0
	6	44	1553	56	0	0	0	0	0	0	0	0
	7	46	1553	56	0	0	0	0	0	0	0	0
	8	47	1553	88	0	0	0	0	0	0	0	0
	9	48	1553	88	0	0	0	0	0	0	0	0
	10	49	1553	88	0	0	0	0	0	0	0	0
	11	50	1553	88	0	0	0	0	0	0	0	0
	12	51	1553	88	0	0	0	0	0	0	0	0
	13	52	4091	88	0	0	9	88	115	88	43	88
	14	53	4091	88	0	0	9	88	115	88	43	88
	15	54	4091	88	0	0	9	88	115	88	43	88
	16	55	4091	88	0	0	9	88	115	88	43	88
	17	56	4091	88	0	0	9	88	115	88	43	88
	18	57	4091	88	0	0	9	88	115	88	43	88
	19	58	4091	88	0	0	9	88	115	88	43	88
	20	59	4091	88	0	0	9	88	115	88	43	88
	21	60	4091	88	0	0	9	88	115	88	43	88
	22	61	4091	88	0	0	9	88	115	88	43	88

	23	62	4091	88	0	0	9	88	115	88	43	88
	24	63	4091	88	0	0	9	88	115	88	43	88
	25	64	4091	88	0	0	9	88	115	88	43	88
	26	65	4091	88	0	0	9	88	115	88	43	88
	27	66	4091	88	0	0	9	88	115	88	43	88
	28	67	4091	88	0	0	9	88	115	88	43	88
	29	68	4091	88	0	0	9	88	115	88	43	88
	30	69	4091	88	0	0	9	88	115	88	43	88
	31	70	4091	88	0	0	9	88	115	88	43	88
	32	71	6505	88	0	0	13	88	174	88	65	88
	33	198										
SB/EB Richardson from Doyle to Francis	1	77	1607	56	5	56	22	56	18	56	5	56
	2	78	1607	56	5	56	22	56	18	56	5	56
	3	79	1607	56	5	56	22	56	18	56	5	56
	4	80	1607	56	5	56	22	56	18	56	5	56
	5	81	1607	56	5	56	22	56	18	56	5	56
	6	82	1607	56	5	56	22	56	18	56	5	56
	7	83	1607	56	5	56	22	56	18	56	5	56
	8	84	1607	56	5	56	22	56	18	56	5	56
	9	85	1607	56	5	56	22	56	18	56	5	56
	10	86	1607	56	5	56	22	56	18	56	5	56
	11	195	1607	56	5	56	22	56	18	56	5	56
	12	196	1607	56	5	56	22	56	18	56	5	56
	13	197	1607	56	5	56	22	56	18	56	5	56
	14	87										
NB/WB Richardson from Francisco to DD	1	88	2315	56	0	0	5	56	65	56	24	56
	2	89	2315	56	0	0	5	56	65	56	24	56
	3	90	2315	56	0	0	5	56	65	56	24	56
	4	91	2315	56	0	0	5	56	65	56	24	56
	5	92	2315	56	0	0	5	56	65	56	24	56
	6	93	2315	56	0	0	5	56	65	56	24	56
	7	94	198`	56	0	0	5	56	65	56	24	56
	8	95	2315	56	0	0	5	56	65	56	24	56
	9	96	2315	56	0	0	5	56	65	56	24	56

	10	97	2315	56	0	0	5	56	65	56	24	56
	11	208	2315	56	0	0	5	56	65	56	24	56
	12	209	2315	56	0	0	5	56	65	56	24	56
	13	98	2315	56	0	0	5	56	65	56	24	56
	14	99										
SB PP Ramp from WB Doyle Drive	1	100	531	56	0	0	1	56	15	56	6	56
	2	101	531	56	0	0	1	56	15	56	6	56
	3	102	531	56	0	0	1	56	15	56	6	56
	4	103	531	56	0	0	1	56	15	56	6	56
	5	104	531	56	0	0	1	56	15	56	6	56
	6	105	531	56	0	0	1	56	15	56	6	56
	7	106	531	56	0	0	1	56	15	56	6	56
	8	107	531	56	0	0	1	56	15	56	6	56
	9	108	531	56	0	0	1	56	15	56	6	56
	10	109	531	56	0	0	1	56	15	56	6	56
	11	110	531	56	0	0	1	56	15	56	6	56
	12	111	531	56	0	0	1	56	15	56	6	56
	13	203	531	56	0	0	1	56	15	56	6	56
	14	202	531	56	0	0	1	56	15	56	6	56
	15	204										
SB PP Ramp from EB Doyle Drive	1	113	1975	56	6	56	26	56	22	56	6	56
	2	114	1975	56	6	56	26	56	22	56	6	56
	3	115	1975	56	6	56	26	56	22	56	6	56
	4	116	1975	56	6	56	26	56	22	56	6	56
	5	117	1975	56	6	56	26	56	22	56	6	56
	6	118	1975	56	6	56	26	56	22	56	6	56
	7	119	1975	56	6	56	26	56	22	56	6	56
	8	120	1975	56	6	56	26	56	22	56	6	56
	9	205	1975	56	6	56	26	56	22	56	6	56
	10	206	1975	56	6	56	26	56	22	56	6	56
	11	121										
NB Park Presidio to WB Doyle Drive	1	122	2145	56	0	0	9	56	22	56	24	56
	2	207	2145	56	0	0	9	56	22	56	24	56
	3	123	2145	56	0	0	9	56	22	56	24	56

	4	124	2145	56	0	0	9	56	22	56	24	56
	5	125	2145	56	0	0	9	56	22	56	24	56
	6	126	2145	56	0	0	9	56	22	56	24	56
	7	127	2145	56	0	0	9	56	22	56	24	56
	8	128	2145	56	0	0	9	56	22	56	24	56
	9	129	2145	56	0	0	9	56	22	56	24	56
	10	130	2145	56	0	0	9	56	22	56	24	56
	11	131	2145	56	0	0	9	56	22	56	24	56
	12	132	2145	56	0	0	9	56	22	56	24	56
	13	191	2145	56	0	0	9	56	22	56	24	56
	14	133										
NB PP ramp to EB Doyle Drive	1	134	1	1	0	0	0	0	0	0	0	0
	2	199	1	1	0	0	0	0	0	0	0	0
	3	200	1	1	0	0	0	0	0	0	0	0
	4	201	1	1	0	0	0	0	0	0	0	0
	5	135	1	1	0	0	0	0	0	0	0	0
	6	136	1	1	0	0	0	0	0	0	0	0
	7	137	1	1	0	0	0	0	0	0	0	0
	8	138										
Mason Street	1	139	7	32	0	0	0	0	0	0	0	0
	2	140	7	32	0	0	0	0	0	0	0	0
	3	141	7	32	0	0	0	0	0	0	0	0
	4	142	7	32	0	0	0	0	0	0	0	0
	5	143	7	32	0	0	0	0	0	0	0	0
	6	144	7	32	0	0	0	0	0	0	0	0
	7	145	7	32	0	0	0	0	0	0	0	0
	8	194	20	32	0	0	0	0	0	0	0	0
	9	146	23	32	0	0	0	0	0	0	0	0
	10	147	23	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	183	32	2	32	0	0	2	32	0	0
	2	150	275	32	3	32	0	0	3	32	0	0
	3	151	275	32	3	32	0	0	3	32	0	0
	4	152	275	32	3	32	0	0	3	32	0	0

	5	153	275	32	3	32	0	0	3	32	0	0
	6	154	275	32	3	32	0	0	3	32	0	0
	7	155	275	32	3	32	0	0	3	32	0	0
	8	156	308	32	3	32	0	0	3	32	0	0
	9	157	181	32	2	32	0	0	2	32	0	0
	10	158	181	32	2	32	0	0	2	32	0	0
	11	159	181	32	2	32	0	0	2	32	0	0
	12	160	181	32	2	32	0	0	2	32	0	0
	13	161	181	32	2	32	0	0	2	32	0	0
	14	162	181	32	2	32	0	0	2	32	0	0
	15	163	181	32	2	32	0	0	2	32	0	0
	16	164	181	32	2	32	0	0	2	32	0	0
	17	165	181	32	2	32	0	0	2	32	0	0
	18	166	181	32	2	32	0	0	2	32	0	0
	19	167	318	32	3	32	0	0	3	32	0	0
	20	168	318	32	3	32	0	0	3	32	0	0
	21	169	396	32	4	32	0	0	4	32	0	0
	22	170	450	32	4	32	0	0	4	32	0	0
	23	171										
Gorgas Avenue	1	172	314	32	0	0	0	0	0	0	0	0
	2	173	314	32	0	0	0	0	0	0	0	0
	3	174	314	32	0	0	0	0	0	0	0	0
	4	175	27	32	0	0	0	0	0	0	0	0
	5	176	27	32	0	0	0	0	0	0	0	0
	6	177	27	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	59	32	0	0	0	0	0	0	0	0
	2	180	44	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	150	32	0	0	0	0	0	0	0	0
	2	183	150	32	0	0	0	0	0	0	0	0
	3	184	150	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	296	32	0	0	0	0	0	0	0	0

	2	187											
Montgomery Street	1	188	138	32	0	0	0	0	0	0	0	0
	2	189	138	32	0	0	0	0	0	0	0	0
	3	190											

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y
23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y

27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y
58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y

62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,275.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,352.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace with Detours - 2010 PM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

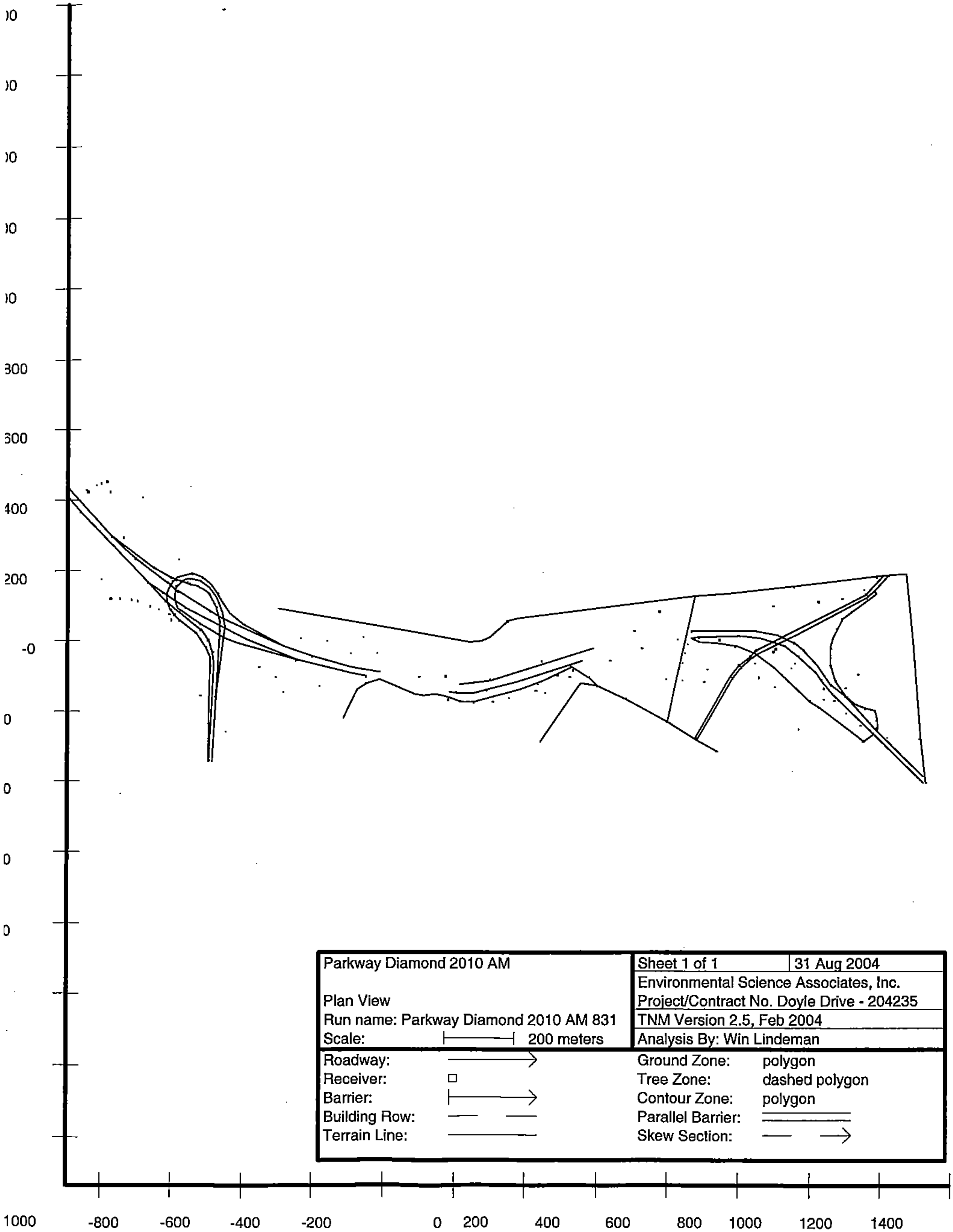
ATMOSPHERICS: 20 deg C, 50% RH

Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier				
				LAeq1h		Increase over existing		Type	Calculated LAeq1h	Noise Reduction			
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact		Calculated	Goal	Calculated minus Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	0.0	62.4	66	62.4	12	—	62.4	0.0	10	-10.0	
2-Palace of Fine Arts near Girard	2	0	0.0	57.5	66	57.5	12	—	57.5	0.0	10	-10.0	
6-Building 1184/1185	7	0	81.0	59.8	71	-21.2	12	—	59.8	0.0	10	-10.0	
7-Building 603/Crissy Center	8	0	72.0	59.6	71	-12.4	12	—	59.6	0.0	10	-10.0	
9-Post Commissary/Sports Basement	10	0	69.0	64.9	71	-4.1	12	—	64.9	0.0	10	-10.0	
10-Battery Blaney/635	11	0	68.0	69.7	66	1.7	12	Snd Lvl	69.7	0.0	10	-10.0	
11-Battery Slaughter	12	0	68.0	79.3	66	11.3	12	Snd Lvl	79.3	0.0	10	-10.0	
12-Battery Sherwood/636	13	0	68.0	75.2	66	7.2	12	Snd Lvl	75.2	0.0	10	-10.0	
13-Battery Baldwin	14	0	68.0	64.1	66	-3.9	12	—	64.1	0.0	10	-10.0	
14-Building 644	15	0	0.0	60.2	71	60.2	12	—	60.2	0.0	10	-10.0	
15-Building 649	16	0	0.0	59.7	66	59.7	12	—	59.7	0.0	10	-10.0	
16-Building 650/Stilwell Hall	17	0	70.0	58.7	66	-11.3	12	—	58.7	0.0	10	-10.0	
17-1253 Armistead Road	18	1	66.0	65.2	66	-0.8	12	—	65.2	0.0	10	-10.0	
18-Home on Armistead Road	19	1	66.0	72.0	66	6.0	12	Snd Lvl	72.0	0.0	10	-10.0	
19-Building 969	20	0	0.0	52.4	71	52.4	12	—	52.4	0.0	10	-10.0	
20-Building 968	21	0	0.0	54.1	71	54.1	12	—	54.1	0.0	10	-10.0	
21-Building 967	22	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0	
22-Building 966	23	0	0.0	56.0	71	56.0	12	—	56.0	0.0	10	-10.0	
23-Building 964	24	1	0.0	53.5	66	53.5	12	—	53.5	0.0	10	-10.0	
24-Building 963	25	1	0.0	54.5	66	54.5	12	—	54.5	0.0	10	-10.0	
25-Building 962	26	1	0.0	54.2	66	54.2	12	—	54.2	0.0	10	-10.0	
26-Unknown Building	27	0	0.0	57.3	71	57.3	12	—	57.3	0.0	10	-10.0	
27-Log Cabin	28	0	63.0	67.3	66	4.3	12	Snd Lvl	67.3	0.0	10	-10.0	

28-Unknown Building	29	0	0.0	61.5	71	61.5	12	—	61.5	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	66.3	66	-0.2	12	Snd Lvl	66.3	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	67.9	66	1.4	12	Snd Lvl	67.9	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	69.8	66	3.3	12	Snd Lvl	69.8	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	71.5	66	5.0	12	Snd Lvl	71.5	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	73.3	66	6.8	12	Snd Lvl	73.3	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	73.3	66	6.8	12	Snd Lvl	73.3	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	70.9	66	4.4	12	Snd Lvl	70.9	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	67.3	66	67.3	12	Snd Lvl	67.3	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.2	66	-2.3	12	—	63.2	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	65.1	71	1.1	12	—	65.1	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	65.2	71	1.2	12	—	65.2	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	64.0	71	0.0	12	—	64.0	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	64.2	71	0.2	12	—	64.2	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	74.0	66	5.0	12	Snd Lvl	74.0	0.0	10	-10.0
44-Building 129	45	1	0.0	60.1	66	60.1	12	—	60.1	0.0	10	-10.0
45-Building 122	46	0	0.0	70.4	71	70.4	12	—	70.4	0.0	10	-10.0
46-Building 108	47	0	0.0	67.5	71	67.5	12	—	67.5	0.0	10	-10.0
47-Building 107	48	0	0.0	67.3	71	67.3	12	—	67.3	0.0	10	-10.0
48-Building 104	49	0	74.0	64.1	71	-9.9	12	—	64.1	0.0	10	-10.0
49-Building 105	50	0	74.0	67.1	71	-6.9	12	—	67.1	0.0	10	-10.0
50-Building 106	51	0	76.0	65.3	71	-10.7	12	—	65.3	0.0	10	-10.0
51-Building 211	52	0	0.0	65.8	71	65.8	12	—	65.8	0.0	10	-10.0
52-Building 204	53	0	0.0	64.2	71	64.2	12	—	64.2	0.0	10	-10.0
53-Building 210	54	0	0.0	62.5	71	62.5	12	—	62.5	0.0	10	-10.0
54-Building 201	55	0	0.0	63.5	71	63.5	12	—	63.5	0.0	10	-10.0
55-Building 220	56	0	0.0	59.9	71	59.9	12	—	59.9	0.0	10	-10.0
56-Building 231	57	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
57-Building 228	58	0	0.0	60.9	71	60.9	12	—	60.9	0.0	10	-10.0
58-Building 229	60	0	0.0	59.5	71	59.5	12	—	59.5	0.0	10	-10.0
59-Building 223	61	0	0.0	57.8	71	57.8	12	—	57.8	0.0	10	-10.0
60-Building 230	62	0	0.0	62.7	71	62.7	12	—	62.7	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	59.2	66	2.2	12	—	59.2	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	57.9	66	0.9	12	—	57.9	0.0	10	-10.0
63-Building 1063	66	0	68.5	59.4	71	-9.1	12	—	59.4	0.0	10	-10.0
64-Building 1062	68	0	68.5	58.2	71	-10.3	12	—	58.2	0.0	10	-10.0
65-Building 1060	69	0	68.5	58.1	71	-10.4	12	—	58.1	0.0	10	-10.0
66-Building 1167	70	0	68.0	59.2	71	-8.8	12	—	59.2	0.0	10	-10.0
67-Building 1163	71	0	0.0	60.5	71	60.5	12	—	60.5	0.0	10	-10.0

68-Building 1169	72	0	68.0	59.5	71	-8.5	12	----	59.5	0.0	10	-10.0
69-Building 1162	73	0	0.0	60.9	71	60.9	12	----	60.9	0.0	10	-10.0
70-Building 1170	74	0	68.0	62.0	71	-6.0	12	----	62.0	0.0	10	-10.0
71-Building 1161	75	0	0.0	66.4	71	66.4	12	----	66.4	0.0	10	-10.0
72-Building 1160	76	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	68.4	66	68.4	12	Snd Lvl	68.4	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	71.7	66	71.7	12	Snd Lvl	71.7	0.0	10	-10.0
75-Building 1004	79	0	0.0	55.9	71	55.9	12	----	55.9	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	71.5	66	-5.0	12	Snd Lvl	71.5	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Parkway Diamond 2010 AM
Plan View
Run name: Parkway Diamond 2010 AM 831
Scale: 200 meters
Sheet 1 of 1
31 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
1000
-800
-600
-400
-200
0
200
400
600
800
1000
1200
1400
300
600
400
200
-0

Environmental Science Associates, Inc. 31 August 2004
Win Lindeman TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North I	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+5:	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,178.0	-259.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fancisco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherlan to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					

Environmental Science Associates, Inc. 31 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 AM

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	5813	88	60	88	12	88	60	88	60	88
	2 - 1+97.539	10	5813	88	60	88	12	88	60	88	60	88
	3 - 4+74	9	3920	88	41	88	8	88	41	88	41	88
	4 - 5+27	8	3920	88	41	88	8	88	41	88	41	88
	5 - 5+27	7	3920	88	41	88	8	88	41	88	41	88
	6 - 6+00	6	3920	88	41	88	8	88	41	88	41	88
	7 - 8+00	5	3920	88	41	88	8	88	41	88	41	88
	8 - 9+57	4	4725	88	49	88	10	88	49	88	49	88
	9 - 11+10	3	4725	88	49	88	10	88	49	88	49	88
	10 - 11+10	2	4725	88	49	88	10	88	49	88	49	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	4725	88	49	88	10	88	49	88	49	88
	2 - 14+10	17	4725	88	49	88	10	88	49	88	49	88
	3 - 14+60	16	4725	88	49	88	10	88	49	88	49	88
	4 - 15+00	15	4725	88	49	88	10	88	49	88	49	88
	5 - 15+85.44	14	4725	88	49	88	10	88	49	88	49	88
	6 - 17+33.198	13	4725	88	49	88	10	88	49	88	49	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2981	56	31	56	6	56	31	56	31	56
	2 - 21+20	20	2981	56	31	56	6	56	31	56	31	56
	3 - 21+20	21	2981	56	31	56	6	56	31	56	31	56

	4 - 22+42.630	22	2981	56	31	56	6	56	31	56	31	56
	5 - 23+00	23	2981	56	31	56	6	56	31	56	31	56
	6 - 23+25	24	2981	56	31	56	6	56	31	56	31	56
	7 - 23+25	25	2981	56	31	56	6	56	31	56	31	56
	8 - 24+20	26	2981	56	31	56	6	56	31	56	31	56
	9 - 24+85.060	27	2981	56	31	56	6	56	31	56	31	56
	10 - 25+17.10	28	2981	56	31	56	6	56	31	56	31	56
	11 - 25+64.74	29	2981	56	31	56	6	56	31	56	31	56
	12 - Gorgas I	30	2981	56	31	56	6	56	31	56	31	56
	13 - Francisc	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	1576	56	16	56	21	56	10	56	16	56
	2 - 27+20.608	33	1576	56	16	56	21	56	10	56	16	56
	3 - 26+00	34	1576	56	16	56	21	56	10	56	16	56
	4 - 25+40	35	1576	56	16	56	21	56	10	56	16	56
	5 - 24+73	36	1576	56	16	56	21	56	10	56	16	56
	6 - 24+20	37	1576	56	16	56	21	56	10	56	16	56
	7 - 23+75	38	1576	56	16	56	21	56	10	56	16	56
	8 - 23+75	39	1576	56	16	56	21	56	10	56	16	56
	9 - 23+22	40	1576	56	16	56	21	56	10	56	16	56
	10 - 23+22	41	1576	56	16	56	21	56	10	56	16	56
	11 - 22+68	42	1576	56	16	56	21	56	10	56	16	56
	12 - 22+00	43	1576	56	16	56	21	56	10	56	16	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	2033	88	21	88	28	88	13	88	21	88
	2 - 15+00	46	2033	88	21	88	28	88	13	88	21	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	2033	88	21	88	28	88	13	88	21	88
	2 - 11+00	52	2033	88	21	88	28	88	13	88	21	88
	3 - 11+00	53	2033	88	21	88	28	88	13	88	21	88
	4 - 9+80	54	2033	88	21	88	28	88	13	88	21	88
	5 - 8+73	55	1688	88	18	88	23	88	11	88	18	88
	6 - 7+00	56	1688	88	18	88	23	88	11	88	18	88
	7 - 6+60	57	1688	88	18	88	23	88	11	88	18	88
	8 - 6+60	58	1688	88	18	88	23	88	11	88	18	88

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	9 - 5+54	59	1688	88	18	88	23	88	11	88	18	88
	10 - 5+54	60	1688	88	18	88	23	88	11	88	18	88
	11 - 5+14	61	1688	88	18	88	23	88	11	88	18	88
	12 - 5+14	62	1688	88	18	88	23	88	11	88	18	88
	13 - 4+00	63	1688	88	18	88	23	88	11	88	18	88
	14 - 3+10	64	3340	88	35	88	45	88	21	88	35	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	345	56	4	56	5	56	2	56	4	56
	2 - 1+30	67	345	56	4	56	5	56	2	56	4	56
	3 - 1+80	68	345	56	4	56	5	56	2	56	4	56
	4 - 2+20	69	345	56	4	56	5	56	2	56	4	56
	5 - 2+20	70	345	56	4	56	5	56	2	56	4	56
	6 - 2+48	71	345	56	4	56	5	56	2	56	4	56
	7 - 3+09	72	345	56	4	56	5	56	2	56	4	56
	8 - 3+40	73	345	56	4	56	5	56	2	56	4	56
	9 - 3+60	74	345	56	4	56	5	56	2	56	4	56
	10 - 3+80	75	345	56	4	56	5	56	2	56	4	56
	11 - 4+00	76	345	56	4	56	5	56	2	56	4	56
	12 - 4+20	77	345	56	4	56	5	56	2	56	4	56
	13 - 4+40	78	345	56	4	56	5	56	2	56	4	56
	14 - 4+59	79	345	56	4	56	5	56	2	56	4	56
	15 - 4+80	80	345	56	4	56	5	56	2	56	4	56
	16 - 5+00	81	345	56	4	56	5	56	2	56	4	56
	17 - 5+20	82	345	56	4	56	5	56	2	56	4	56
	18 - 5+80	83	345	56	4	56	5	56	2	56	4	56
	19 - 6+06	84	345	56	4	56	5	56	2	56	4	56
	20 - 6+31	85	345	56	4	56	5	56	2	56	4	56
	21 - 6+60	86	345	56	4	56	5	56	2	56	4	56
	22 - 6+88	87	345	56	4	56	5	56	2	56	4	56
	23 - 8+23	169	345	56	4	56	5	56	2	56	4	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	1674	56	17	56	17	56	0	0	12	56
	2A	170	1674	56	17	56	17	56	0	0	12	56
	2 - 3+72.391	90	1674	56	17	56	17	56	0	0	12	56

	3 - 4+00	91	1674	56	17	56	17	56	0	0	12	56
	4 - 4+40	92	1674	56	17	56	17	56	0	0	12	56
	5 - 4+60	93	1674	56	17	56	17	56	0	0	12	56
	6 - 5+00	94	1674	56	17	56	17	56	0	0	12	56
	7 - 5+20	95	1674	56	17	56	17	56	0	0	12	56
	8 - 5+40	96	1674	56	17	56	17	56	0	0	12	56
	9 - 5+53	97	1674	56	17	56	17	56	0	0	12	56
	10 - 5+53	98	1674	56	17	56	17	56	0	0	12	56
	11 - 5+80	99	1674	56	17	56	17	56	0	0	12	56
	12 - 5+98	100	1674	56	17	56	17	56	0	0	12	56
	13 - 5+98	101	1674	56	17	56	17	56	0	0	12	56
	14 - 6+58.037	102	1674	56	17	56	17	56	0	0	12	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	803	56	6	56	8	56	8	56	6	56
	2 - 1+35.965	105	803	56	6	56	8	56	8	56	6	56
	3 - 1+60	106	803	56	6	56	8	56	8	56	6	56
	4 - 1+80	107	803	56	6	56	8	56	8	56	6	56
	5 - 2+00	108	803	56	6	56	8	56	8	56	6	56
	6 - 2+20	109	803	56	6	56	8	56	8	56	6	56
	7 - 2+40	110	803	56	6	56	8	56	8	56	6	56
	8 - 2+60	111	803	56	6	56	8	56	8	56	6	56
	9 - 2+81.908	112	803	56	6	56	8	56	8	56	6	56
	10 - 3+09.875	113	803	56	6	56	8	56	8	56	6	56
	11 - 3+40	114	803	56	6	56	8	56	8	56	6	56
	12 - 3+60	115	803	56	6	56	8	56	8	56	6	56
	13 - 3+80	116	803	56	6	56	8	56	8	56	6	56
	14 - 4+00	117	803	56	6	56	8	56	8	56	6	56
	15 - 4+20	118	803	56	6	56	8	56	8	56	6	56
	16 - 4+40	119	803	56	6	56	8	56	8	56	6	56
	17 - 4+53.16	120	803	56	6	56	8	56	8	56	6	56
	18 - 5+20	121	803	56	6	56	8	56	8	56	6	56
	19 - 5+20	122	803	56	6	56	8	56	8	56	6	56
	20 - 6+00	123	803	56	6	56	8	56	8	56	6	56
	21 - 6+40	124	803	56	6	56	8	56	8	56	6	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	1893	56	20	56	4	56	20	56	20	56
	2 - 0+65	129	1893	56	20	56	4	56	20	56	20	56
	3 - 0+65	130	1893	56	20	56	4	56	20	56	20	56
	4 - 2+00	131	1893	56	20	56	4	56	20	56	20	56
	5 - 2+00	132	1893	56	20	56	4	56	20	56	20	56
	6 - 2+40	133	1893	56	20	56	4	56	20	56	20	56
	7 - 2+80	134	1893	56	20	56	4	56	20	56	20	56
	8 - 3+14.595	135	1893	56	20	56	4	56	20	56	20	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	1	1	0	0	0	0	0	0	0	0
	2 - 0+42	138	1	1	0	0	0	0	0	0	0	0
	3 - 0+42	139	1	1	0	0	0	0	0	0	0	0
	4 - 1+00	140	1	1	0	0	0	0	0	0	0	0
	5 - 1+50	141	1	1	0	0	0	0	0	0	0	0
	6 - 1+50	142	1	1	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	1	1	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	1	1	0	0	0	0	0	0	0	0
	9	145	1	1	0	0	0	0	0	0	0	0
	10	146	1	1	0	0	0	0	0	0	0	0
	11	147	1	1	0	0	0	0	0	0	0	0
	12	148	1	1	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	79	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	79	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	79	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	79	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	79	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	79	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	79	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	34	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	34	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	34	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	34	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	34	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	34	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	34	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	34	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	499	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	499	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	82	32	1	32	0	0	1	32	0	0
	2	181	82	32	1	32	0	0	1	32	0	0
	3	182	82	32	1	32	0	0	1	32	0	0
	4	183	110	32	1	32	0	0	1	32	0	0
	5	184	110	32	1	32	0	0	1	32	0	0
	6	185	110	32	1	32	0	0	1	32	0	0
	7	186	110	32	1	32	0	0	1	32	0	0
	8	187	110	32	1	32	0	0	1	32	0	0
	9	188	110	32	1	32	0	0	1	32	0	0
	10	189	122	32	1	32	0	0	1	32	0	0
	11	190	57	32	1	32	0	0	1	32	0	0
	12	191	57	32	1	32	0	0	1	32	0	0
	13	192	57	32	1	32	0	0	1	32	0	0
	14	193	57	32	1	32	0	0	1	32	0	0
	15	194	57	32	1	32	0	0	1	32	0	0
	16	195	149	32	2	32	0	0	2	32	0	0
	17	196	197	32	2	32	0	0	2	32	0	0
	18	197	617	32	6	32	0	0	6	32	0	0
	19	198	679	32	7	32	0	0	7	32	0	0
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	4	32	0	0	0	0	0	0	0	0
	2	201	4	32	0	0	0	0	0	0	0	0
	3	202	4	32	0	0	0	0	0	0	0	0
	4	203	4	32	0	0	0	0	0	0	0	0
	5	204	4	32	0	0	0	0	0	0	0	0

	6	205	4	32	0	0	0	0	0	0	0	0
	7	206	25	32	0	0	0	0	0	0	0	0
	8	207	25	32	0	0	0	0	0	0	0	0
	9	208	27	32	0	0	0	0	0	0	0	0
	10	209	27	32	0	0	0	0	0	0	0	0
	11	210	1785	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	67	32	0	0	0	0	0	0	0	0
	2	213	12	32	0	0	0	0	0	0	0	0
	3	214	12	32	0	0	0	0	0	0	0	0
	4	215	22	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	35	32	0	0	0	0	0	0	0	0
	2	218	35	32	0	0	0	0	0	0	0	0
	3	219	35	32	0	0	0	0	0	0	0	0
	4	220	35	32	0	0	0	0	0	0	0	0
	5	221	35	32	0	0	0	0	0	0	0	0
	6	222	35	32	0	0	0	0	0	0	0	0
	7	223	35	32	0	0	0	0	0	0	0	0
	8	224	35	32	0	0	0	0	0	0	0	0
	9	225	35	32	0	0	0	0	0	0	0	0
	10	226	35	32	0	0	0	0	0	0	0	0
	11	227	35	32	0	0	0	0	0	0	0	0
	12	228	35	32	0	0	0	0	0	0	0	0
	13	229	35	32	0	0	0	0	0	0	0	0
	14	230	35	32	0	0	0	0	0	0	0	0
	15	231	35	32	0	0	0	0	0	0	0	0
	16	232	35	32	0	0	0	0	0	0	0	0
	17	233	35	32	0	0	0	0	0	0	0	0
	18	234	35	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	95	32	0	0	0	0	0	0	0	0
	2	237	95	32	0	0	0	0	0	0	0	0
	3	238										

Environmental Science Associates, Inc
Win Lindeman

31 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 AM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 AM
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 20 deg C, 50% RH

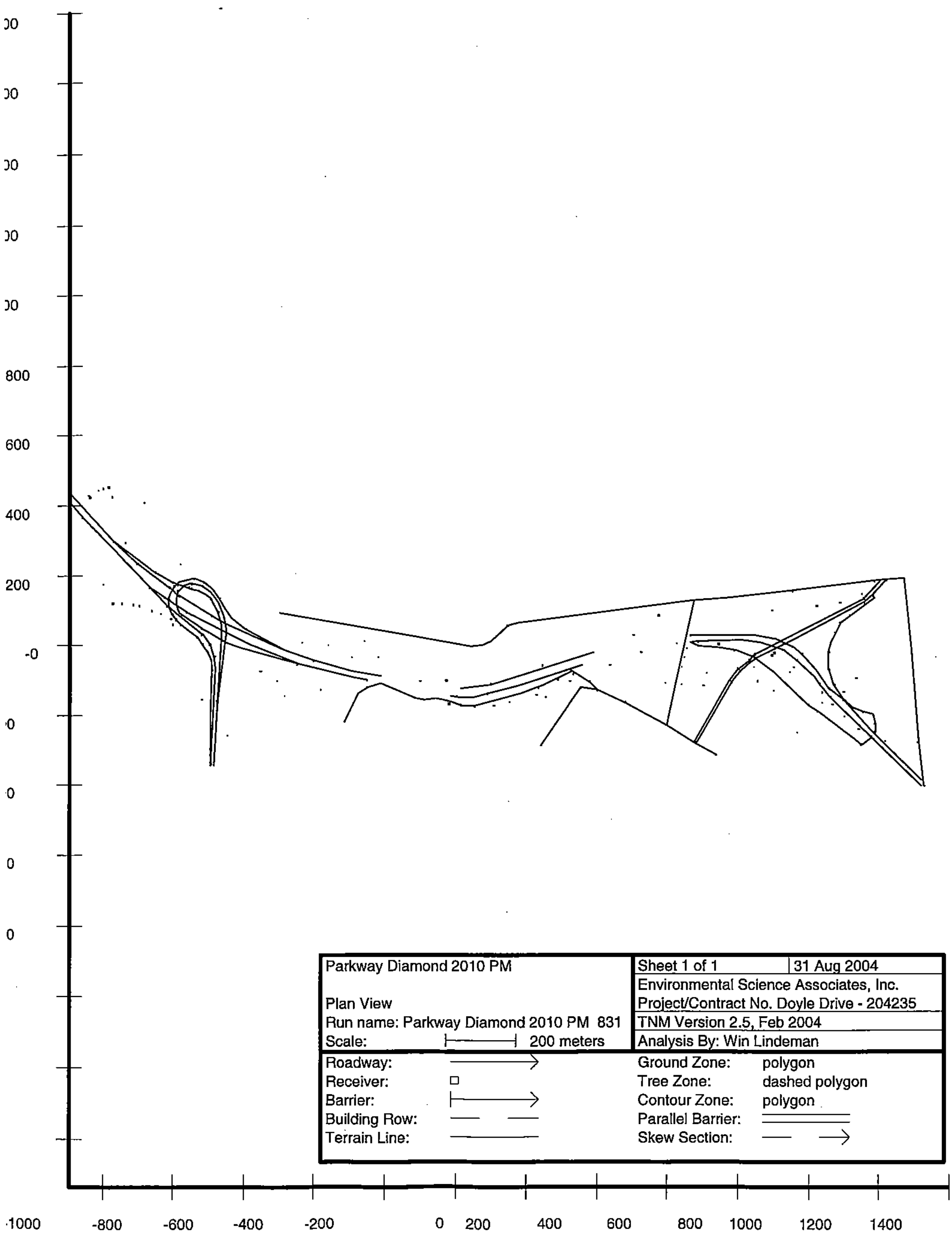
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	68.3	66	68.3	12	Snd Lvl	68.3	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	60.9	66	60.9	12	—	60.9	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	55.8	71	-25.2	12	—	55.8	0.0	10	-10.0
4 Building 1182	4	0	81.0	54.8	71	-26.2	12	—	54.8	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	55.6	71	-25.4	12	—	55.6	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	58.3	71	-22.7	12	—	58.3	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	55.5	71	-16.5	12	—	55.5	0.0	10	-10.0
8 PX Building	8	0	0.0	58.4	71	58.4	12	—	58.4	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	68.5	66	-0.5	12	Snd Lvl	68.5	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	68.9	66	0.9	12	Snd Lvl	68.9	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	64.8	66	-3.2	12	—	64.8	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	64.1	66	-3.9	12	—	64.1	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	66.7	66	-1.3	12	Snd Lvl	66.7	0.0	10	-10.0
14 Building 644	14	0	0.0	59.2	71	59.2	12	—	59.2	0.0	10	-10.0
15 Building 649	15	0	0.0	59.9	66	59.9	12	—	59.9	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	58.6	66	-11.4	12	—	58.6	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	63.7	66	-2.3	12	—	63.7	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	75.6	66	9.6	12	Snd Lvl	75.6	0.0	10	-10.0
19 Building 969	19	0	0.0	57.1	71	57.1	12	—	57.1	0.0	10	-10.0
20 Building 968	20	0	0.0	58.7	71	58.7	12	—	58.7	0.0	10	-10.0
21 Building 967	21	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
22 Building 966	22	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
23 Building 964	23	0	0.0	62.1	66	62.1	12	—	62.1	0.0	10	-10.0

24 Building 963	24	0	0.0	61.5	66	61.5	12	—	61.5	0.0	10	-10.0
25 Building 962	25	0	0.0	60.8	66	60.8	12	—	60.8	0.0	10	-10.0
26 Unknown Building	26	0	0.0	74.3	71	74.3	12	Snd Lvl	74.3	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.0	66	5.0	12	Snd Lvl	68.0	0.0	10	-10.0
28 Building 1387	28	0	0.0	66.5	71	66.5	12	—	66.5	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	65.8	66	-0.7	12	—	65.8	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	67.8	66	1.3	12	Snd Lvl	67.8	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	69.9	66	3.4	12	Snd Lvl	69.9	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	70.5	66	4.0	12	Snd Lvl	70.5	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	71.6	66	5.1	12	Snd Lvl	71.6	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.0	66	6.5	12	Snd Lvl	73.0	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.1	66	5.6	12	Snd Lvl	72.1	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	68.3	66	68.3	12	Snd Lvl	68.3	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	64.1	66	-1.4	12	—	64.1	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	59.8	71	-4.2	12	—	59.8	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	61.8	71	-2.2	12	—	61.8	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	62.9	71	-1.1	12	—	62.9	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	66.6	71	2.6	12	—	66.6	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	62.2	66	-6.8	12	—	62.2	0.0	10	-10.0
44 Building 129	44	1	0.0	56.4	66	56.4	12	—	56.4	0.0	10	-10.0
45 Building 122	45	0	0.0	61.2	71	61.2	12	—	61.2	0.0	10	-10.0
46 Building 108	46	0	0.0	61.2	71	61.2	12	—	61.2	0.0	10	-10.0
47 Building 107	47	0	0.0	66.4	71	66.4	12	—	66.4	0.0	10	-10.0
48 Building 104	48	0	74.0	57.7	71	-16.3	12	—	57.7	0.0	10	-10.0
49 Building 105	49	0	74.0	72.4	71	-1.6	12	Snd Lvl	72.4	0.0	10	-10.0
50 Building 106	50	0	76.0	70.9	71	-5.1	12	—	70.9	0.0	10	-10.0
51 Building 211	51	0	0.0	64.6	71	64.6	12	—	64.6	0.0	10	-10.0
52 Building 204	52	0	0.0	58.4	71	58.4	12	—	58.4	0.0	10	-10.0
53 Building 210	53	0	0.0	61.4	71	61.4	12	—	61.4	0.0	10	-10.0
54 Building 201	54	0	0.0	55.8	71	55.8	12	—	55.8	0.0	10	-10.0
55 Building 220	55	0	0.0	54.1	71	54.1	12	—	54.1	0.0	10	-10.0
56 Building 231	56	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
57 Building 228	57	0	0.0	62.7	71	62.7	12	—	62.7	0.0	10	-10.0
58 Building 229	58	0	0.0	60.8	71	60.8	12	—	60.8	0.0	10	-10.0
59 Building 223	59	0	0.0	58.0	71	58.0	12	—	58.0	0.0	10	-10.0
60 Building 230	60	0	0.0	71.1	71	71.1	12	Snd Lvl	71.1	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	59.5	66	2.5	12	—	59.5	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.0	66	0.0	12	—	57.0	0.0	10	-10.0
63 Building 1063	63	0	68.5	60.5	71	-8.0	12	—	60.5	0.0	10	-10.0

64 Building 1062	64	0	68.5	58.1	71	-10.4	12	—	58.1	0.0	10	-10.0
65 Building 1060	65	0	68.5	58.2	71	-10.3	12	—	58.2	0.0	10	-10.0
66 Building 1167	66	0	68.0	63.6	71	-4.4	12	—	63.6	0.0	10	-10.0
67 Building 1163	67	0	0.0	63.8	71	63.8	12	—	63.8	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.1	71	-3.9	12	—	64.1	0.0	10	-10.0
69 Building 1162	69	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.1	71	3.1	12	Snd Lvl	71.1	0.0	10	-10.0
71 Building 1161	71	0	0.0	66.4	71	66.4	12	—	66.4	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.3	71	71.3	12	Snd Lvl	71.3	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	70.8	66	70.8	12	Snd Lvl	70.8	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.3	66	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
75 Building 1004	75	0	0.0	55.9	71	55.9	12	—	55.9	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	72.6	66	-3.9	12	Snd Lvl	72.6	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	25	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



800
600
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-400
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400
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1200
1400
Parkway Diamond 2010 PM
Plan View
Run name: Parkway Diamond 2010 PM 831
Scale: 200 meters
Sheet 1 of 1
31 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North E	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+10	2	-293.0	-88.0	27.00				Average	
		11 - 11+53	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+1	28	1,030.0	-108.0	3.50				Average	
		11 - 25+6	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,178.0	-259.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fancisco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+2	41	899.0	22.0	6.00				Average	
		11 - 22+6	42	843.0	34.0	6.00				Average	
		12 - 22+0	43	775.0	33.0	4.00				Average	
		13 - 20+8	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherlan to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					

Environmental Science Associates, Inc. 31 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 PM

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	4303	88	13	88	58	88	47	88	13	88
	2 - 1+97.539	10	4303	88	13	88	58	88	47	88	13	88
	3 - 4+74	9	2321	88	7	88	31	88	26	88	7	88
	4 - 5+27	8	2321	88	7	88	31	88	26	88	7	88
	5 - 5+27	7	2321	88	7	88	31	88	26	88	7	88
	6 - 6+00	6	2321	88	7	88	31	88	26	88	7	88
	7 - 8+00	5	2321	88	7	88	31	88	26	88	7	88
	8 - 9+57	4	2813	88	9	88	38	88	32	88	9	88
	9 - 11+10	3	2813	88	9	88	38	88	32	88	9	88
	10 - 11+10	2	2813	88	9	88	38	88	32	88	9	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	2813	88	9	88	38	88	32	88	9	88
	2 - 14+10	17	2813	88	9	88	38	88	32	88	9	88
	3 - 14+60	16	2813	88	9	88	38	88	32	88	9	88
	4 - 15+00	15	2813	88	9	88	38	88	32	88	9	88
	5 - 15+85.44	14	2813	88	9	88	38	88	32	88	9	88
	6 - 17+33.198	13	2813	88	9	88	38	88	32	88	9	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2048	56	6	56	27	56	23	56	6	56
	2 - 21+20	20	2048	56	6	56	27	56	23	56	6	56
	3 - 21+20	21	2048	56	6	56	27	56	23	56	6	56

	4 - 22+42.630	22	2048	56	6	56	27	56	23	56	6	56
	5 - 23+00	23	2048	56	6	56	27	56	23	56	6	56
	6 - 23+25	24	2048	56	6	56	27	56	23	56	6	56
	7 - 23+25	25	2048	56	6	56	27	56	23	56	6	56
	8 - 24+20	26	2048	56	6	56	27	56	23	56	6	56
	9 - 24+85.060	27	2048	56	6	56	27	56	23	56	6	56
	10 - 25+17.10	28	2048	56	6	56	27	56	23	56	6	56
	11 - 25+64.74	29	2048	56	6	56	27	56	23	56	6	56
	12 - Gorgas I	30	2048	56	6	56	27	56	23	56	6	56
	13 - Francisco	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	2556	56	0	0	5	56	72	56	27	56
	2 - 27+20.608	33	2556	56	0	0	5	56	72	56	27	56
	3 - 26+00	34	2556	56	0	0	5	56	72	56	27	56
	4 - 25+40	35	2556	56	0	0	5	56	72	56	27	56
	5 - 24+73	36	2556	56	0	0	5	56	72	56	27	56
	6 - 24+20	37	2556	56	0	0	5	56	72	56	27	56
	7 - 23+75	38	2556	56	0	0	5	56	72	56	27	56
	8 - 23+75	39	2556	56	0	0	5	56	72	56	27	56
	9 - 23+22	40	2556	56	0	0	5	56	72	56	27	56
	10 - 23+22	41	2556	56	0	0	5	56	72	56	27	56
	11 - 22+68	42	2556	56	0	0	5	56	72	56	27	56
	12 - 22+00	43	2556	56	0	0	5	56	72	56	27	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	1087	88	0	0	2	88	31	88	11	88
	2 - 15+00	46	1087	88	0	0	2	88	31	88	11	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	1087	88	0	0	2	88	31	88	11	88
	2 - 11+00	52	1087	88	0	0	2	88	31	88	11	88
	3 - 11+00	53	1087	88	0	0	2	88	31	88	11	88
	4 - 9+80	54	1087	88	0	0	2	88	31	88	11	88
	5 - 8+73	55	3527	88	0	0	7	88	99	88	37	88
	6 - 7+00	56	3527	88	0	0	7	88	99	88	37	88
	7 - 6+60	57	3527	88	0	0	7	88	99	88	37	88
	8 - 6+60	58	3527	88	0	0	7	88	99	88	37	88

	9 - 5+54	59	3527	88	0	0	7	88	99	88	37	88
	10 - 5+54	60	3527	88	0	0	7	88	99	88	37	88
	11 - 5+14	61	3527	88	0	0	7	88	99	88	37	88
	12 - 5+14	62	3527	88	0	0	7	88	99	88	37	88
	13 - 4+00	63	3527	88	0	0	7	88	99	88	37	88
	14 - 3+10	64	5624	88	0	0	12	88	158	88	59	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	1	1	0	0	0	0	0	0	0	0
	2 - 1+30	67	1	1	0	0	0	0	0	0	0	0
	3 - 1+80	68	1	1	0	0	0	0	0	0	0	0
	4 - 2+20	69	1	1	0	0	0	0	0	0	0	0
	5 - 2+20	70	1	1	0	0	0	0	0	0	0	0
	6 - 2+48	71	1	1	0	0	0	0	0	0	0	0
	7 - 3+09	72	1	1	0	0	0	0	0	0	0	0
	8 - 3+40	73	1	1	0	0	0	0	0	0	0	0
	9 - 3+60	74	1	1	0	0	0	0	0	0	0	0
	10 - 3+80	75	1	1	0	0	0	0	0	0	0	0
	11 - 4+00	76	1	1	0	0	0	0	0	0	0	0
	12 - 4+20	77	1	1	0	0	0	0	0	0	0	0
	13 - 4+40	78	1	1	0	0	0	0	0	0	0	0
	14 - 4+59	79	1	1	0	0	0	0	0	0	0	0
	15 - 4+80	80	1	1	0	0	0	0	0	0	0	0
	16 - 5+00	81	1	1	0	0	0	0	0	0	0	0
	17 - 5+20	82	1	1	0	0	0	0	0	0	0	0
	18 - 5+80	83	1	1	0	0	0	0	0	0	0	0
	19 - 6+06	84	1	1	0	0	0	0	0	0	0	0
	20 - 6+31	85	1	1	0	0	0	0	0	0	0	0
	21 - 6+60	86	1	1	0	0	0	0	0	0	0	0
	22 - 6+88	87	1	1	0	0	0	0	0	0	0	0
	23 - 8+23	169	1	1	0	0	0	0	0	0	0	0
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	29	56	0	0	0	0	0	0	0	0
	2A	170	29	56	0	0	0	0	0	0	0	0
	2 - 3+72.391	90	29	56	0	0	0	0	0	0	0	0

	3 - 4+00	91	29	56	0	0	0	0	0	0	0	0
	4 - 4+40	92	29	56	0	0	0	0	0	0	0	0
	5 - 4+60	93	29	56	0	0	0	0	0	0	0	0
	6 - 5+00	94	29	56	0	0	0	0	0	0	0	0
	7 - 5+20	95	29	56	0	0	0	0	0	0	0	0
	8 - 5+40	96	29	56	0	0	0	0	0	0	0	0
	9 - 5+53	97	29	56	0	0	0	0	0	0	0	0
	10 - 5+53	98	29	56	0	0	0	0	0	0	0	0
	11 - 5+80	99	29	56	0	0	0	0	0	0	0	0
	12 - 5+98	100	29	56	0	0	0	0	0	0	0	0
	13 - 5+98	101	29	56	0	0	0	0	0	0	0	0
	14 - 6+58.037	102	29	56	0	0	0	0	0	0	0	0
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	2127	56	0	0	9	56	22	56	24	56
	2 - 1+35.965	105	2127	56	0	0	9	56	22	56	24	56
	3 - 1+60	106	2127	56	0	0	9	56	22	56	24	56
	4 - 1+80	107	2127	56	0	0	9	56	22	56	24	56
	5 - 2+00	108	2127	56	0	0	9	56	22	56	24	56
	6 - 2+20	109	2127	56	0	0	9	56	22	56	24	56
	7 - 2+40	110	2127	56	0	0	9	56	22	56	24	56
	8 - 2+60	111	2127	56	0	0	9	56	22	56	24	56
	9 - 2+81.908	112	2127	56	0	0	9	56	22	56	24	56
	10 - 3+09.875	113	2127	56	0	0	9	56	22	56	24	56
	11 - 3+40	114	2127	56	0	0	9	56	22	56	24	56
	12 - 3+60	115	2127	56	0	0	9	56	22	56	24	56
	13 - 3+80	116	2127	56	0	0	9	56	22	56	24	56
	14 - 4+00	117	2127	56	0	0	9	56	22	56	24	56
	15 - 4+20	118	2127	56	0	0	9	56	22	56	24	56
	16 - 4+40	119	2127	56	0	0	9	56	22	56	24	56
	17 - 4+53.16	120	2127	56	0	0	9	56	22	56	24	56
	18 - 5+20	121	2127	56	0	0	9	56	22	56	24	56
	19 - 5+20	122	2127	56	0	0	9	56	22	56	24	56
	20 - 6+00	123	2127	56	0	0	9	56	22	56	24	56
	21 - 6+40	124	2127	56	0	0	9	56	22	56	24	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	1984	56	6	56	27	56	23	56	6	56
	2 - 0+65	129	1984	56	6	56	27	56	23	56	6	56
	3 - 0+65	130	1984	56	6	56	27	56	23	56	6	56
	4 - 2+00	131	1984	56	6	56	27	56	23	56	6	56
	5 - 2+00	132	1984	56	6	56	27	56	23	56	6	56
	6 - 2+40	133	1984	56	6	56	27	56	23	56	6	56
	7 - 2+80	134	1984	56	6	56	27	56	23	56	6	56
	8 - 3+14.595	135	1984	56	6	56	27	56	23	56	6	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	1	1	0	0	0	0	0	0	0	0
	2 - 0+42	138	1	1	0	0	0	0	0	0	0	0
	3 - 0+42	139	1	1	0	0	0	0	0	0	0	0
	4 - 1+00	140	1	1	0	0	0	0	0	0	0	0
	5 - 1+50	141	1	1	0	0	0	0	0	0	0	0
	6 - 1+50	142	1	1	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	1	1	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	1	1	0	0	0	0	0	0	0	0
	9	145	1	1	0	0	0	0	0	0	0	0
	10	146	1	1	0	0	0	0	0	0	0	0
	11	147	1	1	0	0	0	0	0	0	0	0
	12	148	1	1	0	0	0	0	0	0	0	0
	13 - Intersecti	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	1	1	0	0	0	0	0	0	0	0
	2 - 0+65	151	1	1	0	0	0	0	0	0	0	0
	3 - 2+80	152	1	1	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	1	1	0	0	0	0	0	0	0	0
	5 - 4+40	154	1	1	0	0	0	0	0	0	0	0
	6 - 4+80	155	1	1	0	0	0	0	0	0	0	0
	7 - 5+20	156	1	1	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	1	1	0	0	0	0	0	0	0	0
	2 - 5+20	159	1	1	0	0	0	0	0	0	0	0
	3 - 4+80	160	1	1	0	0	0	0	0	0	0	0

	4 - 4+40	161	1	1	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	1	1	0	0	0	0	0	0	0	0
	6 - 2+80	163	1	1	0	0	0	0	0	0	0	0
	7 - 0+65	164	1	1	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	1	1	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	423	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	423	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	192	32	2	32	0	0	2	32	0	0
	2	181	192	32	2	32	0	0	2	32	0	0
	3	182	192	32	2	32	0	0	2	32	0	0
	4	183	598	32	6	32	0	0	6	32	0	0
	5	184	598	32	6	32	0	0	6	32	0	0
	6	185	598	32	6	32	0	0	6	32	0	0
	7	186	598	32	6	32	0	0	6	32	0	0
	8	187	598	32	6	32	0	0	6	32	0	0
	9	188	598	32	6	32	0	0	6	32	0	0
	10	189	619	32	6	32	0	0	6	32	0	0
	11	190	500	32	5	32	0	0	5	32	0	0
	12	191	500	32	5	32	0	0	5	32	0	0
	13	192	500	32	5	32	0	0	5	32	0	0
	14	193	500	32	5	32	0	0	5	32	0	0
	15	194	500	32	5	32	0	0	5	32	0	0
	16	195	613	32	6	32	0	0	6	32	0	0
	17	196	654	32	7	32	0	0	7	32	0	0
	18	197	912	32	9	32	0	0	9	32	0	0
	19	198	972	32	10	32	0	0	10	32	0	0
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	22	32	0	0	0	0	0	0	0	0
	2	201	22	32	0	0	0	0	0	0	0	0
	3	202	22	32	0	0	0	0	0	0	0	0
	4	203	22	32	0	0	0	0	0	0	0	0
	5	204	22	32	0	0	0	0	0	0	0	0

	6	205	22	32	0	0	0	0	0	0	0	0
	7	206	44	32	0	0	0	0	0	0	0	0
	8	207	42	32	0	0	0	0	0	0	0	0
	9	208	42	32	0	0	0	0	0	0	0	0
	10	209	42	32	0	0	0	0	0	0	0	0
	11	210	732	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	18	32	0	0	0	0	0	0	0	0
	2	213	6	32	0	0	0	0	0	0	0	0
	3	214	6	32	0	0	0	0	0	0	0	0
	4	215	6	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	34	32	0	0	0	0	0	0	0	0
	2	218	34	32	0	0	0	0	0	0	0	0
	3	219	34	32	0	0	0	0	0	0	0	0
	4	220	34	32	0	0	0	0	0	0	0	0
	5	221	34	32	0	0	0	0	0	0	0	0
	6	222	34	32	0	0	0	0	0	0	0	0
	7	223	34	32	0	0	0	0	0	0	0	0
	8	224	34	32	0	0	0	0	0	0	0	0
	9	225	34	32	0	0	0	0	0	0	0	0
	10	226	34	32	0	0	0	0	0	0	0	0
	11	227	34	32	0	0	0	0	0	0	0	0
	12	228	34	32	0	0	0	0	0	0	0	0
	13	229	34	32	0	0	0	0	0	0	0	0
	14	230	34	32	0	0	0	0	0	0	0	0
	15	231	34	32	0	0	0	0	0	0	0	0
	16	232	34	32	0	0	0	0	0	0	0	0
	17	233	34	32	0	0	0	0	0	0	0	0
	18	234	34	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	122	32	0	0	0	0	0	0	0	0
	2	237	122	32	0	0	0	0	0	0	0	0
	3	238										

Environmental Science Associates, Inc
Win Lindeman

31 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 PM

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria		NR Goal	
								LAeq1h	Sub'l		
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2010 PM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

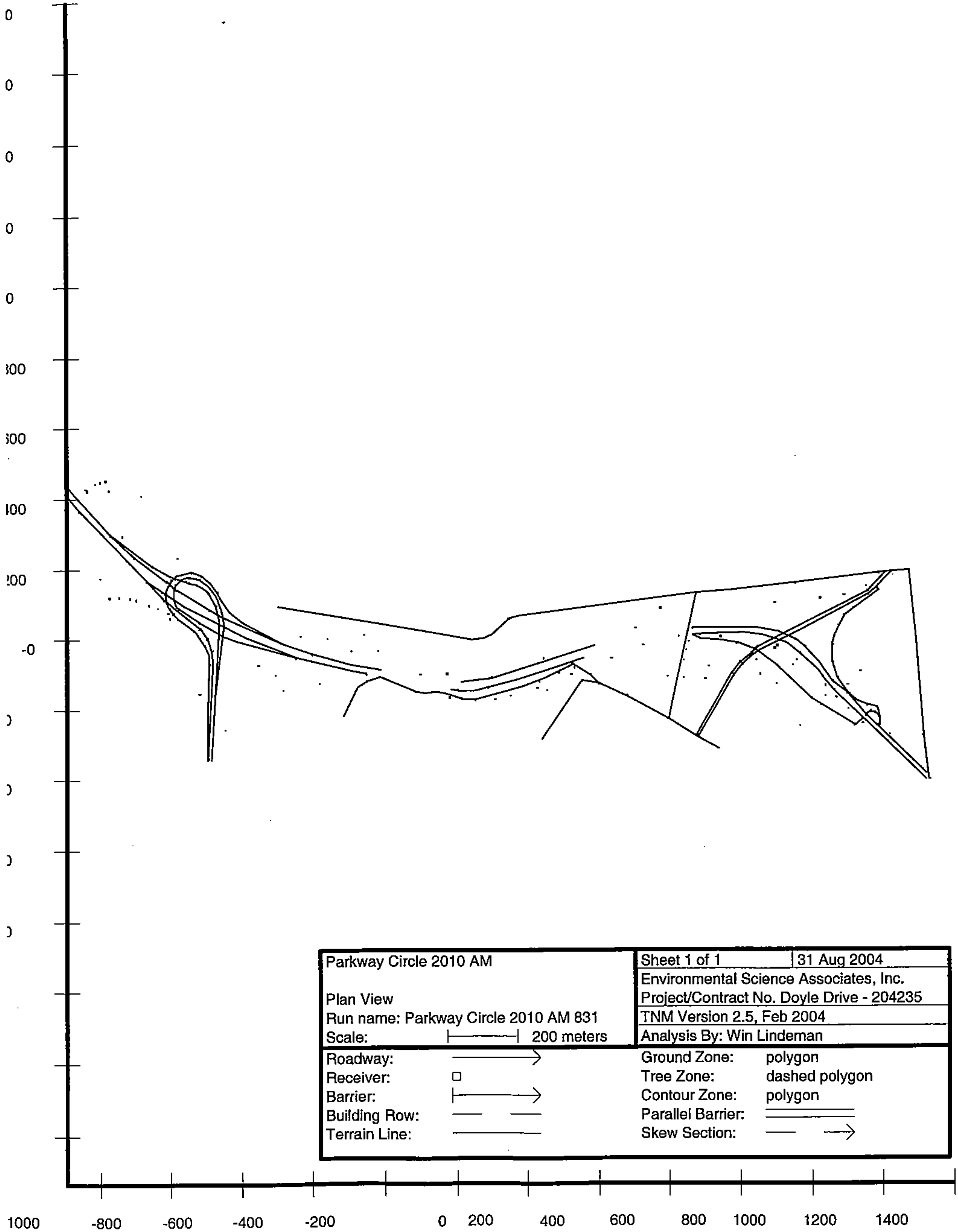
ATMOSPHERICS: 20 deg C, 50% RH

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	68.9	66	68.9	12	Snd Lvl	68.9	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.0	66	61.0	12	—	61.0	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	52.1	71	-28.9	12	—	52.1	0.0	10	-10.0
4 Building 1182	4	0	81.0	53.2	71	-27.8	12	—	53.2	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	55.8	71	-25.2	12	—	55.8	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	58.6	71	-22.4	12	—	58.6	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	53.9	71	-18.1	12	—	53.9	0.0	10	-10.0
8 PX Building	8	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	65.2	66	-3.8	12	—	65.2	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	66.6	66	-1.4	12	Snd Lvl	66.6	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	62.6	66	-5.4	12	—	62.6	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	61.8	66	-6.2	12	—	61.8	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	64.3	66	-3.7	12	—	64.3	0.0	10	-10.0
14 Building 644	14	0	0.0	57.2	71	57.2	12	—	57.2	0.0	10	-10.0
15 Building 649	15	0	0.0	58.1	66	58.1	12	—	58.1	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	57.3	66	-12.7	12	—	57.3	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	63.7	66	-2.3	12	—	63.7	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	76.1	66	10.1	12	Snd Lvl	76.1	0.0	10	-10.0
19 Building 969	19	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
20 Building 968	20	0	0.0	59.4	71	59.4	12	—	59.4	0.0	10	-10.0
21 Building 967	21	0	0.0	64.9	71	64.9	12	—	64.9	0.0	10	-10.0
22 Building 966	22	0	0.0	65.0	71	65.0	12	—	65.0	0.0	10	-10.0
23 Building 964	23	0	0.0	63.2	66	63.2	12	—	63.2	0.0	10	-10.0

24 Building 963	24	0	0.0	62.5	66	62.5	12	—	62.5	0.0	10	-10.0
25 Building 962	25	0	0.0	61.7	66	61.7	12	—	61.7	0.0	10	-10.0
26 Unknown Building	26	0	0.0	74.2	71	74.2	12	Snd Lvl	74.2	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	67.9	66	4.9	12	Snd Lvl	67.9	0.0	10	-10.0
28 Building 1387	28	0	0.0	66.6	71	66.6	12	—	66.6	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	65.7	66	-0.8	12	—	65.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	67.6	66	1.1	12	Snd Lvl	67.6	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	69.6	66	3.1	12	Snd Lvl	69.6	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	70.2	66	3.7	12	Snd Lvl	70.2	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	71.3	66	4.8	12	Snd Lvl	71.3	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	71.9	66	5.4	12	Snd Lvl	71.9	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	72.6	66	6.1	12	Snd Lvl	72.6	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	71.7	66	5.2	12	Snd Lvl	71.7	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	67.3	66	67.3	12	Snd Lvl	67.3	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	59.7	66	-5.8	12	—	59.7	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	59.1	71	-4.9	12	—	59.1	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	60.4	71	-3.6	12	—	60.4	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	60.9	71	-3.1	12	—	60.9	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	64.3	71	0.3	12	—	64.3	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	62.7	66	-6.3	12	—	62.7	0.0	10	-10.0
44 Building 129	44	1	0.0	57.0	66	57.0	12	—	57.0	0.0	10	-10.0
45 Building 122	45	0	0.0	60.4	71	60.4	12	----	60.4	0.0	10	-10.0
46 Building 108	46	0	0.0	59.8	71	59.8	12	—	59.8	0.0	10	-10.0
47 Building 107	47	0	0.0	65.2	71	65.2	12	—	65.2	0.0	10	-10.0
48 Building 104	48	0	74.0	56.4	71	-17.6	12	----	56.4	0.0	10	-10.0
49 Building 105	49	0	74.0	70.4	71	-3.6	12	----	70.4	0.0	10	-10.0
50 Building 106	50	0	76.0	69.0	71	-7.0	12	----	69.0	0.0	10	-10.0
51 Building 211	51	0	0.0	62.1	71	62.1	12	----	62.1	0.0	10	-10.0
52 Building 204	52	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0
53 Building 210	53	0	0.0	59.9	71	59.9	12	----	59.9	0.0	10	-10.0
54 Building 201	54	0	0.0	54.3	71	54.3	12	—	54.3	0.0	10	-10.0
55 Building 220	55	0	0.0	53.6	71	53.6	12	—	53.6	0.0	10	-10.0
56 Building 231	56	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
57 Building 228	57	0	0.0	62.4	71	62.4	12	----	62.4	0.0	10	-10.0
58 Building 229	58	0	0.0	60.2	71	60.2	12	—	60.2	0.0	10	-10.0
59 Building 223	59	0	0.0	57.2	71	57.2	12	----	57.2	0.0	10	-10.0
60 Building 230	60	0	0.0	71.0	71	71.0	12	Snd Lvl	71.0	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	58.9	66	1.9	12	----	58.9	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	56.3	66	-0.7	12	—	56.3	0.0	10	-10.0
63 Building 1063	63	0	68.5	60.1	71	-8.4	12	----	60.1	0.0	10	-10.0

64 Building 1062	64	0	68.5	57.9	71	-10.6	12	----	57.9	0.0	10	-10.0
65 Building 1060	65	0	68.5	58.1	71	-10.4	12	----	58.1	0.0	10	-10.0
66 Building 1167	66	0	68.0	63.8	71	-4.2	12	----	63.8	0.0	10	-10.0
67 Building 1163	67	0	0.0	63.4	71	63.4	12	----	63.4	0.0	10	-10.0
68 Building 1169	68	0	68.0	63.5	71	-4.5	12	----	63.5	0.0	10	-10.0
69 Building 1162	69	0	0.0	61.8	71	61.8	12	----	61.8	0.0	10	-10.0
70 Building 1170	70	0	68.0	70.7	71	2.7	12	----	70.7	0.0	10	-10.0
71 Building 1161	71	0	0.0	66.1	71	66.1	12	----	66.1	0.0	10	-10.0
72 Building 1160	72	0	0.0	70.7	71	70.7	12	----	70.7	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	70.3	66	70.3	12	Snd Lvl	70.3	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	71.8	66	71.8	12	Snd Lvl	71.8	0.0	10	-10.0
75 Building 1004	75	0	0.0	56.0	71	56.0	12	----	56.0	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	73.6	66	-2.9	12	Snd Lvl	73.6	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	25	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0


Parkway Circle 2010 AM
Plan View
Run name: Parkway Circle 2010 AM 831
Scale: 200 meters
Sheet 1 of 1
31 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
1000
-800
-600
-400
-200
0
200
400
600
800
1000
1200
1400
300
500
400
200
-0

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North E	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+5:	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,140.0	-224.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB/NB Richardson-Francisco to Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,148.0	-216.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,118.0	-243.0	4.00				Average	
		12	148	1,118.0	-245.0	4.00				Average	
		13 - Inters	149	1,140.0	-224.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
Palace Drive Connector to Gorgas	7.3	1	240	1,186.0	-221.0	4.00				Average	
		2	241	1,180.0	-214.0	4.00				Average	
		3	242	1,172.0	-208.0	4.00				Average	
		4	243	1,160.0	-206.0	4.00				Average	
		5	244	1,148.0	-216.0	4.00					

Environmental Science Associates, Inc. 31 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle to North Tunnel	1 - North End	11	5813	88	60	88	12	88	60	88	60	88	
	2 - 1+97.539	10	5813	88	60	88	12	88	60	88	60	88	
	3 - 4+74	9	3904	88	40	88	8	88	40	88	40	88	
	4 - 5+27	8	3904	88	40	88	8	88	40	88	40	88	
	5 - 5+27	7	3904	88	40	88	8	88	40	88	40	88	
	6 - 6+00	6	3904	88	40	88	8	88	40	88	40	88	
	7 - 8+00	5	3904	88	40	88	8	88	40	88	40	88	
	8 - 9+57	4	4693	88	48	88	10	88	48	88	48	88	
	9 - 11+10	3	4693	88	48	88	10	88	48	88	48	88	
	10 - 11+10	2	4693	88	48	88	10	88	48	88	48	88	
	11 - 11+53	1											
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	4693	88	48	88	10	88	48	88	48	88	
	2 - 14+10	17	4693	88	48	88	10	88	48	88	48	88	
	3 - 14+60	16	4693	88	48	88	10	88	48	88	48	88	
	4 - 15+00	15	4693	88	48	88	10	88	48	88	48	88	
	5 - 15+85.44	14	4693	88	48	88	10	88	48	88	48	88	
	6 - 17+33.198	13	4693	88	48	88	10	88	48	88	48	88	
	7 - 17+80	12											
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2999	56	31	56	7	56	31	56	31	56	
	2 - 21+20	20	2999	56	31	56	7	56	31	56	31	56	
	3 - 21+20	21	2999	56	31	56	7	56	31	56	31	56	

	4 - 22+42.630	22	2999	56	31	56	7	56	31	56	31	56
	5 - 23+00	23	2999	56	31	56	7	56	31	56	31	56
	6 - 23+25	24	2999	56	31	56	7	56	31	56	31	56
	7 - 23+25	25	2999	56	31	56	7	56	31	56	31	56
	8 - 24+20	26	2999	56	31	56	7	56	31	56	31	56
	9 - 24+85.060	27	2999	56	31	56	7	56	31	56	31	56
	10 - 25+17.10	28	2999	56	31	56	7	56	31	56	31	56
	11 - 25+64.74	29	2999	56	31	56	7	56	31	56	31	56
	12 - Gorgas Ir	30	2999	56	31	56	7	56	31	56	31	56
	13 - Francisco	31										
WB/NB Richardson-Francisco to Tunnel	1 - Francisco	32	1650	56	17	56	22	56	10	56	17	56
	2 - 27+20.608	33	1650	56	17	56	22	56	10	56	17	56
	3 - 26+00	34	1650	56	17	56	22	56	10	56	17	56
	4 - 25+40	35	1650	56	17	56	22	56	10	56	17	56
	5 - 24+73	36	1650	56	17	56	22	56	10	56	17	56
	6 - 24+20	37	1650	56	17	56	22	56	10	56	17	56
	7 - 23+75	38	1650	56	17	56	22	56	10	56	17	56
	8 - 23+75	39	1650	56	17	56	22	56	10	56	17	56
	9 - 23+22	40	1650	56	17	56	22	56	10	56	17	56
	10 - 23+22	41	1650	56	17	56	22	56	10	56	17	56
	11 - 22+68	42	1650	56	17	56	22	56	10	56	17	56
	12 - 22+00	43	1650	56	17	56	22	56	10	56	17	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	2024	88	21	88	27	88	13	88	21	88
	2 - 15+00	46	2024	88	21	88	27	88	13	88	21	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	2024	88	21	88	27	88	13	88	21	88
	2 - 11+00	52	2024	88	21	88	27	88	13	88	21	88
	3 - 11+00	53	2024	88	21	88	27	88	13	88	21	88
	4 - 9+80	54	2024	88	21	88	27	88	13	88	21	88
	5 - 8+73	55	1678	88	18	88	23	88	10	88	18	88
	6 - 7+00	56	1678	88	18	88	23	88	10	88	18	88
	7 - 6+60	57	1678	88	18	88	23	88	10	88	18	88
	8 - 6+60	58	1678	88	18	88	23	88	10	88	18	88

	9 - 5+54	59	1678	88	18	88	23	88	10	88	18	88
	10 - 5+54	60	1678	88	18	88	23	88	10	88	18	88
	11 - 5+14	61	1678	88	18	88	23	88	10	88	18	88
	12 - 5+14	62	1678	88	18	88	23	88	10	88	18	88
	13 - 4+00	63	1678	88	18	88	23	88	10	88	18	88
	14 - 3+10	64	3347	88	35	88	45	88	21	88	35	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	1894	56	20	56	26	56	12	56	20	56
	2 - 1+30	67	1894	56	20	56	26	56	12	56	20	56
	3 - 1+80	68	1894	56	20	56	26	56	12	56	20	56
	4 - 2+20	69	1894	56	20	56	26	56	12	56	20	56
	5 - 2+20	70	1894	56	20	56	26	56	12	56	20	56
	6 - 2+48	71	1894	56	20	56	26	56	12	56	20	56
	7 - 3+09	72	1894	56	20	56	26	56	12	56	20	56
	8 - 3+40	73	1894	56	20	56	26	56	12	56	20	56
	9 - 3+60	74	1894	56	20	56	26	56	12	56	20	56
	10 - 3+80	75	1894	56	20	56	26	56	12	56	20	56
	11 - 4+00	76	1894	56	20	56	26	56	12	56	20	56
	12 - 4+20	77	1894	56	20	56	26	56	12	56	20	56
	13 - 4+40	78	1894	56	20	56	26	56	12	56	20	56
	14 - 4+59	79	1894	56	20	56	26	56	12	56	20	56
	15 - 4+80	80	1894	56	20	56	26	56	12	56	20	56
	16 - 5+00	81	1894	56	20	56	26	56	12	56	20	56
	17 - 5+20	82	1894	56	20	56	26	56	12	56	20	56
	18 - 5+80	83	1894	56	20	56	26	56	12	56	20	56
	19 - 6+06	84	1894	56	20	56	26	56	12	56	20	56
	20 - 6+31	85	1894	56	20	56	26	56	12	56	20	56
	21 - 6+60	86	1894	56	20	56	26	56	12	56	20	56
	22 - 6+88	87	1894	56	20	56	26	56	12	56	20	56
	23 - 8+23	169	1894	56	20	56	26	56	12	56	20	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	1690	56	17	56	17	56	0	0	12	56
	2A	170	1690	56	17	56	17	56	0	0	12	56
	2 - 3+72.391	90	1690	56	17	56	17	56	0	0	12	56

	3 - 4+00	91	1690	56	17	56	17	56	0	0	12	56
	4 - 4+40	92	1690	56	17	56	17	56	0	0	12	56
	5 - 4+60	93	1690	56	17	56	17	56	0	0	12	56
	6 - 5+00	94	1690	56	17	56	17	56	0	0	12	56
	7 - 5+20	95	1690	56	17	56	17	56	0	0	12	56
	8 - 5+40	96	1690	56	17	56	17	56	0	0	12	56
	9 - 5+53	97	1690	56	17	56	17	56	0	0	12	56
	10 - 5+53	98	1690	56	17	56	17	56	0	0	12	56
	11 - 5+80	99	1690	56	17	56	17	56	0	0	12	56
	12 - 5+98	100	1690	56	17	56	17	56	0	0	12	56
	13 - 5+98	101	1690	56	17	56	17	56	0	0	12	56
	14 - 6+58.037	102	1690	56	17	56	17	56	0	0	12	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	787	56	6	56	8	56	8	56	6	56
	2 - 1+35.965	105	787	56	6	56	8	56	8	56	6	56
	3 - 1+60	106	787	56	6	56	8	56	8	56	6	56
	4 - 1+80	107	787	56	6	56	8	56	8	56	6	56
	5 - 2+00	108	787	56	6	56	8	56	8	56	6	56
	6 - 2+20	109	787	56	6	56	8	56	8	56	6	56
	7 - 2+40	110	787	56	6	56	8	56	8	56	6	56
	8 - 2+60	111	787	56	6	56	8	56	8	56	6	56
	9 - 2+81.908	112	787	56	6	56	8	56	8	56	6	56
	10 - 3+09.875	113	787	56	6	56	8	56	8	56	6	56
	11 - 3+40	114	787	56	6	56	8	56	8	56	6	56
	12 - 3+60	115	787	56	6	56	8	56	8	56	6	56
	13 - 3+80	116	787	56	6	56	8	56	8	56	6	56
	14 - 4+00	117	787	56	6	56	8	56	8	56	6	56
	15 - 4+20	118	787	56	6	56	8	56	8	56	6	56
	16 - 4+40	119	787	56	6	56	8	56	8	56	6	56
	17 - 4+53.16	120	787	56	6	56	8	56	8	56	6	56
	18 - 5+20	121	787	56	6	56	8	56	8	56	6	56
	19 - 5+20	122	787	56	6	56	8	56	8	56	6	56
	20 - 6+00	123	787	56	6	56	8	56	8	56	6	56
	21 - 6+40	124	787	56	6	56	8	56	8	56	6	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	348	56	4	56	1	56	4	56	4	56
	2 - 0+65	129	348	56	4	56	1	56	4	56	4	56
	3 - 0+65	130	348	56	4	56	1	56	4	56	4	56
	4 - 2+00	131	348	56	4	56	1	56	4	56	4	56
	5 - 2+00	132	348	56	4	56	1	56	4	56	4	56
	6 - 2+40	133	348	56	4	56	1	56	4	56	4	56
	7 - 2+80	134	348	56	4	56	1	56	4	56	4	56
	8 - 3+14.595	135	348	56	4	56	1	56	4	56	4	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	1	1	0	0	0	0	0	0	0	0
	2 - 0+42	138	1	1	0	0	0	0	0	0	0	0
	3 - 0+42	139	1	1	0	0	0	0	0	0	0	0
	4 - 1+00	140	1	1	0	0	0	0	0	0	0	0
	5 - 1+50	141	1	1	0	0	0	0	0	0	0	0
	6 - 1+50	142	1	1	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	1	1	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	1	1	0	0	0	0	0	0	0	0
	9	145	1	1	0	0	0	0	0	0	0	0
	10	146	1	1	0	0	0	0	0	0	0	0
	11	147	1	1	0	0	0	0	0	0	0	0
	12	148	1	1	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	52	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	52	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	52	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	52	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	52	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	52	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	52	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	29	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	29	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	29	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	29	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	29	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	29	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	29	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	29	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	483	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	483	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	80	32	1	32	0	0	1	32	0	0
	2	181	80	32	1	32	0	0	1	32	0	0
	3	182	80	32	1	32	0	0	1	32	0	0
	4	183	108	32	1	32	0	0	1	32	0	0
	5	184	108	32	1	32	0	0	1	32	0	0
	6	185	108	32	1	32	0	0	1	32	0	0
	7	186	108	32	1	32	0	0	1	32	0	0
	8	187	108	32	1	32	0	0	1	32	0	0
	9	188	108	32	1	32	0	0	1	32	0	0
	10	189	124	32	1	32	0	0	1	32	0	0
	11	190	55	32	1	32	0	0	1	32	0	0
	12	191	55	32	1	32	0	0	1	32	0	0
	13	192	55	32	1	32	0	0	1	32	0	0
	14	193	55	32	1	32	0	0	1	32	0	0
	15	194	55	32	1	32	0	0	1	32	0	0
	16	195	148	32	1	32	0	0	1	32	0	0
	17	196	160	32	2	32	0	0	2	32	0	0
	18	197	573	32	6	32	0	0	6	32	0	0
	19	198	625	32	6	32	0	0	6	32	0	0
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	5	32	0	0	0	0	0	0	0	0
	2	201	5	32	0	0	0	0	0	0	0	0
	3	202	5	32	0	0	0	0	0	0	0	0
	4	203	5	32	0	0	0	0	0	0	0	0
	5	204	5	32	0	0	0	0	0	0	0	0

	6	205	5	32	0	0	0	0	0	0	0	0
	7	206	25	32	0	0	0	0	0	0	0	0
	8	207	25	32	0	0	0	0	0	0	0	0
	9	208	27	32	0	0	0	0	0	0	0	0
	10	209	27	32	0	0	0	0	0	0	0	0
	11	210	27	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	39	32	0	0	0	0	0	0	0	0
	2	213	8	32	0	0	0	0	0	0	0	0
	3	214	8	32	0	0	0	0	0	0	0	0
	4	215	8	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	30	32	0	0	0	0	0	0	0	0
	2	218	30	32	0	0	0	0	0	0	0	0
	3	219	30	32	0	0	0	0	0	0	0	0
	4	220	30	32	0	0	0	0	0	0	0	0
	5	221	30	32	0	0	0	0	0	0	0	0
	6	222	30	32	0	0	0	0	0	0	0	0
	7	223	30	32	0	0	0	0	0	0	0	0
	8	224	30	32	0	0	0	0	0	0	0	0
	9	225	30	32	0	0	0	0	0	0	0	0
	10	226	30	32	0	0	0	0	0	0	0	0
	11	227	30	32	0	0	0	0	0	0	0	0
	12	228	30	32	0	0	0	0	0	0	0	0
	13	229	30	32	0	0	0	0	0	0	0	0
	14	230	30	32	0	0	0	0	0	0	0	0
	15	231	30	32	0	0	0	0	0	0	0	0
	16	232	30	32	0	0	0	0	0	0	0	0
	17	233	30	32	0	0	0	0	0	0	0	0
	18	234	30	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherlan to Lincoln	1	236	94	32	0	0	0	0	0	0	0	0
	2	237	94	32	0	0	0	0	0	0	0	0
	3	238										

INPUT: TRAFFIC FOR LAeq1h Volumes

Palace Drive Connector to Gorgas	1	240	30	32	0	0	0	0	0	0	0	0
	2	241	30	32	0	0	0	0	0	0	0	0
	3	242	30	32	0	0	0	0	0	0	0	0
	4	243	30	32	0	0	0	0	0	0	0	0
	5	244										

Environmental Science Associates, Inc
Win Lindeman

31 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 AM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-198.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-240.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 AM
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 20 deg C, 50% RH

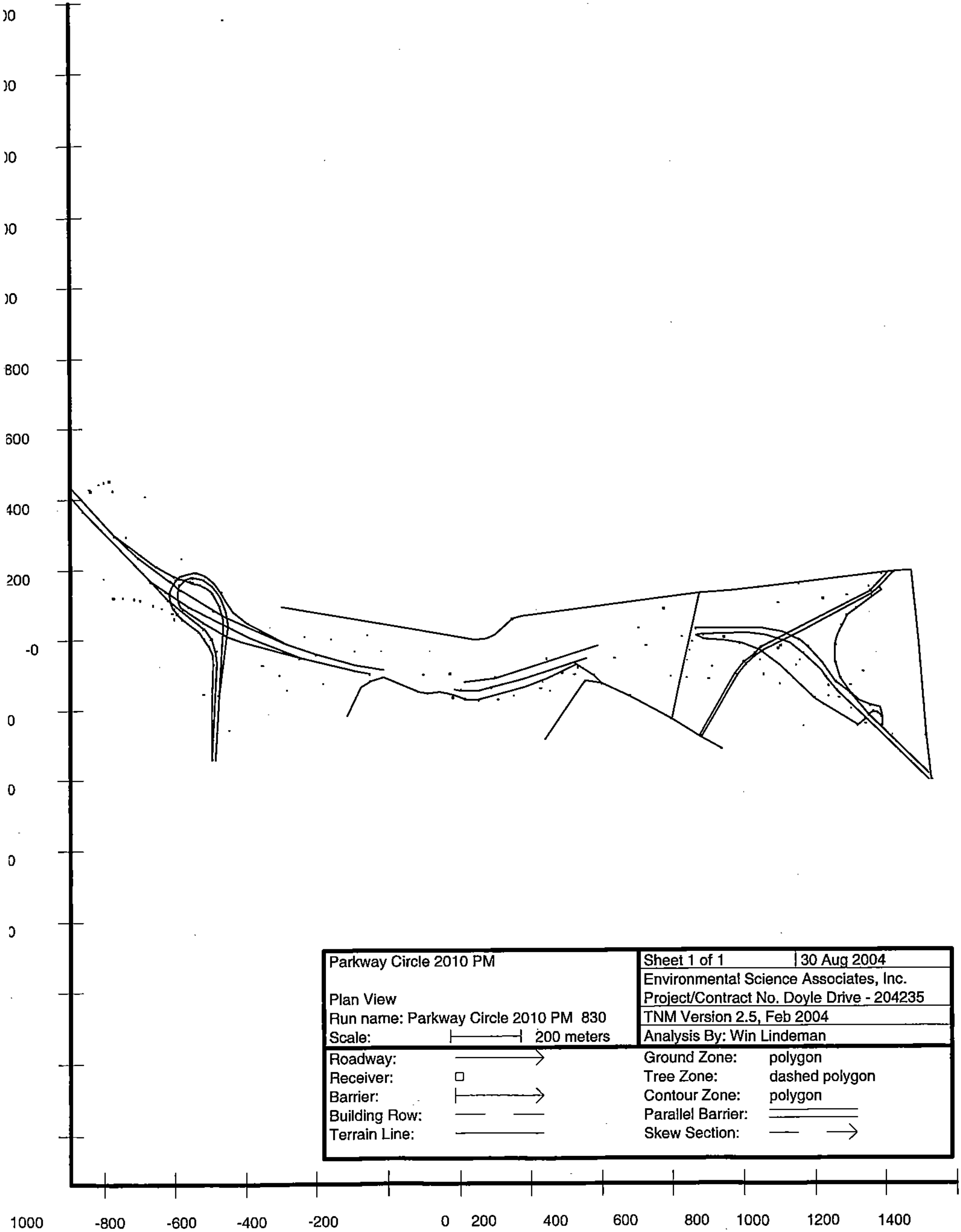
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	68.4	66	68.4	12	Snd Lvl	68.4	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.0	66	61.0	12	—	61.0	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	54.9	71	-26.1	12	—	54.9	0.0	10	-10.0
4 Building 1182	4	0	81.0	54.5	71	-26.5	12	—	54.5	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	55.7	71	-25.3	12	—	55.7	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	58.4	71	-22.6	12	—	58.4	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	55.5	71	-16.5	12	—	55.5	0.0	10	-10.0
8 PX Building	8	0	0.0	58.4	71	58.4	12	—	58.4	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	68.4	66	-0.6	12	Snd Lvl	68.4	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	68.9	66	0.9	12	Snd Lvl	68.9	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	64.8	66	-3.2	12	—	64.8	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	64.1	66	-3.9	12	—	64.1	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	66.7	66	-1.3	12	Snd Lvl	66.7	0.0	10	-10.0
14 Building 644	14	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
15 Building 649	15	0	0.0	60.0	66	60.0	12	—	60.0	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	58.9	66	-11.1	12	—	58.9	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.9	66	-1.1	12	—	64.9	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	75.6	66	9.6	12	Snd Lvl	75.6	0.0	10	-10.0
19 Building 969	19	0	0.0	57.2	71	57.2	12	—	57.2	0.0	10	-10.0
20 Building 968	20	0	0.0	58.7	71	58.7	12	—	58.7	0.0	10	-10.0
21 Building 967	21	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
22 Building 966	22	0	0.0	63.9	71	63.9	12	----	63.9	0.0	10	-10.0
23 Building 964	23	0	0.0	62.1	66	62.1	12	—	62.1	0.0	10	-10.0

24 Building 963	24	0	0.0	61.5	66	61.5	12	—	61.5	0.0	10	-10.0
25 Building 962	25	0	0.0	60.9	66	60.9	12	—	60.9	0.0	10	-10.0
26 Unknown Building	26	0	0.0	74.3	71	74.3	12	Snd Lvl	74.3	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.0	66	5.0	12	Snd Lvl	68.0	0.0	10	-10.0
28 Building 1387	28	0	0.0	66.5	71	66.5	12	—	66.5	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	65.8	66	-0.7	12	—	65.8	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	67.8	66	1.3	12	Snd Lvl	67.8	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	69.8	66	3.3	12	Snd Lvl	69.8	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	70.4	66	3.9	12	Snd Lvl	70.4	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	71.4	66	4.9	12	Snd Lvl	71.4	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.8	66	7.3	12	Snd Lvl	73.8	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	68.7	66	68.7	12	Snd Lvl	68.7	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	64.9	66	-0.6	12	—	64.9	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	59.8	71	-4.2	12	—	59.8	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	61.8	71	-2.2	12	—	61.8	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	62.9	71	-1.1	12	—	62.9	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	66.5	71	2.5	12	—	66.5	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	62.2	66	-6.8	12	—	62.2	0.0	10	-10.0
44 Building 129	44	1	0.0	56.3	66	56.3	12	—	56.3	0.0	10	-10.0
45 Building 122	45	0	0.0	61.2	71	61.2	12	—	61.2	0.0	10	-10.0
46 Building 108	46	0	0.0	61.1	71	61.1	12	—	61.1	0.0	10	-10.0
47 Building 107	47	0	0.0	66.4	71	66.4	12	—	66.4	0.0	10	-10.0
48 Building 104	48	0	74.0	57.7	71	-16.3	12	—	57.7	0.0	10	-10.0
49 Building 105	49	0	74.0	72.4	71	-1.6	12	Snd Lvl	72.4	0.0	10	-10.0
50 Building 106	50	0	76.0	70.9	71	-5.1	12	—	70.9	0.0	10	-10.0
51 Building 211	51	0	0.0	64.5	71	64.5	12	—	64.5	0.0	10	-10.0
52 Building 204	52	0	0.0	58.4	71	58.4	12	—	58.4	0.0	10	-10.0
53 Building 210	53	0	0.0	61.4	71	61.4	12	—	61.4	0.0	10	-10.0
54 Building 201	54	0	0.0	55.8	71	55.8	12	—	55.8	0.0	10	-10.0
55 Building 220	55	0	0.0	54.1	71	54.1	12	—	54.1	0.0	10	-10.0
56 Building 231	56	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
57 Building 228	57	0	0.0	62.7	71	62.7	12	—	62.7	0.0	10	-10.0
58 Building 229	58	0	0.0	60.8	71	60.8	12	—	60.8	0.0	10	-10.0
59 Building 223	59	0	0.0	58.0	71	58.0	12	—	58.0	0.0	10	-10.0
60 Building 230	60	0	0.0	71.2	71	71.2	12	Snd Lvl	71.2	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	59.6	66	2.6	12	—	59.6	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.0	66	0.0	12	—	57.0	0.0	10	-10.0
63 Building 1063	63	0	68.5	60.5	71	-8.0	12	—	60.5	0.0	10	-10.0

64 Building 1062	64	0	68.5	58.2	71	-10.3	12	—	58.2	0.0	10	-10.0
65 Building 1060	65	0	68.5	58.4	71	-10.1	12	—	58.4	0.0	10	-10.0
66 Building 1167	66	0	68.0	63.6	71	-4.4	12	—	63.6	0.0	10	-10.0
67 Building 1163	67	0	0.0	63.8	71	63.8	12	—	63.8	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.2	71	-3.8	12	—	64.2	0.0	10	-10.0
69 Building 1162	69	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.2	71	3.2	12	Snd Lvl	71.2	0.0	10	-10.0
71 Building 1161	71	0	0.0	66.4	71	66.4	12	—	66.4	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.4	71	71.4	12	Snd Lvl	71.4	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	69.7	66	69.7	12	Snd Lvl	69.7	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	71.6	66	71.6	12	Snd Lvl	71.6	0.0	10	-10.0
75 Building 1004	75	0	0.0	55.9	71	55.9	12	—	55.9	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	72.0	66	-4.5	12	Snd Lvl	72.0	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	25	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Parkway Circle 2010 PM	Sheet 1 of 1 | 30 Aug 2004
	Environmental Science Associates, Inc.
Plan View	Project/Contract No. Doyle Drive - 204235
Run name: Parkway Circle 2010 PM 830	TNM Version 2.5, Feb 2004
Scale: 200 meters	Analysis By: Win Lindeman

Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:

Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North I	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+53	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,140.0	-224.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB/NB Richardson-Francisco to Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,148.0	-216.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y.
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,118.0	-243.0	4.00				Average	
		12	148	1,118.0	-245.0	4.00				Average	
		13 - Inters	149	1,140.0	-224.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
Palace Drive Connector to Gorgas	7.3	1	240	1,186.0	-221.0	4.00				Average	
		2	241	1,180.0	-214.0	4.00				Average	
		3	242	1,172.0	-208.0	4.00				Average	
		4	243	1,160.0	-206.0	4.00				Average	
		5	244	1,148.0	-216.0	4.00					

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	3578	88	12	88	53	88	45	88	12	88
	2 - 1+97.539	10	3578	88	12	88	53	88	45	88	12	88
	3 - 4+74	9	2345	88	7	88	31	88	27	88	7	88
	4 - 5+27	8	2345	88	7	88	31	88	27	88	7	88
	5 - 5+27	7	2345	88	7	88	31	88	27	88	7	88
	6 - 6+00	6	2345	88	7	88	31	88	27	88	7	88
	7 - 8+00	5	2345	88	7	88	31	88	27	88	7	88
	8 - 9+57	4	2801	88	9	88	38	88	32	88	9	88
	9 - 11+10	3	2801	88	9	88	38	88	32	88	9	88
	10 - 11+10	2	2801	88	9	88	38	88	32	88	9	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	2801	88	9	88	38	88	32	88	9	88
	2 - 14+10	17	2801	88	9	88	38	88	32	88	9	88
	3 - 14+60	16	2801	88	9	88	38	88	32	88	9	88
	4 - 15+00	15	2801	88	9	88	38	88	32	88	9	88
	5 - 15+85.44	14	2801	88	9	88	38	88	32	88	9	88
	6 - 17+33.198	13	2801	88	9	88	38	88	32	88	9	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2047	56	6	56	27	56	23	56	6	56
	2 - 21+20	20	2047	56	6	56	27	56	23	56	6	56
	3 - 21+20	21	2047	56	6	56	27	56	23	56	6	56

	4 - 22+42.630	22	2047	56	6	56	27	56	23	56	6	56
	5 - 23+00	23	2047	56	6	56	27	56	23	56	6	56
	6 - 23+25	24	2047	56	6	56	27	56	23	56	6	56
	7 - 23+25	25	2047	56	6	56	27	56	23	56	6	56
	8 - 24+20	26	2047	56	6	56	27	56	23	56	6	56
	9 - 24+85.060	27	2047	56	6	56	27	56	23	56	6	56
	10 - 25+17.10	28	2047	56	6	56	27	56	23	56	6	56
	11 - 25+64.74	29	2047	56	6	56	27	56	23	56	6	56
	12 - Gorgas I	30	2047	56	6	56	27	56	23	56	6	56
	13 - Francisc	31										
WB/NB Richardson-Francisco to Tunnel	1 - Francisco	32	2030	56	0	0	4	56	57	56	21	56
	2 - 27+20.608	33	2030	56	0	0	4	56	57	56	21	56
	3 - 26+00	34	2030	56	0	0	4	56	57	56	21	56
	4 - 25+40	35	2030	56	0	0	4	56	57	56	21	56
	5 - 24+73	36	2030	56	0	0	4	56	57	56	21	56
	6 - 24+20	37	2030	56	0	0	4	56	57	56	21	56
	7 - 23+75	38	2030	56	0	0	4	56	57	56	21	56
	8 - 23+75	39	2030	56	0	0	4	56	57	56	21	56
	9 - 23+22	40	2030	56	0	0	4	56	57	56	21	56
	10 - 23+22	41	2030	56	0	0	4	56	57	56	21	56
	11 - 22+68	42	2030	56	0	0	4	56	57	56	21	56
	12 - 22+00	43	2030	56	0	0	4	56	57	56	21	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	3608	88	0	0	8	88	101	88	38	88
	2 - 15+00	46	3608	88	0	0	8	88	101	88	38	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	3608	88	0	0	8	88	101	88	38	88
	2 - 11+00	52	3608	88	0	0	8	88	101	88	38	88
	3 - 11+00	53	3608	88	0	0	8	88	101	88	38	88
	4 - 9+80	54	3608	88	0	0	8	88	101	88	38	88
	5 - 8+73	55	3057	88	0	0	6	88	86	88	32	88
	6 - 7+00	56	3057	88	0	0	6	88	86	88	32	88
	7 - 6+60	57	3057	88	0	0	6	88	86	88	32	88
	8 - 6+60	58	3057	88	0	0	6	88	86	88	32	88

	9 - 5+54	59	3057	88	0	0	6	88	86	88	32	88
	10 - 5+54	60	3057	88	0	0	6	88	86	88	32	88
	11 - 5+14	61	3057	88	0	0	6	88	86	88	32	88
	12 - 5+14	62	3057	88	0	0	6	88	86	88	32	88
	13 - 4+00	63	3057	88	0	0	6	88	86	88	32	88
	14 - 3+10	64	5252	88	0	0	11	88	148	88	55	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	551	56	0	0	1	56	15	56	6	56
	2 - 1+30	67	551	56	0	0	1	56	15	56	6	56
	3 - 1+80	68	551	56	0	0	1	56	15	56	6	56
	4 - 2+20	69	551	56	0	0	1	56	15	56	6	56
	5 - 2+20	70	551	56	0	0	1	56	15	56	6	56
	6 - 2+48	71	551	56	0	0	1	56	15	56	6	56
	7 - 3+09	72	551	56	0	0	1	56	15	56	6	56
	8 - 3+40	73	551	56	0	0	1	56	15	56	6	56
	9 - 3+60	74	551	56	0	0	1	56	15	56	6	56
	10 - 3+80	75	551	56	0	0	1	56	15	56	6	56
	11 - 4+00	76	551	56	0	0	1	56	15	56	6	56
	12 - 4+20	77	551	56	0	0	1	56	15	56	6	56
	13 - 4+40	78	551	56	0	0	1	56	15	56	6	56
	14 - 4+59	79	551	56	0	0	1	56	15	56	6	56
	15 - 4+80	80	551	56	0	0	1	56	15	56	6	56
	16 - 5+00	81	551	56	0	0	1	56	15	56	6	56
	17 - 5+20	82	551	56	0	0	1	56	15	56	6	56
	18 - 5+80	83	551	56	0	0	1	56	15	56	6	56
	19 - 6+06	84	551	56	0	0	1	56	15	56	6	56
	20 - 6+31	85	551	56	0	0	1	56	15	56	6	56
	21 - 6+60	86	551	56	0	0	1	56	15	56	6	56
	22 - 6+88	87	551	56	0	0	1	56	15	56	6	56
	23 - 8+23	169	551	56	0	0	1	56	15	56	6	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2227	56	0	0	9	56	23	56	25	56
	2A	170	2227	56	0	0	9	56	23	56	25	56
	2 - 3+72.391	90	2227	56	0	0	9	56	23	56	25	56

	3 - 4+00	91	2227	56	0	0	9	56	23	56	25	56
	4 - 4+40	92	2227	56	0	0	9	56	23	56	25	56
	5 - 4+60	93	2227	56	0	0	9	56	23	56	25	56
	6 - 5+00	94	2227	56	0	0	9	56	23	56	25	56
	7 - 5+20	95	2227	56	0	0	9	56	23	56	25	56
	8 - 5+40	96	2227	56	0	0	9	56	23	56	25	56
	9 - 5+53	97	2227	56	0	0	9	56	23	56	25	56
	10 - 5+53	98	2227	56	0	0	9	56	23	56	25	56
	11 - 5+80	99	2227	56	0	0	9	56	23	56	25	56
	12 - 5+98	100	2227	56	0	0	9	56	23	56	25	56
	13 - 5+98	101	2227	56	0	0	9	56	23	56	25	56
	14 - 6+58.037	102	2227	56	0	0	9	56	23	56	25	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	459	56	2	56	2	56	3	56	5	56
	2 - 1+35.965	105	459	56	2	56	2	56	3	56	5	56
	3 - 1+60	106	459	56	2	56	2	56	3	56	5	56
	4 - 1+80	107	459	56	2	56	2	56	3	56	5	56
	5 - 2+00	108	459	56	2	56	2	56	3	56	5	56
	6 - 2+20	109	459	56	2	56	2	56	3	56	5	56
	7 - 2+40	110	459	56	2	56	2	56	3	56	5	56
	8 - 2+60	111	459	56	2	56	2	56	3	56	5	56
	9 - 2+81.908	112	459	56	2	56	2	56	3	56	5	56
	10 - 3+09.875	113	459	56	2	56	2	56	3	56	5	56
	11 - 3+40	114	459	56	2	56	2	56	3	56	5	56
	12 - 3+60	115	459	56	2	56	2	56	3	56	5	56
	13 - 3+80	116	459	56	2	56	2	56	3	56	5	56
	14 - 4+00	117	459	56	2	56	2	56	3	56	5	56
	15 - 4+20	118	459	56	2	56	2	56	3	56	5	56
	16 - 4+40	119	459	56	2	56	2	56	3	56	5	56
	17 - 4+53.16	120	459	56	2	56	2	56	3	56	5	56
	18 - 5+20	121	459	56	2	56	2	56	3	56	5	56
	19 - 5+20	122	459	56	2	56	2	56	3	56	5	56
	20 - 6+00	123	459	56	2	56	2	56	3	56	5	56
	21 - 6+40	124	459	56	2	56	2	56	3	56	5	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	1051	56	3	56	14	56	12	56	3	56
	2 - 0+65	129	1051	56	3	56	14	56	12	56	3	56
	3 - 0+65	130	1051	56	3	56	14	56	12	56	3	56
	4 - 2+00	131	1051	56	3	56	14	56	12	56	3	56
	5 - 2+00	132	1051	56	3	56	14	56	12	56	3	56
	6 - 2+40	133	1051	56	3	56	14	56	12	56	3	56
	7 - 2+80	134	1051	56	3	56	14	56	12	56	3	56
	8 - 3+14.595	135	1051	56	3	56	14	56	12	56	3	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	1	1	0	0	0	0	0	0	0	0
	2 - 0+42	138	1	1	0	0	0	0	0	0	0	0
	3 - 0+42	139	1	1	0	0	0	0	0	0	0	0
	4 - 1+00	140	1	1	0	0	0	0	0	0	0	0
	5 - 1+50	141	1	1	0	0	0	0	0	0	0	0
	6 - 1+50	142	1	1	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	1	1	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	1	1	0	0	0	0	0	0	0	0
	9	145	1	1	0	0	0	0	0	0	0	0
	10	146	1	1	0	0	0	0	0	0	0	0
	11	147	1	1	0	0	0	0	0	0	0	0
	12	148	1	1	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	80	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	80	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	80	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	80	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	80	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	80	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	80	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	85	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	85	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	85	56	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes — Doyle Drive - 204235

	4 - 4+40	161	85	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	85	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	85	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	85	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	85	56	0	0	0	0	0	0	0	0
	9 - Mason/Mc	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	100	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	100	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	254	32	7	32	0	0	7	32	0	0
	2	181	254	32	7	32	0	0	7	32	0	0
	3	182	254	32	7	32	0	0	7	32	0	0
	4	183	582	32	6	32	0	0	6	32	0	0
	5	184	582	32	6	32	0	0	6	32	0	0
	6	185	582	32	6	32	0	0	6	32	0	0
	7	186	254	32	6	32	0	0	6	32	0	0
	8	187	582	32	6	32	0	0	6	32	0	0
	9	188	582	32	6	32	0	0	6	32	0	0
	10	189	605	32	6	32	0	0	6	32	0	0
	11	190	483	32	5	32	0	0	5	32	0	0
	12	191	483	32	5	32	0	0	5	32	0	0
	13	192	483	32	5	32	0	0	5	32	0	0
	14	193	483	32	5	32	0	0	5	32	0	0
	15	194	483	32	5	32	0	0	5	32	0	0
	16	195	601	32	6	32	0	0	6	32	0	0
	17	196	641	32	7	32	0	0	7	32	0	0
	18	197	433	32	4	32	0	0	4	32	0	0
	19	198	934	32	10	32	0	0	10	32	0	0
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	20	32	0	0	0	0	0	0	0	0
	2	201	20	32	0	0	0	0	0	0	0	0
	3	202	20	32	0	0	0	0	0	0	0	0
	4	203	20	32	0	0	0	0	0	0	0	0
	5	204	20	32	0	0	0	0	0	0	0	0

	6	205	20	32	0	0	0	0	0	0	0	0
	7	206	44	32	0	0	0	0	0	0	0	0
	8	207	44	32	0	0	0	0	0	0	0	0
	9	208	49	32	0	0	0	0	0	0	0	0
	10	209	49	32	0	0	0	0	0	0	0	0
	11	210	49	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	22	32	0	0	0	0	0	0	0	0
	2	213	5	32	0	0	0	0	0	0	0	0
	3	214	7	32	0	0	0	0	0	0	0	0
	4	215	7	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	34	32	0	0	0	0	0	0	0	0
	2	218	34	32	0	0	0	0	0	0	0	0
	3	219	34	32	0	0	0	0	0	0	0	0
	4	220	34	32	0	0	0	0	0	0	0	0
	5	221	34	32	0	0	0	0	0	0	0	0
	6	222	34	32	0	0	0	0	0	0	0	0
	7	223	34	32	0	0	0	0	0	0	0	0
	8	224	34	32	0	0	0	0	0	0	0	0
	9	225	34	32	0	0	0	0	0	0	0	0
	10	226	34	32	0	0	0	0	0	0	0	0
	11	227	34	32	0	0	0	0	0	0	0	0
	12	228	34	32	0	0	0	0	0	0	0	0
	13	229	34	32	0	0	0	0	0	0	0	0
	14	230	34	32	0	0	0	0	0	0	0	0
	15	231	34	32	0	0	0	0	0	0	0	0
	16	232	34	32	0	0	0	0	0	0	0	0
	17	233	34	32	0	0	0	0	0	0	0	0
	18	234	34	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherlan to Lincoln	1	236	120	32	0	0	0	0	0	0	0	0
	2	237	120	32	0	0	0	0	0	0	0	0
	3	238										

INPUT: TRAFFIC FOR LAeq1h Volumes **Doyle Drive - 204235**

Palace Drive Connector to Gorgas	1	240	34	32	0	0	0	0	0	0	0	0
	2	241	34	32	0	0	0	0	0	0	0	0
	3	242	34	32	0	0	0	0	0	0	0	0
	4	243	34	32	0	0	0	0	0	0	0	0
	5	244										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria		NR Goal	in Calc.
								LAeq1h	Sub'l		
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-198.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-240.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2010 PM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

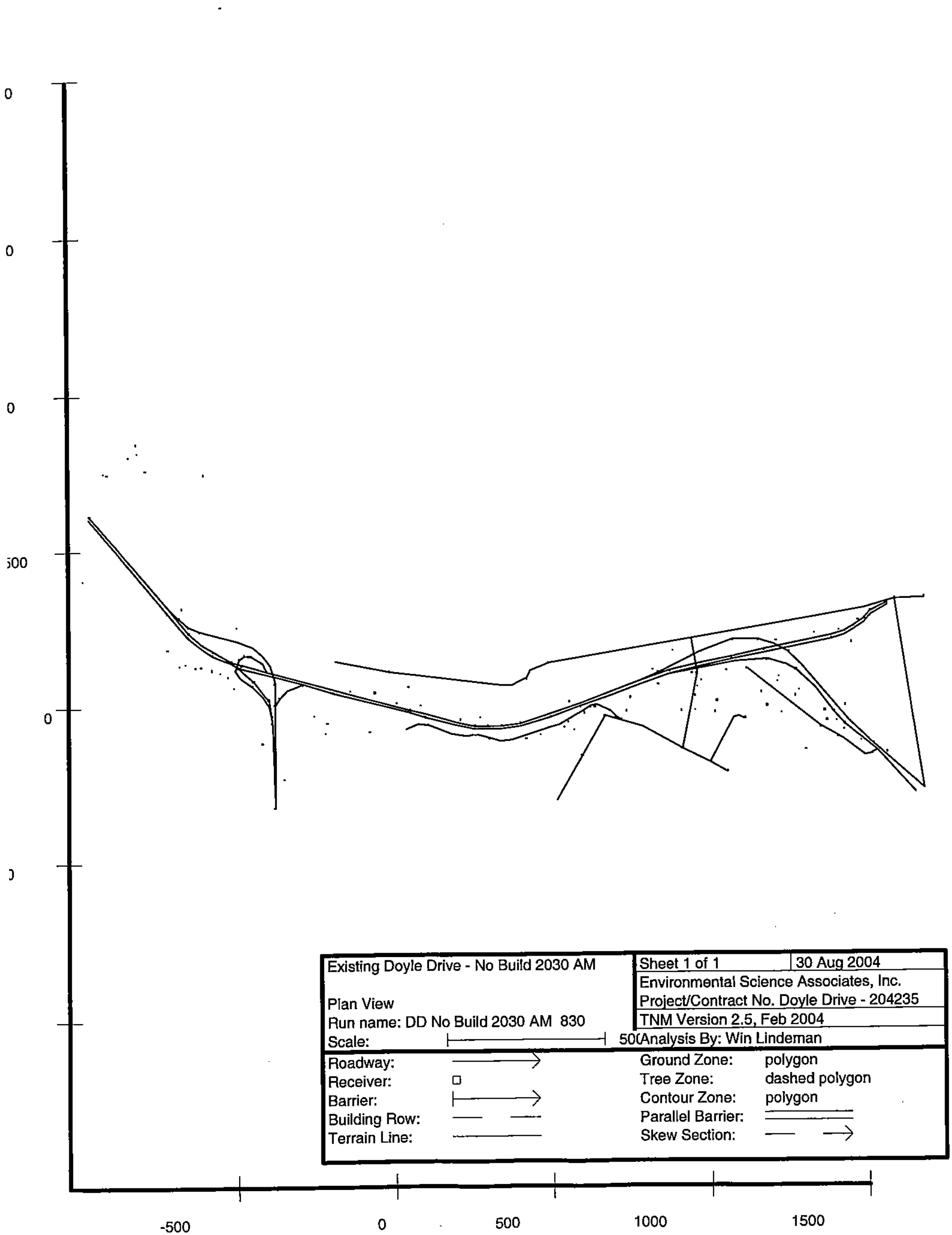
ATMOSPHERICS: 20 deg C, 50% RH

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	68.2	66	68.2	12	Snd Lvl	68.2	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	60.5	66	60.5	12	—	60.5	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	56.0	71	-25.0	12	—	56.0	0.0	10	-10.0
4 Building 1182	4	0	81.0	55.0	71	-26.0	12	—	55.0	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	55.7	71	-25.3	12	—	55.7	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	58.1	71	-22.9	12	—	58.1	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	55.7	71	-16.3	12	—	55.7	0.0	10	-10.0
8 PX Building	8	0	0.0	58.8	71	58.8	12	—	58.8	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	69.7	66	0.7	12	Snd Lvl	69.7	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	68.4	66	0.4	12	Snd Lvl	68.4	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	64.5	66	-3.5	12	—	64.5	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	64.6	66	-3.4	12	—	64.6	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	67.0	66	-1.0	12	Snd Lvl	67.0	0.0	10	-10.0
14 Building 644	14	0	0.0	59.5	71	59.5	12	—	59.5	0.0	10	-10.0
15 Building 649	15	0	0.0	59.7	66	59.7	12	—	59.7	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	58.4	66	-11.6	12	—	58.4	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	63.9	66	-2.1	12	—	63.9	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	76.0	66	10.0	12	Snd Lvl	76.0	0.0	10	-10.0
19 Building 969	19	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
20 Building 968	20	0	0.0	59.2	71	59.2	12	—	59.2	0.0	10	-10.0
21 Building 967	21	0	0.0	64.6	71	64.6	12	—	64.6	0.0	10	-10.0
22 Building 966	22	0	0.0	64.7	71	64.7	12	—	64.7	0.0	10	-10.0
23 Building 964	23	0	0.0	62.9	66	62.9	12	—	62.9	0.0	10	-10.0

24 Building 963	24	0	0.0	62.2	66	62.2	12	—	62.2	0.0	10	-10.0
25 Building 962	25	0	0.0	61.4	66	61.4	12	—	61.4	0.0	10	-10.0
26 Unknown Building	26	0	0.0	73.7	71	73.7	12	Snd Lvl	73.7	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	67.5	66	4.5	12	Snd Lvl	67.5	0.0	10	-10.0
28 Building 1387	28	0	0.0	66.1	71	66.1	12	—	66.1	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	65.3	66	-1.2	12	—	65.3	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	67.2	66	0.7	12	Snd Lvl	67.2	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	69.2	66	2.7	12	Snd Lvl	69.2	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	69.8	66	3.3	12	Snd Lvl	69.8	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	70.8	66	4.3	12	Snd Lvl	70.8	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	71.4	66	4.9	12	Snd Lvl	71.4	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	72.3	66	5.8	12	Snd Lvl	72.3	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	71.4	66	4.9	12	Snd Lvl	71.4	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	67.9	66	67.9	12	Snd Lvl	67.9	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	64.6	66	-0.9	12	—	64.6	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	59.3	71	-4.7	12	—	59.3	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	61.7	71	-2.3	12	—	61.7	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	62.2	71	-1.8	12	—	62.2	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	66.2	71	2.2	12	—	66.2	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	64.3	66	-4.7	12	—	64.3	0.0	10	-10.0
44 Building 129	44	1	0.0	57.9	66	57.9	12	—	57.9	0.0	10	-10.0
45 Building 122	45	0	0.0	62.0	71	62.0	12	—	62.0	0.0	10	-10.0
46 Building 108	46	0	0.0	62.0	71	62.0	12	—	62.0	0.0	10	-10.0
47 Building 107	47	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
48 Building 104	48	0	74.0	58.1	71	-15.9	12	—	58.1	0.0	10	-10.0
49 Building 105	49	0	74.0	72.6	71	-1.4	12	Snd Lvl	72.6	0.0	10	-10.0
50 Building 106	50	0	76.0	71.6	71	-4.4	12	Snd Lvl	71.6	0.0	10	-10.0
51 Building 211	51	0	0.0	65.1	71	65.1	12	—	65.1	0.0	10	-10.0
52 Building 204	52	0	0.0	58.5	71	58.5	12	—	58.5	0.0	10	-10.0
53 Building 210	53	0	0.0	62.1	71	62.1	12	—	62.1	0.0	10	-10.0
54 Building 201	54	0	0.0	54.9	71	54.9	12	—	54.9	0.0	10	-10.0
55 Building 220	55	0	0.0	52.9	71	52.9	12	—	52.9	0.0	10	-10.0
56 Building 231	56	0	0.0	64.8	71	64.8	12	—	64.8	0.0	10	-10.0
57 Building 228	57	0	0.0	61.2	71	61.2	12	—	61.2	0.0	10	-10.0
58 Building 229	58	0	0.0	58.6	71	58.6	12	—	58.6	0.0	10	-10.0
59 Building 223	59	0	0.0	56.6	71	56.6	12	—	56.6	0.0	10	-10.0
60 Building 230	60	0	0.0	70.7	71	70.7	12	—	70.7	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	58.9	66	1.9	12	—	58.9	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	56.3	66	-0.7	12	—	56.3	0.0	10	-10.0
63 Building 1063	63	0	68.5	60.4	71	-8.1	12	—	60.4	0.0	10	-10.0

64 Building 1062	64	0	68.5	57.7	71	-10.8	12	—	57.7	0.0	10	-10.0
65 Building 1060	65	0	68.5	57.9	71	-10.6	12	—	57.9	0.0	10	-10.0
66 Building 1167	66	0	68.0	63.9	71	-4.1	12	—	63.9	0.0	10	-10.0
67 Building 1163	67	0	0.0	63.6	71	63.6	12	—	63.6	0.0	10	-10.0
68 Building 1169	68	0	68.0	63.3	71	-4.7	12	—	63.3	0.0	10	-10.0
69 Building 1162	69	0	0.0	61.5	71	61.5	12	—	61.5	0.0	10	-10.0
70 Building 1170	70	0	68.0	70.4	71	2.4	12	—	70.4	0.0	10	-10.0
71 Building 1161	71	0	0.0	65.7	71	65.7	12	—	65.7	0.0	10	-10.0
72 Building 1160	72	0	0.0	70.4	71	70.4	12	—	70.4	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	68.8	66	68.8	12	Snd Lvl	68.8	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	70.8	66	70.8	12	Snd Lvl	70.8	0.0	10	-10.0
75 Building 1004	75	0	0.0	55.4	71	55.4	12	—	55.4	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	72.1	66	-4.4	12	Snd Lvl	72.1	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	25	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0


0
0
0
500
0
-500
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500
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Existing Doyle Drive - No Build 2030 AM
Plan View
Run name: DD No Build 2030 AM 830
Scale:
500
Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	9.1	N End	1	-966.0	608.0	53.00				Average	
		1	2	-720.0	302.0	56.00				Average	
		2	3	-654.0	228.0	53.00				Average	
		3	4	-610.0	192.0	50.00				Average	
		5	6	-576.0	170.0	46.00				Average	
		6	7	-516.0	144.0	46.00				Average	Y
		7	8	-488.0	130.0	45.00				Average	Y
		8	9	-380.0	100.0	41.00				Average	Y
		9	10	-292.0	76.0	41.00				Average	Y
		10	11	-194.0	47.0	37.00				Average	Y
		12	13	51.0	-18.0	29.00				Average	Y
		13	14	50.0	-18.0	29.00				Average	
		14	15	98.0	-32.0	28.00				Average	
		15	16	196.0	-58.0	27.00				Average	
		16	17	232.0	-66.0	26.50				Average	
		17	18	252.0	-70.0	26.00				Average	
		19	20	333.0	-70.0	24.00				Average	
		20	21	334.0	-70.0	24.00				Average	Y
		21	22	396.0	-60.0	21.40				Average	Y
		22	23	492.0	-32.0	17.80				Average	Y
		23	24	586.0	0.0	14.00				Average	Y
		24	25	680.0	35.0	12.00				Average	Y
		25	26	776.0	70.0	12.00				Average	Y
		26	27	868.0	102.0	11.80				Average	Y
		27	28	968.0	126.0	11.20				Average	Y

		28	29	1,068.0	150.0	11.20				Average	Y
		30	31	1,381.0	213.0	5.00				Average	Y
		31	32	1,382.0	213.0	5.00				Average	
		32	33	1,422.0	224.0	5.00				Average	
		33	34	1,450.0	240.0	4.00				Average	
		34	35	1,486.0	264.0	4.00				Average	
		35	36	1,504.0	286.0	4.00				Average	
		36	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	9.1	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,382.0	224.0	5.00				Average	Y
		8	46	1,166.0	178.0	10.80				Average	Y
		9	47	1,068.0	157.0	11.20				Average	Y
		10	48	968.0	136.0	11.20				Average	Y
		11	49	868.0	111.0	11.80				Average	Y
		12	50	776.0	80.0	12.00				Average	Y
		13	51	680.0	44.0	12.00				Average	Y
		14	52	586.0	10.0	14.00				Average	Y
		15	53	492.0	-22.0	17.80				Average	Y
		16	54	396.0	-52.0	21.40				Average	Y
		17	55	335.0	-60.0	24.00				Average	Y
		18	56	334.0	-60.0	24.00				Average	
		19	57	294.0	-60.0	25.00				Average	
		20	58	252.0	-60.0	26.00				Average	
		21	59	232.0	-56.0	26.50				Average	
		22	60	196.0	-50.0	27.00				Average	
		23	61	98.0	-22.0	28.00				Average	
		24	62	49.0	-8.0	28.40				Average	
		25	63	50.0	-8.0	28.40				Average	Y
		26	64	-98.0	30.0	33.00				Average	Y
		27	65	-194.0	58.0	37.00				Average	Y
		28	66	-292.0	86.0	41.00				Average	Y
		29	67	-380.0	110.0	45.00				Average	Y
		30	68	-406.0	118.0	45.60				Average	Y
		31	69	-407.0	118.0	45.60				Average	

		32	70	-487.0	138.5	49.20				Average	
		33	71	-488.0	138.5	49.20				Average	Y
		34	72	-516.0	150.0	51.00				Average	Y
		35	73	-517.0	150.0	51.00				Average	
		36	74	-576.0	182.0	49.00				Average	
		37	75	-610.0	204.0	50.00				Average	
		38	192	-654.0	242.0	53.00				Average	
		39	193	-720.0	322.0	56.00				Average	
		40	76	-966.0	620.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	868.0	102.0	11.80				Average	Y
		2	78	1,078.0	140.0	10.00				Average	Y
		3	79	1,178.0	147.0	7.00				Average	Y
		4	80	1,233.0	132.0	5.00				Average	Y
		5	81	1,234.0	132.0	5.00				Average	
		6	82	1,270.0	114.0	2.00				Average	
		7	83	1,330.0	57.0	2.00				Average	
		8	84	1,388.0	-20.0	2.00				Average	
		9	85	1,424.0	-60.0	2.00				Average	
		10	86	1,528.0	-146.0	4.00				Average	
		11	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,436.0	-50.0	2.00				Average	
		4	91	1,285.0	130.0	2.00				Average	
		5	92	1,244.0	172.0	3.00				Average	
		6	93	1,200.0	196.0	4.00				Average	
		7	94	1,149.0	210.0	7.00				Average	
		8	95	1,150.0	210.0	7.00				Average	Y
		9	96	1,068.0	210.0	10.00				Average	Y
		10	97	968.0	172.0	11.00				Average	Y
		11	98	830.0	106.0	12.00				Average	Y
		12	99	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-407.0	118.0	45.60				Average	
		2	101	-420.0	144.0	46.00				Average	
		3	102	-456.0	170.0	41.00				Average	
		4	103	-478.0	170.0	40.00				Average	
		5	104	-494.0	158.0	39.00				Average	
		6	105	-505.0	120.0	39.00				Average	

		7	106	-488.0	96.0	39.00			Average	
		8	107	-450.0	70.0	38.00			Average	
		9	108	-418.0	36.0	38.00			Average	
		10	109	-398.0	5.0	38.00			Average	
		11	110	-390.0	-26.0	37.00			Average	
		12	111	-388.0	-50.0	37.00			Average	
		13	112	-380.0	-320.0	37.00				
SB PP Ramp from EB Doyle Drive	4.8	1	113	-515.0	143.9	51.00			Average	Y
		2	114	-495.0	130.0	50.00			Average	Y
		3	115	-494.0	130.0	50.00			Average	
		4	116	-476.0	112.0	49.00			Average	
		5	117	-447.0	86.0	46.00			Average	
		6	118	-410.0	38.0	47.00			Average	
		7	119	-400.0	27.0	37.00			Average	
		8	120	-390.0	-26.0	37.00			Average	
		9	121	-388.0	-27.0	37.00				
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00			Average	
		2	123	-380.0	10.0	37.00			Average	
		3	124	-380.0	80.0	37.00			Average	
		4	125	-384.0	98.0	38.00			Average	
		5	126	-396.0	138.0	38.00			Average	
		6	127	-418.0	170.0	41.00			Average	
		7	128	-450.0	196.0	44.00			Average	
		8	129	-500.0	216.0	47.50			Average	
		9	130	-620.0	246.0	54.00			Average	
		10	131	-656.0	262.0	57.00			Average	
		11	132	-686.0	290.0	58.00			Average	
		12	191	-703.0	306.0	58.00			Average	
		13	133	-720.0	322.0	56.00				
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00			Average	
		2	135	-364.0	34.0	38.00			Average	
		3	136	-338.0	58.0	39.00			Average	
		4	137	-306.0	70.0	40.00			Average	
		5	138	-292.0	76.0	41.00				
Mason Street	7.3	1	139	-188.0	150.0	3.00			Average	
		2	140	-16.0	114.0	3.00			Average	
		3	141	340.0	70.0	4.00			Average	
		4	142	370.0	70.0	4.00			Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	

		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	6235	88	64	88	13	88	64	88	64	88
	1	2	6235	88	64	88	13	88	64	88	64	88
	2	3	6235	88	64	88	13	88	64	88	64	88
	3	4	6235	88	64	88	13	88	64	88	64	88
	5	6	6235	88	64	88	13	88	64	88	64	88
	6	7	6235	88	64	88	13	88	64	88	64	88
	7	8	4206	88	43	88	9	88	43	88	43	88
	8	9	4206	88	43	88	9	88	43	88	43	88
	9	10	4822	88	50	88	10	88	50	88	50	88
	10	11	4822	88	50	88	10	88	50	88	50	88
	12	13	4822	88	50	88	10	88	50	88	50	88
	13	14	4822	88	50	88	10	88	50	88	50	88
	14	15	4822	88	50	88	10	88	50	88	50	88
	15	16	4822	88	50	88	10	88	50	88	50	88
	16	17	4822	88	50	88	10	88	50	88	50	88
	17	18	4822	88	50	88	10	88	50	88	50	88
	19	20	4822	88	50	88	10	88	50	88	50	88
	20	21	4822	88	50	88	10	88	50	88	50	88
	21	22	4822	88	50	88	10	88	50	88	50	88
	22	23	4822	88	50	88	10	88	50	88	50	88
	23	24	4822	88	50	88	10	88	50	88	50	88

	24	25	4822	88	50	88	10	88	50	88	50	88
	25	26	4822	88	50	88	10	88	50	88	50	88
	26	27	1603	88	17	88	3	88	17	88	17	88
	27	28	1603	88	17	88	3	88	17	88	17	88
	28	29	1603	88	17	88	3	88	17	88	17	88
	30	31	1603	88	17	88	3	88	17	88	17	88
	31	32	1603	56	17	56	3	56	17	56	17	56
	32	33	1603	56	17	56	3	56	17	56	17	56
	33	34	1603	56	17	56	3	56	17	56	17	56
	34	35	1603	56	17	56	3	56	17	56	17	56
	35	36	1603	56	17	56	3	56	17	56	17	56
	36	37										
WB Doyle Drive from Marina to 0+00	1	39	775	56	9	56	10	56	5	56	8	56
	2	40	775	56	8	56	10	56	5	56	8	56
	3	41	775	56	8	56	10	56	5	56	8	56
	4	42	775	56	8	56	10	56	5	56	8	56
	5	43	775	88	8	88	10	88	5	88	8	88
	6	44	775	88	8	88	10	88	5	88	8	88
	8	46	775	88	8	88	10	88	5	88	8	88
	9	47	775	88	8	88	10	88	5	88	8	88
	10	48	775	88	8	88	10	88	5	88	8	88
	11	49	775	88	8	88	10	88	5	88	8	88
	12	50	2832	88	29	88	38	88	18	88	29	88
	13	51	2832	88	29	88	38	88	18	88	29	88
	14	52	2832	88	29	88	38	88	18	88	29	88
	15	53	2832	88	29	88	38	88	18	88	29	88
	16	54	2932	88	29	88	38	88	18	88	29	88
	17	55	2832	88	29	88	38	88	18	88	29	88
	18	56	2832	88	29	88	38	88	18	88	29	88
	19	57	2832	88	29	88	38	88	18	88	29	88
	20	58	2832	88	29	88	38	88	18	88	29	88
	21	59	2832	88	29	88	38	88	18	88	29	88
	22	60	2832	88	29	88	38	88	18	88	29	88
	23	61	2832	88	29	88	38	88	18	88	29	88

	24	62	2832	88	29	88	38	88	18	88	29	88
	25	63	2832	88	29	88	38	88	18	88	29	88
	26	64	2832	88	29	88	38	88	18	88	29	88
	27	65	2832	88	29	88	38	88	18	88	29	88
	28	66	2832	88	29	88	38	88	18	88	29	88
	29	67	3464	88	0	0	7	88	97	88	36	88
	30	68	2832	88	29	88	38	88	18	88	29	88
	31	69	2464	88	26	88	33	88	15	88	26	88
	32	70	2464	88	26	88	33	88	15	88	26	88
	33	71	2464	88	26	88	33	88	15	88	26	88
	34	72	2464	88	26	88	33	88	15	88	26	88
	35	73	2464	88	26	88	33	88	15	88	26	88
	36	74	2464	88	26	88	33	88	15	88	26	88
	37	75	2464	88	26	88	33	88	15	88	26	88
	38	192	2464	88	26	88	33	88	15	88	26	88
	39	193	4823	88	50	88	65	88	30	88	50	88
	40	76										
SB/EB Richardson from Doyle to Francis	1	77	3219	56	33	15	7	56	33	56	33	56
	2	78	3219	56	33	56	7	56	33	56	33	56
	3	79	3219	56	33	56	7	56	33	56	33	56
	4	80	3219	56	33	56	7	56	33	56	33	56
	5	81	3219	56	33	56	7	56	33	56	33	56
	6	82	3219	56	33	56	7	56	33	56	33	56
	7	83	3219	56	33	56	7	56	33	56	33	56
	8	84	3219	56	33	56	7	56	33	56	33	56
	9	85	3219	56	33	56	7	56	33	56	33	56
	10	86	3219	56	33	56	7	56	33	56	33	56
	11	87										
NB/WB Richardson from Francisco to DD	1	88	204	56	2	56	3	56	1	56	2	56
	2	89	204	56	2	56	3	56	1	56	2	56
	3	90	204	56	2	56	3	56	1	56	2	56
	4	91	204	56	2	56	3	56	1	56	2	56
	5	92	204	56	2	56	3	56	1	56	2	56
	6	93	204	56	2	56	3	56	1	56	2	56

	7	94	204	56	2	56	3	56	1	56	2	56
	8	95	204	56	2	56	3	56	1	56	2	56
	9	96	204	56	2	56	3	56	1	56	2	56
	10	97	204	56	2	56	3	56	1	56	2	56
	11	98	204	56	2	56	3	56	1	56	2	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	368	56	4	56	5	56	2	56	4	56
	2	101	368	56	4	56	5	56	2	56	4	56
	3	102	368	56	4	56	5	56	2	56	4	56
	4	103	368	56	4	56	5	56	2	56	4	56
	5	104	368	56	4	56	5	56	2	56	4	56
	6	105	368	56	4	56	5	56	2	56	4	56
	7	106	368	56	4	56	5	56	2	56	4	56
	8	107	368	56	4	56	5	56	2	56	4	56
	9	108	368	56	4	56	5	56	2	56	4	56
	10	109	368	56	4	56	5	56	2	56	4	56
	11	110	368	56	4	56	5	56	2	56	4	56
	12	111	368	56	4	56	5	56	2	56	4	56
	13	112										
SB PP Ramp from EB Doyle Drive	1	113	2029	56	21	56	4	56	21	56	21	56
	2	114	2029	56	21	56	4	56	21	56	21	56
	3	115	2029	56	21	56	4	56	21	56	21	56
	4	116	2029	56	21	56	4	56	21	56	21	56
	5	117	2029	56	21	56	4	56	21	56	21	56
	6	118	2029	56	21	56	4	56	21	56	21	56
	7	119	2029	56	21	56	4	56	21	56	21	56
	8	120	2029	56	21	56	4	56	21	56	21	56
	9	121										
NB Park Presidio to WB Doyle Drive	1	122	2389	56	25	56	25	56	0	0	17	56
	2	123	2389	56	25	56	25	56	0	0	17	56
	3	124	2389	56	25	56	25	56	0	0	17	56
	4	125	2389	56	25	56	25	56	0	0	17	56
	5	126	2389	56	25	56	25	56	0	0	17	56
	6	127	2389	56	25	56	25	56	0	0	17	56

	7	128	2389	56	25	56	25	56	0	0	17	56
	8	129	2389	56	25	56	25	56	0	0	17	56
	9	130	2389	56	25	56	25	56	0	0	17	56
	10	131	2389	56	25	56	25	56	0	0	17	56
	11	132	2389	56	25	56	25	56	0	0	17	56
	12	191	2389	56	25	56	25	56	0	0	17	56
	13	133										
NB PP ramp to EB Doyle Drive	1	134	615	56	4	56	6	56	6	56	4	56
	2	135	615	56	4	56	6	56	6	56	4	56
	3	136	615	56	4	56	6	56	6	56	4	56
	4	137	615	56	4	56	6	56	6	56	4	56
	5	138										
Mason Street	1	139	10	32	0	0	0	0	0	0	0	0
	2	140	10	32	0	0	0	0	0	0	0	0
	3	141	10	32	0	0	0	0	0	0	0	0
	4	142	10	32	0	0	0	0	0	0	0	0
	5	143	10	32	0	0	0	0	0	0	0	0
	6	144	10	32	0	0	0	0	0	0	0	0
	7	145	10	32	0	0	0	0	0	0	0	0
	8	194	32	32	1	32	0	0	1	32	1	32
	9	146	22	32	0	0	0	0	0	0	0	0
	10	147	22	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	125	32	2	32	0	0	2	32	2	32
	2	150	231	32	2	32	0	0	2	32	2	32
	3	151	231	32	2	32	0	0	2	32	2	32
	4	152	231	32	2	32	0	0	2	32	2	32
	5	153	231	32	2	32	0	0	2	32	2	32
	6	154	231	32	2	32	0	0	2	32	2	32
	7	155	231	32	2	32	0	0	2	32	2	32
	8	156	231	32	2	32	0	0	2	32	2	32
	9	157	233	32	2	32	0	0	2	32	2	32
	10	158	85	32	1	32	0	0	1	32	1	32
	11	159	85	32	1	32	0	0	1	32	1	32

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	12	160	85	32	1	32	0	0	1	32	1	32
	13	161	85	32	1	32	0	0	1	32	1	32
	14	162	85	32	1	32	0	0	1	32	1	32
	15	163	85	32	1	32	0	0	1	32	1	32
	16	164	85	32	1	32	0	0	1	32	1	32
	17	165	85	32	1	32	0	0	1	32	1	32
	18	166	85	32	1	32	0	0	1	32	1	32
	19	167	280	32	2	32	0	0	2	32	2	32
	20	168	280	32	2	32	0	0	2	32	2	32
	21	169	305	32	3	32	0	0	3	32	3	32
	22	170	404	32	4	32	0	0	4	32	4	32
	23	171										
Gorgas Avenue	1	172	306	32	0	0	0	0	0	0	0	0
	2	173	306	32	0	0	0	0	0	0	0	0
	3	174	306	32	0	0	0	0	0	0	0	0
	4	175	306	32	0	0	0	0	0	0	0	0
	5	176	209	32	0	0	0	0	0	0	0	0
	6	177	59	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	91	32	0	0	0	0	0	0	0	0
	2	180	60	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	132	32	0	0	0	0	0	0	0	0
	2	183	132	32	0	0	0	0	0	0	0	0
	3	184	132	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	289	32	3	32	0	0	0	0	3	32
	2	187										
Montgomery Street	1	188	134	32	2	32	0	0	2	32	2	32
	2	189	103	32	2	32	2	32	2	32	2	32
	3	190										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 AM

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,360.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 AM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 20 deg C, 50% RH

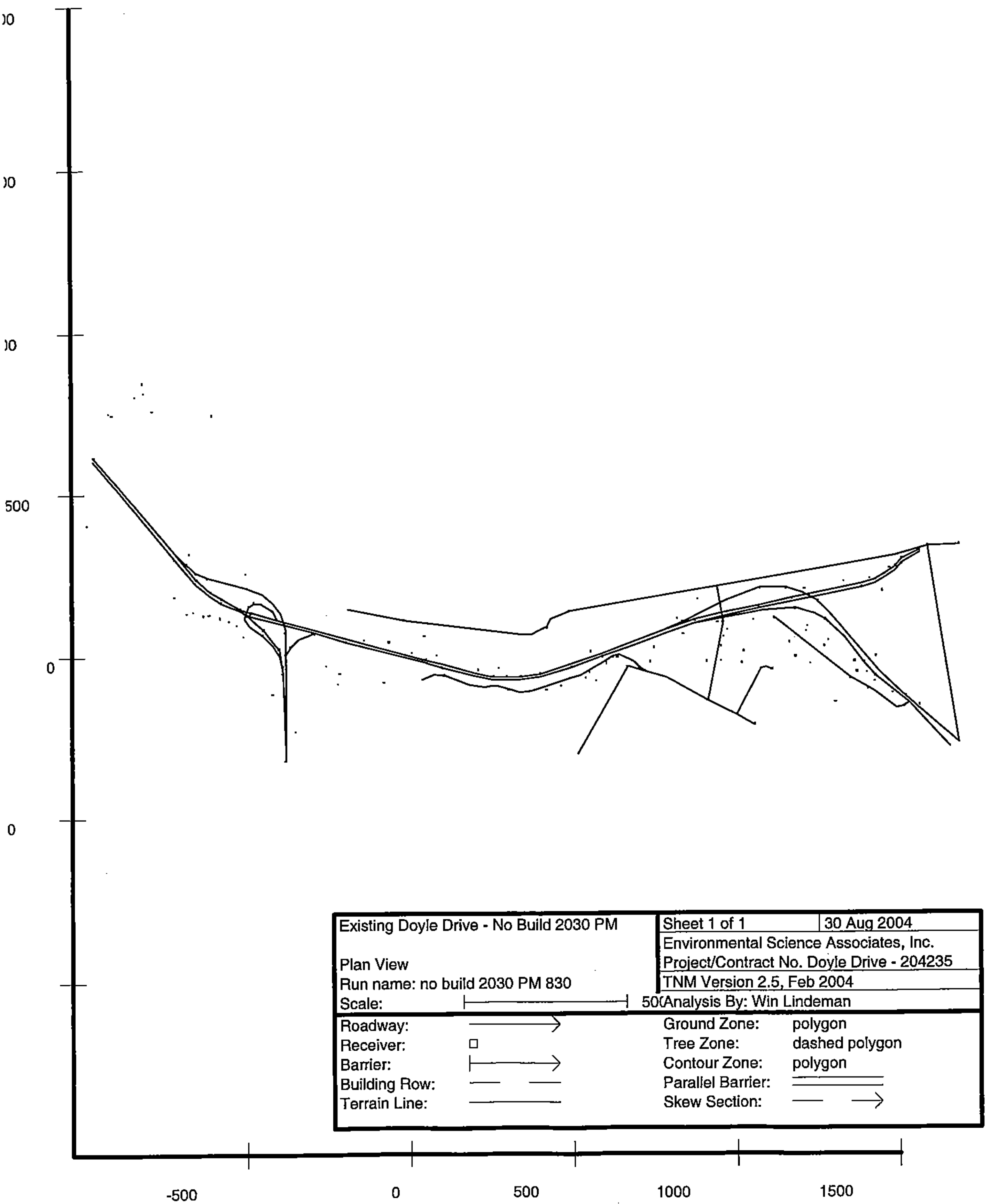
Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	65.2	66	65.2	12	—	65.2	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	65.9	66	65.9	12	—	65.9	0.0	10	-10.0
3-Building 1187/1188	3	0	81.0	67.0	71	-14.0	12	—	67.0	0.0	10	-10.0
4-Building 1182	5	0	81.0	66.4	71	-14.6	12	—	66.4	0.0	10	-10.0
5-Building 1183/1186	6	0	81.0	67.1	71	-13.9	12	—	67.1	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	66.8	71	-14.2	12	—	66.8	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	66.0	71	-6.0	12	—	66.0	0.0	10	-10.0
8-PX Building	9	0	0.0	68.5	71	68.5	12	—	68.5	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	67.4	71	-1.6	12	—	67.4	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	74.0	66	6.0	12	Snd Lvl	74.0	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	78.9	66	10.9	12	Snd Lvl	78.9	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	76.2	66	8.2	12	Snd Lvl	76.2	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	66.2	66	-1.8	12	Snd Lvl	66.2	0.0	10	-10.0
14-Building 644	15	0	0.0	63.6	71	63.6	12	—	63.6	0.0	10	-10.0
15-Building 649	16	0	0.0	60.6	66	60.6	12	—	60.6	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	60.0	66	-10.0	12	—	60.0	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	63.8	66	-2.2	12	—	63.8	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	70.8	66	4.8	12	Snd Lvl	70.8	0.0	10	-10.0
19-Building 969	20	0	0.0	52.2	71	52.2	12	—	52.2	0.0	10	-10.0
20-Building 968	21	0	0.0	54.0	71	54.0	12	—	54.0	0.0	10	-10.0
21-Building 967	22	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0
22-Building 966	23	0	0.0	55.9	71	55.9	12	—	55.9	0.0	10	-10.0
23-Building 964	24	1	0.0	53.5	66	53.5	12	—	53.5	0.0	10	-10.0

24-Building 963	25	1	0.0	54.3	66	54.3	12	—	54.3	0.0	10	-10.0
25-Building 962	26	1	0.0	54.3	66	54.3	12	—	54.3	0.0	10	-10.0
26-Unknown Building	27	0	0.0	56.3	71	56.3	12	—	56.3	0.0	10	-10.0
27-Log Cabin	28	0	63.0	68.3	66	5.3	12	Snd Lvl	68.3	0.0	10	-10.0
28-Unknown Building	29	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	67.0	66	0.5	12	Snd Lvl	67.0	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	68.5	66	2.0	12	Snd Lvl	68.5	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	70.1	66	3.6	12	Snd Lvl	70.1	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	71.8	66	5.3	12	Snd Lvl	71.8	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	73.1	66	6.6	12	Snd Lvl	73.1	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	73.5	66	7.0	12	Snd Lvl	73.5	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	73.1	66	6.6	12	Snd Lvl	73.1	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	70.3	66	3.8	12	Snd Lvl	70.3	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	66.4	66	66.4	12	Snd Lvl	66.4	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.4	66	-2.1	12	—	63.4	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	66.2	71	2.2	12	—	66.2	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	66.1	71	2.1	12	—	66.1	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	65.0	71	1.0	12	—	65.0	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	66.4	71	2.4	12	—	66.4	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	74.3	66	5.3	12	Snd Lvl	74.3	0.0	10	-10.0
44-Building 129	45	1	0.0	62.8	66	62.8	12	—	62.8	0.0	10	-10.0
45-Building 122	46	0	0.0	72.6	71	72.6	12	Snd Lvl	72.6	0.0	10	-10.0
46-Building 108	47	0	0.0	72.7	71	72.7	12	Snd Lvl	72.7	0.0	10	-10.0
47-Building 107	48	0	0.0	74.4	71	74.4	12	Snd Lvl	74.4	0.0	10	-10.0
48-Building 104	49	0	74.0	70.2	71	-3.8	12	—	70.2	0.0	10	-10.0
49-Building 105	50	0	74.0	76.2	71	2.2	12	Snd Lvl	76.2	0.0	10	-10.0
50-Building 106	51	0	76.0	77.7	71	1.7	12	Snd Lvl	77.7	0.0	10	-10.0
51-Building 211	52	0	0.0	75.5	71	75.5	12	Snd Lvl	75.5	0.0	10	-10.0
52-Building 204	53	0	0.0	68.1	71	68.1	12	—	68.1	0.0	10	-10.0
53-Building 210	54	0	0.0	71.1	71	71.1	12	Snd Lvl	71.1	0.0	10	-10.0
54-Building 201	55	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
55-Building 220	56	0	0.0	64.3	71	64.3	12	—	64.3	0.0	10	-10.0
56-Building 231	57	0	0.0	66.6	71	66.6	12	—	66.6	0.0	10	-10.0
57-Building 228	58	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
58-Building 229	60	0	0.0	64.2	71	64.2	12	—	64.2	0.0	10	-10.0
59-Building 223	61	0	0.0	60.1	71	60.1	12	—	60.1	0.0	10	-10.0
60-Building 230	62	0	0.0	67.0	71	67.0	12	—	67.0	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	63.1	66	6.1	12	—	63.1	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	61.1	66	4.1	12	—	61.1	0.0	10	-10.0
63-Building 1063	66	0	68.5	61.5	71	-7.0	12	—	61.5	0.0	10	-10.0

RESULTS: SOUND LEVELS

64-Building 1062	68	0	68.5	59.1	71	-9.4	12	—	59.1	0.0	10	-10.0
65-Building 1060	69	0	68.5	57.7	71	-10.8	12	—	57.7	0.0	10	-10.0
66-Building 1167	70	0	68.0	65.6	71	-2.4	12	—	65.6	0.0	10	-10.0
67-Building 1163	71	0	0.0	64.1	71	64.1	12	—	64.1	0.0	10	-10.0
68-Building 1169	72	0	68.0	65.5	71	-2.5	12	—	65.5	0.0	10	-10.0
69-Building 1162	73	0	0.0	62.4	71	62.4	12	—	62.4	0.0	10	-10.0
70-Building 1170	74	0	68.0	68.3	71	0.3	12	—	68.3	0.0	10	-10.0
71-Building 1161	75	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
72-Building 1160	76	0	0.0	70.3	71	70.3	12	—	70.3	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	69.4	66	69.4	12	Snd Lvl	69.4	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	72.3	66	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
75-Building 1004	79	0	0.0	54.1	71	54.1	12	—	54.1	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	68.5	66	-8.0	12	Snd Lvl	68.5	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



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Existing Doyle Drive - No Build 2030 PM
Plan View
Run name: no build 2030 PM 830
Scale:
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Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	9.1	N End	1	-966.0	608.0	53.00				Average	
		1	2	-720.0	302.0	56.00				Average	
		2	3	-654.0	228.0	53.00				Average	
		3	4	-610.0	192.0	50.00				Average	
		5	6	-576.0	170.0	46.00				Average	
		6	7	-516.0	144.0	46.00				Average	Y
		7	8	-488.0	130.0	45.00				Average	Y
		8	9	-380.0	100.0	41.00				Average	Y
		9	10	-292.0	76.0	41.00				Average	Y
		10	11	-194.0	47.0	37.00				Average	Y
		12	13	51.0	-18.0	29.00				Average	Y
		13	14	50.0	-18.0	29.00				Average	
		14	15	98.0	-32.0	28.00				Average	
		15	16	196.0	-58.0	27.00				Average	
		16	17	232.0	-66.0	26.50				Average	
		17	18	252.0	-70.0	26.00				Average	
		19	20	333.0	-70.0	24.00				Average	
		20	21	334.0	-70.0	24.00				Average	Y
		21	22	396.0	-60.0	21.40				Average	Y
		22	23	492.0	-32.0	17.80				Average	Y
		23	24	586.0	0.0	14.00				Average	Y
		24	25	680.0	35.0	12.00				Average	Y
		25	26	776.0	70.0	12.00				Average	Y
		26	27	868.0	102.0	11.80				Average	Y
		27	28	968.0	126.0	11.20				Average	Y

		28	29	1,068.0	150.0	11.20				Average	Y
		30	31	1,381.0	213.0	5.00				Average	Y
		31	32	1,382.0	213.0	5.00				Average	
		32	33	1,422.0	224.0	5.00				Average	
		33	34	1,450.0	240.0	4.00				Average	
		34	35	1,486.0	264.0	4.00				Average	
		35	36	1,504.0	286.0	4.00				Average	
		36	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	9.1	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,382.0	224.0	5.00				Average	Y
		8	46	1,166.0	178.0	10.80				Average	Y
		9	47	1,068.0	157.0	11.20				Average	Y
		10	48	968.0	136.0	11.20				Average	Y
		11	49	868.0	111.0	11.80				Average	Y
		12	50	776.0	80.0	12.00				Average	Y
		13	51	680.0	44.0	12.00				Average	Y
		14	52	586.0	10.0	14.00				Average	Y
		15	53	492.0	-22.0	17.80				Average	Y
		16	54	396.0	-52.0	21.40				Average	Y
		17	55	335.0	-60.0	24.00				Average	Y
		18	56	334.0	-60.0	24.00				Average	
		19	57	294.0	-60.0	25.00				Average	
		20	58	252.0	-60.0	26.00				Average	
		21	59	232.0	-56.0	26.50				Average	
		22	60	196.0	-50.0	27.00				Average	
		23	61	98.0	-22.0	28.00				Average	
		24	62	49.0	-8.0	28.40				Average	
		25	63	50.0	-8.0	28.40				Average	Y
		26	64	-98.0	30.0	33.00				Average	Y
		27	65	-194.0	58.0	37.00				Average	Y
		28	66	-292.0	86.0	41.00				Average	Y
		29	67	-380.0	110.0	45.00				Average	Y
		30	68	-406.0	118.0	45.60				Average	Y
		31	69	-407.0	118.0	45.60				Average	

		32	70	-487.0	138.5	49.20				Average	
		33	71	-488.0	138.5	49.20				Average	Y
		34	72	-516.0	150.0	51.00				Average	Y
		35	73	-517.0	150.0	51.00				Average	
		36	74	-576.0	182.0	49.00				Average	
		37	75	-610.0	204.0	50.00				Average	
		38	192	-654.0	242.0	53.00				Average	
		39	193	-720.0	322.0	56.00				Average	
		40	76	-966.0	620.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	868.0	102.0	11.80				Average	Y
		2	78	1,078.0	140.0	10.00				Average	Y
		3	79	1,178.0	147.0	7.00				Average	Y
		4	80	1,233.0	132.0	5.00				Average	Y
		5	81	1,234.0	132.0	5.00				Average	
		6	82	1,270.0	114.0	2.00				Average	
		7	83	1,330.0	57.0	2.00				Average	
		8	84	1,388.0	-20.0	2.00				Average	
		9	85	1,424.0	-60.0	2.00				Average	
		10	86	1,528.0	-146.0	4.00				Average	
		11	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,436.0	-50.0	2.00				Average	
		4	91	1,285.0	130.0	2.00				Average	
		5	92	1,244.0	172.0	3.00				Average	
		6	93	1,200.0	196.0	4.00				Average	
		7	94	1,149.0	210.0	7.00				Average	
		8	95	1,150.0	210.0	7.00				Average	Y
		9	96	1,068.0	210.0	10.00				Average	Y
		10	97	968.0	172.0	11.00				Average	Y
		11	98	830.0	106.0	12.00				Average	Y
		12	99	776.0	80.0	12.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-407.0	118.0	45.60				Average	
		2	101	-420.0	144.0	46.00				Average	
		3	102	-456.0	170.0	41.00				Average	
		4	103	-478.0	170.0	40.00				Average	
		5	104	-494.0	158.0	39.00				Average	
		6	105	-505.0	120.0	39.00				Average	

		7	106	-488.0	96.0	39.00			Average	
		8	107	-450.0	70.0	38.00			Average	
		9	108	-418.0	36.0	38.00			Average	
		10	109	-398.0	5.0	38.00			Average	
		11	110	-390.0	-26.0	37.00			Average	
		12	111	-388.0	-50.0	37.00			Average	
		13	112	-380.0	-320.0	37.00				
SB PP Ramp from EB Doyle Drive	4.8	1	113	-515.0	143.9	51.00			Average	Y
		2	114	-495.0	130.0	50.00			Average	Y
		3	115	-494.0	130.0	50.00			Average	
		4	116	-476.0	112.0	49.00			Average	
		5	117	-447.0	86.0	46.00			Average	
		6	118	-410.0	38.0	47.00			Average	
		7	119	-400.0	27.0	37.00			Average	
		8	120	-390.0	-26.0	37.00			Average	
		9	121	-388.0	-27.0	37.00				
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00			Average	
		2	123	-380.0	10.0	37.00			Average	
		3	124	-380.0	80.0	37.00			Average	
		4	125	-384.0	98.0	38.00			Average	
		5	126	-396.0	138.0	38.00			Average	
		6	127	-418.0	170.0	41.00			Average	
		7	128	-450.0	196.0	44.00			Average	
		8	129	-500.0	216.0	47.50			Average	
		9	130	-620.0	246.0	54.00			Average	
		10	131	-656.0	262.0	57.00			Average	
		11	132	-686.0	290.0	58.00			Average	
		12	191	-703.0	306.0	58.00			Average	
		13	133	-720.0	322.0	56.00				
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	10.0	37.00			Average	
		2	135	-364.0	34.0	38.00			Average	
		3	136	-338.0	58.0	39.00			Average	
		4	137	-306.0	70.0	40.00			Average	
		5	138	-292.0	76.0	41.00				
Mason Street	7.3	1	139	-188.0	150.0	3.00			Average	
		2	140	-16.0	114.0	3.00			Average	
		3	141	340.0	70.0	4.00			Average	
		4	118	370.0	70.0	4.00			Average	

		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,528.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	

		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 PM

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	4917	88	15	88	66	88	56	88	15	88
	1	2	4917	88	15	88	66	88	56	88	15	88
	2	3	4917	88	15	88	66	88	56	88	15	88
	3	4	4917	88	15	88	66	88	56	88	15	88
	5	6	4917	88	15	88	66	88	56	88	15	88
	6	7	4917	88	15	88	66	88	56	88	15	88
	7	8	2829	88	9	88	38	88	32	88	9	88
	8	9	2838	88	9	88	38	88	32	88	9	88
	9	10	3479	88	11	88	47	88	39	88	11	88
	10	11	3479	88	11	88	47	88	39	88	11	88
	12	13	3470	88	11	88	47	88	39	88	11	88
	13	14	3479	88	11	88	47	88	39	88	11	88
	14	15	3479	88	11	88	47	88	39	88	11	88
	15	16	3479	88	11	88	47	88	39	88	11	88
	16	17	3479	88	11	88	47	88	39	88	11	88
	17	18	3479	88	11	88	47	88	39	88	11	88
	19	20	3479	88	11	88	47	88	39	88	11	88
	20	21	3479	88	11	88	47	88	39	88	11	88
	21	22	3479	88	11	88	47	88	39	88	11	88
	22	23	3479	88	11	88	47	88	39	88	11	88
	23	24	3479	88	11	88	47	88	39	88	11	88

	24	25	3479	88	11	88	47	88	39	88	11	88
	25	26	3479	88	11	88	47	88	39	88	11	88
	26	27	1015	88	3	88	14	88	12	88	3	88
	27	28	1015	88	3	88	14	88	12	88	3	88
	28	29	1015	88	3	88	14	88	12	88	3	88
	30	31	1015	88	3	88	14	88	12	88	3	88
	31	32	1015	88	3	88	14	88	12	88	3	88
	32	33	1015	56	3	56	14	56	12	56	3	56
	33	34	1015	56	3	56	14	56	12	56	3	56
	34	35	1015	56	3	56	14	56	12	56	3	56
	35	36	1015	56	3	56	14	56	12	56	3	56
	36	37										
WB Doyle Drive from Marina to 0+00	1	39	1802	56	0	0	4	56	51	56	19	56
	2	40	1802	56	0	0	4	56	51	56	19	56
	3	41	1802	56	0	0	4	56	51	56	19	56
	4	42	1804	56	0	0	4	56	51	56	19	56
	5	43	1802	88	0	0	4	88	51	88	19	88
	6	44	1802	88	0	0	4	88	51	88	19	88
	8	46	1802	88	0	0	4	88	51	88	19	88
	9	47	1802	88	0	0	4	88	51	88	19	88
	10	48	1802	88	0	0	4	88	51	88	19	88
	11	49	1802	88	0	0	4	88	51	88	19	88
	12	50	4618	88	0	0	10	88	130	88	48	88
	13	51	4618	88	0	0	10	88	130	88	48	88
	14	52	4618	88	0	0	10	88	130	88	48	88
	15	53	4618	88	0	0	10	88	130	88	48	88
	16	54	4618	88	0	0	10	88	130	88	48	88
	17	55	4618	88	0	0	10	88	130	88	48	88
	18	56	4618	88	0	0	10	88	130	88	48	88
	19	57	4618	88	0	0	10	88	130	88	48	88
	20	58	4618	88	0	0	10	88	130	88	48	88
	21	59	4618	88	0	0	10	88	130	88	48	88
	22	60	4618	88	0	0	10	88	130	88	48	88
	23	61	4618	88	0	0	10	88	130	88	48	88

	24	62	4618	88	0	0	10	88	130	88	48	88
	25	63	4618	88	0	0	10	88	130	88	48	88
	26	64	4618	88	0	0	10	88	130	88	48	88
	27	65	4618	88	0	0	10	88	130	88	48	88
	28	66	4618	88	0	0	10	88	130	88	48	88
	29	67	4618	88	0	0	10	88	130	88	48	88
	30	68	4618	88	0	0	10	88	130	88	48	88
	31	69	3859	88	0	0	8	88	108	88	40	88
	32	70	3859	88	0	0	8	88	108	88	40	88
	33	71	3859	88	0	0	8	88	108	88	40	88
	34	72	3859	88	0	0	8	88	108	88	40	88
	35	73	3859	88	0	0	8	88	108	88	40	88
	36	74	3959	88	0	0	8	88	108	88	40	88
	37	75	3859	88	0	0	8	88	108	88	40	88
	38	192	3859	88	0	0	8	88	108	88	40	88
	39	193	5970	88	0	0	12	88	168	88	62	88
	40	76										
SB/EB Richardson from Doyle to Francis	1	77	2464	56	8	56	33	56	28	56	8	56
	2	78	2464	56	8	56	33	56	28	56	8	56
	3	79	2464	56	8	56	33	56	28	56	8	56
	4	80	2464	56	8	56	33	56	28	56	8	56
	5	81	2464	56	8	56	33	56	28	56	8	56
	6	82	2464	56	8	56	33	56	28	56	8	56
	7	83	2464	56	8	56	33	56	28	56	8	56
	8	84	2464	56	8	56	33	56	28	56	8	56
	9	85	2464	56	8	56	33	56	28	56	8	56
	10	86	2464	56	8	56	33	56	28	56	8	56
	11	87										
NB/WB Richardson from Francisco to DD	1	88	2928	56	0	0	6	56	82	56	30	56
	2	89	2928	56	0	0	6	56	82	56	30	56
	3	90	2928	56	0	0	6	56	82	56	30	56
	4	91	2928	56	0	0	6	56	82	56	30	56
	5	92	2928	56	0	0	6	56	82	56	30	56
	6	93	2928	56	0	0	6	56	82	56	30	56

	7	94	2928	56	0	0	6	56	82	56	30	56
	8	95	2928	56	0	0	6	56	82	56	30	56
	9	96	2928	56	0	0	6	56	82	56	30	56
	10	97	2928	56	0	0	6	56	82	56	30	56
	11	98	2928	56	0	0	6	56	82	56	30	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	759	56	0	0	2	56	21	56	8	56
	2	101	759	56	0	0	2	56	21	56	8	56
	3	102	759	56	0	0	2	56	21	56	8	56
	4	103	759	56	0	0	2	56	21	56	8	56
	5	104	759	56	0	0	2	56	21	56	8	56
	6	105	759	56	0	0	2	56	21	56	8	56
	7	106	759	56	0	0	2	56	21	56	8	56
	8	107	759	56	0	0	2	56	21	56	8	56
	9	108	759	56	0	0	2	56	21	56	8	56
	10	109	759	56	0	0	2	56	21	56	8	56
	11	110	759	56	0	0	2	56	21	56	8	56
	12	111	759	56	0	0	2	56	21	56	8	56
	13	112										
SB PP Ramp from EB Doyle Drive	1	113	2079	56	6	56	28	56	24	56	6	56
	2	114	2079	56	6	56	28	56	24	56	6	56
	3	115	2079	56	6	56	28	56	24	56	6	56
	4	116	2079	56	6	56	28	56	24	56	6	56
	5	117	2079	56	6	56	28	56	24	56	6	56
	6	118	2079	56	6	56	28	56	24	56	6	56
	7	119	2079	56	6	56	28	56	24	56	6	56
	8	120	2079	56	6	56	28	56	24	56	6	56
	9	121										
NB Park Presidio to WB Doyle Drive	1	122	2148	56	25	56	0	0	9	56	24	56
	2	123	2148	56	25	56	0	0	9	56	24	56
	3	124	2148	56	25	56	0	0	9	56	24	56
	4	125	2148	56	25	56	0	0	9	56	24	56
	5	126	2148	56	25	56	0	0	9	56	24	56
	6	127	2148	56	25	56	0	0	9	56	24	56

	7	128	2148	56	25	56	0	0	9	56	24	56
	8	129	2148	56	25	56	0	0	9	56	24	56
	9	130	2148	56	25	56	0	0	9	56	24	56
	10	131	2148	56	25	56	0	0	9	56	24	56
	11	132	2148	56	25	56	0	0	9	56	24	56
	12	191	2148	56	25	56	0	0	9	56	24	56
	13	133										
NB PP ramp to EB Doyle Drive	1	134	644	56	0	0	3	56	7	56	7	56
	2	135	644	56	0	0	3	56	7	56	7	56
	3	136	644	56	0	0	3	56	7	56	7	56
	4	137	644	56	0	0	3	56	7	56	7	56
	5	138										
Mason Street	1	139	18	32	1	32	1	32	1	32	1	32
	2	140	18	32	1	32	1	32	1	32	1	32
	3	141	18	32	1	32	1	32	1	32	1	32
	4	142	18	32	1	32	1	32	1	32	1	32
	5	143	18	32	1	32	1	32	1	32	1	32
	6	144	18	32	1	32	1	32	1	32	1	32
	7	145	18	32	1	32	1	32	1	32	1	32
	8	194	155	32	1	32	1	32	1	32	1	32
	9	146	155	32	1	32	1	32	1	32	1	32
	10	147	153	32	1	32	1	32	1	32	1	32
	11	148										
Lincoln Blvd.	1	149	213	32	2	32	0	0	2	32	2	32
	2	150	399	32	4	32	0	0	4	32	4	32
	3	151	399	32	4	32	0	0	4	32	4	32
	4	152	399	32	4	32	0	0	4	32	4	32
	5	153	399	32	4	32	0	0	4	32	4	32
	6	154	399	32	4	32	0	0	4	32	4	32
	7	155	399	32	4	32	0	0	4	32	4	32
	8	156	399	32	4	32	0	0	4	32	4	32
	9	157	410	32	4	32	0	0	4	32	4	32
	10	158	239	32	2	32	0	0	2	32	2	32
	11	159	239	32	2	32	0	0	2	32	2	32

	12	160	239	32	2	32	0	0	2	32	2	32
	13	161	239	32	2	32	0	0	2	32	2	32
	14	162	239	32	2	32	0	0	2	32	2	32
	15	163	239	32	2	32	0	0	2	32	2	32
	16	164	239	32	2	32	0	0	2	32	2	32
	17	165	239	32	2	32	0	0	2	32	2	32
	18	166	239	32	2	32	0	0	2	32	2	32
	19	167	471	32	4	32	0	0	4	32	4	32
	20	168	471	32	4	32	0	0	4	32	4	32
	21	169	603	32	6	32	0	0	6	32	6	32
	22	170	711	32	7	32	0	0	7	32	7	32
	23	171										
Gorgas Avenue	1	172	544	32	0	0	0	0	0	0	0	0
	2	173	544	32	0	0	0	0	0	0	0	0
	3	174	544	32	0	0	0	0	0	0	0	0
	4	175	544	32	0	0	0	0	0	0	0	0
	5	176	149	32	0	0	0	0	0	0	0	0
	6	177	68	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	227	32	0	0	0	0	0	0	0	0
	2	180	179	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	176	32	0	0	0	0	0	0	0	0
	2	183	176	32	0	0	0	0	0	0	0	0
	3	184	176	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	479	32	5	32	0	0	0	0	5	32
	2	187										
Montgomery Street	1	188	148	32	1	32	1	32	1	32	1	32
	2	189	148	32	1	32	1	32	1	32	1	32
	3	190										

Environmental Science Associates, Inc 30 August 2004
Win Lindeman TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 PM

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,360.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Existing Doyle Drive - No Build 2030 PM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

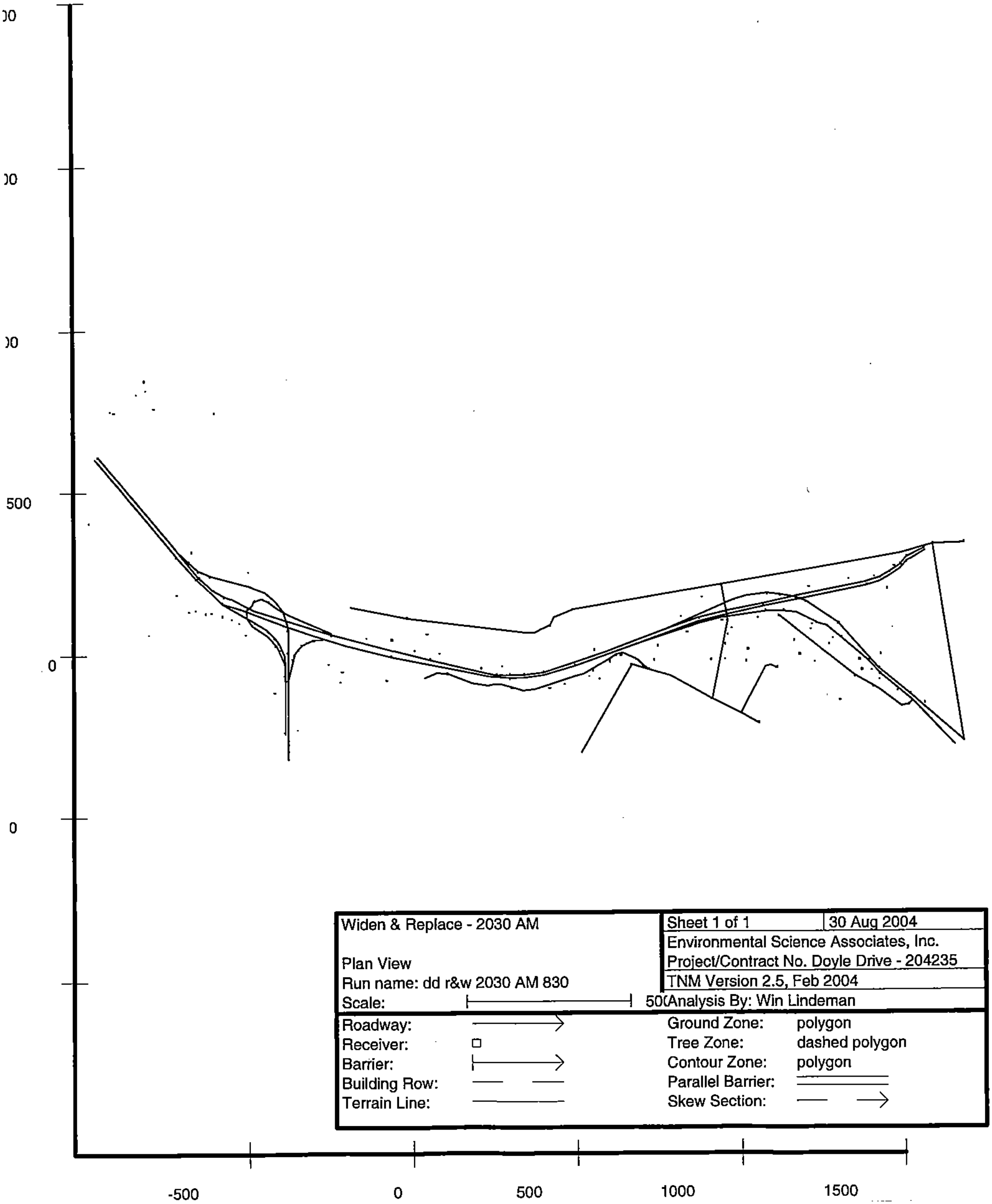
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	68.8	66	68.8	12	Snd Lvl	68.8	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	67.4	66	67.4	12	Snd Lvl	67.4	0.0	10	-10.0
3-Building 1187/1188	3	0	81.0	68.9	71	-12.1	12	—	68.9	0.0	10	-10.0
4-Building 1182	5	0	81.0	69.1	71	-11.9	12	—	69.1	0.0	10	-10.0
5-Building 1183/1186	6	0	81.0	68.2	71	-12.8	12	—	68.2	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	70.3	71	-10.7	12	—	70.3	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	67.1	71	-4.9	12	—	67.1	0.0	10	-10.0
8-PX Building	9	0	0.0	68.3	71	68.3	12	—	68.3	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	67.3	71	-1.7	12	—	67.3	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	74.8	66	6.8	12	Snd Lvl	74.8	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	79.5	66	11.5	12	Snd Lvl	79.5	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	76.8	66	8.8	12	Snd Lvl	76.8	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	66.7	66	-1.3	12	Snd Lvl	66.7	0.0	10	-10.0
14-Building 644	15	0	0.0	63.7	71	63.7	12	—	63.7	0.0	10	-10.0
15-Building 649	16	0	0.0	60.9	66	60.9	12	—	60.9	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	60.2	66	-9.8	12	—	60.2	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	63.6	66	-2.4	12	—	63.6	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	70.7	66	4.7	12	Snd Lvl	70.7	0.0	10	-10.0
19-Building 969	20	0	0.0	52.4	71	52.4	12	—	52.4	0.0	10	-10.0
20-Building 968	21	0	0.0	54.2	71	54.2	12	—	54.2	0.0	10	-10.0
21-Building 967	22	0	0.0	56.2	71	56.2	12	—	56.2	0.0	10	-10.0
22-Building 966	23	0	0.0	56.0	71	56.0	12	—	56.0	0.0	10	-10.0
23-Building 964	24	1	0.0	53.4	66	53.4	12	—	53.4	0.0	10	-10.0

24-Building 963	25	1	0.0	54.4	66	54.4	12	—	54.4	0.0	10	-10.0
25-Building 962	26	1	0.0	54.2	66	54.2	12	—	54.2	0.0	10	-10.0
26-Unknown Building	27	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0
27-Log Cabin	28	0	63.0	68.5	66	5.5	12	Snd Lvl	68.5	0.0	10	-10.0
28-Unknown Building	29	0	0.0	62.1	71	62.1	12	—	62.1	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	67.4	66	0.9	12	Snd Lvl	67.4	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	68.8	66	2.3	12	Snd Lvl	68.8	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	70.3	66	3.8	12	Snd Lvl	70.3	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	72.0	66	5.5	12	Snd Lvl	72.0	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	73.2	66	6.7	12	Snd Lvl	73.2	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	73.6	66	7.1	12	Snd Lvl	73.6	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	73.4	66	6.9	12	Snd Lvl	73.4	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	70.6	66	4.1	12	Snd Lvl	70.6	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	66.5	66	66.5	12	Snd Lvl	66.5	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.2	66	-2.3	12	—	63.2	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	66.3	71	2.3	12	—	66.3	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	66.2	71	2.2	12	—	66.2	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	65.1	71	1.1	12	—	65.1	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	66.6	71	2.6	12	—	66.6	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	74.4	66	5.4	12	Snd Lvl	74.4	0.0	10	-10.0
44-Building 129	45	1	0.0	63.1	66	63.1	12	—	63.1	0.0	10	-10.0
45-Building 122	46	0	0.0	72.5	71	72.5	12	Snd Lvl	72.5	0.0	10	-10.0
46-Building 108	47	0	0.0	72.7	71	72.7	12	Snd Lvl	72.7	0.0	10	-10.0
47-Building 107	48	0	0.0	74.4	71	74.4	12	Snd Lvl	74.4	0.0	10	-10.0
48-Building 104	49	0	74.0	70.2	71	-3.8	12	—	70.2	0.0	10	-10.0
49-Building 105	50	0	74.0	76.2	71	2.2	12	Snd Lvl	76.2	0.0	10	-10.0
50-Building 106	51	0	76.0	77.6	71	1.6	12	Snd Lvl	77.6	0.0	10	-10.0
51-Building 211	52	0	0.0	75.5	71	75.5	12	Snd Lvl	75.5	0.0	10	-10.0
52-Building 204	53	0	0.0	69.2	71	69.2	12	—	69.2	0.0	10	-10.0
53-Building 210	54	0	0.0	71.1	71	71.1	12	Snd Lvl	71.1	0.0	10	-10.0
54-Building 201	55	0	0.0	67.5	71	67.5	12	—	67.5	0.0	10	-10.0
55-Building 220	56	0	0.0	64.5	71	64.5	12	—	64.5	0.0	10	-10.0
56-Building 231	57	0	0.0	67.2	71	67.2	12	—	67.2	0.0	10	-10.0
57-Building 228	58	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
58-Building 229	60	0	0.0	64.9	71	64.9	12	—	64.9	0.0	10	-10.0
59-Building 223	61	0	0.0	60.8	71	60.8	12	—	60.8	0.0	10	-10.0
60-Building 230	62	0	0.0	67.8	71	67.8	12	—	67.8	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	63.7	66	6.7	12	—	63.7	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	61.7	66	4.7	12	—	61.7	0.0	10	-10.0
63-Building 1063	66	0	68.5	62.3	71	-6.2	12	—	62.3	0.0	10	-10.0

64-Building 1062	68	0	68.5	60.2	71	-8.3	12	—	60.2	0.0	10	-10.0
65-Building 1060	69	0	68.5	59.3	71	-9.2	12	—	59.3	0.0	10	-10.0
66-Building 1167	70	0	68.0	66.0	71	-2.0	12	—	66.0	0.0	10	-10.0
67-Building 1163	71	0	0.0	64.7	71	64.7	12	—	64.7	0.0	10	-10.0
68-Building 1169	72	0	68.0	66.2	71	-1.8	12	—	66.2	0.0	10	-10.0
69-Building 1162	73	0	0.0	63.4	71	63.4	12	—	63.4	0.0	10	-10.0
70-Building 1170	74	0	68.0	69.3	71	1.3	12	—	69.3	0.0	10	-10.0
71-Building 1161	75	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
72-Building 1160	76	0	0.0	71.1	71	71.1	12	Snd Lvl	71.1	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	70.3	66	70.3	12	Snd Lvl	70.3	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	73.0	66	73.0	12	Snd Lvl	73.0	0.0	10	-10.0
75-Building 1004	79	0	0.0	56.2	71	56.2	12	—	56.2	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	72.9	66	-3.6	12	Snd Lvl	72.9	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Widen & Replace - 2030 AM	Sheet 1 of 1	30 Aug 2004
	Environmental Science Associates, Inc.	
Plan View	Project/Contract No. Doyle Drive - 204235	
Run name: dd r&w 2030 AM 830	TNM Version 2.5, Feb 2004	
Scale: 50(	Analysis By: Win Lindeman	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace - 2030 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	11.0	N End	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-660.0	234.0	57.00				Average	
		4	4	-614.0	196.0	55.00				Average	
		5	6	-580.0	162.0	53.00				Average	
		6	7	-579.0	162.0	53.00				Average	Y
		7	8	-526.0	144.0	51.00				Average	Y
		8	9	-392.0	92.0	46.00				Average	Y
		9	10	-298.0	60.0	42.00				Average	Y
		10	11	-200.0	30.0	37.00				Average	Y
		11	13	-64.0	-4.0	29.00				Average	Y
		12	14	-63.0	-4.0	29.00				Average	
		13	15	196.0	-58.0	29.00				Average	
		14	16	232.0	-66.0	28.00				Average	
		15	17	294.0	-71.0	27.00				Average	
		16	18	334.0	-70.0	24.00				Average	
		17	20	335.0	-70.0	24.00				Average	Y
		18	21	396.0	-60.0	24.00				Average	Y
		19	22	492.0	-32.0	23.00				Average	Y
		19A	208	680.0	35.0	18.50				Average	Y
		20	23	868.0	102.0	14.00				Average	Y
		21	24	968.0	126.0	14.00				Average	Y
		22	25	1,068.0	150.0	11.00				Average	Y
		23	26	1,166.0	170.0	10.80				Average	Y
		24	27	1,381.0	213.0	5.00				Average	Y

		25	28	1,382.0	213.0	5.00				Average	
		26	29	1,422.0	224.0	5.00				Average	
		27	31	1,450.0	240.0	4.00				Average	
		28	32	1,486.0	264.0	4.00				Average	
		29	33	1,504.0	286.0	4.00				Average	
		30	35	1,520.0	296.0	4.00				Average	
		31	36	1,540.0	307.0	4.00				Average	
		32	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	11.0	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,383.0	224.0	5.00				Average	
		7	46	1,384.0	224.0	5.00				Average	Y
		8	47	1,166.0	178.0	10.80				Average	Y
		9	48	1,068.0	157.0	13.00				Average	Y
		10	49	968.0	136.0	13.00				Average	Y
		11	50	868.0	111.0	14.00				Average	Y
		12	51	776.0	80.0	14.00				Average	Y
		13	52	680.0	44.0	14.00				Average	Y
		14	53	586.0	10.0	14.00				Average	Y
		15	54	492.0	-22.0	17.80				Average	Y
		16	55	396.0	-52.0	21.40				Average	Y
		17	56	335.0	-60.0	26.00				Average	Y
		18	57	334.0	-60.0	26.00				Average	
		19	58	294.0	-60.0	28.00				Average	
		20	59	252.0	-60.0	29.00				Average	
		21	60	232.0	-56.0	29.00				Average	
		22	61	50.0	-12.0	29.00				Average	
		23	62	-60.0	14.0	29.00				Average	
		24	63	-61.0	14.0	29.00				Average	Y
		25	64	-250.0	64.0	41.00				Average	Y
		26	65	-484.0	142.0	50.00				Average	Y
		27	66	-554.0	176.0	51.00				Average	Y
		28	67	-555.0	176.0	51.00				Average	
		29	68	-576.0	182.0	49.00				Average	
		30	69	-610.0	204.0	50.00				Average	

		31	70	-654.0	242.0	53.00				Average	
		32	71	-720.0	322.0	56.00				Average	
		34	73	-961.0	614.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	680.0	35.0	18.50				Average	Y
		2	78	876.0	98.0	14.00				Average	Y
		3	79	938.0	114.0	14.00				Average	Y
		4	80	1,076.0	134.0	12.00				Average	Y
		5	81	1,130.0	134.0	12.00				Average	Y
		6	82	1,168.0	128.0	11.00				Average	Y
		7	83	1,225.0	101.0	8.00				Average	Y
		8	84	1,227.0	98.0	8.00				Average	
		9	85	1,260.0	88.0	6.00				Average	
		10	86	1,306.0	50.0	3.00				Average	
		11	195	1,388.0	-20.0	2.00				Average	
		12	196	1,424.0	-60.0	4.00				Average	
		13	197	1,522.0	-146.0	4.00				Average	
		14	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,418.0	-40.0	3.00				Average	
		4	91	1,296.0	96.0	3.00				Average	
		5	92	1,196.0	163.0	3.00				Average	
		6	93	1,160.0	176.0	3.00				Average	
		7	94	1,159.0	176.0	3.00				Average	Y
		8	95	1,116.0	182.0	3.00				Average	Y
		9	96	1,076.0	186.0	5.00				Average	Y
		10	97	1,014.0	180.0	8.00				Average	Y
		11	98	976.0	168.0	12.00				Average	Y
		12	99	776.0	80.0	14.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-250.0	68.0	40.00				Average	Y
		2	101	-376.0	124.0	45.00				Average	Y
		3	102	-410.0	144.0	45.00				Average	Y
		4	103	-411.0	144.0	45.00				Average	
		5	104	-440.0	170.0	44.20				Average	
		6	105	-460.0	176.0	44.00				Average	
		7	106	-484.0	170.0	44.00				Average	
		8	107	-490.0	156.0	44.00				Average	
		9	108	-504.0	144.0	44.50				Average	

		10	109	-504.0	117.0	45.00				Average	
		11	110	-488.0	94.0	43.50				Average	
		12	111	-440.0	60.0	42.50				Average	
		13	203	-416.0	30.0	42.00				Average	
		14	202	-406.0	14.0	41.00				Average	
		15	204	-388.0	-28.0	38.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-579.0	160.0	53.00				Average	Y
		2	114	-479.0	100.0	49.00				Average	Y
		3	115	-478.0	100.0	49.00				Average	
		4	116	-446.0	80.0	49.00				Average	
		5	117	-420.0	54.0	48.00				Average	
		6	118	-408.0	36.0	44.00				Average	
		7	119	-400.0	17.0	40.00				Average	
		8	120	-390.0	0.0	39.00				Average	
		9	205	-388.0	-28.0	38.00				Average	
		10	206	-388.0	-62.0	38.00				Average	
		11	121	-388.0	-238.0	38.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	207	-380.0	-74.0	40.00				Average	
		3	123	-380.0	10.0	37.00				Average	
		4	124	-380.0	80.0	37.00				Average	
		5	125	-384.0	98.0	38.00				Average	
		6	126	-396.0	138.0	38.00				Average	
		7	127	-418.0	170.0	41.00				Average	
		8	128	-450.0	196.0	44.00				Average	
		9	129	-500.0	216.0	47.50				Average	
		10	130	-620.0	246.0	54.00				Average	
		11	131	-656.0	262.0	57.00				Average	
		12	132	-686.0	290.0	58.00				Average	
		13	191	-703.0	306.0	58.00				Average	
		14	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	-74.0	40.00				Average	
		2	199	-364.0	-10.0	38.20				Average	
		3	200	-360.0	5.0	38.80				Average	
		4	201	-348.0	20.0	40.20				Average	
		5	135	-336.0	34.0	41.40				Average	
		6	136	-320.0	42.0	41.80				Average	
		7	137	-300.0	48.0	41.20				Average	

		8	138	-274.0	49.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	
		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,522.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	
		3	174	1,488.0	-160.0	4.00				Average	

		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	
		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace - 2030 AM

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	6209	88	64	88	13	88	64	88	64	88
	2	2	6209	88	64	88	13	88	64	88	64	88
	3	3	6209	88	64	88	13	88	64	88	64	88
	4	4	6209	88	64	88	13	88	64	88	64	88
	5	6	5144	88	53	88	11	88	53	88	53	88
	6	7	5144	88	53	88	11	88	53	88	53	88
	7	8	5144	88	53	88	11	88	53	88	53	88
	8	9	5144	88	53	88	11	88	53	88	53	88
	9	10	5144	88	53	88	11	88	53	88	53	88
	10	11	4836	88	50	88	10	88	50	88	50	88
	11	13	4836	88	50	88	10	88	50	88	50	88
	12	14	4836	88	50	88	10	88	50	88	50	88
	13	15	4836	88	50	88	10	88	50	88	50	88
	14	16	4836	88	50	88	10	88	50	88	50	88
	15	17	4836	88	50	88	11	88	50	88	50	88
	16	18	4836	88	50	88	10	88	50	88	50	88
	17	20	4836	88	50	88	10	88	50	88	50	88
	18	21	4836	88	50	88	10	88	50	88	50	88
	19	22	4836	88	50	88	10	88	50	88	50	88
	19A	208	1676	88	0	0	0	0	0	0	0	0
	20	23	1676	88	0	0	0	0	0	0	0	0

	21	24	1676	88	0	0	0	0	0	0	0	0
	22	25	1676	88	0	0	0	0	0	0	0	0
	23	26	1676	56	0	0	0	0	0	0	0	0
	24	27	1676	56	0	0	0	0	0	0	0	0
	25	28	1676	56	0	0	0	0	0	0	0	0
	26	29	1676	56	0	0	0	0	0	0	0	0
	27	31	1676	56	0	0	0	0	0	0	0	0
	28	32	1676	56	0	0	0	0	0	0	0	0
	29	33	1676	56	0	0	0	0	0	0	0	0
	30	35	1676	56	0	0	0	0	0	0	0	0
	31	36	1676	56	0	0	0	0	0	0	0	0
	32	37										
WB Doyle Drive from Marina to 0+00	1	39	770	56	0	0	0	0	0	0	0	0
	2	40	770	56	0	0	0	0	0	0	0	0
	3	41	770	56	0	0	0	0	0	0	0	0
	4	42	770	56	0	0	0	0	0	0	0	0
	5	43	770	56	0	0	0	0	0	0	0	0
	6	44	770	56	0	0	0	0	0	0	0	0
	7	46	770	88	0	0	0	0	0	0	0	0
	8	47	770	88	0	0	0	0	0	0	0	0
	9	48	770	88	0	0	0	0	0	0	0	0
	10	49	770	88	0	0	0	0	0	0	0	0
	11	50	770	88	0	0	0	0	0	0	0	0
	12	51	2863	88	30	88	39	88	18	88	30	88
	13	52	2863	88	30	88	39	88	18	88	30	88
	14	53	2863	88	30	88	39	88	18	88	30	88
	15	54	2863	88	30	88	39	88	18	88	30	88
	16	55	2863	88	30	88	39	88	18	88	30	88
	17	56	2863	88	30	88	39	88	18	88	30	88
	18	57	2863	88	30	88	39	88	18	88	30	88
	19	58	2863	88	30	88	39	88	18	88	30	88
	20	59	2863	88	30	88	39	88	18	88	30	88
	21	60	2863	88	30	88	39	88	18	88	30	88
	22	61	2863	88	30	88	39	88	18	88	30	88

	23	62	2863	88	30	88	39	88	18	88	30	88
	24	63	2863	88	30	88	39	88	18	88	30	88
	25	64	2492	88	26	88	34	88	16	88	26	88
	26	65	2492	88	26	88	34	88	16	88	26	88
	27	66	2492	88	26	88	34	88	16	88	26	88
	28	67	2492	88	26	88	34	88	16	88	26	88
	29	68	2492	88	26	88	34	88	16	88	26	88
	30	69	2492	88	26	88	34	88	16	88	26	88
	31	70	2492	88	26	88	34	88	16	88	26	88
	32	71	4817	88	50	88	65	88	30	88	50	88
	34	73										
SB/EB Richardson from Doyle to Francis	1	77	3214	56	33	56	7	56	33	56	33	56
	2	78	3214	56	33	56	7	56	33	56	33	56
	3	79	3214	56	33	56	7	56	33	56	33	56
	4	80	3214	56	33	56	7	56	33	56	33	56
	5	81	3214	56	33	56	7	56	33	56	33	56
	6	82	3214	56	33	56	7	56	33	56	33	56
	7	83	3214	56	33	56	7	56	33	56	33	56
	8	84	3214	56	33	56	7	56	33	56	33	56
	9	85	3214	56	33	56	7	56	33	56	33	56
	10	86	3214	56	33	56	7	56	33	56	33	56
	11	195	3214	56	33	56	7	56	33	56	33	56
	12	196	3214	56	33	56	7	56	33	56	33	56
	13	197	3214	56	33	56	7	56	33	56	33	56
	14	87										
NB/WB Richardson from Francisco to DD	1	88	2122	56	22	56	29	56	13	56	22	56
	2	89	2122	56	22	56	29	56	13	56	22	56
	3	90	2122	56	22	56	29	56	13	56	22	56
	4	91	2122	56	22	56	29	56	13	56	22	56
	5	92	2122	56	22	56	29	56	13	56	22	56
	6	93	2122	56	22	56	29	56	13	56	22	56
	7	94	2122	56	22	56	29	56	13	56	22	56
	8	95	2122	56	22	56	29	56	13	56	22	56
	9	96	2122	56	22	56	29	56	13	56	22	56

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	10	97	2122	56	22	56	29	56	13	56	22	56
	11	98	2122	56	22	56	29	56	13	56	22	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	371	56	4	56	5	56	2	56	4	56
	2	101	371	56	4	56	5	56	2	56	4	56
	3	102	371	56	4	56	5	56	2	56	4	56
	4	103	371	56	4	56	5	56	2	56	4	56
	5	104	371	56	4	56	5	56	2	56	4	56
	6	105	371	56	4	56	5	56	2	56	4	56
	7	106	371	56	4	56	5	56	2	56	4	56
	8	107	371	56	4	56	5	56	2	56	4	56
	9	108	371	56	4	56	5	56	2	56	4	56
	10	109	371	56	4	56	5	56	2	56	4	56
	11	110	371	56	4	56	5	56	2	56	4	56
	12	111	371	56	4	56	5	56	2	56	4	56
	13	203	371	56	4	56	5	56	2	56	4	56
	14	202	371	56	4	56	5	56	2	56	4	56
	15	204										
SB PP Ramp from EB Doyle Drive	1	113	2032	56	21	56	4	56	21	56	21	56
	2	114	2032	56	21	56	4	56	21	56	21	56
	3	115	2032	56	21	56	4	56	21	56	21	56
	4	116	2032	56	21	56	4	56	21	56	21	56
	5	117	2032	56	21	56	4	56	21	56	21	56
	6	118	2032	56	21	56	4	56	21	56	21	56
	7	119	2032	56	21	56	4	56	21	56	21	56
	8	120	2032	56	21	56	4	56	21	56	21	56
	9	205	2032	56	21	56	4	56	21	56	21	56
	10	206	2032	56	21	56	4	56	21	56	21	56
	11	121										
NB Park Presidio to WB Doyle Drive	1	122	2355	56	24	56	24	56	0	0	17	56
	2	207	2355	56	24	56	24	56	0	0	17	56
	3	123	2355	56	24	56	24	56	0	0	17	56
	4	124	2355	56	24	56	24	56	0	0	17	56
	5	125	2355	56	24	56	24	56	0	0	17	56

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	6	126	2355	56	24	56	24	56	0	0	17	56
	7	127	2355	56	24	56	24	56	0	0	17	56
	8	128	2355	56	24	56	24	56	0	0	17	56
	9	129	2355	56	24	56	24	56	0	0	17	56
	10	130	2355	56	24	56	24	56	0	0	17	56
	11	131	2355	56	24	56	24	56	0	0	17	56
	12	132	2355	56	24	56	24	56	0	0	17	56
	13	191	2355	56	24	56	24	56	0	0	17	56
	14	133										
NB PP ramp to EB Doyle Drive	1	134	368	56	3	56	4	56	4	56	3	56
	2	199	368	56	3	56	4	56	4	56	3	56
	3	200	368	56	3	56	4	56	4	56	3	56
	4	201	368	56	3	56	4	56	4	56	3	56
	5	135	368	56	3	56	4	56	4	56	3	56
	6	136	368	56	3	56	4	56	4	56	3	56
	7	137	368	56	3	56	4	56	4	56	3	56
	8	138										
Mason Street	1	139	10	32	0	0	0	0	0	0	0	0
	2	140	10	32	0	0	0	0	0	0	0	0
	3	141	10	32	0	0	0	0	0	0	0	0
	4	142	10	32	0	0	0	0	0	0	0	0
	5	143	10	32	0	0	0	0	0	0	0	0
	6	144	10	32	0	0	0	0	0	0	0	0
	7	145	10	32	0	0	0	0	0	0	0	0
	8	194	23	32	0	0	0	0	0	0	0	0
	9	146	82	32	0	0	0	0	0	0	0	0
	10	147	83	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	123	32	1	32	0	0	1	32	0	0
	2	150	214	32	2	32	0	0	2	32	0	0
	3	151	214	32	2	32	0	0	2	32	0	0
	4	152	214	32	2	32	0	0	2	32	0	0
	5	153	214	32	2	32	0	0	2	32	0	0
	6	154	214	32	2	32	0	0	2	32	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	7	155	214	32	2	32	0	0	2	32	0	0
	8	156	218	32	2	32	0	0	2	32	0	0
	9	157	55	32	1	32	0	0	1	32	0	0
	10	158	55	32	1	32	0	0	1	32	0	0
	11	159	55	32	1	32	0	0	1	32	0	0
	12	160	55	32	1	32	0	0	1	32	0	0
	13	161	55	32	1	32	0	0	1	32	0	0
	14	162	55	32	1	32	0	0	1	32	0	0
	15	163	55	32	1	32	0	0	1	32	0	0
	16	164	55	32	1	32	0	0	1	32	0	0
	17	165	55	32	1	32	0	0	1	32	0	0
	18	166	55	32	1	32	0	0	1	32	0	0
	19	167	192	32	2	32	0	0	2	32	0	0
	20	168	191	32	2	32	0	0	2	32	0	0
	21	169	365	32	4	32	0	0	4	32	0	0
	22	170	456	32	4	32	0	0	4	32	0	0
	23	171										
Gorgas Avenue	1	172	392	32	0	0	0	0	0	0	0	0
	2	173	392	32	0	0	0	0	0	0	0	0
	3	174	392	32	0	0	0	0	0	0	0	0
	4	175	392	32	0	0	0	0	0	0	0	0
	5	176	193	32	0	0	0	0	0	0	0	0
	6	177	132	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	149	32	0	0	0	0	0	0	0	0
	2	180	55	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	132	32	0	0	0	0	0	0	0	0
	2	183	132	32	0	0	0	0	0	0	0	0
	3	184	132	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	262	32	0	0	0	0	0	0	0	0
	2	187										
Montgomery Street	1	188	140	32	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	2	189	140	32	0	0	0	0	0	0	0	0
	3	190										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace - 2030 AM

Receiver							Input Sound Levels and Criteria				
Name	No.	#DUs	Coordinates (ground)			Height	Existing	Impact Criteria		NR	Active
			X	Y	Z	above Ground	LAeq1h	LAeq1h	Sub'l	Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0	Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0	Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0	Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0	Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0	Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0	Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0	Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0	Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0	Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0	Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0	Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0	Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0	Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0	Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0	Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0	Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0	Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0	Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0	Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0	Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0	Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0	Y

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

Doyle Drive - 204235

58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,360.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace - 2030 AM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 20 deg C, 50% RH

Receiver				No Barrier						With Barrier			
Name	No.	#DUs	Existing LAeq1h	LAeq1h		Increase over existing		Type Impact		Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc				Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	67.3	66	67.3	12	Snd Lvl		67.3	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	63.8	66	63.8	12	—		63.8	0.0	10	-10.0
3-Building 1187/1188	3	0	81.0	64.9	71	-16.1	12	—		64.9	0.0	10	-10.0
4-Building 1182	5	0	81.0	61.8	71	-19.2	12	—		61.8	0.0	10	-10.0
5-Building 1183/1186	6	0	81.0	63.6	71	-17.4	12	—		63.6	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	64.8	71	-16.2	12	—		64.8	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	65.3	71	-6.7	12	—		65.3	0.0	10	-10.0
8-PX Building	9	0	0.0	64.2	71	64.2	12	—		64.2	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	63.6	71	-5.4	12	—		63.6	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	69.6	66	1.6	12	Snd Lvl		69.6	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	79.2	66	11.2	12	Snd Lvl		79.2	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	75.4	66	7.4	12	Snd Lvl		75.4	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	64.9	66	-3.1	12	—		64.9	0.0	10	-10.0
14-Building 644	15	0	0.0	60.6	71	60.6	12	—		60.6	0.0	10	-10.0
15-Building 649	16	0	0.0	59.9	66	59.9	12	—		59.9	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	59.5	66	-10.5	12	—		59.5	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	65.8	66	-0.2	12	—		65.8	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	72.3	66	6.3	12	Snd Lvl		72.3	0.0	10	-10.0
19-Building 969	20	0	0.0	52.3	71	52.3	12	—		52.3	0.0	10	-10.0
20-Building 968	21	0	0.0	53.9	71	53.9	12	—		53.9	0.0	10	-10.0
21-Building 967	22	0	0.0	55.8	71	55.8	12	—		55.8	0.0	10	-10.0
22-Building 966	23	0	0.0	55.9	71	55.9	12	—		55.9	0.0	10	-10.0
23-Building 964	24	1	0.0	53.7	66	53.7	12	—		53.7	0.0	10	-10.0

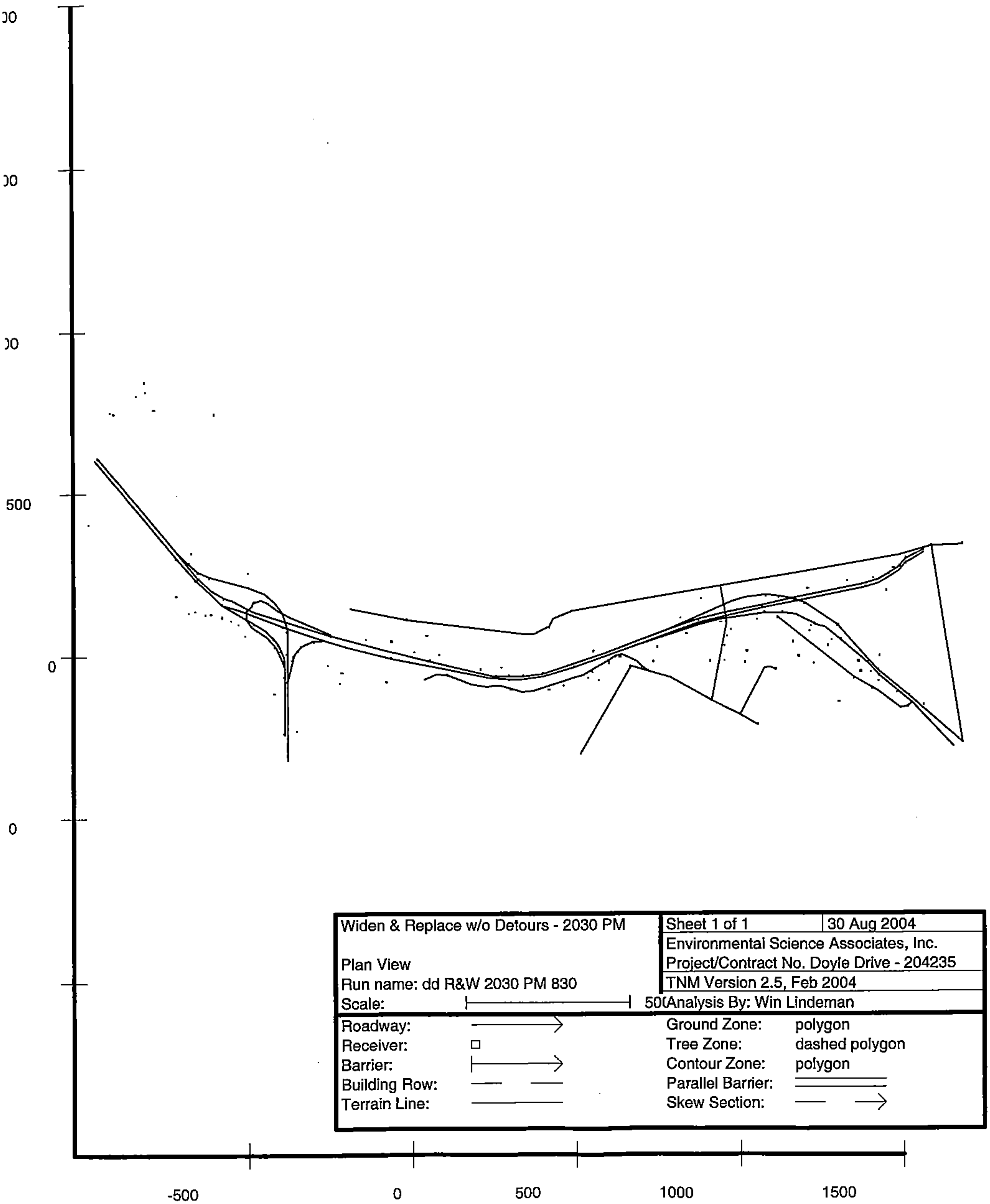
RESULTS: SOUND LEVELS

Doyle Drive - 204235

24-Building 963	25	1	0.0	54.5	66	54.5	12	—	54.5	0.0	10	-10.0
25-Building 962	26	1	0.0	54.4	66	54.4	12	—	54.4	0.0	10	-10.0
26-Unknown Building	27	0	0.0	57.5	71	57.5	12	—	57.5	0.0	10	-10.0
27-Log Cabin	28	0	63.0	67.9	66	4.9	12	Snd Lvl	67.9	0.0	10	-10.0
28-Unknown Building	29	0	0.0	60.9	71	60.9	12	—	60.9	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	67.2	66	0.7	12	Snd Lvl	67.2	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	68.7	66	2.2	12	Snd Lvl	68.7	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	70.7	66	4.2	12	Snd Lvl	70.7	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	72.6	66	6.1	12	Snd Lvl	72.6	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	73.9	66	7.4	12	Snd Lvl	73.9	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	74.2	66	7.7	12	Snd Lvl	74.2	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	74.2	66	7.7	12	Snd Lvl	74.2	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	71.7	66	5.2	12	Snd Lvl	71.7	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	67.9	66	67.9	12	Snd Lvl	67.9	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.6	66	-1.9	12	—	63.6	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	66.0	71	2.0	12	—	66.0	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	66.1	71	2.1	12	—	66.1	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	64.9	71	0.9	12	—	64.9	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	65.1	71	1.1	12	—	65.1	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	75.0	66	6.0	12	Snd Lvl	75.0	0.0	10	-10.0
44-Building 129	45	1	0.0	68.2	66	68.2	12	Snd Lvl	68.2	0.0	10	-10.0
45-Building 122	46	0	0.0	71.7	71	71.7	12	Snd Lvl	71.7	0.0	10	-10.0
46-Building 108	47	0	0.0	70.9	71	70.9	12	—	70.9	0.0	10	-10.0
47-Building 107	48	0	0.0	72.3	71	72.3	12	Snd Lvl	72.3	0.0	10	-10.0
48-Building 104	49	0	74.0	69.1	71	-4.9	12	—	69.1	0.0	10	-10.0
49-Building 105	50	0	74.0	73.3	71	-0.7	12	Snd Lvl	73.3	0.0	10	-10.0
50-Building 106	51	0	76.0	71.2	71	-4.8	12	Snd Lvl	71.2	0.0	10	-10.0
51-Building 211	52	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
52-Building 204	53	0	0.0	64.5	71	64.5	12	—	64.5	0.0	10	-10.0
53-Building 210	54	0	0.0	69.0	71	69.0	12	—	69.0	0.0	10	-10.0
54-Building 201	55	0	0.0	63.4	71	63.4	12	—	63.4	0.0	10	-10.0
55-Building 220	56	0	0.0	63.3	71	63.3	12	—	63.3	0.0	10	-10.0
56-Building 231	57	0	0.0	66.0	71	66.0	12	—	66.0	0.0	10	-10.0
57-Building 228	58	0	0.0	65.0	71	65.0	12	—	65.0	0.0	10	-10.0
58-Building 229	60	0	0.0	63.6	71	63.6	12	—	63.6	0.0	10	-10.0
59-Building 223	61	0	0.0	60.8	71	60.8	12	—	60.8	0.0	10	-10.0
60-Building 230	62	0	0.0	66.1	71	66.1	12	—	66.1	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	62.6	66	5.6	12	—	62.6	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	60.9	66	3.9	12	—	60.9	0.0	10	-10.0
63-Building 1063	66	0	68.5	61.9	71	-6.6	12	—	61.9	0.0	10	-10.0

64-Building 1062	68	0	68.5	59.6	71	-8.9	12	—	59.6	0.0	10	-10.0
65-Building 1060	69	0	68.5	58.8	71	-9.7	12	—	58.8	0.0	10	-10.0
66-Building 1167	70	0	68.0	64.7	71	-3.3	12	—	64.7	0.0	10	-10.0
67-Building 1163	71	0	0.0	64.2	71	64.2	12	—	64.2	0.0	10	-10.0
68-Building 1169	72	0	68.0	67.4	71	-0.6	12	—	67.4	0.0	10	-10.0
69-Building 1162	73	0	0.0	64.3	71	64.3	12	—	64.3	0.0	10	-10.0
70-Building 1170	74	0	68.0	70.6	71	2.6	12	—	70.6	0.0	10	-10.0
71-Building 1161	75	0	0.0	66.8	71	66.8	12	—	66.8	0.0	10	-10.0
72-Building 1160	76	0	0.0	71.1	71	71.1	12	Snd Lvl	71.1	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	67.6	66	67.6	12	Snd Lvl	67.6	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	74.6	66	74.6	12	Snd Lvl	74.6	0.0	10	-10.0
75-Building 1004	79	0	0.0	56.0	71	56.0	12	—	56.0	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	72.1	66	-4.4	12	Snd Lvl	72.1	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Widen & Replace w/o Detours - 2030 PM
Plan View
Run name: dd R&W 2030 PM 830
Scale:
50(
Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
500
0
-500
0
500
1000
1500

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace 2030 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle Drive to Marina	11.0	N End	1	-966.0	608.0	53.00				Average	
		2	2	-720.0	302.0	56.00				Average	
		3	3	-660.0	234.0	57.00				Average	
		4	4	-614.0	196.0	55.00				Average	
		5	6	-580.0	162.0	53.00				Average	
		6	7	-579.0	162.0	53.00				Average	Y
		7	8	-526.0	144.0	51.00				Average	Y
		8	9	-392.0	92.0	46.00				Average	Y
		9	10	-298.0	60.0	42.00				Average	Y
		10	11	-200.0	30.0	37.00				Average	Y
		11	13	-64.0	-4.0	29.00				Average	Y
		12	14	-63.0	-4.0	29.00				Average	
		13	15	196.0	-58.0	29.00				Average	
		14	16	232.0	-66.0	28.00				Average	
		15	17	294.0	-71.0	27.00				Average	
		16	18	334.0	-70.0	24.00				Average	
		17	20	335.0	-70.0	24.00				Average	Y
		18	21	396.0	-60.0	24.00				Average	Y
		19	22	492.0	-32.0	23.00				Average	Y
		19A	208	680.0	35.0	18.50				Average	Y
		20	23	868.0	102.0	14.00				Average	Y
		21	24	968.0	126.0	14.00				Average	Y
		22	25	1,068.0	150.0	11.00				Average	Y
		23	26	1,166.0	170.0	10.80				Average	Y
		24	27	1,381.0	213.0	5.00				Average	Y

		25	28	1,382.0	213.0	5.00				Average	
		26	29	1,422.0	224.0	5.00				Average	
		27	31	1,450.0	240.0	4.00				Average	
		28	32	1,486.0	264.0	4.00				Average	
		29	33	1,504.0	286.0	4.00				Average	
		30	35	1,520.0	296.0	4.00				Average	
		31	36	1,540.0	307.0	4.00				Average	
		32	37	1,560.0	318.0	4.00					
WB Doyle Drive from Marina to 0+00	11.0	1	39	1,560.0	326.0	4.00				Average	
		2	40	1,504.0	300.0	4.00				Average	
		3	41	1,486.0	276.0	4.00				Average	
		4	42	1,450.0	251.0	4.00				Average	
		5	43	1,422.0	234.0	5.00				Average	
		6	44	1,383.0	224.0	5.00				Average	
		7	46	1,384.0	224.0	5.00				Average	Y
		8	47	1,166.0	178.0	10.80				Average	Y
		9	48	1,068.0	157.0	13.00				Average	Y
		10	49	968.0	136.0	13.00				Average	Y
		11	50	868.0	111.0	14.00				Average	Y
		12	51	776.0	80.0	14.00				Average	Y
		13	52	680.0	44.0	14.00				Average	Y
		14	53	586.0	10.0	14.00				Average	Y
		15	54	492.0	-22.0	17.80				Average	Y
		16	55	396.0	-52.0	21.40				Average	Y
		17	56	335.0	-60.0	26.00				Average	Y
		18	57	334.0	-60.0	26.00				Average	
		19	58	294.0	-60.0	28.00				Average	
		20	59	252.0	-60.0	29.00				Average	
		21	60	232.0	-56.0	29.00				Average	
		22	61	50.0	-12.0	29.00				Average	
		23	62	-60.0	14.0	29.00				Average	
		24	63	-61.0	14.0	29.00				Average	Y
		25	64	-250.0	64.0	41.00				Average	Y
		26	65	-484.0	142.0	50.00				Average	Y
		27	66	-554.0	176.0	51.00				Average	Y
		28	67	-555.0	176.0	51.00				Average	
		29	68	-576.0	182.0	49.00				Average	
		30	69	-610.0	204.0	50.00				Average	

		31	70	-654.0	242.0	53.00				Average	
		32	71	-720.0	322.0	56.00				Average	
		33	198	-960.0	614.0	53.00				Average	
		34	73	-961.0	614.0	53.00					
SB/EB Richardson from Doyle to Francis	11.0	1	77	680.0	35.0	18.50				Average	Y
		2	78	876.0	98.0	14.00				Average	Y
		3	79	938.0	114.0	14.00				Average	Y
		4	80	1,076.0	134.0	12.00				Average	Y
		5	81	1,130.0	134.0	12.00				Average	Y
		6	82	1,168.0	128.0	11.00				Average	Y
		7	83	1,225.0	101.0	8.00				Average	Y
		8	84	1,227.0	98.0	8.00				Average	
		9	85	1,260.0	88.0	6.00				Average	
		10	86	1,306.0	50.0	3.00				Average	
		11	195	1,388.0	-20.0	2.00				Average	
		12	196	1,424.0	-60.0	4.00				Average	
		13	197	1,522.0	-146.0	4.00				Average	
		14	87	1,650.0	-280.0	4.00					
NB/WB Richardson from Francisco to DD	9.0	1	88	1,680.0	-266.0	4.00				Average	
		2	89	1,514.0	-122.0	4.00				Average	
		3	90	1,418.0	-40.0	3.00				Average	
		4	91	1,296.0	96.0	3.00				Average	
		5	92	1,196.0	163.0	3.00				Average	
		6	93	1,160.0	176.0	3.00				Average	
		7	94	1,159.0	176.0	3.00				Average	Y
		8	95	1,116.0	182.0	3.00				Average	Y
		9	96	1,076.0	186.0	5.00				Average	Y
		10	97	1,014.0	180.0	8.00				Average	Y
		11	98	976.0	168.0	12.00				Average	Y
		12	99	776.0	80.0	14.00					
SB PP Ramp from WB Doyle Drive	4.6	1	100	-250.0	68.0	40.00				Average	Y
		2	101	-376.0	124.0	45.00				Average	Y
		3	102	-410.0	144.0	45.00				Average	Y
		4	103	-411.0	144.0	45.00				Average	
		5	104	-440.0	170.0	44.20				Average	
		6	105	-460.0	176.0	44.00				Average	
		7	106	-484.0	170.0	44.00				Average	
		8	107	-490.0	156.0	44.00				Average	

		9	108	-504.0	144.0	44.50				Average	
		10	109	-504.0	117.0	45.00				Average	
		11	110	-488.0	94.0	43.50				Average	
		12	111	-440.0	60.0	42.50				Average	
		13	203	-416.0	30.0	42.00				Average	
		14	202	-406.0	14.0	41.00				Average	
		15	204	-388.0	-28.0	38.00					
SB PP Ramp from EB Doyle Drive	4.8	1	113	-579.0	160.0	53.00				Average	Y
		2	114	-479.0	100.0	49.00				Average	Y
		3	115	-478.0	100.0	49.00				Average	
		4	116	-446.0	80.0	49.00				Average	
		5	117	-420.0	54.0	48.00				Average	
		6	118	-408.0	36.0	44.00				Average	
		7	119	-400.0	17.0	40.00				Average	
		8	120	-390.0	0.0	39.00				Average	
		9	205	-388.0	-28.0	38.00				Average	
		10	206	-388.0	-62.0	38.00				Average	
		11	121	-388.0	-238.0	38.00					
NB Park Presidio to WB Doyle Drive	4.6	1	122	-380.0	-320.0	37.00				Average	
		2	207	-380.0	-74.0	40.00				Average	
		3	123	-380.0	10.0	37.00				Average	
		4	124	-380.0	80.0	37.00				Average	
		5	125	-384.0	98.0	38.00				Average	
		6	126	-396.0	138.0	38.00				Average	
		7	127	-418.0	170.0	41.00				Average	
		8	128	-450.0	196.0	44.00				Average	
		9	129	-500.0	216.0	47.50				Average	
		10	130	-620.0	246.0	54.00				Average	
		11	131	-656.0	262.0	57.00				Average	
		12	132	-686.0	290.0	58.00				Average	
		13	191	-703.0	306.0	58.00				Average	
		14	133	-720.0	322.0	56.00					
NB PP ramp to EB Doyle Drive	4.6	1	134	-380.0	-74.0	40.00				Average	
		2	199	-364.0	-10.0	38.20				Average	
		3	200	-360.0	5.0	38.80				Average	
		4	201	-348.0	20.0	40.20				Average	
		5	135	-336.0	34.0	41.40				Average	
		6	136	-320.0	42.0	41.80				Average	

		7	137	-300.0	48.0	41.20				Average	
		8	138	-274.0	49.0	41.00					
Mason Street	7.3	1	139	-188.0	150.0	3.00				Average	
		2	140	-16.0	114.0	3.00				Average	
		3	141	340.0	70.0	4.00				Average	
		4	142	370.0	70.0	4.00				Average	
		5	143	416.0	92.0	4.00				Average	
		6	144	428.0	118.0	4.00				Average	
		7	145	486.0	142.0	4.00				Average	
		8	194	938.0	214.0	4.00				Average	
		9	146	1,486.0	310.0	4.00				Average	
		10	147	1,584.0	340.0	4.00				Average	
		11	148	1,680.0	344.0	4.00					
Lincoln Blvd.	7.3	1	149	36.0	-70.0	33.00				Average	
		2	150	74.0	-53.0	33.00				Average	
		3	151	106.0	-56.0	32.00				Average	
		4	152	180.0	-86.0	30.00				Average	
		5	153	226.0	-92.0	29.00				Average	
		6	154	246.0	-90.0	29.00				Average	
		7	155	268.0	-90.0	29.00				Average	
		8	156	308.0	-100.0	29.00				Average	
		9	157	334.0	-108.0	27.00				Average	
		10	158	368.0	-105.0	26.00				Average	
		11	159	490.0	-66.0	19.00				Average	
		12	160	520.0	-56.0	17.00				Average	
		13	161	568.0	-30.0	16.00				Average	
		14	162	596.0	-14.0	13.00				Average	
		15	163	620.0	0.0	14.00				Average	
		16	164	636.0	6.0	12.00				Average	
		17	165	680.0	-14.0	13.00				Average	
		18	166	700.0	-34.0	14.00				Average	
		19	167	718.0	-44.0	14.00				Average	
		20	168	784.0	-66.0	15.00				Average	
		21	169	910.0	-136.0	14.00				Average	
		22	170	998.0	-180.0	14.00				Average	
		23	171	1,054.0	-210.0	14.00					
Gorgas Avenue	6.0	1	172	1,522.0	-146.0	4.00				Average	
		2	173	1,510.0	-158.0	4.00				Average	

		3	174	1,488.0	-160.0	4.00				Average	
		4	175	1,420.0	-108.0	2.00				Average	
		5	176	1,400.0	-98.0	2.00				Average	
		6	177	1,344.0	-66.0	2.00				Average	
		7	178	1,112.0	120.0	3.00					
Halleck Street	7.3	1	179	910.0	-136.0	14.00				Average	
		2	180	957.0	106.0	6.00				Average	
		3	181	938.0	214.0	4.00					
Girard Road	7.3	1	182	998.0	-180.0	14.00				Average	
		2	183	1,074.0	-38.0	3.00				Average	
		3	184	1,090.0	-33.0	4.00				Average	
		4	185	1,108.0	-40.0	5.00					
Baker Street	11.6	1	186	1,680.0	-266.0	4.00				Average	
		2	187	1,584.0	340.0	4.00					
Montgomery Street	9.2	1	188	510.0	-300.0	15.00				Average	
		2	189	664.0	-30.0	12.00				Average	
		3	190	718.0	-44.0	14.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace 2030 PM

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle Drive to Marina	N End	1	5399	88	17	88	72	88	61	88	17	88
	2	2	5399	88	17	88	72	88	61	88	17	88
	3	3	5399	88	17	88	72	88	61	88	17	88
	4	4	5399	88	17	88	72	88	61	88	17	88
	5	6	5399	88	17	88	72	88	61	88	17	88
	6	7	3065	88	9	88	41	88	35	88	9	88
	7	8	3065	88	9	88	41	88	35	88	9	88
	8	9	3065	88	9	88	41	88	35	88	9	88
	9	10	3636	88	11	88	49	88	41	88	11	88
	10	11	3636	88	11	88	49	88	41	88	11	88
	11	13	3636	88	11	88	49	88	41	88	11	88
	12	14	3636	88	11	88	49	88	41	88	11	88
	13	15	3636	88	11	88	49	88	41	88	11	88
	14	16	3636	88	11	88	49	88	41	88	11	88
	15	17	3636	88	11	88	49	88	41	88	11	88
	16	18	3636	88	11	88	49	88	41	88	11	88
	17	20	3636	88	11	88	49	88	41	88	11	88
	18	21	3636	88	11	88	49	88	41	88	11	88
	19	22	3636	88	11	88	49	88	41	88	11	88
	19A	208	3636	88	11	88	49	88	41	88	11	88
	20	23	795	88	2	88	11	88	9	88	2	88

	21	24	795	88	2	88	11	88	9	88	2	88
	22	25	795	88	2	88	11	88	9	88	2	88
	23	26	795	56	2	56	11	56	9	56	2	56
	24	27	795	56	2	56	11	56	9	56	2	56
	25	28	795	56	2	56	11	56	9	56	2	56
	26	29	795	56	2	56	11	56	9	56	2	56
	27	31	795	56	2	56	11	56	9	56	2	56
	28	32	795	56	2	56	11	56	9	56	2	56
	29	33	795	56	2	56	11	56	9	56	2	56
	30	35	795	56	2	56	11	56	9	56	2	56
	31	36	795	56	2	56	11	56	9	56	2	56
	32	37										
WB Doyle Drive from Marina to 0+00	1	39	1185	56	0	0	2	56	33	56	12	56
	2	40	1185	56	0	0	2	56	33	56	12	56
	3	41	1185	56	0	0	2	56	33	56	12	56
	4	42	1185	56	0	0	2	56	33	56	12	56
	5	43	1185	56	0	0	2	56	33	56	12	56
	6	44	1185	56	0	0	2	56	33	56	12	56
	7	46	1185	88	0	0	2	88	33	88	12	88
	8	47	1185	88	0	0	2	88	33	88	12	88
	9	48	1185	88	0	0	2	88	33	88	12	88
	10	49	1185	88	0	0	2	88	33	88	12	88
	11	50	1185	88	0	0	2	88	33	88	12	88
	12	51	4711	88	0	0	10	88	132	88	49	88
	13	52	4711	88	0	0	10	88	132	88	49	88
	14	53	4711	88	0	0	10	88	132	88	49	88
	15	54	4711	88	0	0	10	88	132	88	49	88
	16	55	4711	88	0	0	10	88	132	88	49	88
	17	56	4711	88	0	0	10	88	132	88	49	88
	18	57	4711	88	0	0	10	88	132	88	49	88
	19	58	4711	88	0	0	10	88	132	88	49	88
	20	59	4711	88	0	0	10	88	132	88	49	88
	21	60	4711	88	0	0	10	88	132	88	49	88
	22	61	4711	88	0	0	10	88	132	88	49	88

	23	62	4711	88	0	0	10	88	132	88	49	88
	24	63	5711	88	0	0	10	88	132	88	49	88
	25	64	4065	88	0	0	8	88	114	88	42	88
	26	65	4065	88	0	0	8	88	114	88	42	88
	27	66	4065	88	0	0	8	88	114	88	42	88
	28	67	4065	88	0	0	8	88	114	88	42	88
	29	68	4065	88	0	0	8	88	114	88	42	88
	30	69	4065	88	0	0	8	88	114	88	42	88
	31	70	4065	88	0	0	8	88	114	88	42	88
	32	71	6180	88	0	0	13	88	174	88	64	88
	33	198	6180	88	0	0	13	88	174	88	64	88
	34	73										
SB/EB Richardson from Doyle to Francis	1	77	2582	56	8	56	35	56	29	56	8	56
	2	78	2582	56	8	56	35	56	29	56	8	56
	3	79	2582	56	8	56	35	56	29	56	8	56
	4	80	2582	56	8	56	35	56	29	56	8	56
	5	81	2582	56	8	56	35	56	29	56	8	56
	6	82	2582	56	8	56	35	56	29	56	8	56
	7	83	2582	56	8	56	35	56	29	56	8	56
	8	84	2582	56	8	56	35	56	29	56	8	56
	9	85	2582	56	8	56	35	56	29	56	8	56
	10	86	2582	56	8	56	35	56	29	56	8	56
	11	195	2582	56	8	56	35	56	29	56	8	56
	12	196	2582	56	8	56	35	56	29	56	8	56
	13	197	2582	56	8	56	35	56	29	56	8	56
	14	87										
NB/WB Richardson from Francisco to DD	1	88	3285	56	0	0	5	56	65	56	24	56
	2	89	3285	56	0	0	5	56	65	56	24	56
	3	90	3285	56	0	0	5	56	65	56	24	56
	4	91	3285	56	0	0	5	56	65	56	24	56
	5	92	3285	56	0	0	5	56	65	56	24	56
	6	93	3285	56	0	0	5	56	65	56	24	56
	7	94	3285	56	0	0	5	56	65	56	24	56
	8	95	3285	56	0	0	5	56	65	56	24	56

	9	96	3285	56	0	0	5	56	65	56	24	56
	10	97	3285	56	0	0	5	56	65	56	24	56
	11	98	3285	56	0	0	5	56	65	56	24	56
	12	99										
SB PP Ramp from WB Doyle Drive	1	100	646	56	0	0	1	56	18	56	7	56
	2	101	646	56	0	0	1	56	18	56	7	56
	3	102	646	56	0	0	1	56	18	56	7	56
	4	103	646	56	0	0	1	56	18	56	7	56
	5	104	646	56	0	0	1	56	18	56	7	56
	6	105	646	56	0	0	1	56	18	56	7	56
	7	106	646	56	0	0	1	56	18	56	7	56
	8	107	646	56	0	0	1	56	18	56	7	56
	9	108	646	56	0	0	1	56	18	56	7	56
	10	109	646	56	0	0	1	56	18	56	7	56
	11	110	646	56	0	0	1	56	18	56	7	56
	12	111	646	56	0	0	1	56	18	56	7	56
	13	203	646	56	0	0	1	56	18	56	7	56
	14	202	646	56	0	0	1	56	18	56	7	56
	15	204										
SB PP Ramp from EB Doyle Drive	1	113	2326	56	7	56	31	56	26	56	7	56
	2	114	2326	56	7	56	31	56	26	56	7	56
	3	115	2326	56	7	56	31	56	26	56	7	56
	4	116	2326	56	7	56	31	56	26	56	7	56
	5	117	2326	56	7	56	31	56	26	56	7	56
	6	118	2326	56	7	56	31	56	26	56	7	56
	7	119	2326	56	7	56	31	56	26	56	7	56
	8	120	2326	56	7	56	31	56	26	56	7	56
	9	205	2326	56	7	56	31	56	26	56	7	56
	10	206	2326	56	7	56	31	56	26	56	7	56
	11	121										
NB Park Presidio to WB Doyle Drive	1	122	2146	56	0	0	9	56	22	56	24	56
	2	207	2146	56	0	0	9	56	22	56	24	56
	3	123	2146	56	0	0	9	56	22	56	24	56
	4	124	2146	56	0	0	9	56	22	56	24	56

	5	125	2146	56	0	0	9	56	22	56	24	56
	6	126	2146	56	0	0	9	56	22	56	24	56
	7	127	2146	56	0	0	9	56	22	56	24	56
	8	128	2146	56	0	0	9	56	22	56	24	56
	9	129	2146	56	0	0	9	56	22	56	24	56
	10	130	2146	56	0	0	9	56	22	56	24	56
	11	131	2146	56	0	0	9	56	22	56	24	56
	12	132	2146	56	0	0	9	56	22	56	24	56
	13	191	2146	56	0	0	9	56	22	56	24	56
	14	133										
NB PP ramp to EB Doyle Drive	1	134	574	56	2	56	2	56	4	56	6	56
	2	199	574	56	2	56	2	56	4	56	6	56
	3	200	574	56	2	56	2	56	4	56	6	56
	4	201	574	56	2	56	2	56	4	56	6	56
	5	135	574	56	2	56	2	56	4	56	6	56
	6	136	574	56	2	56	2	56	4	56	6	56
	7	137	574	56	2	56	2	56	4	56	6	56
	8	138										
Mason Street	1	139	9	32	0	0	0	0	0	0	0	0
	2	140	9	32	0	0	0	0	0	0	0	0
	3	141	9	32	0	0	0	0	0	0	0	0
	4	142	9	32	0	0	0	0	0	0	0	0
	5	143	9	32	0	0	0	0	0	0	0	0
	6	144	9	32	0	0	0	0	0	0	0	0
	7	145	46	32	0	0	0	0	0	0	0	0
	8	194	46	32	0	0	0	0	0	0	0	0
	9	146	53	32	0	0	0	0	0	0	0	0
	10	147	1815	32	0	0	0	0	0	0	0	0
	11	148										
Lincoln Blvd.	1	149	218	32	2	32	0	0	2	32	2	32
	2	150	249	32	3	32	0	0	3	32	3	32
	3	151	249	32	3	32	0	0	3	32	3	32
	4	152	249	32	3	32	0	0	3	32	3	32
	5	153	249	32	3	32	0	0	3	32	3	32

	6	154	249	32	3	32	0	0	3	32	3	32
	7	155	249	32	3	32	0	0	3	32	3	32
	8	156	249	32	3	32	0	0	3	32	3	32
	9	157	290	32	3	32	0	0	3	32	3	32
	10	158	141	32	1	32	0	0	1	32	1	32
	11	159	141	32	1	32	0	0	1	32	1	32
	12	160	141	32	1	32	0	0	1	32	1	32
	13	161	141	32	1	32	0	0	1	32	1	32
	14	162	141	32	1	32	0	0	1	32	1	32
	15	163	141	32	1	32	0	0	1	32	1	32
	16	164	141	32	1	32	0	0	1	32	1	32
	17	165	141	32	1	32	0	0	1	32	1	32
	18	166	141	32	1	32	0	0	1	32	1	32
	19	167	404	32	4	32	0	0	4	32	4	32
	20	168	404	32	4	32	0	0	4	32	4	32
	21	169	848	32	8	32	0	0	8	32	8	32
	22	170	913	32	9	32	0	0	9	32	9	32
	23	171										
Gorgas Avenue	1	172	320	32	0	0	0	0	0	0	0	0
	2	173	320	32	0	0	0	0	0	0	0	0
	3	174	320	32	0	0	0	0	0	0	0	0
	4	175	320	32	0	0	0	0	0	0	0	0
	5	176	320	32	0	0	0	0	0	0	0	0
	6	177	320	32	0	0	0	0	0	0	0	0
	7	178										
Halleck Street	1	179	67	32	0	0	0	0	0	0	0	0
	2	180	67	32	0	0	0	0	0	0	0	0
	3	181										
Girard Road	1	182	698	32	0	0	0	0	0	0	0	0
	2	183	698	32	0	0	0	0	0	0	0	0
	3	184	698	32	0	0	0	0	0	0	0	0
	4	185										
Baker Street	1	186	19	32	0	0	0	0	0	0	0	0
	2	187										

Montgomery Street	1	188	114	32	2	32	0	0	2	32	2	32
	2	189	114	32	2	32	0	0	2	32	2	32
	3	190										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace 2030 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria					Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria		NR Goal		
								LAeq1h	Sub'l			
			m	m	m	m	dBA	dBA	dB	dB		
1-Palace of Fine Arts near Richardson	1	0	1,426.0	0.0	4.00	1.50	0.00	66	12.0	10.0		Y
2-Palace of Fine Arts near Girard	2	0	1,446.0	202.0	4.00	1.50	0.00	66	12.0	10.0		Y
3-Building 1187/1188	3	0	1,466.0	272.0	2.40	1.50	81.00	71	12.0	10.0		Y
4-Building 1182	5	0	1,406.0	240.0	2.40	1.50	81.00	71	12.0	10.0		Y
5-Building 1183/1186	6	0	1,326.0	230.0	2.40	1.50	81.00	71	12.0	10.0		Y
6-Building 1184/1185	7	0	1,206.0	208.0	2.40	1.50	81.00	71	12.0	10.0		Y
7-Building 603/Crissy Center	8	0	880.0	176.0	3.00	1.50	72.00	71	12.0	10.0		Y
8-PX Building	9	0	816.0	118.0	3.00	1.50	0.00	71	12.0	10.0		Y
9-Post Commissary/Sports Basement	10	0	552.0	16.0	4.00	1.50	69.00	71	12.0	10.0		Y
10-Battery Blaney/635	11	0	270.0	-34.0	24.00	1.50	68.00	66	12.0	10.0		Y
11-Battery Slaughter	12	0	208.0	-40.0	28.00	1.50	68.00	66	12.0	10.0		Y
12-Battery Sherwood/636	13	0	80.0	6.0	29.00	1.50	68.00	66	12.0	10.0		Y
13-Battery Baldwin	14	0	4.0	15.0	21.00	1.50	68.00	66	12.0	10.0		Y
14-Building 644	15	0	42.0	66.0	4.00	1.50	0.00	71	12.0	10.0		Y
15-Building 649	16	0	-64.0	48.0	4.00	1.50	0.00	66	12.0	10.0		Y
16-Building 650/Stilwell Hall	17	0	-140.0	52.0	5.00	1.50	70.00	66	12.0	10.0		Y
17-1253 Armistead Road	18	1	-502.0	258.0	45.00	1.50	66.00	66	12.0	10.0		Y
18-Home on Armistead Road	19	1	-674.0	320.0	57.00	1.50	66.00	66	12.0	10.0		Y
19-Building 969	20	0	-604.0	748.0	38.00	1.50	0.00	71	12.0	10.0		Y
20-Building 968	21	0	-788.0	762.0	38.00	1.50	0.00	71	12.0	10.0		Y
21-Building 967	22	0	-910.0	750.0	46.00	1.50	0.00	71	12.0	10.0		Y
22-Building 966	23	0	-920.0	754.0	46.00	1.50	0.00	71	12.0	10.0		Y

23-Building 964	24	1	-818.0	846.0	46.00	1.50	0.00	66	12.0	10.0	Y
24-Building 963	25	1	-840.0	804.0	46.00	1.50	0.00	66	12.0	10.0	Y
25-Building 962	26	1	-814.0	816.0	46.00	1.50	0.00	66	12.0	10.0	Y
26-Unknown Building	27	0	-1,132.0	697.0	58.00	1.50	0.00	71	12.0	10.0	Y
27-Log Cabin	28	0	-720.0	188.0	64.00	1.50	63.00	66	12.0	10.0	Y
28-Unknown Building	29	0	-988.0	408.0	65.00	1.50	0.00	71	12.0	10.0	Y
29-Building 1298 Storey Ave.	30	2	-682.0	136.0	63.00	1.50	66.50	66	12.0	10.0	Y
30-Building 1297 Storey Ave.	31	2	-664.0	140.0	62.00	1.50	66.50	66	12.0	10.0	Y
31-Building 1295 Storey Ave.	32	2	-632.0	130.0	62.00	1.50	66.50	66	12.0	10.0	Y
32-Building 1294 Storey Ave.	33	2	-614.0	132.0	59.00	1.50	66.50	66	12.0	10.0	Y
33-Building 1293 Storey Ave.	34	2	-580.0	122.0	57.00	1.50	66.50	66	12.0	10.0	Y
34-Building 1291 Storey Ave.	35	2	-552.0	112.0	56.00	1.50	66.50	66	12.0	10.0	Y
35-Building 1290 Storey Ave.	36	2	-528.0	100.0	55.00	1.50	66.50	66	12.0	10.0	Y
36-Building 1289 Storey Ave.	37	2	-510.0	66.0	53.00	1.50	66.50	66	12.0	10.0	Y
37-Building 1263 Storey Ave.	38	2	-420.0	-114.0	61.00	1.50	0.00	66	12.0	10.0	Y
38-Building 682/Cross Cultural Center	39	0	-350.0	-228.0	38.00	1.50	65.50	66	12.0	10.0	Y
39-Building 661/Cavalry Stables Pen	40	0	-256.0	-26.0	21.00	1.50	64.00	71	12.0	10.0	Y
40-Building 662/Cavalry Stable	41	0	-214.0	-50.0	20.00	1.50	64.00	71	12.0	10.0	Y
41-Building 663/Cavalry Stable	42	0	-220.0	-80.0	23.00	1.50	64.00	71	12.0	10.0	Y
42-Building 667/Cavalry Stable	43	0	-80.0	-78.0	18.00	1.50	64.00	71	12.0	10.0	Y
43-National Cemetery Grave Site	44	0	300.0	-102.0	29.00	1.50	69.00	66	12.0	10.0	Y
44-Building 129	45	1	414.0	-100.0	21.50	1.50	0.00	66	12.0	10.0	Y
45-Building 122	46	0	460.0	-90.0	21.00	1.50	0.00	71	12.0	10.0	Y
46-Building 108	47	0	536.0	-64.0	17.00	1.50	0.00	71	12.0	10.0	Y
47-Building 107	48	0	546.0	-48.0	16.00	1.50	0.00	71	12.0	10.0	Y
48-Building 104	49	0	566.0	-72.0	16.00	1.50	74.00	71	12.0	10.0	Y
49-Building 105	50	0	598.0	-20.0	14.00	1.50	74.00	71	12.0	10.0	Y
50-Building 106	51	0	632.0	0.0	12.00	1.50	76.00	71	12.0	10.0	Y
51-Building 211	52	0	744.0	28.0	12.00	1.50	0.00	71	12.0	10.0	Y
52-Building 204	53	0	834.0	68.0	4.00	1.50	0.00	71	12.0	10.0	Y
53-Building 210	54	0	734.0	-16.0	13.00	1.50	0.00	71	12.0	10.0	Y
54-Building 201	55	0	940.0	106.0	4.00	1.50	0.00	71	12.0	10.0	Y
55-Building 220	56	0	908.0	-16.0	7.60	1.50	0.00	71	12.0	10.0	Y
56-Building 231	57	0	970.0	80.0	6.00	1.50	0.00	71	12.0	10.0	Y
57-Building 228	58	0	958.0	60.0	6.50	1.50	0.00	71	12.0	10.0	Y

58-Building 229	60	0	950.0	32.0	7.00	1.50	0.00	71	12.0	10.0	Y
59-Building 223	61	0	950.0	-14.0	8.00	1.50	0.00	71	12.0	10.0	Y
60-Building 230	62	0	1,050.0	112.0	4.00	1.50	0.00	71	12.0	10.0	Y
61-Building 1029/Swords to Plowshares	63	100	1,020.0	16.0	6.00	1.50	57.00	66	12.0	10.0	Y
62-Building 1030/Swords to Plowshares	64	100	1,014.0	-20.0	6.00	1.50	57.00	66	12.0	10.0	Y
63-Building 1063	66	0	1,160.0	44.0	2.00	1.50	68.50	71	12.0	10.0	Y
64-Building 1062	68	0	1,178.0	0.0	2.00	1.50	68.50	71	12.0	10.0	Y
65-Building 1060	69	0	1,224.0	-22.0	2.00	1.50	68.50	71	12.0	10.0	Y
66-Building 1167	70	0	1,216.0	94.0	2.00	1.50	68.00	71	12.0	10.0	Y
67-Building 1163	71	0	1,212.0	76.0	2.00	1.50	0.00	71	12.0	10.0	Y
68-Building 1169	72	0	1,280.0	50.0	2.00	1.50	68.00	71	12.0	10.0	Y
69-Building 1162	73	0	1,266.0	32.0	2.00	1.50	0.00	71	12.0	10.0	Y
70-Building 1170	74	0	1,360.0	-16.0	2.00	1.50	68.00	71	12.0	10.0	Y
71-Building 1161	75	0	1,368.0	-48.0	2.00	1.50	0.00	71	12.0	10.0	Y
72-Building 1160	76	0	1,398.0	-50.0	2.00	1.50	0.00	71	12.0	10.0	Y
73-Building 1152/YMCA	77	0	1,420.0	-76.0	2.00	1.50	0.00	66	12.0	10.0	Y
74-Building 1151/YMCA Pool	78	0	1,476.0	-114.0	4.00	1.50	0.00	66	12.0	10.0	Y
75-Building 1004	79	0	1,300.0	-140.0	4.00	1.50	0.00	71	12.0	10.0	Y
76-Home at 3234 Lyon St.	81	8	1,560.0	-150.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Widen & Replace 2030 PM
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 20 deg C, 50% RH

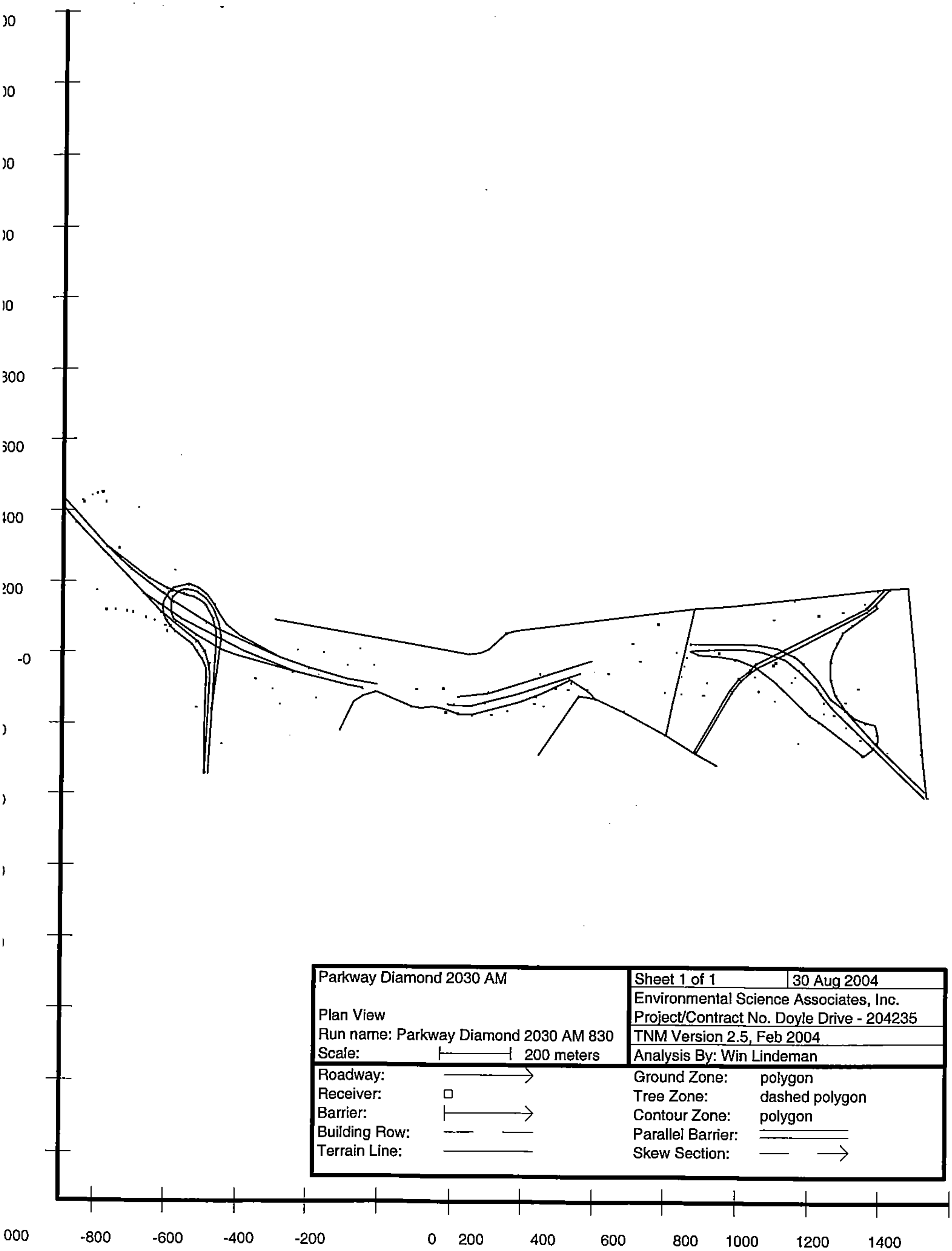
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1-Palace of Fine Arts near Richardson	1	0	0.0	67.9	66	67.9	12	Snd Lvl	67.9	0.0	10	-10.0
2-Palace of Fine Arts near Girard	2	0	0.0	64.1	66	64.1	12	—	64.1	0.0	10	-10.0
3-Building 1187/1188	3	0	81.0	66.6	71	-14.4	12	—	66.6	0.0	10	-10.0
4-Building 1182	5	0	81.0	64.0	71	-17.0	12	—	64.0	0.0	10	-10.0
5-Building 1183/1186	6	0	81.0	65.3	71	-15.7	12	—	65.3	0.0	10	-10.0
6-Building 1184/1185	7	0	81.0	65.8	71	-15.2	12	—	65.8	0.0	10	-10.0
7-Building 603/Crissy Center	8	0	72.0	66.3	71	-5.7	12	—	66.3	0.0	10	-10.0
8-PX Building	9	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
9-Post Commissary/Sports Basement	10	0	69.0	64.3	71	-4.7	12	—	64.3	0.0	10	-10.0
10-Battery Blaney/635	11	0	68.0	70.6	66	2.6	12	Snd Lvl	70.6	0.0	10	-10.0
11-Battery Slaughter	12	0	68.0	80.1	66	12.1	12	Both	80.1	0.0	10	-10.0
12-Battery Sherwood/636	13	0	68.0	76.1	66	8.1	12	Snd Lvl	76.1	0.0	10	-10.0
13-Battery Baldwin	14	0	68.0	64.9	66	-3.1	12	—	64.9	0.0	10	-10.0
14-Building 644	15	0	0.0	61.1	71	61.1	12	—	61.1	0.0	10	-10.0
15-Building 649	16	0	0.0	60.9	66	60.9	12	—	60.9	0.0	10	-10.0
16-Building 650/Stilwell Hall	17	0	70.0	59.9	66	-10.1	12	—	59.9	0.0	10	-10.0
17-1253 Armistead Road	18	1	66.0	65.5	66	-0.5	12	—	65.5	0.0	10	-10.0
18-Home on Armistead Road	19	1	66.0	72.3	66	6.3	12	Snd Lvl	72.3	0.0	10	-10.0
19-Building 969	20	0	0.0	52.7	71	52.7	12	—	52.7	0.0	10	-10.0
20-Building 968	21	0	0.0	54.2	71	54.2	12	—	54.2	0.0	10	-10.0
21-Building 967	22	0	0.0	56.2	71	56.2	12	—	56.2	0.0	10	-10.0
22-Building 966	23	0	0.0	56.1	71	56.1	12	—	56.1	0.0	10	-10.0
23-Building 964	24	1	0.0	53.8	66	53.8	12	—	53.8	0.0	10	-10.0

24-Building 963	25	1	0.0	54.7	66	54.7	12	—	54.7	0.0	10	-10.0
25-Building 962	26	1	0.0	54.5	66	54.5	12	—	54.5	0.0	10	-10.0
26-Unknown Building	27	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
27-Log Cabin	28	0	63.0	67.8	66	4.8	12	Snd Lvl	67.8	0.0	10	-10.0
28-Unknown Building	29	0	0.0	61.6	71	61.6	12	—	61.6	0.0	10	-10.0
29-Building 1298 Storey Ave.	30	2	66.5	66.9	66	0.4	12	Snd Lvl	66.9	0.0	10	-10.0
30-Building 1297 Storey Ave.	31	2	66.5	68.4	66	1.9	12	Snd Lvl	68.4	0.0	10	-10.0
31-Building 1295 Storey Ave.	32	2	66.5	70.4	66	3.9	12	Snd Lvl	70.4	0.0	10	-10.0
32-Building 1294 Storey Ave.	33	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
33-Building 1293 Storey Ave.	34	2	66.5	73.4	66	6.9	12	Snd Lvl	73.4	0.0	10	-10.0
34-Building 1291 Storey Ave.	35	2	66.5	73.8	66	7.3	12	Snd Lvl	73.8	0.0	10	-10.0
35-Building 1290 Storey Ave.	36	2	66.5	73.8	66	7.3	12	Snd Lvl	73.8	0.0	10	-10.0
36-Building 1289 Storey Ave.	37	2	66.5	71.3	66	4.8	12	Snd Lvl	71.3	0.0	10	-10.0
37-Building 1263 Storey Ave.	38	2	0.0	67.9	66	67.9	12	Snd Lvl	67.9	0.0	10	-10.0
38-Building 682/Cross Cultural Center	39	0	65.5	63.5	66	-2.0	12	—	63.5	0.0	10	-10.0
39-Building 661/Cavalry Stables Pen	40	0	64.0	66.4	71	2.4	12	—	66.4	0.0	10	-10.0
40-Building 662/Cavalry Stable	41	0	64.0	66.5	71	2.5	12	—	66.5	0.0	10	-10.0
41-Building 663/Cavalry Stable	42	0	64.0	65.3	71	1.3	12	—	65.3	0.0	10	-10.0
42-Building 667/Cavalry Stable	43	0	64.0	65.5	71	1.5	12	—	65.5	0.0	10	-10.0
43-National Cemetery Grave Site	44	0	69.0	75.1	66	6.1	12	Snd Lvl	75.1	0.0	10	-10.0
44-Building 129	45	1	0.0	67.6	66	67.6	12	Snd Lvl	67.6	0.0	10	-10.0
45-Building 122	46	0	0.0	72.1	71	72.1	12	Snd Lvl	72.1	0.0	10	-10.0
46-Building 108	47	0	0.0	71.7	71	71.7	12	Snd Lvl	71.7	0.0	10	-10.0
47-Building 107	48	0	0.0	73.1	71	73.1	12	Snd Lvl	73.1	0.0	10	-10.0
48-Building 104	49	0	74.0	70.0	71	-4.0	12	—	70.0	0.0	10	-10.0
49-Building 105	50	0	74.0	74.4	71	0.4	12	Snd Lvl	74.4	0.0	10	-10.0
50-Building 106	51	0	76.0	72.8	71	-3.2	12	Snd Lvl	72.8	0.0	10	-10.0
51-Building 211	52	0	0.0	73.9	71	73.9	12	Snd Lvl	73.9	0.0	10	-10.0
52-Building 204	53	0	0.0	66.5	71	66.5	12	—	66.5	0.0	10	-10.0
53-Building 210	54	0	0.0	70.7	71	70.7	12	—	70.7	0.0	10	-10.0
54-Building 201	55	0	0.0	64.1	71	64.1	12	—	64.1	0.0	10	-10.0
55-Building 220	56	0	0.0	64.6	71	64.6	12	—	64.6	0.0	10	-10.0
56-Building 231	57	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
57-Building 228	58	0	0.0	65.2	71	65.2	12	—	65.2	0.0	10	-10.0
58-Building 229	60	0	0.0	63.9	71	63.9	12	—	63.9	0.0	10	-10.0
59-Building 223	61	0	0.0	61.2	71	61.2	12	—	61.2	0.0	10	-10.0
60-Building 230	62	0	0.0	66.6	71	66.6	12	—	66.6	0.0	10	-10.0
61-Building 1029/Swords to Plowshares	63	100	57.0	62.8	66	5.8	12	—	62.8	0.0	10	-10.0
62-Building 1030/Swords to Plowshares	64	100	57.0	61.2	66	4.2	12	—	61.2	0.0	10	-10.0
63-Building 1063	66	0	68.5	61.9	71	-6.6	12	—	61.9	0.0	10	-10.0

64-Building 1062	68	0	68.5	59.7	71	-8.8	12	—	59.7	0.0	10	-10.0
65-Building 1060	69	0	68.5	59.0	71	-9.5	12	—	59.0	0.0	10	-10.0
66-Building 1167	70	0	68.0	65.2	71	-2.8	12	—	65.2	0.0	10	-10.0
67-Building 1163	71	0	0.0	64.4	71	64.4	12	—	64.4	0.0	10	-10.0
68-Building 1169	72	0	68.0	67.1	71	-0.9	12	—	67.1	0.0	10	-10.0
69-Building 1162	73	0	0.0	64.1	71	64.1	12	—	64.1	0.0	10	-10.0
70-Building 1170	74	0	68.0	70.7	71	2.7	12	—	70.7	0.0	10	-10.0
71-Building 1161	75	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
72-Building 1160	76	0	0.0	71.4	71	71.4	12	Snd Lvl	71.4	0.0	10	-10.0
73-Building 1152/YMCA	77	0	0.0	67.8	66	67.8	12	Snd Lvl	67.8	0.0	10	-10.0
74-Building 1151/YMCA Pool	78	0	0.0	74.8	66	74.8	12	Snd Lvl	74.8	0.0	10	-10.0
75-Building 1004	79	0	0.0	56.5	71	56.5	12	—	56.5	0.0	10	-10.0
76-Home at 3234 Lyon St.	81	8	76.5	72.9	66	-3.6	12	Snd Lvl	72.9	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	232	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



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Parkway Diamond 2030 AM
Plan View
Run name: Parkway Diamond 2030 AM 830
Scale: 200 meters
Sheet 1 of 1
30 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North I	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+5:	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00			Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00			Average	
		10 - 25+17	28	1,030.0	-108.0	3.50			Average	
		11 - 25+64	29	1,062.0	-146.0	3.00			Average	
		12 - Gorg	30	1,178.0	-259.0	4.00			Average	
		13 - Franc	31	1,320.0	-400.0	4.00				
WB Doyle from Fancisco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00			Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00			Average	
		3 - 26+00	34	1,095.0	-152.0	3.50			Average	
		4 - 25+40	35	1,055.0	-120.0	3.50			Average	
		5 - 24+73	36	1,018.0	-65.0	4.00			Average	
		6 - 24+20	37	977.0	-21.0	5.00			Average	
		7 - 23+75	38	950.0	0.0	6.00			Average	
		8 - 23+75	39	949.0	0.0	6.00			Average	Y
		9 - 23+22	40	900.0	22.0	6.00			Average	Y
		10 - 23+22	41	899.0	22.0	6.00			Average	
		11 - 22+68	42	843.0	34.0	6.00			Average	
		12 - 22+00	43	775.0	33.0	4.00			Average	
		13 - 20+85	44	661.0	31.0	2.00				
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50			Average	
		2 - 15+00	46	96.0	-107.0	10.00			Average	
		3 - 14+10	47	10.0	-119.0	14.00				
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00			Average	
		2 - 11+00	52	-295.0	-69.0	27.00			Average	
		3 - 11+00	53	-296.0	-69.0	27.00			Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00			Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00			Average	Y
		6 - 7+00	56	-661.0	69.0	44.00			Average	Y
		7 - 6+60	57	-696.0	88.0	46.00			Average	Y
		8 - 6+60	58	-697.0	88.0	46.00			Average	
		9 - 5+54	59	-789.0	145.0	50.00			Average	
		10 - 5+54	60	-790.0	145.0	50.00			Average	Y
		11 - 5+14	61	-817.0	169.0	52.00			Average	Y
		12 - 5+14	62	-818.0	169.0	52.00			Average	
		13 - 4+00	63	-907.0	237.0	56.00			Average	
		14 - 3+10	64	-975.0	300.0	56.00			Average	
		15 - 0+00	65	-1,170.0	522.0	53.00				
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00			Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherlan to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 AM

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	6340	88	66	88	13	88	66	88	66	88
	2 - 1+97.539	10	6340	88	66	88	13	88	66	88	66	88
	3 - 4+74	9	4190	88	43	88	9	88	43	88	43	88
	4 - 5+27	8	4190	88	43	88	9	88	43	88	43	88
	5 - 5+27	7	4190	88	43	88	9	88	43	88	43	88
	6 - 6+00	6	4190	88	43	88	9	88	43	88	43	88
	7 - 8+00	5	4190	88	43	88	9	88	43	88	43	88
	8 - 9+57	4	4793	88	50	88	10	88	50	88	50	88
	9 - 11+10	3	4793	88	50	88	10	88	50	88	50	88
	10 - 11+10	2	4793	88	50	88	10	88	50	88	50	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	4793	88	50	88	10	88	50	88	50	88
	2 - 14+10	17	4793	88	50	88	10	88	50	88	50	88
	3 - 14+60	16	4793	88	50	88	10	88	50	88	50	88
	4 - 15+00	15	4793	88	50	88	10	88	50	88	50	88
	5 - 15+85.44	14	4793	88	50	88	10	88	50	88	50	88
	6 - 17+33.198	13	4793	88	50	88	10	88	50	88	50	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	3030	56	31	56	6	56	31	56	31	56
	2 - 21+20	20	3030	56	31	56	6	56	31	56	31	56
	3 - 21+20	21	3030	56	31	56	6	56	31	56	31	56

	4 - 22+42.630	22	3030	56	31	56	6	56	31	56	31	56
	5 - 23+00	23	3030	56	31	56	6	56	31	56	31	56
	6 - 23+25	24	3030	56	31	56	6	56	31	56	31	56
	7 - 23+25	25	3030	56	31	56	6	56	31	56	31	56
	8 - 24+20	26	3030	56	31	56	6	56	31	56	31	56
	9 - 24+85.060	27	3030	56	31	56	6	56	31	56	31	56
	10 - 25+17.10	28	3030	56	31	56	6	56	31	56	31	56
	11 - 25+64.74	29	3030	56	31	56	6	56	31	56	31	56
	12 - Gorgas I	30	3030	56	31	56	6	56	31	56	31	56
	13 - Francisco	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	2708	56	28	56	37	56	17	56	28	56
	2 - 27+20.608	33	2708	56	28	56	37	56	17	56	28	56
	3 - 26+00	34	2708	56	28	56	37	56	17	56	28	56
	4 - 25+40	35	2708	56	28	56	37	56	17	56	28	56
	5 - 24+73	36	2708	56	28	56	37	56	17	56	28	56
	6 - 24+20	37	2708	56	28	56	37	56	17	56	28	56
	7 - 23+75	38	2708	56	28	56	37	56	17	56	28	56
	8 - 23+75	39	2708	56	28	56	37	56	17	56	28	56
	9 - 23+22	40	2708	56	28	56	37	56	17	56	28	56
	10 - 23+22	41	2708	56	28	56	37	56	17	56	28	56
	11 - 22+68	42	2708	56	28	56	37	56	17	56	28	56
	12 - 22+00	43	2708	56	28	56	37	56	17	56	28	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	2877	88	30	88	39	88	18	88	30	88
	2 - 15+00	46	2877	88	30	88	39	88	18	88	30	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	2877	88	30	88	39	88	18	88	30	88
	2 - 11+00	52	2877	88	30	88	39	88	18	88	30	88
	3 - 11+00	53	2877	88	30	88	39	88	18	88	30	88
	4 - 9+80	54	2877	88	30	88	39	88	18	88	30	88
	5 - 8+73	55	2877	88	30	88	39	88	18	88	30	88
	6 - 7+00	56	2877	88	30	88	39	88	18	88	30	88
	7 - 6+60	57	2877	88	30	88	39	88	18	88	30	88
	8 - 6+60	58	2877	88	30	88	39	88	18	88	30	88

	9 - 5+54	59	2877	88	30	88	39	88	18	88	30	88
	10 - 5+54	60	2877	88	30	88	39	88	18	88	30	88
	11 - 5+14	61	2877	88	30	88	39	88	18	88	30	88
	12 - 5+14	62	2877	88	30	88	39	88	18	88	30	88
	13 - 4+00	63	2877	88	30	88	39	88	18	88	30	88
	14 - 3+10	64	4892	88	51	88	66	88	31	88	51	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	340	56	4	56	5	56	2	56	4	56
	2 - 1+30	67	340	56	4	56	5	56	2	56	4	56
	3 - 1+80	68	340	56	4	56	5	56	2	56	4	56
	4 - 2+20	69	340	56	4	56	5	56	2	56	4	56
	5 - 2+20	70	340	56	4	56	5	56	2	56	4	56
	6 - 2+48	71	340	56	4	56	5	56	2	56	4	56
	7 - 3+09	72	340	56	4	56	5	56	2	56	4	56
	8 - 3+40	73	340	56	4	56	5	56	2	56	4	56
	9 - 3+60	74	340	56	4	56	5	56	2	56	4	56
	10 - 3+80	75	340	56	4	56	5	56	2	56	4	56
	11 - 4+00	76	340	56	4	56	5	56	2	56	4	56
	12 - 4+20	77	340	56	4	56	5	56	2	56	4	56
	13 - 4+40	78	340	56	4	56	5	56	2	56	4	56
	14 - 4+59	79	340	56	4	56	5	56	2	56	4	56
	15 - 4+80	80	340	56	4	56	5	56	2	56	4	56
	16 - 5+00	81	340	56	4	56	5	56	2	56	4	56
	17 - 5+20	82	340	56	4	56	5	56	2	56	4	56
	18 - 5+80	83	340	56	4	56	5	56	2	56	4	56
	19 - 6+06	84	340	56	4	56	5	56	2	56	4	56
	20 - 6+31	85	340	56	4	56	5	56	2	56	4	56
	21 - 6+60	86	340	56	4	56	5	56	2	56	4	56
	22 - 6+88	87	340	56	4	56	5	56	2	56	4	56
	23 - 8+23	169	340	56	4	56	5	56	2	56	4	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2385	56	25	56	25	56	0	0	17	56
	2A	170	2385	56	25	56	25	56	0	0	17	56
	2 - 3+72.391	90	2385	56	25	56	25	56	0	0	17	56

	3 - 4+00	91	2385	56	25	56	25	56	0	0	17	56
	4 - 4+40	92	2385	56	25	56	25	56	0	0	17	56
	5 - 4+60	93	2385	56	25	56	25	56	0	0	17	56
	6 - 5+00	94	2385	56	25	56	25	56	0	0	17	56
	7 - 5+20	95	2385	56	25	56	25	56	0	0	17	56
	8 - 5+40	96	2385	56	25	56	25	56	0	0	17	56
	9 - 5+53	97	2385	56	25	56	25	56	0	0	17	56
	10 - 5+53	98	2385	56	25	56	25	56	0	0	17	56
	11 - 5+80	99	2385	56	25	56	25	56	0	0	17	56
	12 - 5+98	100	2385	56	25	56	25	56	0	0	17	56
	13 - 5+98	101	2385	56	25	56	25	56	0	0	17	56
	14 - 6+58.037	102	2385	56	25	56	25	56	0	0	17	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	602	56	4	56	6	56	6	56	4	56
	2 - 1+35.965	105	602	56	4	56	6	56	6	56	4	56
	3 - 1+60	106	602	56	4	56	6	56	6	56	4	56
	4 - 1+80	107	602	56	4	56	6	56	6	56	4	56
	5 - 2+00	108	602	56	4	56	6	56	6	56	4	56
	6 - 2+20	109	602	56	4	56	6	56	6	56	4	56
	7 - 2+40	110	602	56	4	56	6	56	6	56	4	56
	8 - 2+60	111	602	56	4	56	6	56	6	56	4	56
	9 - 2+81.908	112	602	56	4	56	6	56	6	56	4	56
	10 - 3+09.875	113	602	56	4	56	6	56	6	56	4	56
	11 - 3+40	114	602	56	4	56	6	56	6	56	4	56
	12 - 3+60	115	602	56	4	56	6	56	6	56	4	56
	13 - 3+80	116	602	56	4	56	6	56	6	56	4	56
	14 - 4+00	117	602	56	4	56	6	56	6	56	4	56
	15 - 4+20	118	602	56	4	56	6	56	6	56	4	56
	16 - 4+40	119	602	56	4	56	6	56	6	56	4	56
	17 - 4+53.16	120	602	56	4	56	6	56	6	56	4	56
	18 - 5+20	121	602	56	4	56	6	56	6	56	4	56
	19 - 5+20	122	602	56	4	56	6	56	6	56	4	56
	20 - 6+00	123	602	56	4	56	6	56	6	56	4	56
	21 - 6+40	124	602	56	4	56	6	56	6	56	4	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2373	56	25	56	5	56	25	56	25	56
	2 - 0+65	129	2373	56	25	56	5	56	25	56	25	56
	3 - 0+65	130	2373	56	25	56	5	56	25	56	25	56
	4 - 2+00	131	2373	56	25	56	5	56	25	56	25	56
	5 - 2+00	132	2373	56	25	56	5	56	25	56	25	56
	6 - 2+40	133	2373	56	25	56	5	56	25	56	25	56
	7 - 2+80	134	2373	56	25	56	5	56	25	56	25	56
	8 - 3+14.595	135	2373	56	25	56	5	56	25	56	25	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	385	56	0	0	0	0	0	0	0	0
	2 - 0+42	138	385	56	0	0	0	0	0	0	0	0
	3 - 0+42	139	385	56	0	0	0	0	0	0	0	0
	4 - 1+00	140	385	56	0	0	0	0	0	0	0	0
	5 - 1+50	141	385	56	0	0	0	0	0	0	0	0
	6 - 1+50	142	385	56	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	385	56	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	385	56	0	0	0	0	0	0	0	0
	9	145	385	56	0	0	0	0	0	0	0	0
	10	146	385	56	0	0	0	0	0	0	0	0
	11	147	385	56	0	0	0	0	0	0	0	0
	12	148	385	56	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	111	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	111	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	111	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	111	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	111	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	111	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	111	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	79	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	79	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	79	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	79	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	79	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	79	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	79	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	79	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	42	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	42	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	98	32	2	32	0	0	2	32	2	32
	2	181	98	32	2	32	0	0	2	32	2	32
	3	182	98	32	2	32	0	0	2	32	2	32
	4	183	187	32	2	32	0	0	2	32	2	32
	5	184	187	32	2	32	0	0	2	32	2	32
	6	185	187	32	2	32	0	0	2	32	2	32
	7	186	187	32	2	32	0	0	2	32	2	32
	8	187	187	32	2	32	0	0	2	32	2	32
	9	188	187	32	2	32	0	0	2	32	2	32
	10	189	190	32	2	32	0	0	2	32	2	32
	11	190	54	32	1	32	0	0	1	32	1	32
	12	191	54	32	1	32	0	0	1	32	1	32
	13	192	54	32	1	32	0	0	1	32	1	32
	14	193	54	32	1	32	0	0	1	32	1	32
	15	194	54	32	1	32	0	0	1	32	1	32
	16	195	251	32	2	32	0	0	2	32	2	32
	17	196	251	32	2	32	0	0	2	32	2	32
	18	197	715	32	7	32	0	0	7	32	7	32
	19	198	782	32	8	32	0	0	8	32	8	32
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	4	32	0	0	0	0	0	0	0	0
	2	201	4	32	0	0	0	0	0	0	0	0
	3	202	4	32	0	0	0	0	0	0	0	0
	4	203	4	32	0	0	0	0	0	0	0	0
	5	204	4	32	0	0	0	0	0	0	0	0

	6	205	4	32	0	0	0	0	0	0	0	0
	7	206	15	32	0	0	0	0	0	0	0	0
	8	207	15	32	0	0	0	0	0	0	0	0
	9	208	17	32	0	0	0	0	0	0	0	0
	10	209	1495	32	0	0	0	0	0	0	0	0
	11	210	1495	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	83	32	1	32	0	0	0	0	1	32
	2	213	3	32	1	32	0	0	0	0	1	32
	3	214	8	32	1	32	0	0	0	0	1	32
	4	215	8	32	1	32	0	0	0	0	1	32
	5	216										
Palace Drive from Richardson to Marina	1	217	35	32	0	0	0	0	0	0	0	0
	2	218	35	32	0	0	0	0	0	0	0	0
	3	219	35	32	0	0	0	0	0	0	0	0
	4	220	35	32	0	0	0	0	0	0	0	0
	5	221	35	32	0	0	0	0	0	0	0	0
	6	222	35	32	0	0	0	0	0	0	0	0
	7	223	35	32	0	0	0	0	0	0	0	0
	8	224	35	32	0	0	0	0	0	0	0	0
	9	225	35	32	0	0	0	0	0	0	0	0
	10	226	35	32	0	0	0	0	0	0	0	0
	11	227	35	32	0	0	0	0	0	0	0	0
	12	228	35	32	0	0	0	0	0	0	0	0
	13	229	35	32	0	0	0	0	0	0	0	0
	14	230	35	32	0	0	0	0	0	0	0	0
	15	231	35	32	0	0	0	0	0	0	0	0
	16	232	35	32	0	0	0	0	0	0	0	0
	17	233	35	32	0	0	0	0	0	0	0	0
	18	234	35	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherlan to Lincoln	1	236	110	32	2	32	0	0	2	32	2	32
	2	237	110	32	2	32	0	0	2	32	2	32
	3	238										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 AM

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 AM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

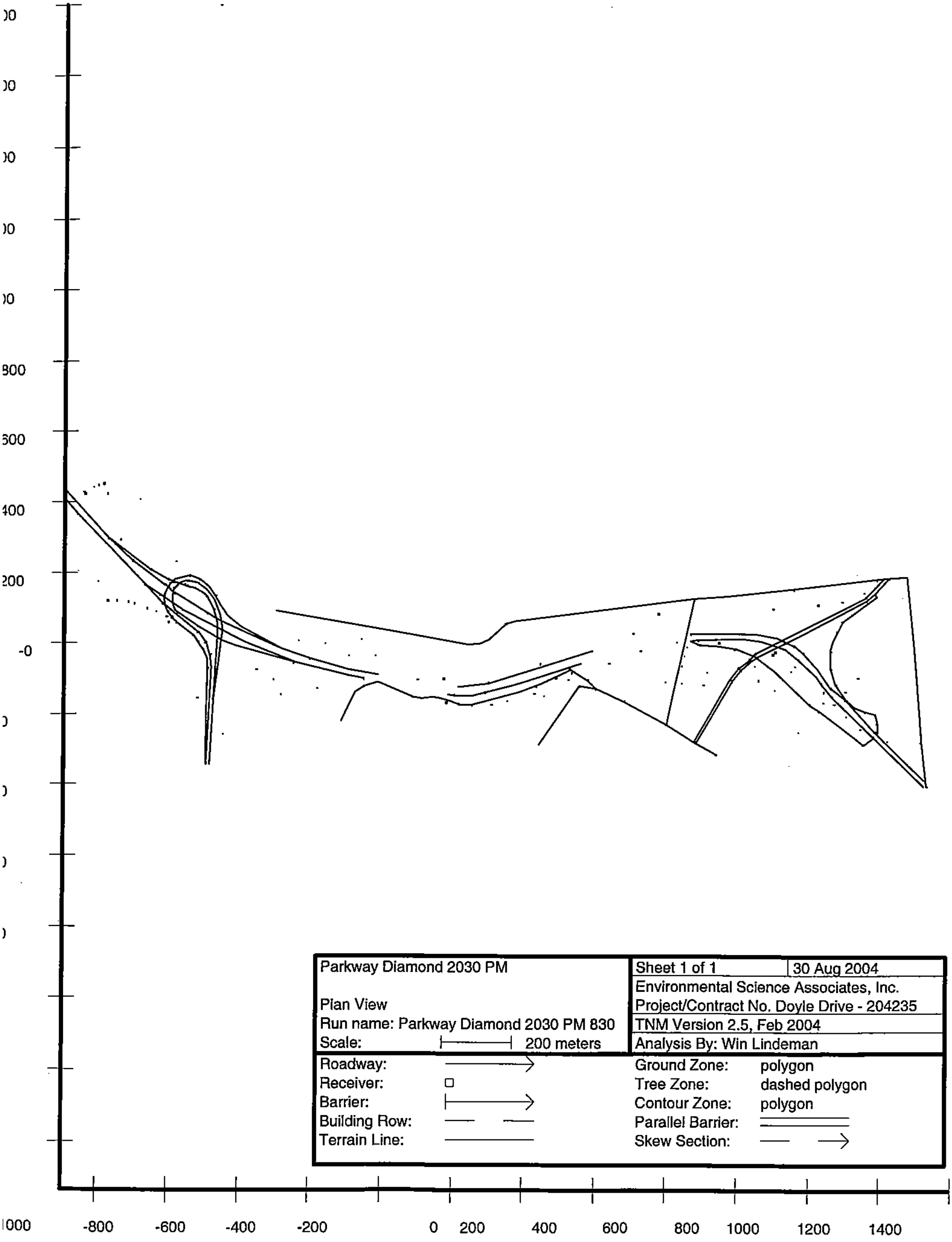
ATMOSPHERICS: 20 deg C, 50% RH

Receiver				No Barrier						With Barrier			
Name	No.	#DUs	Existing LAeq1h	LAeq1h		Increase over existing		Type Impact		Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc				Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.7	66	69.7	12	Snd Lvl		69.7	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	62.0	66	62.0	12	—		62.0	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	57.3	71	-23.7	12	—		57.3	0.0	10	-10.0
4 Building 1182	4	0	81.0	56.1	71	-24.9	12	—		56.1	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	57.0	71	-24.0	12	—		57.0	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.5	71	-21.5	12	—		59.5	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.3	71	-15.7	12	—		56.3	0.0	10	-10.0
8 PX Building	8	0	0.0	59.2	71	59.2	12	—		59.2	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	69.8	66	0.8	12	Snd Lvl		69.8	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.4	66	1.4	12	Snd Lvl		69.4	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.4	66	-2.6	12	—		65.4	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.0	66	-3.0	12	—		65.0	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	67.6	66	-0.4	12	Snd Lvl		67.6	0.0	10	-10.0
14 Building 644	14	0	0.0	60.1	71	60.1	12	—		60.1	0.0	10	-10.0
15 Building 649	15	0	0.0	60.7	66	60.7	12	—		60.7	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.3	66	-10.7	12	—		59.3	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.8	66	-1.2	12	—		64.8	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	76.9	66	10.9	12	Snd Lvl		76.9	0.0	10	-10.0
19 Building 969	19	0	0.0	58.4	71	58.4	12	—		58.4	0.0	10	-10.0
20 Building 968	20	0	0.0	60.1	71	60.1	12	—		60.1	0.0	10	-10.0
21 Building 967	21	0	0.0	65.4	71	65.4	12	—		65.4	0.0	10	-10.0
22 Building 966	22	0	0.0	65.4	71	65.4	12	—		65.4	0.0	10	-10.0
23 Building 964	23	0	0.0	63.5	66	63.5	12	—		63.5	0.0	10	-10.0

24 Building 963	24	0	0.0	62.8	66	62.8	12	—	62.8	0.0	10	-10.0
25 Building 962	25	0	0.0	62.1	66	62.1	12	—	62.1	0.0	10	-10.0
26 Unknown Building	26	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.8	66	5.8	12	Snd Lvl	68.8	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.6	66	2.1	12	Snd Lvl	68.6	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.7	66	4.2	12	Snd Lvl	70.7	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.3	66	4.8	12	Snd Lvl	71.3	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.4	66	5.9	12	Snd Lvl	72.4	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	73.0	66	6.5	12	Snd Lvl	73.0	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.7	66	7.2	12	Snd Lvl	73.7	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.2	66	69.2	12	Snd Lvl	69.2	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.4	66	-0.1	12	—	65.4	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	60.3	71	-3.7	12	—	60.3	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.4	71	-1.6	12	—	62.4	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.3	71	-0.7	12	—	63.3	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.1	71	3.1	12	—	67.1	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	63.1	66	-5.9	12	—	63.1	0.0	10	-10.0
44 Building 129	44	1	0.0	56.9	66	56.9	12	—	56.9	0.0	10	-10.0
45 Building 122	45	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
46 Building 108	46	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
47 Building 107	47	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
48 Building 104	48	0	74.0	58.4	71	-15.6	12	—	58.4	0.0	10	-10.0
49 Building 105	49	0	74.0	73.1	71	-0.9	12	Snd Lvl	73.1	0.0	10	-10.0
50 Building 106	50	0	76.0	71.7	71	-4.3	12	Snd Lvl	71.7	0.0	10	-10.0
51 Building 211	51	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
52 Building 204	52	0	0.0	59.1	71	59.1	12	—	59.1	0.0	10	-10.0
53 Building 210	53	0	0.0	62.3	71	62.3	12	—	62.3	0.0	10	-10.0
54 Building 201	54	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
55 Building 220	55	0	0.0	53.5	71	53.5	12	—	53.5	0.0	10	-10.0
56 Building 231	56	0	0.0	66.0	71	66.0	12	—	66.0	0.0	10	-10.0
57 Building 228	57	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
58 Building 229	58	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
59 Building 223	59	0	0.0	57.3	71	57.3	12	—	57.3	0.0	10	-10.0
60 Building 230	60	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	60.1	66	3.1	12	—	60.1	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.6	66	0.6	12	—	57.6	0.0	10	-10.0
63 Building 1063	63	0	68.5	62.8	71	-5.7	12	—	62.8	0.0	10	-10.0

64 Building 1062	64	0	68.5	59.6	71	-8.9	12	—	59.6	0.0	10	-10.0
65 Building 1060	65	0	68.5	60.0	71	-8.5	12	—	60.0	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.1	71	-2.9	12	—	65.1	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.2	71	65.2	12	—	65.2	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.8	71	-3.2	12	—	64.8	0.0	10	-10.0
69 Building 1162	69	0	0.0	63.4	71	63.4	12	—	63.4	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.8	71	3.8	12	Snd Lvl	71.8	0.0	10	-10.0
71 Building 1161	71	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	71.5	66	71.5	12	Snd Lvl	71.5	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.9	66	72.9	12	Snd Lvl	72.9	0.0	10	-10.0
75 Building 1004	75	0	0.0	57.1	71	57.1	12	—	57.1	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	74.3	66	-2.2	12	Snd Lvl	74.3	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Parkway Diamond 2030 PM

Plan View

Run name: Parkway Diamond 2030 PM 830

Scale: 200 meters

Sheet 1 of 1 | 30 Aug 2004

Environmental Science Associates, Inc.

Project/Contract No. Doyle Drive - 204235

TNM Version 2.5, Feb 2004

Analysis By: Win Lindeman

Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North I	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+5:	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,178.0	-259.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fanclsco to South Tunnel	10.8	1 - Francls	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presldio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65.	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle to North Tunnel	1 - North End	11	5438	88	17	88	73	88	62	88	17	88	
	2 - 1+97.539	10	5438	88	17	88	73	88	62	88	17	88	
	3 - 4+74	9	3091	88	10	88	41	88	35	88	10	88	
	4 - 5+27	8	3091	88	10	88	41	88	35	88	10	88	
	5 - 5+27	7	3091	88	10	88	41	88	35	88	10	88	
	6 - 6+00	6	3091	88	10	88	41	88	35	88	10	88	
	7 - 8+00	5	3091	88	10	88	9	88	41	88	10	88	
	8 - 9+57	4	3668	88	11	88	49	88	42	88	11	88	
	9 - 11+10	3	4732	88	49	88	10	88	49	88	49	88	
	10 - 11+10	2	3668	88	11	88	49	88	42	88	11	88	
	11 - 11+53	1											
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	3668	88	11	88	49	88	42	88	11	88	
	2 - 14+10	17	3668	88	11	88	49	88	42	88	11	88	
	3 - 14+60	16	3668	88	11	88	49	88	42	88	11	88	
	4 - 15+00	15	3668	88	11	88	49	88	42	88	11	88	
	5 - 15+85.44	14	3668	88	11	88	49	88	42	88	11	88	
	6 - 17+33.198	13	3668	88	11	88	49	88	42	88	11	88	
	7 - 17+80	12											
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2324	56	7	56	31	56	26	56	7	56	
	2 - 21+20	20	2324	56	7	56	31	56	26	56	7	56	
	3 - 21+20	21	2324	56	7	56	31	56	26	56	7	56	

	4 - 22+42.630	22	2324	56	7	56	31	56	26	56	7	56
	5 - 23+00	23	2324	56	7	56	31	56	26	56	7	56
	6 - 23+25	24	2324	56	7	56	31	56	26	56	7	56
	7 - 23+25	25	2324	56	7	56	31	56	26	56	7	56
	8 - 24+20	26	2324	56	7	56	31	56	26	56	7	56
	9 - 24+85.060	27	2324	56	7	56	31	56	26	56	7	56
	10 - 25+17.10	28	2324	56	7	56	31	56	26	56	7	56
	11 - 25+64.74	29	2324	56	7	56	31	56	26	56	7	56
	12 - Gorgas I	30	2324	56	7	56	31	56	26	56	7	56
	13 - Francisco	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	3268	56	0	0	7	56	92	56	34	56
	2 - 27+20.608	33	3268	56	0	0	7	56	92	56	34	56
	3 - 26+00	34	3268	56	0	0	7	56	92	56	34	56
	4 - 25+40	35	3268	56	0	0	7	56	92	56	34	56
	5 - 24+73	36	3268	56	0	0	7	56	92	56	34	56
	6 - 24+20	37	3268	56	0	0	7	56	92	56	34	56
	7 - 23+75	38	3268	56	0	0	7	56	92	56	34	56
	8 - 23+75	39	3268	56	0	0	7	56	92	56	34	56
	9 - 23+22	40	3268	56	0	0	7	56	92	56	34	56
	10 - 23+22	41	3268	56	0	0	7	56	92	56	34	56
	11 - 22+68	42	3268	56	0	0	7	56	92	56	34	56
	12 - 22+00	43	3268	56	0	0	7	56	92	56	34	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	4732	88	0	0	10	88	133	88	49	88
	2 - 15+00	46	4732	88	0	0	10	88	133	88	49	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	4732	88	0	0	10	88	133	88	49	88
	2 - 11+00	52	4732	88	0	0	10	88	133	88	49	88
	3 - 11+00	53	4732	88	0	0	10	88	133	88	49	88
	4 - 9+80	54	4732	88	0	0	10	88	133	88	49	88
	5 - 8+73	55	4086	88	0	0	9	88	115	88	43	88
	6 - 7+00	56	4086	88	0	0	9	88	115	88	43	88
	7 - 6+60	57	4086	88	0	0	9	88	115	88	43	88
	8 - 6+60	58	4086	88	0	0	9	88	115	88	43	88

	9 - 5+54	59	4086	88	0	0	9	88	115	88	43	88
	10 - 5+54	60	4086	88	0	0	9	88	115	88	43	88
	11 - 5+14	61	4086	88	0	0	9	88	115	88	43	88
	12 - 5+14	62	4086	88	0	0	9	88	115	88	43	88
	13 - 4+00	63	4086	88	0	0	9	88	115	88	43	88
	14 - 3+10	64	6197	88	0	0	13	88	174	88	64	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	645	56	0	0	1	56	18	56	7	56
	2 - 1+30	67	645	56	0	0	1	56	18	56	7	56
	3 - 1+80	68	645	56	0	0	1	56	18	56	7	56
	4 - 2+20	69	645	56	0	0	1	56	18	56	7	56
	5 - 2+20	70	645	56	0	0	1	56	18	56	7	56
	6 - 2+48	71	645	56	0	0	1	56	18	56	7	56
	7 - 3+09	72	645	56	0	0	1	56	18	56	7	56
	8 - 3+40	73	645	56	0	0	1	56	18	56	7	56
	9 - 3+60	74	645	56	0	0	1	56	18	56	7	56
	10 - 3+80	75	645	56	0	0	1	56	18	56	7	56
	11 - 4+00	76	645	56	0	0	1	56	18	56	7	56
	12 - 4+20	77	645	56	0	0	1	56	18	56	7	56
	13 - 4+40	78	645	56	0	0	1	56	18	56	7	56
	14 - 4+59	79	645	56	0	0	1	56	18	56	7	56
	15 - 4+80	80	645	56	0	0	1	56	18	56	7	56
	16 - 5+00	81	645	56	0	0	1	56	18	56	7	56
	17 - 5+20	82	645	56	0	0	1	56	18	56	7	56
	18 - 5+80	83	645	56	0	0	1	56	18	56	7	56
	19 - 6+06	84	645	56	0	0	1	56	18	56	7	56
	20 - 6+31	85	645	56	0	0	1	56	18	56	7	56
	21 - 6+60	86	645	56	0	0	1	56	18	56	7	56
	22 - 6+88	87	645	56	0	0	1	56	18	56	7	56
	23 - 8+23	169	645	56	0	0	1	56	18	56	7	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2141	56	0	0	9	56	22	56	24	56
	2A	170	2141	56	0	0	9	56	22	56	24	56
	2 - 3+72.391	90	2141	56	0	0	9	56	22	56	24	56

	3 - 4+00	91	2141	56	0	0	9	56	22	56	24	56
	4 - 4+40	92	2141	56	0	0	9	56	22	56	24	56
	5 - 4+60	93	2141	56	0	0	9	56	22	56	24	56
	6 - 5+00	94	2141	56	0	0	9	56	22	56	24	56
	7 - 5+20	95	2141	56	0	0	9	56	22	56	24	56
	8 - 5+40	96	2141	56	0	0	9	56	22	56	24	56
	9 - 5+53	97	2141	56	0	0	9	56	22	56	24	56
	10 - 5+53	98	2141	56	0	0	9	56	22	56	24	56
	11 - 5+80	99	2141	56	0	0	9	56	22	56	24	56
	12 - 5+98	100	2141	56	0	0	9	56	22	56	24	56
	13 - 5+98	101	2141	56	0	0	9	56	22	56	24	56
	14 - 6+58.037	102	2141	56	0	0	9	56	22	56	24	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	581	56	2	56	2	56	4	56	7	56
	2 - 1+35.965	105	581	56	2	56	2	56	4	56	7	56
	3 - 1+60	106	581	56	2	56	2	56	4	56	7	56
	4 - 1+80	107	581	56	2	56	2	56	4	56	7	56
	5 - 2+00	108	581	56	2	56	2	56	4	56	7	56
	6 - 2+20	109	581	56	2	56	2	56	4	56	7	56
	7 - 2+40	110	581	56	2	56	2	56	4	56	7	56
	8 - 2+60	111	581	56	2	56	2	56	4	56	7	56
	9 - 2+81.908	112	581	56	2	56	2	56	4	56	7	56
	10 - 3+09.875	113	581	56	2	56	2	56	4	56	7	56
	11 - 3+40	114	581	56	2	56	2	56	4	56	7	56
	12 - 3+60	115	581	56	2	56	2	56	4	56	7	56
	13 - 3+80	116	581	56	2	56	2	56	4	56	7	56
	14 - 4+00	117	581	56	2	56	2	56	4	56	7	56
	15 - 4+20	118	581	56	2	56	2	56	4	56	7	56
	16 - 4+40	119	581	56	2	56	2	56	4	56	7	56
	17 - 4+53.16	120	581	56	2	56	2	56	4	56	7	56
	18 - 5+20	121	581	56	2	56	2	56	4	56	7	56
	19 - 5+20	122	581	56	2	56	2	56	4	56	7	56
	20 - 6+00	123	581	56	2	56	2	56	4	56	7	56
	21 - 6+40	124	581	56	2	56	2	56	4	56	7	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2306	56	0	0	5	56	65	56	24	56
	2 - 0+65	129	2306	56	0	0	5	56	65	56	24	56
	3 - 0+65	130	2306	56	0	0	5	56	65	56	24	56
	4 - 2+00	131	2306	56	0	0	5	56	65	56	24	56
	5 - 2+00	132	2306	56	0	0	5	56	65	56	24	56
	6 - 2+40	133	2306	56	0	0	5	56	65	56	24	56
	7 - 2+80	134	2306	56	0	0	5	56	65	56	24	56
	8 - 3+14.595	135	2306	56	0	0	5	56	65	56	24	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	222	56	0	0	0	0	0	0	0	0
	2 - 0+42	138	222	56	0	0	0	0	0	0	0	0
	3 - 0+42	139	222	56	0	0	0	0	0	0	0	0
	4 - 1+00	140	222	56	0	0	0	0	0	0	0	0
	5 - 1+50	141	222	56	0	0	0	0	0	0	0	0
	6 - 1+50	142	222	56	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	222	56	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	222	56	0	0	0	0	0	0	0	0
	9	145	222	56	0	0	0	0	0	0	0	0
	10	146	222	56	0	0	0	0	0	0	0	0
	11	147	222	56	0	0	0	0	0	0	0	0
	12	148	222	56	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	91	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	91	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	91	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	91	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	91	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	91	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	91	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	115	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	115	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	115	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	115	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	115	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	115	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	115	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	115	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	57	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	57	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	259	32	2	32	0	0	2	32	2	32
	2	181	259	32	2	32	0	0	2	32	2	32
	3	182	259	32	2	32	0	0	2	32	2	32
	4	183	265	32	3	32	0	0	3	32	3	32
	5	184	265	32	3	32	0	0	3	32	3	32
	6	185	265	32	3	32	0	0	3	32	3	32
	7	186	265	32	3	32	0	0	3	32	3	32
	8	187	265	32	3	32	0	0	3	32	3	32
	9	188	265	32	3	32	0	0	3	32	3	32
	10	189	275	32	3	32	0	0	3	32	3	32
	11	190	128	32	1	32	0	0	1	32	1	32
	12	191	128	32	1	32	0	0	1	32	1	32
	13	192	128	32	1	32	0	0	1	32	1	32
	14	193	128	32	1	32	0	0	1	32	1	32
	15	194	128	32	1	32	0	0	1	32	1	32
	16	195	365	32	4	32	0	0	4	32	4	32
	17	196	363	32	4	32	0	0	4	32	4	32
	18	197	430	32	5	32	0	0	5	32	5	32
	19	198	919	32	9	32	0	0	9	32	9	32
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	7	32	0	0	0	0	0	0	0	0
	2	201	7	32	0	0	0	0	0	0	0	0
	3	202	7	32	0	0	0	0	0	0	0	0
	4	203	7	32	0	0	0	0	0	0	0	0
	5	204	7	32	0	0	0	0	0	0	0	0

	6	205	7	32	0	0	0	0	0	0	0	0
	7	206	39	32	1	32	1	32	1	32	1	32
	8	207	39	32	1	32	1	32	1	32	1	32
	9	208	44	32	1	32	1	32	1	32	1	32
	10	209	2188	32	0	0	0	0	0	0	0	0
	11	210	2188	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	38	32	1	32	0	0	0	0	1	32
	2	213	3	32	0	0	0	0	0	0	0	0
	3	214	7	32	0	0	0	0	0	0	0	0
	4	215	9	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	0	0	0	0	0	0	0	0	0	0
	2	218	0	0	0	0	0	0	0	0	0	0
	3	219	0	0	0	0	0	0	0	0	0	0
	4	220	0	0	0	0	0	0	0	0	0	0
	5	221	0	0	0	0	0	0	0	0	0	0
	6	222	0	0	0	0	0	0	0	0	0	0
	7	223	0	0	0	0	0	0	0	0	0	0
	8	224	0	0	0	0	0	0	0	0	0	0
	9	225	0	0	0	0	0	0	0	0	0	0
	10	226	0	0	0	0	0	0	0	0	0	0
	11	227	0	0	0	0	0	0	0	0	0	0
	12	228	0	0	0	0	0	0	0	0	0	0
	13	229	0	0	0	0	0	0	0	0	0	0
	14	230	0	0	0	0	0	0	0	0	0	0
	15	231	0	0	0	0	0	0	0	0	0	0
	16	232	0	0	0	0	0	0	0	0	0	0
	17	233	0	0	0	0	0	0	0	0	0	0
	18	234	0	0	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	113	32	2	32	0	0	2	32	2	32
	2	237	113	32	2	32	0	0	2	32	2	32
	3	238										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Diamond 2030 PM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

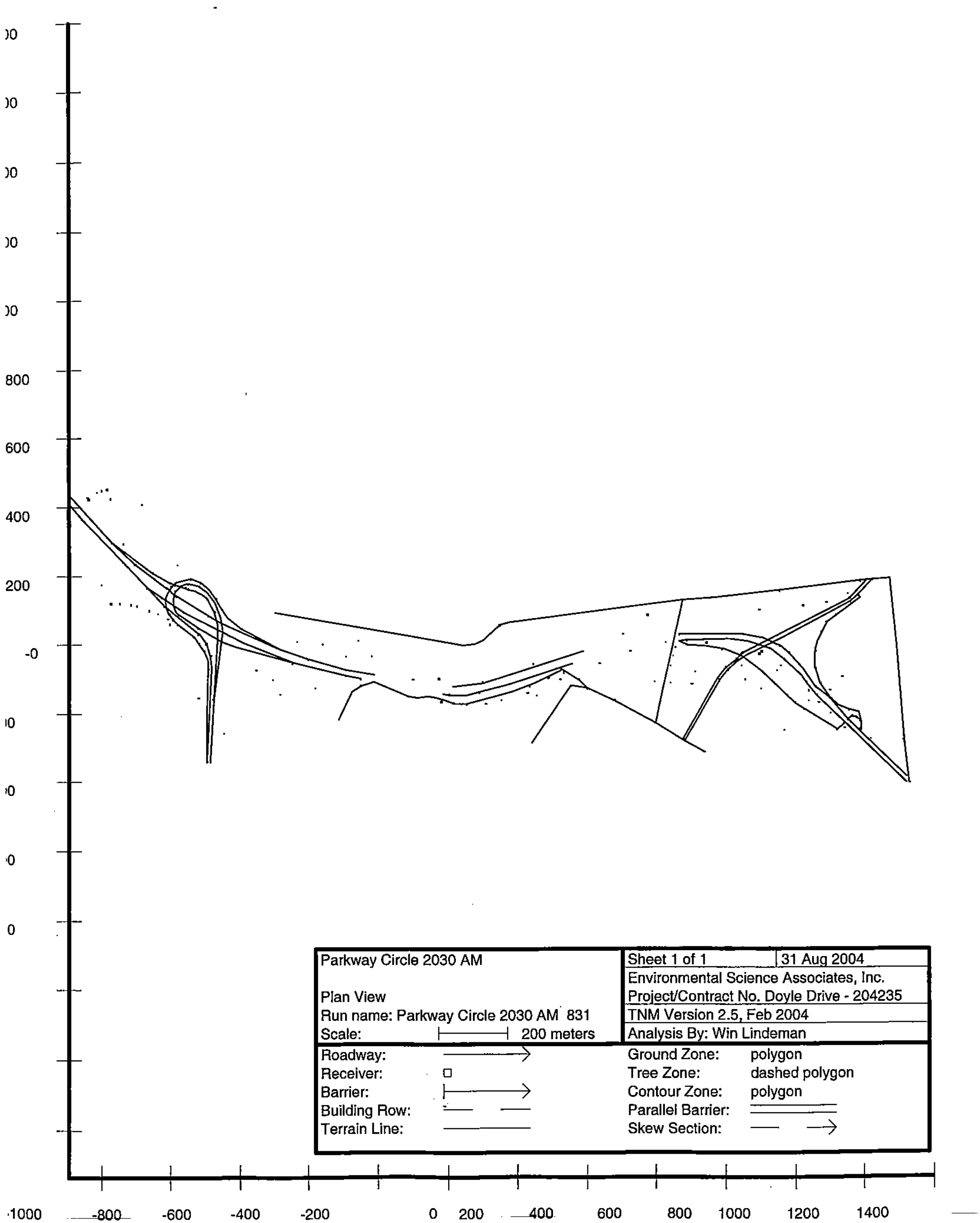
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.9	66	69.9	12	Snd Lvl	69.9	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.8	66	61.8	12	—	61.8	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	57.3	71	-23.7	12	—	57.3	0.0	10	-10.0
4 Building 1182	4	0	81.0	56.1	71	-24.9	12	—	56.1	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	57.2	71	-23.8	12	—	57.2	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.6	71	-21.4	12	—	59.6	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.8	71	-15.2	12	—	56.8	0.0	10	-10.0
8 PX Building	8	0	0.0	60.0	71	60.0	12	—	60.0	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	70.9	66	1.9	12	Snd Lvl	70.9	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.6	66	1.6	12	Snd Lvl	69.6	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.7	66	-2.3	12	—	65.7	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.8	66	-2.2	12	—	65.8	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	68.1	66	0.1	12	Snd Lvl	68.1	0.0	10	-10.0
14 Building 644	14	0	0.0	60.6	71	60.6	12	—	60.6	0.0	10	-10.0
15 Building 649	15	0	0.0	60.8	66	60.8	12	—	60.8	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.4	66	-10.6	12	—	59.4	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.9	66	-1.1	12	—	64.9	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	77.2	66	11.2	12	Snd Lvl	77.2	0.0	10	-10.0
19 Building 969	19	0	0.0	58.6	71	58.6	12	—	58.6	0.0	10	-10.0
20 Building 968	20	0	0.0	60.1	71	60.1	12	—	60.1	0.0	10	-10.0
21 Building 967	21	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
22 Building 966	22	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
23 Building 964	23	0	0.0	63.9	66	63.9	12	—	63.9	0.0	10	-10.0

24 Building 963	24	0	0.0	63.2	66	63.2	12	—	63.2	0.0	10	-10.0
25 Building 962	25	0	0.0	62.4	66	62.4	12	—	62.4	0.0	10	-10.0
26 Unknown Building	26	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.9	66	5.9	12	Snd Lvl	68.9	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.6	66	2.1	12	Snd Lvl	68.6	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.6	66	4.1	12	Snd Lvl	70.6	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.2	66	4.7	12	Snd Lvl	71.2	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.7	66	7.2	12	Snd Lvl	73.7	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.7	66	6.2	12	Snd Lvl	72.7	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.3	66	69.3	12	Snd Lvl	69.3	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.1	66	-0.4	12	—	65.1	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	60.2	71	-3.8	12	—	60.2	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.6	71	-1.4	12	—	62.6	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.3	71	-0.7	12	—	63.3	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.4	71	3.4	12	—	67.4	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	64.2	66	-4.8	12	—	64.2	0.0	10	-10.0
44 Building 129	44	1	0.0	57.2	66	57.2	12	—	57.2	0.0	10	-10.0
45 Building 122	45	0	0.0	62.3	71	62.3	12	—	62.3	0.0	10	-10.0
46 Building 108	46	0	0.0	62.5	71	62.5	12	—	62.5	0.0	10	-10.0
47 Building 107	47	0	0.0	67.6	71	67.6	12	—	67.6	0.0	10	-10.0
48 Building 104	48	0	74.0	58.7	71	-15.3	12	—	58.7	0.0	10	-10.0
49 Building 105	49	0	74.0	73.5	71	-0.5	12	Snd Lvl	73.5	0.0	10	-10.0
50 Building 106	50	0	76.0	72.5	71	-3.5	12	Snd Lvl	72.5	0.0	10	-10.0
51 Building 211	51	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
52 Building 204	52	0	0.0	59.6	71	59.6	12	—	59.6	0.0	10	-10.0
53 Building 210	53	0	0.0	62.8	71	62.8	12	—	62.8	0.0	10	-10.0
54 Building 201	54	0	0.0	57.8	71	57.8	12	—	57.8	0.0	10	-10.0
55 Building 220	55	0	0.0	53.8	71	53.8	12	—	53.8	0.0	10	-10.0
56 Building 231	56	0	0.0	65.9	71	65.9	12	—	65.9	0.0	10	-10.0
57 Building 228	57	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
58 Building 229	58	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
59 Building 223	59	0	0.0	57.4	71	57.4	12	—	57.4	0.0	10	-10.0
60 Building 230	60	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	59.9	66	2.9	12	—	59.9	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.3	66	0.3	12	—	57.3	0.0	10	-10.0
63 Building 1063	63	0	68.5	62.3	71	-6.2	12	—	62.3	0.0	10	-10.0

64 Building 1062	64	0	68.5	59.2	71	-9.3	12	----	59.2	0.0	10	-10.0
65 Building 1060	65	0	68.5	59.5	71	-9.0	12	----	59.5	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.4	71	-2.6	12	----	65.4	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.0	71	65.0	12	----	65.0	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.3	71	-3.7	12	----	64.3	0.0	10	-10.0
69 Building 1162	69	0	0.0	62.9	71	62.9	12	----	62.9	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.4	71	3.4	12	Snd Lvl	71.4	0.0	10	-10.0
71 Building 1161	71	0	0.0	67.0	71	67.0	12	----	67.0	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.5	71	71.5	12	Snd Lvl	71.5	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	71.0	66	71.0	12	Snd Lvl	71.0	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.6	66	72.6	12	Snd Lvl	72.6	0.0	10	-10.0
75 Building 1004	75	0	0.0	57.0	71	57.0	12	----	57.0	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	74.6	66	-1.9	12	Snd Lvl	74.6	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



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Parkway Circle 2030 AM
Plan View
Run name: Parkway Circle 2030 AM 831
Scale: 200 meters
Sheet 1 of 1
31 Aug 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North E	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+10	2	-293.0	-88.0	27.00				Average	
		11 - 11+53	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,140.0	-224.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB/NB Richardson-Francisco to Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,148.0	-216.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00				
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50			Average	
		2 - 1+35.9	105	-657.0	20.0	36.00			Average	
		3 - 1+60	106	-654.0	44.0	40.00			Average	
		4 - 1+80	107	-657.0	65.0	40.00			Average	
		5 - 2+00	108	-661.0	85.0	40.00			Average	
		6 - 2+20	109	-667.0	104.0	42.00			Average	
		7 - 2+40	110	-675.0	123.0	42.00			Average	
		8 - 2+60	111	-686.0	140.0	42.00			Average	
		9 - 2+81.9	112	-700.0	157.0	42.00			Average	
		10 - 3+09.	113	-723.0	175.0	42.00			Average	
		11 - 3+40	114	-754.0	180.0	42.00			Average	
		12 - 3+60	115	-775.0	173.0	42.00			Average	
		13 - 3+80	116	-790.0	158.0	42.00			Average	
		14 - 4+00	117	-796.0	138.0	42.00			Average	
		15 - 4+20	118	-795.0	116.0	42.00			Average	
		16 - 4+40	119	-788.0	97.0	42.00			Average	
		17 - 4+53.	120	-778.0	88.0	42.00			Average	
		18 - 5+20	121	-722.0	51.0	42.00			Average	
		19 - 5+20	122	-721.0	51.0	42.00			Average	Y
		20 - 6+00	123	-652.0	11.0	42.00			Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00			Average	
		22 - 8+19.	125	-450.0	-50.0	33.00				
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00			Average	
		2 - 0+65	129	-823.0	116.0	52.00			Average	
		3 - 0+65	130	-822.0	116.0	52.00			Average	Y
		4 - 2+00	131	-723.0	35.0	44.00			Average	Y
		5 - 2+00	132	-722.0	35.0	44.00			Average	
		6 - 2+40	133	-700.0	5.0	42.00			Average	
		7 - 2+80	134	-687.0	-30.0	40.00			Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00			Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00				
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00			Average	
		2 - 0+42	138	685.0	0.0	2.00			Average	
		3 - 0+42	139	686.0	0.0	2.00			Average	Y
		4 - 1+00	140	740.0	-2.0	2.00			Average	Y
		5 - 1+50	141	786.0	-11.0	2.00			Average	Y
		6 - 1+50	142	787.0	-11.0	2.00			Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,118.0	-243.0	4.00				Average	
		12	148	1,118.0	-245.0	4.00				Average	
		13 - Inters	149	1,140.0	-224.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
Palace Drive Connector to Gorgas	7.3	1	240	1,186.0	-221.0	4.00				Average	
		2	241	1,180.0	-214.0	4.00				Average	
		3	242	1,172.0	-208.0	4.00				Average	
		4	243	1,160.0	-206.0	4.00				Average	
		5	244	1,148.0	-216.0	4.00					

Environmental Science Associates, Inc. 31 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	6345	88	66	88	13	88	66	88	66	88
	2 - 1+97.539	10	6345	88	66	88	13	88	66	88	66	88
	3 - 4+74	9	4158	88	43	88	9	88	43	88	43	88
	4 - 5+27	8	4158	88	43	88	9	88	43	88	43	88
	5 - 5+27	7	4158	88	43	88	9	88	43	88	43	88
	6 - 6+00	6	4158	88	43	88	9	88	43	88	43	88
	7 - 8+00	5	4158	88	43	88	9	88	43	88	43	88
	8 - 9+57	4	4732	88	49	88	10	88	49	88	49	88
	9 - 11+10	3	4732	88	49	88	10	88	49	88	49	88
	10 - 11+10	2	4732	88	49	88	10	88	49	88	49	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	4732	88	49	88	10	88	49	88	49	88
	2 - 14+10	17	4732	88	49	88	10	88	49	88	49	88
	3 - 14+60	16	4732	88	49	88	10	88	49	88	49	88
	4 - 15+00	15	4732	88	49	88	10	88	49	88	49	88
	5 - 15+85.44	14	4732	88	49	88	10	88	49	88	49	88
	6 - 17+33.198	13	4732	88	49	88	10	88	49	88	49	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	3038	56	31	56	6	56	31	56	31	56
	2 - 21+20	20	3038	56	31	56	6	56	31	56	31	56
	3 - 21+20	21	3038	56	31	56	6	56	31	56	31	56

	4 - 22+42.630	22	3038	56	31	56	6	56	31	56	31	56
	5 - 23+00	23	3038	56	31	56	6	56	31	56	31	56
	6 - 23+25	24	3038	56	31	56	6	56	31	56	31	56
	7 - 23+25	25	3038	56	31	56	6	56	31	56	31	56
	8 - 24+20	26	3038	56	31	56	6	56	31	56	31	56
	9 - 24+85.060	27	3038	56	31	56	6	56	31	56	31	56
	10 - 25+17.10	28	3038	56	31	56	6	56	31	56	31	56
	11 - 25+64.74	29	3038	56	31	56	6	56	31	56	31	56
	12 - Gorgas I	30	3038	56	31	56	6	56	31	56	31	56
	13 - Francisco	31										
WB/NB Richardson-Francisco to Tunnel	1 - Francisco	32	2103	56	22	56	28	56	13	56	22	56
	2 - 27+20.608	33	2103	56	22	56	28	56	13	56	22	56
	3 - 26+00	34	2103	56	22	56	28	56	13	56	22	56
	4 - 25+40	35	2103	56	22	56	28	56	13	56	22	56
	5 - 24+73	36	2103	56	22	56	28	56	13	56	22	56
	6 - 24+20	37	2103	56	22	56	28	56	13	56	22	56
	7 - 23+75	38	2103	56	22	56	28	56	13	56	22	56
	8 - 23+75	39	2103	56	22	56	28	56	13	56	22	56
	9 - 23+22	40	2103	56	22	56	28	56	13	56	22	56
	10 - 23+22	41	2103	56	22	56	28	56	13	56	22	56
	11 - 22+68	42	2103	56	22	56	28	56	13	56	22	56
	12 - 22+00	43	2103	56	22	56	28	56	13	56	22	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	2833	88	29	88	38	88	18	88	29	88
	2 - 15+00	46	2833	88	29	88	38	88	18	88	29	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	2833	88	29	88	38	88	18	88	29	88
	2 - 11+00	52	2833	88	29	88	38	88	18	88	29	88
	3 - 11+00	53	2833	88	29	88	38	88	18	88	29	88
	4 - 9+80	54	2833	88	29	88	38	88	18	88	29	88
	5 - 8+73	55	2833	88	29	88	38	88	18	88	29	88
	6 - 7+00	56	2833	88	29	88	38	88	18	88	29	88
	7 - 6+60	57	2833	88	29	88	38	88	18	88	29	88
	8 - 6+60	58	2833	88	29	88	38	88	18	88	29	88

	9 - 5+54	59	2833	88	29	88	38	88	18	88	29	88
	10 - 5+54	60	2833	88	29	88	38	88	18	88	29	88
	11 - 5+14	61	2833	88	29	88	38	88	18	88	29	88
	12 - 5+14	62	2833	88	29	88	38	88	18	88	29	88
	13 - 4+00	63	2833	88	29	88	38	88	18	88	29	88
	14 - 3+10	64	4897	88	51	88	66	88	31	88	51	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	318	56	3	56	4	56	2	56	3	56
	2 - 1+30	67	318	56	3	56	4	56	2	56	3	56
	3 - 1+80	68	318	56	3	56	4	56	2	56	3	56
	4 - 2+20	69	318	56	3	56	4	56	2	56	3	56
	5 - 2+20	70	318	56	3	56	4	56	2	56	3	56
	6 - 2+48	71	318	56	3	56	4	56	2	56	3	56
	7 - 3+09	72	318	56	3	56	4	56	2	56	3	56
	8 - 3+40	73	318	56	3	56	4	56	2	56	3	56
	9 - 3+60	74	318	56	3	56	4	56	2	56	3	56
	10 - 3+80	75	318	56	3	56	4	56	2	56	3	56
	11 - 4+00	76	318	56	3	56	4	56	2	56	3	56
	12 - 4+20	77	318	56	3	56	4	56	2	56	3	56
	13 - 4+40	78	318	56	3	56	4	56	2	56	3	56
	14 - 4+59	79	318	56	3	56	4	56	2	56	3	56
	15 - 4+80	80	318	56	3	56	4	56	2	56	3	56
	16 - 5+00	81	318	56	3	56	4	56	2	56	3	56
	17 - 5+20	82	318	56	3	56	4	56	2	56	3	56
	18 - 5+80	83	318	56	3	56	4	56	2	56	3	56
	19 - 6+06	84	318	56	3	56	4	56	2	56	3	56
	20 - 6+31	85	318	56	3	56	4	56	2	56	3	56
	21 - 6+60	86	318	56	3	56	4	56	2	56	3	56
	22 - 6+88	87	318	56	3	56	4	56	2	56	3	56
	23 - 8+23	169	318	56	3	56	4	56	2	56	3	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2412	56	25	56	25	56	0	0	17	56
	2A	170	2412	56	25	56	25	56	0	0	17	56
	2 - 3+72.391	90	2412	56	25	56	25	56	0	0	17	56

	3 - 4+00	91	2412	56	25	56	25	56	0	0	17	56
	4 - 4+40	92	2412	56	25	56	25	56	0	0	17	56
	5 - 4+60	93	2412	56	25	56	25	56	0	0	17	56
	6 - 5+00	94	2412	56	25	56	25	56	0	0	17	56
	7 - 5+20	95	2412	56	25	56	25	56	0	0	17	56
	8 - 5+40	96	2412	56	25	56	25	56	0	0	17	56
	9 - 5+53	97	2412	56	25	56	25	56	0	0	17	56
	10 - 5+53	98	2412	56	25	56	25	56	0	0	17	56
	11 - 5+80	99	2412	56	25	56	25	56	0	0	17	56
	12 - 5+98	100	2412	56	25	56	25	56	0	0	17	56
	13 - 5+98	101	2412	56	25	56	25	56	0	0	17	56
	14 - 6+58.037	102	2412	56	25	56	25	56	0	0	17	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	573	56	4	56	6	56	6	56	4	56
	2 - 1+35.965	105	573	56	4	56	6	56	6	56	4	56
	3 - 1+60	106	573	56	4	56	6	56	6	56	4	56
	4 - 1+80	107	573	56	4	56	6	56	6	56	4	56
	5 - 2+00	108	573	56	4	56	6	56	6	56	4	56
	6 - 2+20	109	573	56	4	56	6	56	6	56	4	56
	7 - 2+40	110	573	56	4	56	6	56	6	56	4	56
	8 - 2+60	111	573	56	4	56	6	56	6	56	4	56
	9 - 2+81.908	112	573	56	4	56	6	56	6	56	4	56
	10 - 3+09.875	113	573	56	4	56	6	56	6	56	4	56
	11 - 3+40	114	573	56	4	56	6	56	6	56	4	56
	12 - 3+60	115	573	56	4	56	6	56	6	56	4	56
	13 - 3+80	116	573	56	4	56	6	56	6	56	4	56
	14 - 4+00	117	573	56	4	56	6	56	6	56	4	56
	15 - 4+20	118	573	56	4	56	6	56	6	56	4	56
	16 - 4+40	119	573	56	4	56	6	56	6	56	4	56
	17 - 4+53.16	120	573	56	4	56	6	56	6	56	4	56
	18 - 5+20	121	573	56	4	56	6	56	6	56	4	56
	19 - 5+20	122	573	56	4	56	6	56	6	56	4	56
	20 - 6+00	123	573	56	4	56	6	56	6	56	4	56
	21 - 6+40	124	573	56	4	56	6	56	6	56	4	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2400	56	25	56	5	56	25	56	25	56
	2 - 0+65	129	2400	56	25	56	5	56	25	56	25	56
	3 - 0+65	130	2400	56	25	56	5	56	25	56	25	56
	4 - 2+00	131	2400	56	25	56	5	56	25	56	25	56
	5 - 2+00	132	2400	56	25	56	5	56	25	56	25	56
	6 - 2+40	133	2400	56	25	56	5	56	25	56	25	56
	7 - 2+80	134	2400	56	25	56	5	56	25	56	25	56
	8 - 3+14.595	135	2400	56	25	56	5	56	25	56	25	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	268	32	0	0	0	0	0	0	0	0
	2 - 0+42	138	268	32	0	0	0	0	0	0	0	0
	3 - 0+42	139	268	32	0	0	0	0	0	0	0	0
	4 - 1+00	140	268	32	0	0	0	0	0	0	0	0
	5 - 1+50	141	268	32	0	0	0	0	0	0	0	0
	6 - 1+50	142	268	32	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	268	32	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	268	32	0	0	0	0	0	0	0	0
	9	145	268	32	0	0	0	0	0	0	0	0
	10	146	268	32	0	0	0	0	0	0	0	0
	11	147	268	32	0	0	0	0	0	0	0	0
	12	148	268	32	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	95	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	95	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	95	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	95	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	95	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	95	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	95	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	438	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	438	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	438	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	438	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	438	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	438	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	438	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	438	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	43	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	43	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	102	32	1	32	0	0	1	32	0	0
	2	181	102	32	1	32	0	0	1	32	0	0
	3	182	102	32	1	32	0	0	1	32	0	0
	4	183	192	32	2	32	0	0	2	32	0	0
	5	184	192	32	2	32	0	0	2	32	0	0
	6	185	192	32	2	32	0	0	2	32	0	0
	7	186	192	32	2	32	0	0	2	32	0	0
	8	187	192	32	2	32	0	0	2	32	0	0
	9	188	192	32	2	32	0	0	2	32	0	0
	10	189	201	32	2	32	0	0	2	32	0	0
	11	190	58	32	1	32	0	0	1	32	0	0
	12	191	58	32	1	32	0	0	1	32	0	0
	13	192	58	32	1	32	0	0	1	32	0	0
	14	193	58	32	1	32	0	0	1	32	0	0
	15	194	58	32	1	32	0	0	1	32	0	0
	16	195	169	32	2	32	0	0	2	32	0	0
	17	196	225	32	2	32	0	0	2	32	0	0
	18	197	666	32	7	32	0	0	7	32	0	0
	19	198	750	32	7	32	0	0	7	32	0	0
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	4	32	0	0	0	0	0	0	0	0
	2	201	4	32	0	0	0	0	0	0	0	0
	3	202	4	32	0	0	0	0	0	0	0	0
	4	203	4	32	0	0	0	0	0	0	0	0
	5	204	4	32	0	0	0	0	0	0	0	0

	6	205	4	32	0	0	0	0	0	0	0	0
	7	206	4	32	0	0	0	0	0	0	0	0
	8	207	16	32	0	0	0	0	0	0	0	0
	9	208	16	32	0	0	0	0	0	0	0	0
	10	209	19	32	0	0	0	0	0	0	0	0
	11	210	1400	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	40	32	0	0	0	0	0	0	0	0
	2	213	2	32	0	0	0	0	0	0	0	0
	3	214	6	32	0	0	0	0	0	0	0	0
	4	215	6	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	30	32	0	0	0	0	0	0	0	0
	2	218	30	32	0	0	0	0	0	0	0	0
	3	219	30	32	0	0	0	0	0	0	0	0
	4	220	30	32	0	0	0	0	0	0	0	0
	5	221	30	32	0	0	0	0	0	0	0	0
	6	222	30	32	0	0	0	0	0	0	0	0
	7	223	30	32	0	0	0	0	0	0	0	0
	8	224	30	32	0	0	0	0	0	0	0	0
	9	225	30	32	0	0	0	0	0	0	0	0
	10	226	30	32	0	0	0	0	0	0	0	0
	11	227	30	32	0	0	0	0	0	0	0	0
	12	228	30	32	0	0	0	0	0	0	0	0
	13	229	30	32	0	0	0	0	0	0	0	0
	14	230	30	32	0	0	0	0	0	0	0	0
	15	231	30	32	0	0	0	0	0	0	0	0
	16	232	30	32	0	0	0	0	0	0	0	0
	17	233	30	32	0	0	0	0	0	0	0	0
	18	234	30	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	115	32	0	0	0	0	0	0	0	0
	2	237	115	32	0	0	0	0	0	0	0	0
	3	238										

INPUT: TRAFFIC FOR LAeq1h Volumes **Doyle Drive - 204235**

Palace Drive Connector to Gorgas	1	240	30	32	0	0	0	0	0	0	0	0
	2	241	30	32	0	0	0	0	0	0	0	0
	3	242	30	32	0	0	0	0	0	0	0	0
	4	243	30	32	0	0	0	0	0	0	0	0
	5	244										

Environmental Science Associates, Inc
Win Lindeman

31 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 AM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS **Doyle Drive - 204235**

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-198.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-240.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

31 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 AM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

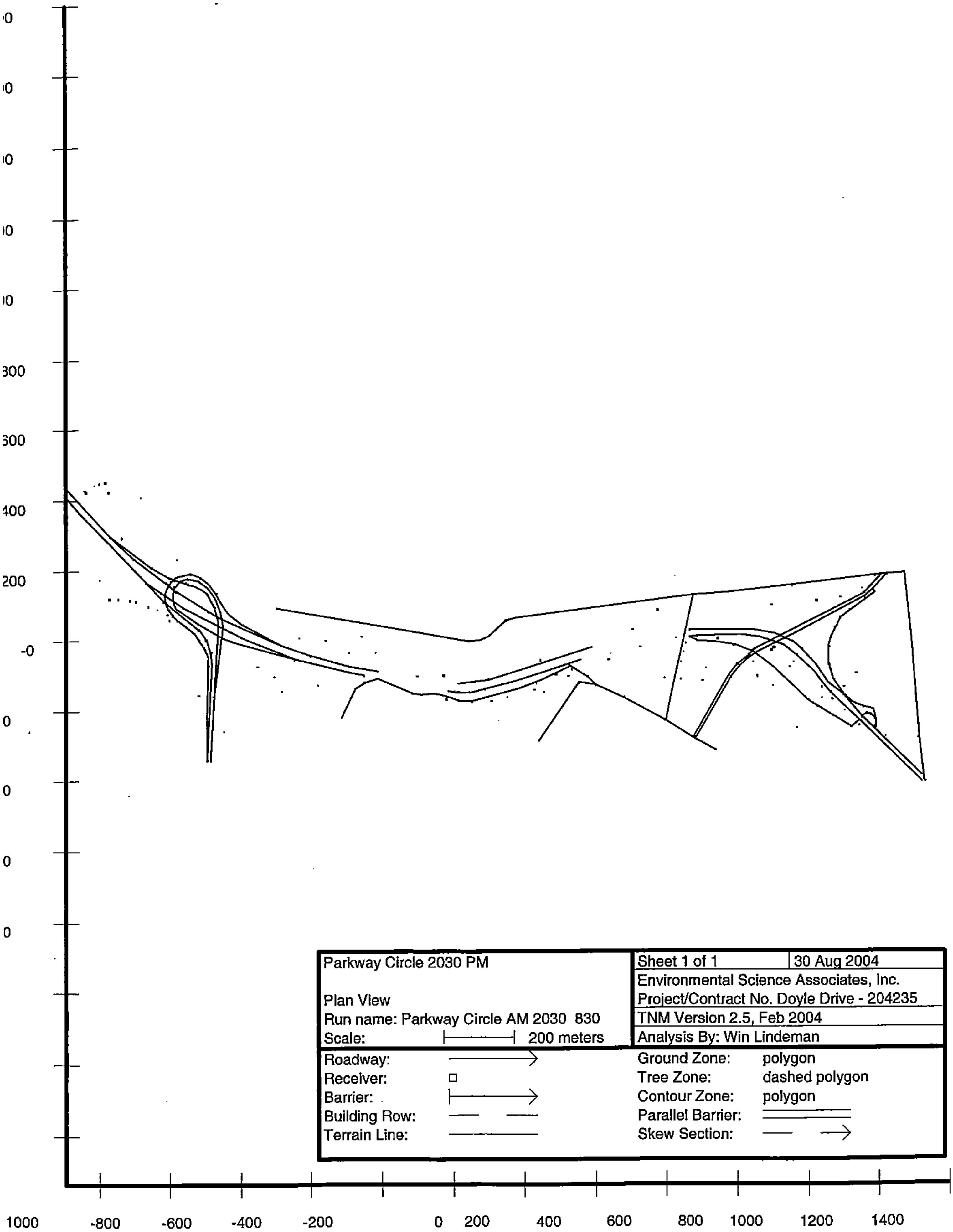
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.0	66	69.0	12	Snd Lvl	69.0	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.5	66	61.5	12	—	61.5	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	58.4	71	-22.6	12	—	58.4	0.0	10	-10.0
4 Building 1182	4	0	81.0	57.1	71	-23.9	12	—	57.1	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	56.8	71	-24.2	12	—	56.8	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.0	71	-22.0	12	—	59.0	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.1	71	-15.9	12	—	56.1	0.0	10	-10.0
8 PX Building	8	0	0.0	59.1	71	59.1	12	—	59.1	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	69.7	66	0.7	12	Snd Lvl	69.7	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.3	66	1.3	12	Snd Lvl	69.3	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.3	66	-2.7	12	—	65.3	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.0	66	-3.0	12	—	65.0	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	67.5	66	-0.5	12	Snd Lvl	67.5	0.0	10	-10.0
14 Building 644	14	0	0.0	60.1	71	60.1	12	—	60.1	0.0	10	-10.0
15 Building 649	15	0	0.0	60.7	66	60.7	12	—	60.7	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.2	66	-10.8	12	—	59.2	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.7	66	-1.3	12	—	64.7	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	76.8	66	10.8	12	Snd Lvl	76.8	0.0	10	-10.0
19 Building 969	19	0	0.0	58.4	71	58.4	12	—	58.4	0.0	10	-10.0
20 Building 968	20	0	0.0	60.1	71	60.1	12	—	60.1	0.0	10	-10.0
21 Building 967	21	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
22 Building 966	22	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
23 Building 964	23	0	0.0	63.5	66	63.5	12	—	63.5	0.0	10	-10.0

24 Building 963	24	0	0.0	62.8	66	62.8	12	—	62.8	0.0	10	-10.0
25 Building 962	25	0	0.0	62.1	66	62.1	12	—	62.1	0.0	10	-10.0
26 Unknown Building	26	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.8	66	5.8	12	Snd Lvl	68.8	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.6	66	2.1	12	Snd Lvl	68.6	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.7	66	4.2	12	Snd Lvl	70.7	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.3	66	4.8	12	Snd Lvl	71.3	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.4	66	5.9	12	Snd Lvl	72.4	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	73.0	66	6.5	12	Snd Lvl	73.0	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.7	66	7.2	12	Snd Lvl	73.7	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.7	66	6.2	12	Snd Lvl	72.7	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.2	66	69.2	12	Snd Lvl	69.2	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.3	66	-0.2	12	—	65.3	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	60.2	71	-3.8	12	—	60.2	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.3	71	-1.7	12	—	62.3	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.3	71	-0.7	12	—	63.3	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.1	71	3.1	12	—	67.1	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	63.0	66	-6.0	12	—	63.0	0.0	10	-10.0
44 Building 129	44	1	0.0	56.8	66	56.8	12	—	56.8	0.0	10	-10.0
45 Building 122	45	0	0.0	61.8	71	61.8	12	—	61.8	0.0	10	-10.0
46 Building 108	46	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
47 Building 107	47	0	0.0	67.0	71	67.0	12	—	67.0	0.0	10	-10.0
48 Building 104	48	0	74.0	58.3	71	-15.7	12	—	58.3	0.0	10	-10.0
49 Building 105	49	0	74.0	73.0	71	-1.0	12	Snd Lvl	73.0	0.0	10	-10.0
50 Building 106	50	0	76.0	71.7	71	-4.3	12	Snd Lvl	71.7	0.0	10	-10.0
51 Building 211	51	0	0.0	65.3	71	65.3	12	—	65.3	0.0	10	-10.0
52 Building 204	52	0	0.0	59.0	71	59.0	12	—	59.0	0.0	10	-10.0
53 Building 210	53	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
54 Building 201	54	0	0.0	55.5	71	55.5	12	—	55.5	0.0	10	-10.0
55 Building 220	55	0	0.0	53.3	71	53.3	12	—	53.3	0.0	10	-10.0
56 Building 231	56	0	0.0	65.5	71	65.5	12	—	65.5	0.0	10	-10.0
57 Building 228	57	0	0.0	61.7	71	61.7	12	—	61.7	0.0	10	-10.0
58 Building 229	58	0	0.0	59.0	71	59.0	12	—	59.0	0.0	10	-10.0
59 Building 223	59	0	0.0	57.1	71	57.1	12	—	57.1	0.0	10	-10.0
60 Building 230	60	0	0.0	71.5	71	71.5	12	Snd Lvl	71.5	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	60.0	66	3.0	12	—	60.0	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.7	66	0.7	12	—	57.7	0.0	10	-10.0
63 Building 1063	63	0	68.5	62.5	71	-6.0	12	—	62.5	0.0	10	-10.0

RESULTS: SOUND LEVELS

64 Building 1062	64	0	68.5	58.9	71	-9.6	12	—	58.9	0.0	10	-10.0
65 Building 1060	65	0	68.5	59.0	71	-9.5	12	—	59.0	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.9	71	-2.1	12	—	65.9	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.6	71	65.6	12	—	65.6	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.4	71	-3.6	12	—	64.4	0.0	10	-10.0
69 Building 1162	69	0	0.0	62.6	71	62.6	12	—	62.6	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.5	71	3.5	12	Snd Lvl	71.5	0.0	10	-10.0
71 Building 1161	71	0	0.0	66.8	71	66.8	12	—	66.8	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.6	71	71.6	12	Snd Lvl	71.6	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	69.9	66	69.9	12	Snd Lvl	69.9	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	71.9	66	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
75 Building 1004	75	0	0.0	56.4	71	56.4	12	—	56.4	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	72.7	66	-3.8	12	Snd Lvl	72.7	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Parkway Circle 2030 PM	Sheet 1 of 1 / 30 Aug 2004
	Environmental Science Associates, Inc.
Plan View	Project/Contract No. Doyle Drive - 204235
Run name: Parkway Circle AM 2030 830	TNM Version 2.5, Feb 2004
Scale: 200 meters	Analysis By: Win Lindeman

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North E	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+10	2	-293.0	-88.0	27.00				Average	
		11 - 11+53	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,140.0	-224.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fancisco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,148.0	-216.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,118.0	-243.0	4.00				Average	
		12	148	1,118.0	-245.0	4.00				Average	
		13 - Inters	149	1,140.0	-224.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherlan to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
Palace Drive Connector to Gorgas	7.3	1	240	1,186.0	-221.0	4.00				Average	
		2	241	1,180.0	-214.0	4.00				Average	
		3	242	1,172.0	-208.0	4.00				Average	
		4	243	1,160.0	-206.0	4.00				Average	
		5	244	1,148.0	-216.0	4.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	
EB Doyle to North Tunnel	1 - North End	11	5268	88	16	88	71	88	60	88	16	88	
	2 - 1+97.539	10	5268	88	16	88	71	88	60	88	16	88	
	3 - 4+74	9	3081	88	10	88	41	88	35	88	10	88	
	4 - 5+27	8	3081	88	10	88	41	88	35	88	10	88	
	5 - 5+27	7	3081	88	10	88	41	88	35	88	10	88	
	6 - 6+00	6	3081	88	10	88	41	88	35	88	10	88	
	7 - 8+00	5	3081	88	10	88	41	88	35	88	10	88	
	8 - 9+57	4	3719	88	12	88	50	88	42	88	12	88	
	9 - 11+10	3	3719	88	12	88	50	88	42	88	12	88	
	10 - 11+10	2	3719	88	12	88	50	88	42	88	12	88	
	11 - 11+53	1											
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	3719	88	12	88	50	88	42	88	12	88	
	2 - 14+10	17	3719	88	12	88	50	88	42	88	12	88	
	3 - 14+60	16	3719	88	12	88	50	88	42	88	12	88	
	4 - 15+00	15	3719	88	12	88	50	88	42	88	12	88	
	5 - 15+85.44	14	3719	88	12	88	50	88	42	88	12	88	
	6 - 17+33.198	13	3719	88	12	88	50	88	42	88	12	88	
	7 - 17+80	12											
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2530	56	8	56	34	56	29	56	8	56	
	2 - 21+20	20	2530	56	8	56	34	56	29	56	8	56	
	3 - 21+20	21	2530	56	8	56	34	56	29	56	8	56	

	4 - 22+42.630	22	2530	56	8	56	34	56	29	56	8	56
	5 - 23+00	23	2530	56	8	56	34	56	29	56	8	56
	6 - 23+25	24	2530	56	8	56	34	56	29	56	8	56
	7 - 23+25	25	2530	56	8	56	34	56	29	56	8	56
	8 - 24+20	26	2530	56	8	56	34	56	29	56	8	56
	9 - 24+85.060	27	2530	56	8	56	34	56	29	56	8	56
	10 - 25+17.10	28	2530	56	8	56	34	56	29	56	8	56
	11 - 25+64.74	29	2530	56	8	56	34	56	29	56	8	56
	12 - Gorgas I	30	2530	56	8	56	34	56	29	56	8	56
	13 - Francisco	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	2372	56	0	0	5	56	87	56	25	56
	2 - 27+20.608	33	2372	56	0	0	5	56	87	56	25	56
	3 - 26+00	34	2372	56	0	0	5	56	87	56	25	56
	4 - 25+40	35	2372	56	0	0	5	56	87	56	25	56
	5 - 24+73	36	2372	56	0	0	5	56	87	56	25	56
	6 - 24+20	37	2372	56	0	0	5	56	87	56	25	56
	7 - 23+75	38	2372	56	0	0	5	56	87	56	25	56
	8 - 23+75	39	2372	56	0	0	5	56	87	56	25	56
	9 - 23+22	40	2372	56	0	0	5	56	87	56	25	56
	10 - 23+22	41	2372	56	0	0	5	56	87	56	25	56
	11 - 22+68	42	2372	56	0	0	5	56	87	56	25	56
	12 - 22+00	43	2372	56	0	0	5	56	87	56	25	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	4608	88	0	0	10	88	129	88	48	88
	2 - 15+00	46	4608	88	0	0	10	88	129	88	48	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	4608	88	0	0	10	88	129	88	48	88
	2 - 11+00	52	4608	88	0	0	10	88	129	88	48	88
	3 - 11+00	53	4608	88	0	0	10	88	129	88	48	88
	4 - 9+80	54	4608	88	0	0	10	88	129	88	48	88
	5 - 8+73	55	3909	88	0	0	8	88	110	88	41	88
	6 - 7+00	56	3909	88	0	0	8	88	110	88	41	88
	7 - 6+60	57	3909	88	0	0	8	88	110	88	41	88
	8 - 6+60	58	3909	88	0	0	8	88	110	88	41	88

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	9 - 5+54	59	3909	88	0	0	8	88	110	88	41	88
	10 - 5+54	60	3909	88	0	0	8	88	110	88	41	88
	11 - 5+14	61	3909	88	0	0	8	88	110	88	41	88
	12 - 5+14	62	3909	88	0	0	8	88	110	88	41	88
	13 - 4+00	63	3909	88	0	0	8	88	110	88	41	88
	14 - 3+10	64	6019	88	0	0	13	88	169	88	63	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	703	56	2	56	9	56	8	56	2	56
	2 - 1+30	67	703	56	2	56	9	56	8	56	2	56
	3 - 1+80	68	703	56	2	56	9	56	8	56	2	56
	4 - 2+20	69	703	56	2	56	9	56	8	56	2	56
	5 - 2+20	70	703	56	2	56	9	56	8	56	2	56
	6 - 2+48	71	703	56	2	56	9	56	8	56	2	56
	7 - 3+09	72	703	56	2	56	9	56	8	56	2	56
	8 - 3+40	73	703	56	2	56	9	56	8	56	2	56
	9 - 3+60	74	703	56	2	56	9	56	8	56	2	56
	10 - 3+80	75	703	56	2	56	9	56	8	56	2	56
	11 - 4+00	76	703	56	2	56	9	56	8	56	2	56
	12 - 4+20	77	703	56	2	56	9	56	8	56	2	56
	13 - 4+40	78	703	56	2	56	9	56	8	56	2	56
	14 - 4+59	79	703	56	2	56	9	56	8	56	2	56
	15 - 4+80	80	703	56	2	56	9	56	8	56	2	56
	16 - 5+00	81	703	56	2	56	9	56	8	56	2	56
	17 - 5+20	82	703	56	2	56	9	56	8	56	2	56
	18 - 5+80	83	703	56	2	56	9	56	8	56	2	56
	19 - 6+06	84	703	56	2	56	9	56	8	56	2	56
	20 - 6+31	85	703	56	2	56	9	56	8	56	2	56
	21 - 6+60	86	703	56	2	56	9	56	8	56	2	56
	22 - 6+88	87	703	56	2	56	9	56	8	56	2	56
	23 - 8+23	169	703	56	2	56	9	56	8	56	2	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2139	56	0	0	9	56	22	56	24	56
	2A	170	2139	56	0	0	9	56	22	56	24	56
	2 - 3+72.391	90	2139	56	0	0	9	56	22	56	24	56

	3 - 4+00	91	2139	56	0	0	9	56	22	56	24	56
	4 - 4+40	92	2139	56	0	0	9	56	22	56	24	56
	5 - 4+60	93	2139	56	0	0	9	56	22	56	24	56
	6 - 5+00	94	2139	56	0	0	9	56	22	56	24	56
	7 - 5+20	95	2139	56	0	0	9	56	22	56	24	56
	8 - 5+40	96	2139	56	0	0	9	56	22	56	24	56
	9 - 5+53	97	2139	56	0	0	9	56	22	56	24	56
	10 - 5+53	98	2139	56	0	0	9	56	22	56	24	56
	11 - 5+80	99	2139	56	0	0	9	56	22	56	24	56
	12 - 5+98	100	2139	56	0	0	9	56	22	56	24	56
	13 - 5+98	101	2139	56	0	0	9	56	22	56	24	56
	14 - 6+58.037	102	2139	56	0	0	9	56	22	56	24	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	642	56	3	56	3	56	4	56	7	56
	2 - 1+35.965	105	642	56	3	56	3	56	4	56	7	56
	3 - 1+60	106	642	56	3	56	3	56	4	56	7	56
	4 - 1+80	107	642	56	3	56	3	56	4	56	7	56
	5 - 2+00	108	642	56	3	56	3	56	4	56	7	56
	6 - 2+20	109	642	56	3	56	3	56	4	56	7	56
	7 - 2+40	110	642	56	3	56	3	56	4	56	7	56
	8 - 2+60	111	642	56	3	56	3	56	4	56	7	56
	9 - 2+81.908	112	642	56	3	56	3	56	4	56	7	56
	10 - 3+09.875	113	642	56	3	56	3	56	4	56	7	56
	11 - 3+40	114	642	56	3	56	3	56	4	56	7	56
	12 - 3+60	115	642	56	3	56	3	56	4	56	7	56
	13 - 3+80	116	642	56	3	56	3	56	4	56	7	56
	14 - 4+00	117	642	56	3	56	3	56	4	56	7	56
	15 - 4+20	118	642	56	3	56	3	56	4	56	7	56
	16 - 4+40	119	642	56	3	56	3	56	4	56	7	56
	17 - 4+53.16	120	642	56	3	56	3	56	4	56	7	56
	18 - 5+20	121	642	56	3	56	3	56	4	56	7	56
	19 - 5+20	122	642	56	3	56	3	56	4	56	7	56
	20 - 6+00	123	642	56	3	56	3	56	4	56	7	56
	21 - 6+40	124	642	56	3	56	3	56	4	56	7	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2170	56	0	0	5	56	61	56	23	56
	2 - 0+65	129	2170	56	0	0	5	56	61	56	23	56
	3 - 0+65	130	2170	56	0	0	5	56	61	56	23	56
	4 - 2+00	131	2170	56	0	0	5	56	61	56	23	56
	5 - 2+00	132	2170	56	0	0	5	56	61	56	23	56
	6 - 2+40	133	2170	56	0	0	5	56	61	56	23	56
	7 - 2+80	134	2170	56	0	0	5	56	61	56	23	56
	8 - 3+14.595	135	2170	56	0	0	5	56	61	56	23	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	524	56	0	0	0	0	0	0	0	0
	2 - 0+42	138	524	56	0	0	0	0	0	0	0	0
	3 - 0+42	139	524	56	0	0	0	0	0	0	0	0
	4 - 1+00	140	524	56	0	0	0	0	0	0	0	0
	5 - 1+50	141	524	56	0	0	0	0	0	0	0	0
	6 - 1+50	142	524	56	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	524	56	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	524	56	0	0	0	0	0	0	0	0
	9	145	524	56	0	0	0	0	0	0	0	0
	10	146	524	56	0	0	0	0	0	0	0	0
	11	147	524	56	0	0	0	0	0	0	0	0
	12	148	524	56	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	93	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	93	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	93	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	93	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	93	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	93	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	93	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	100	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	100	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	100	56	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	4 - 4+40	161	100	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	100	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	100	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	100	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	100	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	155	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	64	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	260	32	2	32	0	0	2	32	2	32
	2	181	260	32	2	32	0	0	2	32	2	32
	3	182	260	32	2	32	0	0	2	32	2	32
	4	183	433	32	4	32	0	0	4	32	4	32
	5	184	433	32	4	32	0	0	4	32	4	32
	6	185	433	32	4	32	0	0	4	32	4	32
	7	186	433	32	4	32	0	0	4	32	4	32
	8	187	433	32	4	32	0	0	4	32	4	32
	9	188	433	32	4	32	0	0	4	32	4	32
	10	189	442	32	5	32	0	0	5	32	5	32
	11	190	234	32	2	32	0	0	2	32	2	32
	12	191	234	32	2	32	0	0	2	32	2	32
	13	192	234	32	2	32	0	0	2	32	2	32
	14	193	234	32	2	32	0	0	2	32	2	32
	15	194	234	32	2	32	0	0	2	32	2	32
	16	195	474	32	4	32	0	0	4	32	4	32
	17	196	474	32	4	32	0	0	4	32	4	32
	18	197	572	32	6	32	0	0	6	32	6	32
	19	198	683	32	7	32	0	0	7	32	7	32
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	23	32	0	0	0	0	0	0	0	0
	2	201	23	32	0	0	0	0	0	0	0	0
	3	202	23	32	0	0	0	0	0	0	0	0
	4	203	23	32	0	0	0	0	0	0	0	0
	5	204	23	32	0	0	0	0	0	0	0	0

	6	205	23	32	0	0	0	0	0	0	0	0
	7	206	39	32	1	32	0	0	1	32	1	32
	8	207	70	32	2	32	0	0	2	32	2	32
	9	208	70	32	2	32	0	0	2	32	2	32
	10	209	74	32	2	32	0	0	2	32	2	32
	11	210	2913	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	538	32	6	32	0	0	0	0	6	32
	2	213	114	32	1	32	0	0	0	0	1	32
	3	214	131	32	1	32	0	0	0	0	1	32
	4	215	131	32	1	32	0	0	0	0	1	32
	5	216										
Palace Drive from Richardson to Marina	1	217	34	32	0	0	0	0	0	0	0	0
	2	218	34	32	0	0	0	0	0	0	0	0
	3	219	34	32	0	0	0	0	0	0	0	0
	4	220	34	32	0	0	0	0	0	0	0	0
	5	221	34	32	0	0	0	0	0	0	0	0
	6	222	34	32	0	0	0	0	0	0	0	0
	7	223	34	32	0	0	0	0	0	0	0	0
	8	224	34	32	0	0	0	0	0	0	0	0
	9	225	34	32	0	0	0	0	0	0	0	0
	10	226	34	32	0	0	0	0	0	0	0	0
	11	227	34	32	0	0	0	0	0	0	0	0
	12	228	34	32	0	0	0	0	0	0	0	0
	13	229	34	32	0	0	0	0	0	0	0	0
	14	230	34	32	0	0	0	0	0	0	0	0
	15	231	34	32	0	0	0	0	0	0	0	0
	16	232	34	32	0	0	0	0	0	0	0	0
	17	233	34	32	0	0	0	0	0	0	0	0
	18	234	34	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	151	32	1	32	1	32	1	32	1	32
	2	237	151	32	1	32	1	32	1	32	1	32
	3	238										

INPUT: TRAFFIC FOR LAeq1h Volumes **Doyle Drive - 204235**

Palace Drive Connector to Gorgas	1	240	34	32	0	0	0	0	0	0	0	0
	2	241	34	32	0	0	0	0	0	0	0	0
	3	242	34	32	0	0	0	0	0	0	0	0
	4	243	34	32	0	0	0	0	0	0	0	0
	5	244										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-198.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-240.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Parkway Circle 2030 PM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 20 deg C, 50% RH

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.2	66	69.2	12	Snd Lvl	69.2	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.5	66	61.5	12	—	61.5	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	57.1	71	-23.9	12	----	57.1	0.0	10	-10.0
4 Building 1182	4	0	81.0	56.0	71	-25.0	12	—	56.0	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	56.7	71	-24.3	12	—	56.7	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.2	71	-21.8	12	—	59.2	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.8	71	-15.2	12	—	56.8	0.0	10	-10.0
8 PX Building	8	0	0.0	59.9	71	59.9	12	—	59.9	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	70.8	66	1.8	12	Snd Lvl	70.8	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.6	66	1.6	12	Snd Lvl	69.6	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.6	66	-2.4	12	—	65.6	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.7	66	-2.3	12	—	65.7	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	68.1	66	0.1	12	Snd Lvl	68.1	0.0	10	-10.0
14 Building 644	14	0	0.0	60.6	71	60.6	12	—	60.6	0.0	10	-10.0
15 Building 649	15	0	0.0	60.8	66	60.8	12	—	60.8	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.5	66	-10.5	12	—	59.5	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.9	66	-1.1	12	—	64.9	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	77.1	66	11.1	12	Snd Lvl	77.1	0.0	10	-10.0
19 Building 969	19	0	0.0	58.5	71	58.5	12	—	58.5	0.0	10	-10.0
20 Building 968	20	0	0.0	60.0	71	60.0	12	—	60.0	0.0	10	-10.0
21 Building 967	21	0	0.0	65.3	71	65.3	12	—	65.3	0.0	10	-10.0
22 Building 966	22	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
23 Building 964	23	0	0.0	63.8	66	63.8	12	—	63.8	0.0	10	-10.0

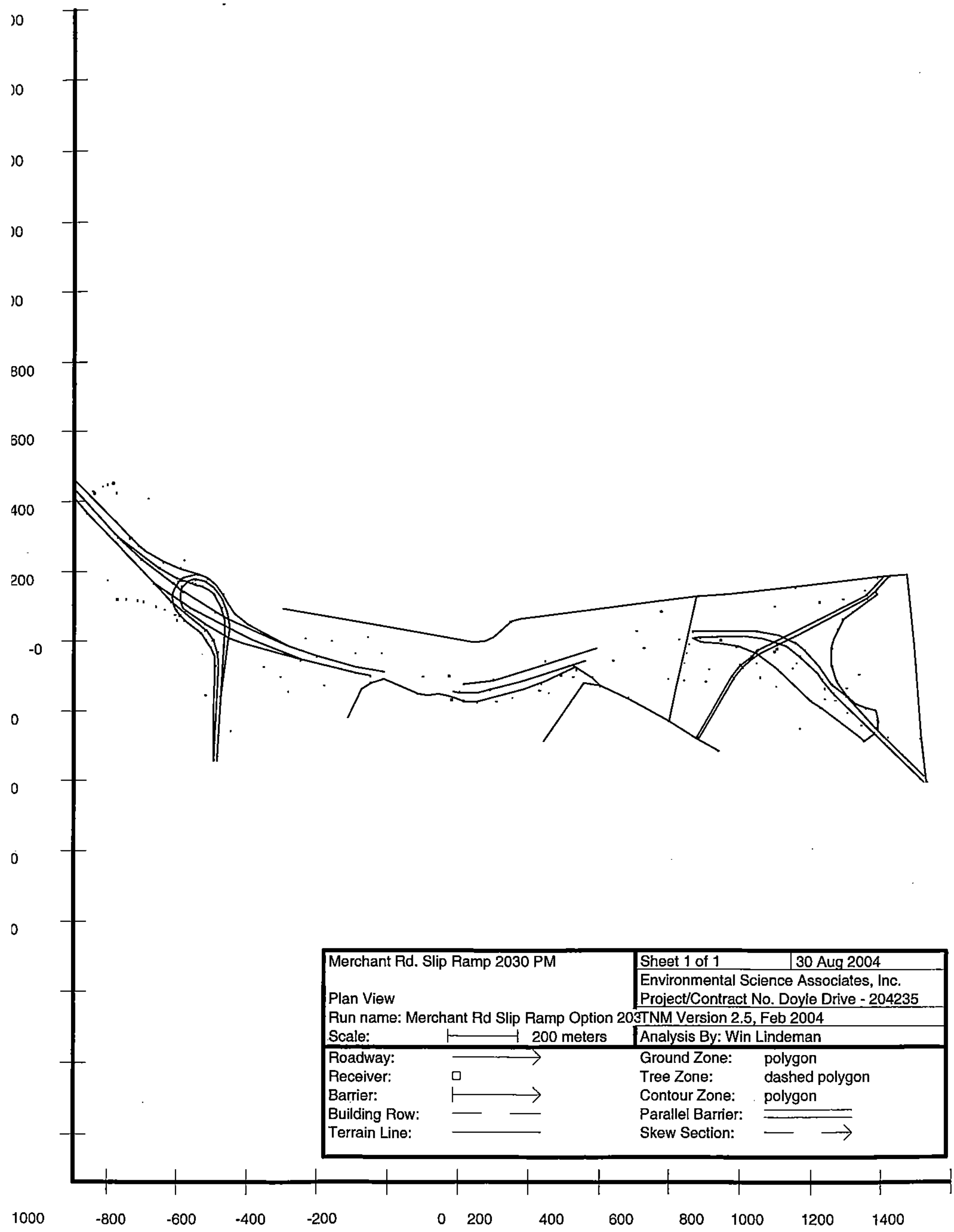
RESULTS: SOUND LEVELS

24 Building 963	24	0	0.0	63.0	66	63.0	12	—	63.0	0.0	10	-10.0
25 Building 962	25	0	0.0	62.3	66	62.3	12	—	62.3	0.0	10	-10.0
26 Unknown Building	26	0	0.0	74.9	71	74.9	12	Snd Lvl	74.9	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.7	66	5.7	12	Snd Lvl	68.7	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.3	71	67.3	12	—	67.3	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.6	66	0.1	12	Snd Lvl	66.6	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.5	66	2.0	12	Snd Lvl	68.5	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.5	66	4.0	12	Snd Lvl	70.5	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.1	66	4.6	12	Snd Lvl	71.1	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.1	66	5.6	12	Snd Lvl	72.1	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	72.7	66	6.2	12	Snd Lvl	72.7	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.6	66	7.1	12	Snd Lvl	73.6	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.7	66	6.2	12	Snd Lvl	72.7	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.3	66	69.3	12	Snd Lvl	69.3	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.1	66	-0.4	12	—	65.1	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	60.4	71	-3.6	12	—	60.4	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.8	71	-1.2	12	—	62.8	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.3	71	-0.7	12	—	63.3	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.3	71	3.3	12	—	67.3	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	64.6	66	-4.4	12	—	64.6	0.0	10	-10.0
44 Building 129	44	1	0.0	57.6	66	57.6	12	—	57.6	0.0	10	-10.0
45 Building 122	45	0	0.0	62.5	71	62.5	12	—	62.5	0.0	10	-10.0
46 Building 108	46	0	0.0	62.6	71	62.6	12	—	62.6	0.0	10	-10.0
47 Building 107	47	0	0.0	67.7	71	67.7	12	—	67.7	0.0	10	-10.0
48 Building 104	48	0	74.0	58.8	71	-15.2	12	—	58.8	0.0	10	-10.0
49 Building 105	49	0	74.0	73.5	71	-0.5	12	Snd Lvl	73.5	0.0	10	-10.0
50 Building 106	50	0	76.0	72.6	71	-3.4	12	Snd Lvl	72.6	0.0	10	-10.0
51 Building 211	51	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
52 Building 204	52	0	0.0	59.6	71	59.6	12	—	59.6	0.0	10	-10.0
53 Building 210	53	0	0.0	62.8	71	62.8	12	—	62.8	0.0	10	-10.0
54 Building 201	54	0	0.0	55.9	71	55.9	12	—	55.9	0.0	10	-10.0
55 Building 220	55	0	0.0	53.7	71	53.7	12	—	53.7	0.0	10	-10.0
56 Building 231	56	0	0.0	66.1	71	66.1	12	—	66.1	0.0	10	-10.0
57 Building 228	57	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
58 Building 229	58	0	0.0	59.4	71	59.4	12	—	59.4	0.0	10	-10.0
59 Building 223	59	0	0.0	57.5	71	57.5	12	—	57.5	0.0	10	-10.0
60 Building 230	60	0	0.0	72.1	71	72.1	12	Snd Lvl	72.1	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	60.1	66	3.1	12	—	60.1	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.5	66	0.5	12	—	57.5	0.0	10	-10.0
63 Building 1063	63	0	68.5	63.0	71	-5.5	12	—	63.0	0.0	10	-10.0

RESULTS: SOUND LEVELS

64 Building 1062	64	0	68.5	59.6	71	-8.9	12	—	59.6	0.0	10	-10.0
65 Building 1060	65	0	68.5	60.0	71	-8.5	12	—	60.0	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.2	71	-2.8	12	—	65.2	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.1	71	65.1	12	—	65.1	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.4	71	-3.6	12	—	64.4	0.0	10	-10.0
69 Building 1162	69	0	0.0	63.2	71	63.2	12	—	63.2	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.3	71	3.3	12	Snd Lvl	71.3	0.0	10	-10.0
71 Building 1161	71	0	0.0	67.0	71	67.0	12	—	67.0	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.4	71	71.4	12	Snd Lvl	71.4	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	69.9	66	69.9	12	Snd Lvl	69.9	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.0	66	72.0	12	Snd Lvl	72.0	0.0	10	-10.0
75 Building 1004	75	0	0.0	56.6	71	56.6	12	—	56.6	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	73.0	66	-3.5	12	Snd Lvl	73.0	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Merchant Rd. Slip Ramp 2030 PM

Plan View

Run name: Merchant Rd Slip Ramp Option 20

Scale: 200 meters

Sheet 1 of 1 | 30 Aug 2004

Environmental Science Associates, Inc.

Project/Contract No. Doyle Drive - 204235

TNM Version 2.5, Feb 2004

Analysis By: Win Lindeman

Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:

Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Merchant Rd. Slip Ramp 2030 PM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+53	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,178.0	-259.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fanclsco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+68	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presldio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
NB Park Presidio to EB Doyle Drive	7.0	1 - 0+00	104	-679.0	-153.0	38.50				Average	
		2 - 1+35.9	105	-657.0	20.0	36.00				Average	
		3 - 1+60	106	-654.0	44.0	40.00				Average	
		4 - 1+80	107	-657.0	65.0	40.00				Average	
		5 - 2+00	108	-661.0	85.0	40.00				Average	
		6 - 2+20	109	-667.0	104.0	42.00				Average	
		7 - 2+40	110	-675.0	123.0	42.00				Average	
		8 - 2+60	111	-686.0	140.0	42.00				Average	
		9 - 2+81.9	112	-700.0	157.0	42.00				Average	
		10 - 3+09.	113	-723.0	175.0	42.00				Average	
		11 - 3+40	114	-754.0	180.0	42.00				Average	
		12 - 3+60	115	-775.0	173.0	42.00				Average	
		13 - 3+80	116	-790.0	158.0	42.00				Average	
		14 - 4+00	117	-796.0	138.0	42.00				Average	
		15 - 4+20	118	-795.0	116.0	42.00				Average	
		16 - 4+40	119	-788.0	97.0	42.00				Average	
		17 - 4+53.	120	-778.0	88.0	42.00				Average	
		18 - 5+20	121	-722.0	51.0	42.00				Average	
		19 - 5+20	122	-721.0	51.0	42.00				Average	Y
		20 - 6+00	123	-652.0	11.0	42.00				Average	Y
		21 - 6+40	124	-614.0	-3.0	42.00				Average	
		22 - 8+19.	125	-450.0	-50.0	33.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y

		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	
		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	

		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	
		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	

		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
Merchant Road Slip Ramp	3.7	1 - 3+10	240	-746.0	194.0	42.00				Average	
		2	241	-795.0	211.0	42.00				Average	
		3	242	-844.0	230.0	42.00				Average	
		4	243	-895.0	260.0	48.00				Average	
		5	244	-916.0	276.0	48.00				Average	
		6 - Merch	245	-1,118.0	487.0	43.00					

Environmental Science Associates, Inc. 30 August 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Merchant Rd. Slip Ramp 2030 PM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	5438	88	17	88	73	88	62	88	17	88
	2 - 1+97.539	10	5438	88	17	88	73	88	62	88	17	88
	3 - 4+74	9	3091	88	10	88	41	88	35	88	10	88
	4 - 5+27	8	3091	88	10	88	41	88	35	88	10	88
	5 - 5+27	7	3091	88	10	88	41	88	35	88	10	88
	6 - 6+00	6	3091	88	10	88	41	88	35	88	10	88
	7 - 8+00	5	3091	88	10	88	9	88	41	88	10	88
	8 - 9+57	4	3668	88	11	88	49	88	42	88	11	88
	9 - 11+10	3	4732	88	49	88	10	88	49	88	49	88
	10 - 11+10	2	3668	88	11	88	49	88	42	88	11	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	3668	88	11	88	49	88	42	88	11	88
	2 - 14+10	17	3668	88	11	88	49	88	42	88	11	88
	3 - 14+60	16	3668	88	11	88	49	88	42	88	11	88
	4 - 15+00	15	3668	88	11	88	49	88	42	88	11	88
	5 - 15+85.44	14	3668	88	11	88	49	88	42	88	11	88
	6 - 17+33.198	13	3668	88	11	88	49	88	42	88	11	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	2324	56	7	56	31	56	26	56	7	56
	2 - 21+20	20	2324	56	7	56	31	56	26	56	7	56
	3 - 21+20	21	2324	56	7	56	31	56	26	56	7	56

	4 - 22+42.630	22	2324	56	7	56	31	56	26	56	7	56
	5 - 23+00	23	2324	56	7	56	31	56	26	56	7	56
	6 - 23+25	24	2324	56	7	56	31	56	26	56	7	56
	7 - 23+25	25	2324	56	7	56	31	56	26	56	7	56
	8 - 24+20	26	2324	56	7	56	31	56	26	56	7	56
	9 - 24+85.060	27	2324	56	7	56	31	56	26	56	7	56
	10 - 25+17.10	28	2324	56	7	56	31	56	26	56	7	56
	11 - 25+64.74	29	2324	56	7	56	31	56	26	56	7	56
	12 - Gorgas In	30	2324	56	7	56	31	56	26	56	7	56
	13 - Francisco	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	3268	56	0	0	7	56	92	56	34	56
	2 - 27+20.608	33	3268	56	0	0	7	56	92	56	34	56
	3 - 26+00	34	3268	56	0	0	7	56	92	56	34	56
	4 - 25+40	35	3268	56	0	0	7	56	92	56	34	56
	5 - 24+73	36	3268	56	0	0	7	56	92	56	34	56
	6 - 24+20	37	3268	56	0	0	7	56	92	56	34	56
	7 - 23+75	38	3268	56	0	0	7	56	92	56	34	56
	8 - 23+75	39	3268	56	0	0	7	56	92	56	34	56
	9 - 23+22	40	3268	56	0	0	7	56	92	56	34	56
	10 - 23+22	41	3268	56	0	0	7	56	92	56	34	56
	11 - 22+68	42	3268	56	0	0	7	56	92	56	34	56
	12 - 22+00	43	3268	56	0	0	7	56	92	56	34	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	4732	88	0	0	10	88	133	88	49	88
	2 - 15+00	46	4732	88	0	0	10	88	133	88	49	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	4732	88	0	0	10	88	133	88	49	88
	2 - 11+00	52	4732	88	0	0	10	88	133	88	49	88
	3 - 11+00	53	4732	88	0	0	10	88	133	88	49	88
	4 - 9+80	54	4732	88	0	0	10	88	133	88	49	88
	5 - 8+73	55	4086	88	0	0	9	88	115	88	43	88
	6 - 7+00	56	4086	88	0	0	9	88	115	88	43	88
	7 - 6+60	57	4086	88	0	0	9	88	115	88	43	88
	8 - 6+60	58	4086	88	0	0	9	88	115	88	43	88

	9 - 5+54	59	4086	88	0	0	9	88	115	88	43	88
	10 - 5+54	60	4086	88	0	0	9	88	115	88	43	88
	11 - 5+14	61	4086	88	0	0	9	88	115	88	43	88
	12 - 5+14	62	4086	88	0	0	9	88	115	88	43	88
	13 - 4+00	63	4086	88	0	0	9	88	115	88	43	88
	14 - 3+10	64	6197	88	0	0	13	88	174	88	64	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	645	56	0	0	1	56	18	56	7	56
	2 - 1+30	67	645	56	0	0	1	56	18	56	7	56
	3 - 1+80	68	645	56	0	0	1	56	18	56	7	56
	4 - 2+20	69	645	56	0	0	1	56	18	56	7	56
	5 - 2+20	70	645	56	0	0	1	56	18	56	7	56
	6 - 2+48	71	645	56	0	0	1	56	18	56	7	56
	7 - 3+09	72	645	56	0	0	1	56	18	56	7	56
	8 - 3+40	73	645	56	0	0	1	56	18	56	7	56
	9 - 3+60	74	645	56	0	0	1	56	18	56	7	56
	10 - 3+80	75	645	56	0	0	1	56	18	56	7	56
	11 - 4+00	76	645	56	0	0	1	56	18	56	7	56
	12 - 4+20	77	645	56	0	0	1	56	18	56	7	56
	13 - 4+40	78	645	56	0	0	1	56	18	56	7	56
	14 - 4+59	79	645	56	0	0	1	56	18	56	7	56
	15 - 4+80	80	645	56	0	0	1	56	18	56	7	56
	16 - 5+00	81	645	56	0	0	1	56	18	56	7	56
	17 - 5+20	82	645	56	0	0	1	56	18	56	7	56
	18 - 5+80	83	645	56	0	0	1	56	18	56	7	56
	19 - 6+06	84	645	56	0	0	1	56	18	56	7	56
	20 - 6+31	85	645	56	0	0	1	56	18	56	7	56
	21 - 6+60	86	645	56	0	0	1	56	18	56	7	56
	22 - 6+88	87	645	56	0	0	1	56	18	56	7	56
	23 - 8+23	169	645	56	0	0	1	56	18	56	7	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2141	56	0	0	9	56	22	56	24	56
	2A	170	2141	56	0	0	9	56	22	56	24	56
	2 - 3+72.391	90	2141	56	0	0	9	56	22	56	24	56

	3 - 4+00	91	2141	56	0	0	9	56	22	56	24	56
	4 - 4+40	92	2141	56	0	0	9	56	22	56	24	56
	5 - 4+60	93	2141	56	0	0	9	56	22	56	24	56
	6 - 5+00	94	2141	56	0	0	9	56	22	56	24	56
	7 - 5+20	95	2141	56	0	0	9	56	22	56	24	56
	8 - 5+40	96	2141	56	0	0	9	56	22	56	24	56
	9 - 5+53	97	2141	56	0	0	9	56	22	56	24	56
	10 - 5+53	98	2141	56	0	0	9	56	22	56	24	56
	11 - 5+80	99	2141	56	0	0	9	56	22	56	24	56
	12 - 5+98	100	2141	56	0	0	9	56	22	56	24	56
	13 - 5+98	101	2141	56	0	0	9	56	22	56	24	56
	14 - 6+58.037	102	2141	56	0	0	9	56	22	56	24	56
	15 - 8+04.414	103										
NB Park Presidio to EB Doyle Drive	1 - 0+00	104	581	56	2	56	2	56	4	56	7	56
	2 - 1+35.965	105	581	56	2	56	2	56	4	56	7	56
	3 - 1+60	106	581	56	2	56	2	56	4	56	7	56
	4 - 1+80	107	581	56	2	56	2	56	4	56	7	56
	5 - 2+00	108	581	56	2	56	2	56	4	56	7	56
	6 - 2+20	109	581	56	2	56	2	56	4	56	7	56
	7 - 2+40	110	581	56	2	56	2	56	4	56	7	56
	8 - 2+60	111	581	56	2	56	2	56	4	56	7	56
	9 - 2+81.908	112	581	56	2	56	2	56	4	56	7	56
	10 - 3+09.875	113	581	56	2	56	2	56	4	56	7	56
	11 - 3+40	114	581	56	2	56	2	56	4	56	7	56
	12 - 3+60	115	581	56	2	56	2	56	4	56	7	56
	13 - 3+80	116	581	56	2	56	2	56	4	56	7	56
	14 - 4+00	117	581	56	2	56	2	56	4	56	7	56
	15 - 4+20	118	581	56	2	56	2	56	4	56	7	56
	16 - 4+40	119	581	56	2	56	2	56	4	56	7	56
	17 - 4+53.16	120	581	56	2	56	2	56	4	56	7	56
	18 - 5+20	121	581	56	2	56	2	56	4	56	7	56
	19 - 5+20	122	581	56	2	56	2	56	4	56	7	56
	20 - 6+00	123	581	56	2	56	2	56	4	56	7	56
	21 - 6+40	124	581	56	2	56	2	56	4	56	7	56

	22 - 8+19.142	125										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2306	56	0	0	5	56	65	56	24	56
	2 - 0+65	129	2306	56	0	0	5	56	65	56	24	56
	3 - 0+65	130	2306	56	0	0	5	56	65	56	24	56
	4 - 2+00	131	2306	56	0	0	5	56	65	56	24	56
	5 - 2+00	132	2306	56	0	0	5	56	65	56	24	56
	6 - 2+40	133	2306	56	0	0	5	56	65	56	24	56
	7 - 2+80	134	2306	56	0	0	5	56	65	56	24	56
	8 - 3+14.595	135	2306	56	0	0	5	56	65	56	24	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	222	56	0	0	0	0	0	0	0	0
	2 - 0+42	138	222	56	0	0	0	0	0	0	0	0
	3 - 0+42	139	222	56	0	0	0	0	0	0	0	0
	4 - 1+00	140	222	56	0	0	0	0	0	0	0	0
	5 - 1+50	141	222	56	0	0	0	0	0	0	0	0
	6 - 1+50	142	222	56	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	222	56	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	222	56	0	0	0	0	0	0	0	0
	9	145	222	56	0	0	0	0	0	0	0	0
	10	146	222	56	0	0	0	0	0	0	0	0
	11	147	222	56	0	0	0	0	0	0	0	0
	12	148	222	56	0	0	0	0	0	0	0	0
	13 - Intersect	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	91	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	91	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	91	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	91	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	91	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	91	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	91	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	115	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	115	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	115	56	0	0	0	0	0	0	0	0

	4 - 4+40	161	115	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	115	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	115	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	115	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	115	56	0	0	0	0	0	0	0	0
	9 - Mason/M	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	57	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	57	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	259	32	2	32	0	0	2	32	2	32
	2	181	259	32	2	32	0	0	2	32	2	32
	3	182	259	32	2	32	0	0	2	32	2	32
	4	183	265	32	3	32	0	0	3	32	3	32
	5	184	265	32	3	32	0	0	3	32	3	32
	6	185	265	32	3	32	0	0	3	32	3	32
	7	186	265	32	3	32	0	0	3	32	3	32
	8	187	265	32	3	32	0	0	3	32	3	32
	9	188	265	32	3	32	0	0	3	32	3	32
	10	189	275	32	3	32	0	0	3	32	3	32
	11	190	128	32	1	32	0	0	1	32	1	32
	12	191	128	32	1	32	0	0	1	32	1	32
	13	192	128	32	1	32	0	0	1	32	1	32
	14	193	128	32	1	32	0	0	1	32	1	32
	15	194	128	32	1	32	0	0	1	32	1	32
	16	195	365	32	4	32	0	0	4	32	4	32
	17	196	363	32	4	32	0	0	4	32	4	32
	18	197	430	32	5	32	0	0	5	32	5	32
	19	198	919	32	9	32	0	0	9	32	9	32
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	7	32	0	0	0	0	0	0	0	0
	2	201	7	32	0	0	0	0	0	0	0	0
	3	202	7	32	0	0	0	0	0	0	0	0
	4	203	7	32	0	0	0	0	0	0	0	0
	5	204	7	32	0	0	0	0	0	0	0	0

	6	205	7	32	0	0	0	0	0	0	0	0
	7	206	39	32	1	32	1	32	1	32	1	32
	8	207	39	32	1	32	1	32	1	32	1	32
	9	208	44	32	1	32	1	32	1	32	1	32
	10	209	2188	32	0	0	0	0	0	0	0	0
	11	210	2188	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	38	32	1	32	0	0	0	0	1	32
	2	213	3	32	0	0	0	0	0	0	0	0
	3	214	7	32	0	0	0	0	0	0	0	0
	4	215	9	32	0	0	0	0	0	0	0	0
	5	216										
Palace Drive from Richardson to Marina	1	217	0	0	0	0	0	0	0	0	0	0
	2	218	0	0	0	0	0	0	0	0	0	0
	3	219	0	0	0	0	0	0	0	0	0	0
	4	220	0	0	0	0	0	0	0	0	0	0
	5	221	0	0	0	0	0	0	0	0	0	0
	6	222	0	0	0	0	0	0	0	0	0	0
	7	223	0	0	0	0	0	0	0	0	0	0
	8	224	0	0	0	0	0	0	0	0	0	0
	9	225	0	0	0	0	0	0	0	0	0	0
	10	226	0	0	0	0	0	0	0	0	0	0
	11	227	0	0	0	0	0	0	0	0	0	0
	12	228	0	0	0	0	0	0	0	0	0	0
	13	229	0	0	0	0	0	0	0	0	0	0
	14	230	0	0	0	0	0	0	0	0	0	0
	15	231	0	0	0	0	0	0	0	0	0	0
	16	232	0	0	0	0	0	0	0	0	0	0
	17	233	0	0	0	0	0	0	0	0	0	0
	18	234	0	0	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherlan to Lincoln	1	236	113	32	2	32	0	0	2	32	2	32
	2	237	113	32	2	32	0	0	2	32	2	32
	3	238										

INPUT: TRAFFIC FOR LAeq1h Volumes **Doyle Drive - 204235**

Merchant Road Slip Ramp	1 - 3+10	240	313	50	0	0	0	0	0	0	0	0
	2	241	313	50	0	0	0	0	0	0	0	0
	3	242	313	50	0	0	0	0	0	0	0	0
	4	243	313	50	0	0	0	0	0	0	0	0
	5	244	313	50	0	0	0	0	0	0	0	0
	6 - Merchant	245										

Environmental Science Associates, Inc
Win Lindeman

30 August 2004
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Merchant Rd. Slip Ramp 2030 PM

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

Doyle Drive - 204235

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

Doyle Drive - 204235

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc.
Win Lindeman

30 August 2004
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Merchant Rd. Slip Ramp 2030 PM
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

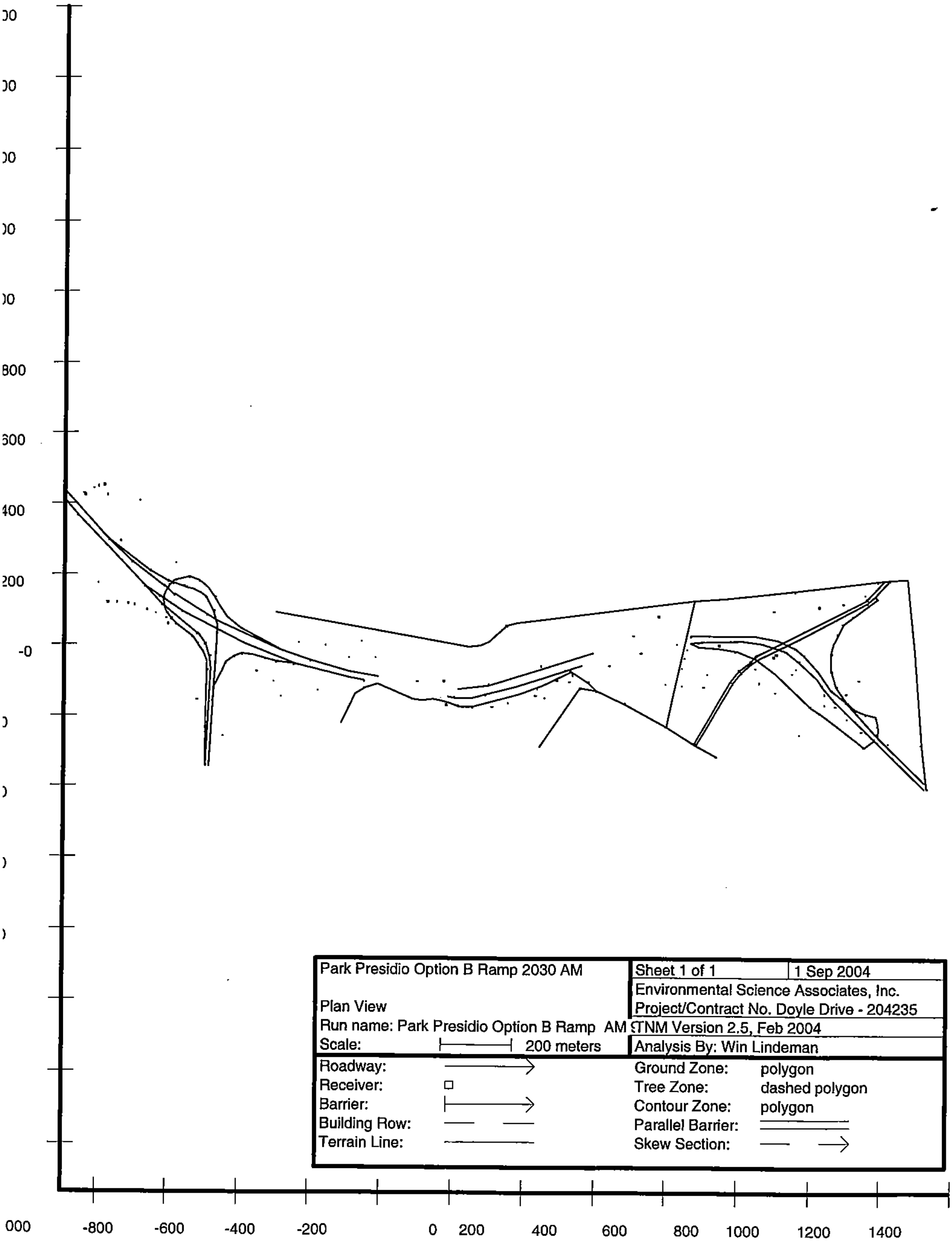
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact		Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.9	66	69.9	12	Snd Lvl	69.9	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	61.8	66	61.8	12	—	61.8	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	57.3	71	-23.7	12	—	57.3	0.0	10	-10.0
4 Building 1182	4	0	81.0	56.1	71	-24.9	12	—	56.1	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	57.2	71	-23.8	12	—	57.2	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.6	71	-21.4	12	—	59.6	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.8	71	-15.2	12	—	56.8	0.0	10	-10.0
8 PX Building	8	0	0.0	60.0	71	60.0	12	—	60.0	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	70.9	66	1.9	12	Snd Lvl	70.9	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.6	66	1.6	12	Snd Lvl	69.6	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.7	66	-2.3	12	—	65.7	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.8	66	-2.2	12	—	65.8	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	68.1	66	0.1	12	Snd Lvl	68.1	0.0	10	-10.0
14 Building 644	14	0	0.0	60.6	71	60.6	12	—	60.6	0.0	10	-10.0
15 Building 649	15	0	0.0	60.8	66	60.8	12	—	60.8	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.4	66	-10.6	12	—	59.4	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	66.6	66	0.6	12	Snd Lvl	66.6	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	77.4	66	11.4	12	Snd Lvl	77.4	0.0	10	-10.0
19 Building 969	19	0	0.0	62.1	71	62.1	12	—	62.1	0.0	10	-10.0
20 Building 968	20	0	0.0	64.2	71	64.2	12	—	64.2	0.0	10	-10.0
21 Building 967	21	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
22 Building 966	22	0	0.0	67.3	71	67.3	12	—	67.3	0.0	10	-10.0
23 Building 964	23	0	0.0	67.0	66	67.0	12	Snd Lvl	67.0	0.0	10	-10.0

24 Building 963	24	0	0.0	66.3	66	66.3	12	Snd Lvl	66.3	0.0	10	-10.0
25 Building 962	25	0	0.0	65.8	66	65.8	12	—	65.8	0.0	10	-10.0
26 Unknown Building	26	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.9	66	5.9	12	Snd Lvl	68.9	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.6	66	2.1	12	Snd Lvl	68.6	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.6	66	4.1	12	Snd Lvl	70.6	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.2	66	4.7	12	Snd Lvl	71.2	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.2	66	5.7	12	Snd Lvl	72.2	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.7	66	7.2	12	Snd Lvl	73.7	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.7	66	6.2	12	Snd Lvl	72.7	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.3	66	69.3	12	Snd Lvl	69.3	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.1	66	-0.4	12	—	65.1	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	60.2	71	-3.8	12	—	60.2	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.6	71	-1.4	12	—	62.6	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.3	71	-0.7	12	—	63.3	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.4	71	3.4	12	—	67.4	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	64.2	66	-4.8	12	—	64.2	0.0	10	-10.0
44 Building 129	44	1	0.0	57.2	66	57.2	12	—	57.2	0.0	10	-10.0
45 Building 122	45	0	0.0	62.3	71	62.3	12	—	62.3	0.0	10	-10.0
46 Building 108	46	0	0.0	62.6	71	62.6	12	—	62.6	0.0	10	-10.0
47 Building 107	47	0	0.0	67.6	71	67.6	12	—	67.6	0.0	10	-10.0
48 Building 104	48	0	74.0	58.7	71	-15.3	12	—	58.7	0.0	10	-10.0
49 Building 105	49	0	74.0	73.5	71	-0.5	12	Snd Lvl	73.5	0.0	10	-10.0
50 Building 106	50	0	76.0	72.5	71	-3.5	12	Snd Lvl	72.5	0.0	10	-10.0
51 Building 211	51	0	0.0	66.2	71	66.2	12	—	66.2	0.0	10	-10.0
52 Building 204	52	0	0.0	59.6	71	59.6	12	—	59.6	0.0	10	-10.0
53 Building 210	53	0	0.0	62.8	71	62.8	12	—	62.8	0.0	10	-10.0
54 Building 201	54	0	0.0	57.8	71	57.8	12	—	57.8	0.0	10	-10.0
55 Building 220	55	0	0.0	53.8	71	53.8	12	—	53.8	0.0	10	-10.0
56 Building 231	56	0	0.0	65.9	71	65.9	12	—	65.9	0.0	10	-10.0
57 Building 228	57	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
58 Building 229	58	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
59 Building 223	59	0	0.0	57.4	71	57.4	12	—	57.4	0.0	10	-10.0
60 Building 230	60	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	59.9	66	2.9	12	—	59.9	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.3	66	0.3	12	—	57.3	0.0	10	-10.0
63 Building 1063	63	0	68.5	62.3	71	-6.2	12	—	62.3	0.0	10	-10.0

64 Building 1062	64	0	68.5	59.2	71	-9.3	12	—	59.2	0.0	10	-10.0
65 Building 1060	65	0	68.5	59.5	71	-9.0	12	—	59.5	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.4	71	-2.6	12	—	65.4	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.0	71	65.0	12	—	65.0	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.3	71	-3.7	12	—	64.3	0.0	10	-10.0
69 Building 1162	69	0	0.0	62.9	71	62.9	12	—	62.9	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.4	71	3.4	12	Snd Lvl	71.4	0.0	10	-10.0
71 Building 1161	71	0	0.0	67.0	71	67.0	12	—	67.0	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.5	71	71.5	12	Snd Lvl	71.5	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	71.0	66	71.0	12	Snd Lvl	71.0	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.6	66	72.6	12	Snd Lvl	72.6	0.0	10	-10.0
75 Building 1004	75	0	0.0	57.0	71	57.0	12	—	57.0	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	74.6	66	-1.9	12	Snd Lvl	74.6	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0


Park Presidio Option B Ramp 2030 AM
Plan View
Run name: Park Presidio Option B Ramp AM
Scale: 200 meters
Sheet 1 of 1
1 Sep 2004
Environmental Science Associates, Inc.
Project/Contract No. Doyle Drive - 204235
TNM Version 2.5, Feb 2004
Analysis By: Win Lindeman
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
800
600
400
200
-0
000
-800
-600
-400
-200
0
200
400
600
800
1000
1200
1400

Environmental Science Associates, Inc.
Win Lindeman

1 September 2004
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Park Presidio Option B Ramp 2030 AM

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points										
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
EB Doyle to North Tunnel	18.0	1 - North I	11	-1,185.0	519.0	53.00				Average	
		2 - 1+97.5	10	-1,060.0	368.0	56.00				Average	
		3 - 4+74	9	-870.0	167.0	54.00				Average	
		4 - 5+27	8	-827.0	138.0	51.50				Average	
		5 - 5+27	7	-826.0	138.0	51.50				Average	Y
		6 - 6+00	6	-764.0	95.0	49.00				Average	Y
		7 - 8+00	5	-588.0	7.0	40.00				Average	Y
		8 - 9+57	4	-450.0	-50.0	33.00				Average	Y
		9 - 11+10	3	-294.0	-88.0	27.00				Average	Y
		10 - 11+1(	2	-293.0	-88.0	27.00				Average	
		11 - 11+5:	1	-253.0	-96.0	26.00					
EB Doyle from North Tunnel to S. Tunnel	18.0	1 - 13+93	18	-17.0	-142.0	16.00				Average	
		2 - 14+10	17	0.0	-143.0	16.00				Average	
		3 - 14+60	16	49.0	-143.0	14.00				Average	
		4 - 15+00	15	88.0	-135.0	12.00				Average	
		5 - 15+85.	14	170.0	-112.0	9.00				Average	
		6 - 17+33.	13	310.0	-65.0	5.00				Average	
		7 - 17+80	12	354.0	-52.0	4.00					
EB Doyle from South Tunnel to Francisco	18.0	1 - 20+95	19	660.0	11.0	2.00				Average	
		2 - 21+20	20	684.0	14.0	3.00				Average	
		3 - 21+20	21	685.0	14.0	3.00				Average	Y
		4 - 22+42.	22	807.0	18.0	5.00				Average	Y
		5 - 23+00	23	859.0	12.0	6.00				Average	Y
		6 - 23+25	24	925.0	-10.0	6.00				Average	Y
		7 - 23+25	25	926.0	-10.0	6.00				Average	

		8 - 24+20	26	966.0	-41.0	5.00				Average	
		9 - 24+85.	27	1,016.0	-88.0	4.00				Average	
		10 - 25+17	28	1,030.0	-108.0	3.50				Average	
		11 - 25+64	29	1,062.0	-146.0	3.00				Average	
		12 - Gorg	30	1,178.0	-259.0	4.00				Average	
		13 - Franc	31	1,320.0	-400.0	4.00					
WB Doyle from Fancisco to South Tunnel	10.8	1 - Francis	32	1,320.0	-380.0	4.00				Average	
		2 - 27+20.	33	1,182.0	-246.0	4.00				Average	
		3 - 26+00	34	1,095.0	-152.0	3.50				Average	
		4 - 25+40	35	1,055.0	-120.0	3.50				Average	
		5 - 24+73	36	1,018.0	-65.0	4.00				Average	
		6 - 24+20	37	977.0	-21.0	5.00				Average	
		7 - 23+75	38	950.0	0.0	6.00				Average	
		8 - 23+75	39	949.0	0.0	6.00				Average	Y
		9 - 23+22	40	900.0	22.0	6.00				Average	Y
		10 - 23+22	41	899.0	22.0	6.00				Average	
		11 - 22+66	42	843.0	34.0	6.00				Average	
		12 - 22+00	43	775.0	33.0	4.00				Average	
		13 - 20+85	44	661.0	31.0	2.00					
WB Doyle from S. Tunnel to N. Tunnel	10.8	1 - 18+05	45	386.0	-15.0	3.50				Average	
		2 - 15+00	46	96.0	-107.0	10.00				Average	
		3 - 14+10	47	10.0	-119.0	14.00					
WB Doyle from North Tunnel to North End	13.2	1 - 11+80	51	-216.0	-85.0	24.00				Average	
		2 - 11+00	52	-295.0	-69.0	27.00				Average	
		3 - 11+00	53	-296.0	-69.0	27.00				Average	Y
		4 - 9+80	54	-407.0	-39.0	32.00				Average	Y
		5 - 8+73	55	-488.0	-9.0	36.00				Average	Y
		6 - 7+00	56	-661.0	69.0	44.00				Average	Y
		7 - 6+60	57	-696.0	88.0	46.00				Average	Y
		8 - 6+60	58	-697.0	88.0	46.00				Average	
		9 - 5+54	59	-789.0	145.0	50.00				Average	
		10 - 5+54	60	-790.0	145.0	50.00				Average	Y
		11 - 5+14	61	-817.0	169.0	52.00				Average	Y
		12 - 5+14	62	-818.0	169.0	52.00				Average	
		13 - 4+00	63	-907.0	237.0	56.00				Average	
		14 - 3+10	64	-975.0	300.0	56.00				Average	
		15 - 0+00	65	-1,170.0	522.0	53.00					
WB Doyle off ramp to SB Park Presidio	7.0	1 - 0+00	66	-488.0	-9.0	42.00				Average	Y

		2 - 1+30	67	-600.0	52.0	42.00				Average	Y
		3 - 1+80	68	-639.0	82.0	42.00				Average	Y
		4 - 2+20	69	-661.0	114.0	42.00				Average	Y
		5 - 2+20	70	-662.0	114.0	42.00				Average	
		6 - 2+48	71	-673.0	139.0	42.00				Average	
		7 - 3+09	72	-693.0	165.0	42.00				Average	
		8 - 3+40	73	-718.0	184.0	42.00				Average	
		9 - 3+60	74	-746.0	194.0	42.00				Average	
		10 - 3+80	75	-787.0	185.0	42.00				Average	
		11 - 4+00	76	-803.0	171.0	42.00				Average	
		12 - 4+20	77	-813.0	153.0	42.00				Average	
		13 - 4+40	78	-818.0	134.0	42.00				Average	
		14 - 4+59	79	-815.0	112.0	42.00				Average	
		15 - 4+80	80	-807.0	93.0	42.00				Average	
		16 - 5+00	81	-796.0	76.0	41.00				Average	
		17 - 5+20	82	-782.0	61.0	40.00				Average	
		18 - 5+80	83	-735.0	24.0	40.00				Average	
		19 - 6+06	84	-719.0	5.0	40.00				Average	
		20 - 6+31	85	-706.0	-15.0	40.00				Average	
		21 - 6+60	86	-696.0	-42.0	40.00				Average	
		22 - 6+88	87	-694.0	-68.0	40.00				Average	
		23 - 8+23	169	-699.0	-203.0	40.00				Average	
		24 - 5+88.	88	-698.0	-337.0	40.00					
NB Park Presidio to WB Doyle Drive	10.2	1 - 0+00	89	-690.0	-337.0	40.00				Average	
		2A	170	-679.0	-153.0	38.50				Average	
		2 - 3+72.3	90	-667.0	32.0	37.00				Average	
		3 - 4+00	91	-667.0	61.0	38.00				Average	
		4 - 4+40	92	-677.0	101.0	40.00				Average	
		5 - 4+60	93	-698.0	137.0	48.00				Average	
		6 - 5+00	94	-715.0	150.0	48.00				Average	
		7 - 5+20	95	-734.0	160.0	49.00				Average	
		8 - 5+40	96	-753.0	165.0	49.00				Average	
		9 - 5+53	97	-760.0	168.0	50.00				Average	
		10 - 5+53	98	-761.0	168.0	50.00				Average	Y
		11 - 5+80	99	-792.0	176.0	51.00				Average	Y
		12 - 5+98	100	-807.0	183.0	52.00				Average	Y
		13 - 5+98	101	-808.0	183.0	52.00				Average	
		14 - 6+58.	102	-857.0	212.0	53.00				Average	

		15 - 8+04.	103	-975.0	300.0	56.00					
SB Off-ramp from Doyle to Park Presidio	10.0	1 - 0+00	128	-870.0	167.0	54.00				Average	
		2 - 0+65	129	-823.0	116.0	52.00				Average	
		3 - 0+65	130	-822.0	116.0	52.00				Average	Y
		4 - 2+00	131	-723.0	35.0	44.00				Average	Y
		5 - 2+00	132	-722.0	35.0	44.00				Average	
		6 - 2+40	133	-700.0	5.0	42.00				Average	
		7 - 2+80	134	-687.0	-30.0	40.00				Average	
		8 - 3+14.5	135	-685.0	-63.0	37.00				Average	
		9 - 5+88.1	136	-698.0	-337.0	40.00					
Gorgas Ave. from SB Doyle to Richardso	6.0	1 - 0+00	137	660.0	11.0	2.00				Average	
		2 - 0+42	138	685.0	0.0	2.00				Average	
		3 - 0+42	139	686.0	0.0	2.00				Average	Y
		4 - 1+00	140	740.0	-2.0	2.00				Average	Y
		5 - 1+50	141	786.0	-11.0	2.00				Average	Y
		6 - 1+50	142	787.0	-11.0	2.00				Average	Y
		7 - 2+12.1	143	843.0	-30.0	1.00				Average	Y
		8 - EC 0+7	144	898.0	-75.0	1.50				Average	
		9	145	998.0	-167.0	3.00				Average	
		10	146	1,024.0	-186.0	3.00				Average	
		11	147	1,128.0	-265.0	4.00				Average	
		12	148	1,148.0	-281.0	4.00				Average	
		13 - Inters	149	1,178.0	-259.0	4.00					
NB Girard Rd. from Marina to Lincoln	3.7	1 - 0+00	150	1,201.0	188.0	4.00				Average	
		2 - 0+65	151	1,153.0	136.0	3.60				Average	
		3 - 2+80	152	965.0	40.0	0.50				Average	
		4 - 4+09.9	153	843.0	-23.0	0.00				Average	
		5 - 4+40	154	828.0	-40.0	1.00				Average	
		6 - 4+80	155	796.0	-65.0	4.70				Average	
		7 - 5+20	156	772.0	-98.0	5.50				Average	
		8 - 7+20	157	673.0	-273.0	11.50					
SB Girard Rd. from Lincoln to Marina	3.7	1 - 7+20	158	678.0	-273.0	11.50				Average	
		2 - 5+20	159	779.0	-102.0	5.50				Average	
		3 - 4+80	160	803.0	-70.0	4.70				Average	
		4 - 4+40	161	831.0	-44.0	1.00				Average	
		5 - 4+09.9	162	852.0	-31.0	0.00				Average	
		6 - 2+80	163	965.0	27.0	0.50				Average	
		7 - 0+65	164	1,156.0	127.0	3.60				Average	

		8 - Palace	239	1,178.0	146.0	4.00				Average	
		9 - Mason	165	1,218.0	191.0	4.00					
Halleck St. from Lincon to Mason	7.2	1 - 3+65	166	593.0	-225.0	11.00				Average	
		2 - 2+77.9	167	612.0	-139.0	10.00				Average	
		3 - 0+00	168	673.0	130.0	4.00					
Lincoln from McDowell to Letterman	7.3	1	180	-316.0	-214.0	33.00				Average	
		2	181	-279.0	-132.0	33.00				Average	
		3	182	-251.0	-115.0	33.00				Average	
		4	183	-216.0	-104.0	32.00				Average	
		5	184	-118.0	-147.0	31.00				Average	
		6	185	-93.0	-152.0	29.00				Average	
		7	186	-59.0	-148.0	29.00				Average	
		8	187	-38.0	-151.0	29.00				Average	
		9	188	-14.0	-158.0	29.00				Average	
		10	189	13.0	-167.0	27.00				Average	
		11	190	50.0	-170.0	26.00				Average	
		12	191	182.0	-134.0	19.00				Average	
		13	192	245.0	-108.0	15.00				Average	
		14	193	324.0	-68.0	12.00				Average	
		15	194	376.0	-100.0	13.00				Average	
		16	195	396.0	-124.0	13.00				Average	
		17	196	478.0	-160.0	12.00				Average	
		18	197	593.0	-225.0	11.00				Average	
		19	198	673.0	-273.0	11.50				Average	
		20	199	735.0	-310.0	12.00					
Mason St. from Crissy Ave. to Marina	7.3	1	200	-500.0	96.0	3.00				Average	
		2	201	40.0	0.0	4.00				Average	
		3	202	72.0	4.0	4.00				Average	
		4	203	96.0	15.0	4.00				Average	
		5	204	144.0	60.0	4.00				Average	
		6	205	174.0	68.0	4.00				Average	
		7	206	673.0	130.0	4.00				Average	
		8	207	768.0	138.0	4.00				Average	
		9	208	952.0	159.0	4.00				Average	
		10	209	1,185.0	187.0	4.00				Average	
		11	210	1,218.0	191.0	4.00				Average	
		12	211	1,270.0	196.0	4.00					
Baker St. from Marina to Richardson	7.3	1	212	1,270.0	196.0	4.00				Average	

		2	213	1,280.0	93.0	4.00				Average	
		3	214	1,290.0	-7.0	4.00				Average	
		4	215	1,310.0	-276.0	4.00				Average	
		5	216	1,327.0	-400.0	4.00					
Palace Drive from Richardson to Marina	7.3	1	217	1,182.0	-246.0	4.00				Average	
		2	218	1,186.0	-245.0	4.00				Average	
		3	219	1,186.0	-221.0	4.00				Average	
		4	220	1,180.0	-195.0	3.50				Average	
		5	221	1,151.0	-188.0	3.00				Average	
		6	222	1,125.0	-175.0	3.00				Average	
		7	223	1,100.0	-153.0	3.00				Average	
		8	224	1,081.0	-130.0	3.00				Average	
		9	225	1,069.0	-108.0	3.00				Average	
		10	226	1,060.0	-83.0	3.00				Average	
		11	227	1,055.0	-63.5	4.00				Average	
		12	228	1,053.0	-39.0	4.00				Average	
		13	229	1,055.0	-14.0	4.00				Average	
		14	230	1,061.0	10.0	4.00				Average	
		15	231	1,073.0	40.0	4.00				Average	
		16	232	1,088.0	68.0	4.00				Average	
		17	233	1,116.0	91.0	4.00				Average	
		18	234	1,185.0	139.0	4.00				Average	
		19	235	1,178.0	146.0	4.00					
Montgomery St. from Sherian to Lincoln	9.2	1	236	237.0	-280.0	16.00				Average	
		2	237	350.0	-117.0	13.00				Average	
		3	238	396.0	-124.0	13.00					
NB Park Presidio to EB Doyle Drive	4.6	1	240	-673.0	-113.0	45.70				Average	
		2	241	-652.0	-68.0	43.70				Average	
		3	242	-641.0	-46.0	41.90				Average	
		4	243	-618.0	-28.0	41.80				Average	
		5	244	-597.0	-21.0	41.00				Average	
		6	245	-565.0	-23.0	40.10				Average	
		7	246	-530.0	-34.0	38.00				Average	
		8	248	-500.0	-43.0	35.00				Average	
		8	247	-450.0	-50.0	33.00					

Environmental Science Associates, Inc. 1 September 2004
Win Lindeman TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Park Presidio Option B Ramp 2030 AM

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
EB Doyle to North Tunnel	1 - North End	11	6340	88	66	88	13	88	66	88	66	88
	2 - 1+97.539	10	6340	88	66	88	13	88	66	88	66	88
	3 - 4+74	9	4190	88	43	88	9	88	43	88	43	88
	4 - 5+27	8	4190	88	43	88	9	88	43	88	43	88
	5 - 5+27	7	4190	88	43	88	9	88	43	88	43	88
	6 - 6+00	6	4190	88	43	88	9	88	43	88	43	88
	7 - 8+00	5	4190	88	43	88	9	88	43	88	43	88
	8 - 9+57	4	4793	88	50	88	10	88	50	88	50	88
	9 - 11+10	3	4793	88	50	88	10	88	50	88	50	88
	10 - 11+10	2	4793	88	50	88	10	88	50	88	50	88
	11 - 11+53	1										
EB Doyle from North Tunnel to S. Tunnel	1 - 13+93	18	4793	88	50	88	10	88	50	88	50	88
	2 - 14+10	17	4793	88	50	88	10	88	50	88	50	88
	3 - 14+60	16	4793	88	50	88	10	88	50	88	50	88
	4 - 15+00	15	4793	88	50	88	10	88	50	88	50	88
	5 - 15+85.44	14	4793	88	50	88	10	88	50	88	50	88
	6 - 17+33.198	13	4793	88	50	88	10	88	50	88	50	88
	7 - 17+80	12										
EB Doyle from South Tunnel to Francisco	1 - 20+95	19	3030	56	31	56	6	56	31	56	31	56
	2 - 21+20	20	3030	56	31	56	6	56	31	56	31	56
	3 - 21+20	21	3030	56	31	56	6	56	31	56	31	56

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	4 - 22+42.630	22	3030	56	31	56	6	56	31	56	31	56
	5 - 23+00	23	3030	56	31	56	6	56	31	56	31	56
	6 - 23+25	24	3030	56	31	56	6	56	31	56	31	56
	7 - 23+25	25	3030	56	31	56	6	56	31	56	31	56
	8 - 24+20	26	3030	56	31	56	6	56	31	56	31	56
	9 - 24+85.060	27	3030	56	31	56	6	56	31	56	31	56
	10 - 25+17.10	28	3030	56	31	56	6	56	31	56	31	56
	11 - 25+64.74	29	3030	56	31	56	6	56	31	56	31	56
	12 - Gorgas I	30	3030	56	31	56	6	56	31	56	31	56
	13 - Francisc	31										
WB Doyle from Fancisco to South Tunnel	1 - Francisco	32	2708	56	28	56	37	56	17	56	28	56
	2 - 27+20.608	33	2708	56	28	56	37	56	17	56	28	56
	3 - 26+00	34	2708	56	28	56	37	56	17	56	28	56
	4 - 25+40	35	2708	56	28	56	37	56	17	56	28	56
	5 - 24+73	36	2708	56	28	56	37	56	17	56	28	56
	6 - 24+20	37	2708	56	28	56	37	56	17	56	28	56
	7 - 23+75	38	2708	56	28	56	37	56	17	56	28	56
	8 - 23+75	39	2708	56	28	56	37	56	17	56	28	56
	9 - 23+22	40	2708	56	28	56	37	56	17	56	28	56
	10 - 23+22	41	2708	56	28	56	37	56	17	56	28	56
	11 - 22+68	42	2708	56	28	56	37	56	17	56	28	56
	12 - 22+00	43	2708	56	28	56	37	56	17	56	28	56
	13 - 20+85	44										
WB Doyle from S. Tunnel to N. Tunnel	1 - 18+05	45	2877	88	30	88	39	88	18	88	30	88
	2 - 15+00	46	2877	88	30	88	39	88	18	88	30	88
	3 - 14+10	47										
WB Doyle from North Tunnel to North End	1 - 11+80	51	2877	88	30	88	39	88	18	88	30	88
	2 - 11+00	52	2877	88	30	88	39	88	18	88	30	88
	3 - 11+00	53	2877	88	30	88	39	88	18	88	30	88
	4 - 9+80	54	2877	88	30	88	39	88	18	88	30	88
	5 - 8+73	55	2877	88	30	88	39	88	18	88	30	88
	6 - 7+00	56	2877	88	30	88	39	88	18	88	30	88
	7 - 6+60	57	2877	88	30	88	39	88	18	88	30	88
	8 - 6+60	58	2877	88	30	88	39	88	18	88	30	88

INPUT: TRAFFIC FOR LAeq1h Volumes **Doyle Drive - 204235**

	9 - 5+54	59	2877	88	30	88	39	88	18	88	30	88
	10 - 5+54	60	2877	88	30	88	39	88	18	88	30	88
	11 - 5+14	61	2877	88	30	88	39	88	18	88	30	88
	12 - 5+14	62	2877	88	30	88	39	88	18	88	30	88
	13 - 4+00	63	2877	88	30	88	39	88	18	88	30	88
	14 - 3+10	64	4892	88	51	88	66	88	31	88	51	88
	15 - 0+00	65										
WB Doyle off ramp to SB Park Presidio	1 - 0+00	66	340	56	4	56	5	56	2	56	4	56
	2 - 1+30	67	340	56	4	56	5	56	2	56	4	56
	3 - 1+80	68	340	56	4	56	5	56	2	56	4	56
	4 - 2+20	69	340	56	4	56	5	56	2	56	4	56
	5 - 2+20	70	340	56	4	56	5	56	2	56	4	56
	6 - 2+48	71	340	56	4	56	5	56	2	56	4	56
	7 - 3+09	72	340	56	4	56	5	56	2	56	4	56
	8 - 3+40	73	340	56	4	56	5	56	2	56	4	56
	9 - 3+60	74	340	56	4	56	5	56	2	56	4	56
	10 - 3+80	75	340	56	4	56	5	56	2	56	4	56
	11 - 4+00	76	340	56	4	56	5	56	2	56	4	56
	12 - 4+20	77	340	56	4	56	5	56	2	56	4	56
	13 - 4+40	78	340	56	4	56	5	56	2	56	4	56
	14 - 4+59	79	340	56	4	56	5	56	2	56	4	56
	15 - 4+80	80	340	56	4	56	5	56	2	56	4	56
	16 - 5+00	81	340	56	4	56	5	56	2	56	4	56
	17 - 5+20	82	340	56	4	56	5	56	2	56	4	56
	18 - 5+80	83	340	56	4	56	5	56	2	56	4	56
	19 - 6+06	84	340	56	4	56	5	56	2	56	4	56
	20 - 6+31	85	340	56	4	56	5	56	2	56	4	56
	21 - 6+60	86	340	56	4	56	5	56	2	56	4	56
	22 - 6+88	87	340	56	4	56	5	56	2	56	4	56
	23 - 8+23	169	340	56	4	56	5	56	2	56	4	56
	24 - 5+88.184	88										
NB Park Presidio to WB Doyle Drive	1 - 0+00	89	2385	56	25	56	25	56	0	0	17	56
	2A	170	2385	56	25	56	25	56	0	0	17	56
	2 - 3+72.391	90	2385	56	25	56	25	56	0	0	17	56

G:\204xxx\204235 - Doyle Drive\Parkway Diamond 2030 AM 830\Park Presidio Option B Ramp AM 90104

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	3 - 4+00	91	2385	56	25	56	25	56	0	0	17	56
	4 - 4+40	92	2385	56	25	56	25	56	0	0	17	56
	5 - 4+60	93	2385	56	25	56	25	56	0	0	17	56
	6 - 5+00	94	2385	56	25	56	25	56	0	0	17	56
	7 - 5+20	95	2385	56	25	56	25	56	0	0	17	56
	8 - 5+40	96	2385	56	25	56	25	56	0	0	17	56
	9 - 5+53	97	2385	56	25	56	25	56	0	0	17	56
	10 - 5+53	98	2385	56	25	56	25	56	0	0	17	56
	11 - 5+80	99	2385	56	25	56	25	56	0	0	17	56
	12 - 5+98	100	2385	56	25	56	25	56	0	0	17	56
	13 - 5+98	101	2385	56	25	56	25	56	0	0	17	56
	14 - 6+58.037	102	2385	56	25	56	25	56	0	0	17	56
	15 - 8+04.414	103										
SB Off-ramp from Doyle to Park Presidio	1 - 0+00	128	2373	56	25	56	5	56	25	56	25	56
	2 - 0+65	129	2373	56	25	56	5	56	25	56	25	56
	3 - 0+65	130	2373	56	25	56	5	56	25	56	25	56
	4 - 2+00	131	2373	56	25	56	5	56	25	56	25	56
	5 - 2+00	132	2373	56	25	56	5	56	25	56	25	56
	6 - 2+40	133	2373	56	25	56	5	56	25	56	25	56
	7 - 2+80	134	2373	56	25	56	5	56	25	56	25	56
	8 - 3+14.595	135	2373	56	25	56	5	56	25	56	25	56
	9 - 5+88.184	136										
Gorgas Ave. from SB Doyle to Richardso	1 - 0+00	137	385	56	0	0	0	0	0	0	0	0
	2 - 0+42	138	385	56	0	0	0	0	0	0	0	0
	3 - 0+42	139	385	56	0	0	0	0	0	0	0	0
	4 - 1+00	140	385	56	0	0	0	0	0	0	0	0
	5 - 1+50	141	385	56	0	0	0	0	0	0	0	0
	6 - 1+50	142	385	56	0	0	0	0	0	0	0	0
	7 - 2+12.133	143	385	56	0	0	0	0	0	0	0	0
	8 - EC 0+74.1	144	385	56	0	0	0	0	0	0	0	0
	9	145	385	56	0	0	0	0	0	0	0	0
	10	146	385	56	0	0	0	0	0	0	0	0
	11	147	385	56	0	0	0	0	0	0	0	0
	12	148	385	56	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	13 - Intersecti	149										
NB Girard Rd. from Marina to Lincoln	1 - 0+00	150	111	56	0	0	0	0	0	0	0	0
	2 - 0+65	151	111	56	0	0	0	0	0	0	0	0
	3 - 2+80	152	111	56	0	0	0	0	0	0	0	0
	4 - 4+09.995	153	111	56	0	0	0	0	0	0	0	0
	5 - 4+40	154	111	56	0	0	0	0	0	0	0	0
	6 - 4+80	155	111	56	0	0	0	0	0	0	0	0
	7 - 5+20	156	111	56	0	0	0	0	0	0	0	0
	8 - 7+20	157										
SB Girard Rd. from Lincoln to Marina	1 - 7+20	158	79	56	0	0	0	0	0	0	0	0
	2 - 5+20	159	79	56	0	0	0	0	0	0	0	0
	3 - 4+80	160	79	56	0	0	0	0	0	0	0	0
	4 - 4+40	161	79	56	0	0	0	0	0	0	0	0
	5 - 4+09.995	162	79	56	0	0	0	0	0	0	0	0
	6 - 2+80	163	79	56	0	0	0	0	0	0	0	0
	7 - 0+65	164	79	56	0	0	0	0	0	0	0	0
	8 - Palace Dr	239	79	56	0	0	0	0	0	0	0	0
	9 - Mason/Mc	165										
Halleck St. from Lincon to Mason	1 - 3+65	166	42	32	0	0	0	0	0	0	0	0
	2 - 2+77.948	167	42	32	0	0	0	0	0	0	0	0
	3 - 0+00	168										
Lincoln from McDowell to Letterman	1	180	98	32	2	32	0	0	2	32	2	32
	2	181	98	32	2	32	0	0	2	32	2	32
	3	182	98	32	2	32	0	0	2	32	2	32
	4	183	187	32	2	32	0	0	2	32	2	32
	5	184	187	32	2	32	0	0	2	32	2	32
	6	185	187	32	2	32	0	0	2	32	2	32
	7	186	187	32	2	32	0	0	2	32	2	32
	8	187	187	32	2	32	0	0	2	32	2	32
	9	188	187	32	2	32	0	0	2	32	2	32
	10	189	190	32	2	32	0	0	2	32	2	32
	11	190	54	32	1	32	0	0	1	32	1	32
	12	191	54	32	1	32	0	0	1	32	1	32
	13	192	54	32	1	32	0	0	1	32	1	32

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	14	193	54	32	1	32	0	0	1	32	1	32
	15	194	54	32	1	32	0	0	1	32	1	32
	16	195	251	32	2	32	0	0	2	32	2	32
	17	196	251	32	2	32	0	0	2	32	2	32
	18	197	715	32	7	32	0	0	7	32	7	32
	19	198	782	32	8	32	0	0	8	32	8	32
	20	199										
Mason St. from Crissy Ave. to Marina	1	200	4	32	0	0	0	0	0	0	0	0
	2	201	4	32	0	0	0	0	0	0	0	0
	3	202	4	32	0	0	0	0	0	0	0	0
	4	203	4	32	0	0	0	0	0	0	0	0
	5	204	4	32	0	0	0	0	0	0	0	0
	6	205	4	32	0	0	0	0	0	0	0	0
	7	206	15	32	0	0	0	0	0	0	0	0
	8	207	15	32	0	0	0	0	0	0	0	0
	9	208	17	32	0	0	0	0	0	0	0	0
	10	209	1495	32	0	0	0	0	0	0	0	0
	11	210	1495	32	0	0	0	0	0	0	0	0
	12	211										
Baker St. from Marina to Richardson	1	212	83	32	1	32	0	0	0	0	1	32
	2	213	3	32	1	32	0	0	0	0	1	32
	3	214	8	32	1	32	0	0	0	0	1	32
	4	215	8	32	1	32	0	0	0	0	1	32
	5	216										
Palace Drive from Richardson to Marina	1	217	35	32	0	0	0	0	0	0	0	0
	2	218	35	32	0	0	0	0	0	0	0	0
	3	219	35	32	0	0	0	0	0	0	0	0
	4	220	35	32	0	0	0	0	0	0	0	0
	5	221	35	32	0	0	0	0	0	0	0	0
	6	222	35	32	0	0	0	0	0	0	0	0
	7	223	35	32	0	0	0	0	0	0	0	0
	8	224	35	32	0	0	0	0	0	0	0	0
	9	225	35	32	0	0	0	0	0	0	0	0
	10	226	35	32	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Doyle Drive - 204235

	11	227	35	32	0	0	0	0	0	0	0	0
	12	228	35	32	0	0	0	0	0	0	0	0
	13	229	35	32	0	0	0	0	0	0	0	0
	14	230	35	32	0	0	0	0	0	0	0	0
	15	231	35	32	0	0	0	0	0	0	0	0
	16	232	35	32	0	0	0	0	0	0	0	0
	17	233	35	32	0	0	0	0	0	0	0	0
	18	234	35	32	0	0	0	0	0	0	0	0
	19	235										
Montgomery St. from Sherian to Lincoln	1	236	110	32	2	32	0	0	2	32	2	32
	2	237	110	32	2	32	0	0	2	32	2	32
	3	238										
NB Park Presidio to EB Doyle Drive	1	240	602	56	4	56	6	56	6	56	4	56
	2	241	602	56	4	56	6	56	6	56	4	56
	3	242	602	56	4	56	6	56	6	56	4	56
	4	243	602	56	4	56	6	56	6	56	4	56
	5	244	602	56	4	56	6	56	6	56	4	56
	6	245	602	56	4	56	6	56	6	56	4	56
	7	246	602	56	4	56	6	56	6	56	4	56
	8	248	602	56	4	56	6	56	6	56	4	56
	8	247										

Environmental Science Associates, Inc 1 September 2004
Win Lindeman TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Park Presidio Option B Ramp 2030 AM

Receiver

Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
1 Palace of Fine Arts near Richardson	1	0	1,098.0	-130.0	4.00	1.50	0.00	66	12.0	10.0	Y
2 Palace of Fine Arts near Girard	2	0	1,133.0	-91.0	4.00	1.50	0.00	66	12.0	10.0	Y
3 Buildings 1187/1188	3	0	1,148.0	150.0	2.40	1.50	81.00	71	12.0	10.0	Y
4 Building 1182	4	0	1,087.0	125.0	2.40	1.50	81.00	71	12.0	10.0	Y
5 Buildings 1183/1186	5	0	1,020.0	116.0	2.40	1.50	81.00	71	12.0	10.0	Y
6 Buildings 1184/1185	6	0	893.0	103.0	2.40	1.50	81.00	71	12.0	10.0	Y
7 Building 603/Crissy Center	7	0	571.0	88.0	3.00	1.50	72.00	71	12.0	10.0	Y
8 PX Building	8	0	500.0	33.0	3.00	1.50	0.00	71	12.0	10.0	Y
9 Post Commissary/Sports Basement	9	0	240.0	-54.0	4.00	1.50	69.00	66	12.0	10.0	Y
10 Battery Blaney	10	0	-30.0	-96.0	24.00	1.50	68.00	66	12.0	10.0	Y
11 Battery Slaughter	11	0	-104.0	-98.0	28.00	1.50	68.00	66	12.0	10.0	Y
12 Battery Sherwood	12	0	-223.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
13 Battery Baldwin	13	0	-297.0	-32.0	21.00	1.50	68.00	66	12.0	10.0	Y
14 Building 644	14	0	-260.0	16.0	4.00	1.50	0.00	71	12.0	10.0	Y
15 Building 649	15	0	-364.0	4.0	4.00	1.50	0.00	66	12.0	10.0	Y
16 Building 650/Stilwell Hall	16	0	-437.0	11.0	5.00	1.50	70.00	66	12.0	10.0	Y
17 1253 Armistead Road	17	1	-785.0	235.0	45.00	1.50	66.00	66	12.0	10.0	Y
18 Home on Armistead Road	18	1	-939.0	296.0	57.00	1.50	66.00	66	12.0	10.0	Y
19 Building 969	19	0	-887.0	410.0	38.00	1.50	0.00	71	12.0	10.0	Y
20 Building 968	20	0	-978.0	427.0	38.00	1.50	0.00	71	12.0	10.0	Y
21 Building 967	21	0	-1,040.0	427.0	46.00	1.50	0.00	71	12.0	10.0	Y
22 Building 966	22	0	-1,044.0	433.0	46.00	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS

Doyle Drive - 204235

23 Building 964	23	0	-1,016.0	446.0	46.00	1.50	0.00	66	12.0	10.0	Y
24 Building 963	24	0	-1,002.0	452.0	46.00	1.50	0.00	66	12.0	10.0	Y
25 Building 962	25	0	-987.0	455.0	46.00	1.50	0.00	66	12.0	10.0	Y
26 Unknown Building	26	0	-1,153.0	421.0	58.00	1.50	0.00	71	12.0	10.0	Y
27 Building 1299/Log Cabin	27	0	-1,003.0	177.0	64.00	1.50	63.00	66	12.0	10.0	Y
28 Building 1387	28	0	-1,105.0	268.0	65.00	1.50	0.00	71	12.0	10.0	Y
29 Building 1298 Storey Ave.	29	2	-977.0	123.0	63.00	1.50	66.50	66	12.0	10.0	Y
30 Building 1297 Storey Ave.	30	2	-950.0	123.0	62.00	1.50	66.50	66	12.0	10.0	Y
31 Building 1295 Storey Ave.	31	2	-919.0	119.0	62.00	1.50	66.50	66	12.0	10.0	Y
32 Building 1294 Storey Ave.	32	2	-900.0	116.0	59.00	1.50	66.50	66	12.0	10.0	Y
33 Building 1293 Storey Ave.	33	2	-865.0	102.0	57.00	1.50	66.50	66	12.0	10.0	Y
34 Building 1291 Storey Ave.	34	2	-841.0	92.0	56.00	1.50	66.50	66	12.0	10.0	Y
35 Building 1290 Storey Ave.	35	2	-811.0	78.0	55.00	1.50	66.50	66	12.0	10.0	Y
36 Building 1289 Storey Ave.	36	2	-804.0	63.0	53.00	1.50	66.50	66	12.0	10.0	Y
37 Building 1263 Storey Ave.	37	2	-722.0	-152.0	61.00	1.50	0.00	66	12.0	10.0	Y
38 Building 682/Cross Cultural Center	38	0	-650.0	-254.0	38.00	1.50	65.50	66	12.0	10.0	Y
39 Building 661/Cavalry Stable Pen	39	0	-556.0	-70.0	21.00	1.50	64.00	71	12.0	10.0	Y
40 Building 662/Cavalry Stable	40	0	-508.0	-97.0	20.00	1.50	64.00	71	12.0	10.0	Y
41 Building 663/Cavalry Stable	41	0	-488.0	-140.0	18.00	1.50	64.00	71	12.0	10.0	Y
42 Building 667/Cavalry Stable	42	0	-384.0	-122.0	23.00	1.50	64.00	71	12.0	10.0	Y
43 National Cemetery Grave Site	43	0	-23.0	-163.0	29.00	1.50	69.00	66	12.0	10.0	Y
44 Building 129	44	1	104.0	-168.0	21.50	1.50	0.00	66	12.0	10.0	Y
45 Building 122	45	0	148.0	-157.0	21.00	1.50	0.00	71	12.0	10.0	Y
46 Building 108	46	0	225.0	-136.0	17.00	1.50	0.00	71	12.0	10.0	Y
47 Building 107	47	0	230.0	-120.0	16.00	1.50	0.00	71	12.0	10.0	Y
48 Building 104	48	0	252.0	-143.0	16.00	1.50	74.00	71	12.0	10.0	Y
49 Building 105	49	0	285.0	-93.0	14.00	1.50	74.00	71	12.0	10.0	Y
50 Building 106	50	0	328.0	-78.0	12.00	1.50	76.00	71	12.0	10.0	Y
51 Building 211	51	0	433.0	-52.0	12.00	1.50	0.00	71	12.0	10.0	Y
52 Building 204	52	0	522.0	-17.0	4.00	1.50	0.00	71	12.0	10.0	Y
53 Building 210	53	0	320.0	-97.0	13.00	1.50	0.00	71	12.0	10.0	Y
54 Building 201	54	0	623.0	8.0	4.00	1.50	0.00	71	12.0	10.0	Y
55 Building 220	55	0	590.0	-104.0	7.60	1.50	0.00	71	12.0	10.0	Y
56 Building 231	56	0	650.0	-5.0	6.00	1.50	0.00	71	12.0	10.0	Y
57 Building 228	57	0	643.0	-31.0	6.50	1.50	0.00	71	12.0	10.0	Y

INPUT: RECEIVERS **Doyle Drive - 204235**

58 Building 229	58	0	637.0	-60.0	7.00	1.50	0.00	71	12.0	10.0	Y
59 Building 223	59	0	636.0	-108.0	8.00	1.50	0.00	71	12.0	10.0	Y
60 Building 230	60	0	740.0	6.0	4.00	1.50	0.00	71	12.0	10.0	Y
61 Building 1029/Swords to Plowshares	61	100	706.0	-77.0	6.00	1.50	57.00	66	12.0	10.0	Y
62 Building 1030/Swords to Plowshares	62	100	698.0	-113.0	6.00	1.50	57.00	66	12.0	10.0	Y
63 Building 1063	63	0	842.0	-60.0	2.00	1.50	68.50	71	12.0	10.0	Y
64 Building 1062	64	0	852.0	-100.0	2.00	1.50	68.50	71	12.0	10.0	Y
65 Building 1060	65	0	898.0	-127.0	2.00	1.50	68.50	71	12.0	10.0	Y
66 Building 1167	66	0	900.0	-18.0	2.00	1.50	68.00	71	12.0	10.0	Y
67 Building 1163	67	0	892.0	-26.0	2.00	1.50	0.00	71	12.0	10.0	Y
68 Building 1169	68	0	955.0	-58.0	2.00	1.50	68.00	71	12.0	10.0	Y
69 Building 1162	69	0	943.0	-73.0	2.00	1.50	0.00	71	12.0	10.0	Y
70 Building 1170	70	0	1,035.0	-132.0	2.00	1.50	68.00	71	12.0	10.0	Y
71 Building 1161	71	0	1,035.0	-161.0	2.00	1.50	0.00	71	12.0	10.0	Y
72 Building 1160	72	0	1,066.0	-166.0	2.00	1.50	0.00	71	12.0	10.0	Y
73 Building 1152/YMCA	73	0	1,100.0	-200.0	2.00	1.50	0.00	66	12.0	10.0	Y
74 Building 1151/YMCA Pool	74	0	1,140.0	-235.0	4.00	1.50	0.00	66	12.0	10.0	Y
75 Building 1004	75	0	965.0	-246.0	4.00	1.50	0.00	71	12.0	10.0	Y
76 Residences at 3234 Lyon St.	76	8	1,216.0	-270.0	4.00	1.50	76.50	66	12.0	10.0	Y

Environmental Science Associates, Inc. 1 September 2004
Win Lindeman TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Doyle Drive - 204235
RUN: Park Presidio Option B Ramp 2030 AM
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 20 deg C, 50% RH

Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier						With Barrier			
				LAeq1h		Increase over existing		Type Impact		Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc				Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
1 Palace of Fine Arts near Richardson	1	0	0.0	69.7	66	69.7	12	Snd Lvl		69.7	0.0	10	-10.0
2 Palace of Fine Arts near Girard	2	0	0.0	62.0	66	62.0	12	—		62.0	0.0	10	-10.0
3 Buildings 1187/1188	3	0	81.0	57.3	71	-23.7	12	—		57.3	0.0	10	-10.0
4 Building 1182	4	0	81.0	56.1	71	-24.9	12	—		56.1	0.0	10	-10.0
5 Buildings 1183/1186	5	0	81.0	57.0	71	-24.0	12	—		57.0	0.0	10	-10.0
6 Buildings 1184/1185	6	0	81.0	59.5	71	-21.5	12	—		59.5	0.0	10	-10.0
7 Building 603/Crissy Center	7	0	72.0	56.3	71	-15.7	12	—		56.3	0.0	10	-10.0
8 PX Building	8	0	0.0	59.2	71	59.2	12	—		59.2	0.0	10	-10.0
9 Post Commissary/Sports Basement	9	0	69.0	69.8	66	0.8	12	Snd Lvl		69.8	0.0	10	-10.0
10 Battery Blaney	10	0	68.0	69.4	66	1.4	12	Snd Lvl		69.4	0.0	10	-10.0
11 Battery Slaughter	11	0	68.0	65.4	66	-2.6	12	—		65.4	0.0	10	-10.0
12 Battery Sherwood	12	0	68.0	65.0	66	-3.0	12	—		65.0	0.0	10	-10.0
13 Battery Baldwin	13	0	68.0	67.6	66	-0.4	12	Snd Lvl		67.6	0.0	10	-10.0
14 Building 644	14	0	0.0	60.1	71	60.1	12	—		60.1	0.0	10	-10.0
15 Building 649	15	0	0.0	60.7	66	60.7	12	—		60.7	0.0	10	-10.0
16 Building 650/Stilwell Hall	16	0	70.0	59.3	66	-10.7	12	—		59.3	0.0	10	-10.0
17 1253 Armistead Road	17	1	66.0	64.5	66	-1.5	12	—		64.5	0.0	10	-10.0
18 Home on Armistead Road	18	1	66.0	76.9	66	10.9	12	Snd Lvl		76.9	0.0	10	-10.0
19 Building 969	19	0	0.0	58.4	71	58.4	12	—		58.4	0.0	10	-10.0
20 Building 968	20	0	0.0	60.1	71	60.1	12	—		60.1	0.0	10	-10.0
21 Building 967	21	0	0.0	65.4	71	65.4	12	—		65.4	0.0	10	-10.0
22 Building 966	22	0	0.0	65.4	71	65.4	12	—		65.4	0.0	10	-10.0
23 Building 964	23	0	0.0	63.4	66	63.4	12	—		63.4	0.0	10	-10.0

24 Building 963	24	0	0.0	62.8	66	62.8	12	—	62.8	0.0	10	-10.0
25 Building 962	25	0	0.0	62.1	66	62.1	12	—	62.1	0.0	10	-10.0
26 Unknown Building	26	0	0.0	75.0	71	75.0	12	Snd Lvl	75.0	0.0	10	-10.0
27 Building 1299/Log Cabin	27	0	63.0	68.9	66	5.9	12	Snd Lvl	68.9	0.0	10	-10.0
28 Building 1387	28	0	0.0	67.4	71	67.4	12	—	67.4	0.0	10	-10.0
29 Building 1298 Storey Ave.	29	2	66.5	66.7	66	0.2	12	Snd Lvl	66.7	0.0	10	-10.0
30 Building 1297 Storey Ave.	30	2	66.5	68.7	66	2.2	12	Snd Lvl	68.7	0.0	10	-10.0
31 Building 1295 Storey Ave.	31	2	66.5	70.8	66	4.3	12	Snd Lvl	70.8	0.0	10	-10.0
32 Building 1294 Storey Ave.	32	2	66.5	71.4	66	4.9	12	Snd Lvl	71.4	0.0	10	-10.0
33 Building 1293 Storey Ave.	33	2	66.5	72.4	66	5.9	12	Snd Lvl	72.4	0.0	10	-10.0
34 Building 1291 Storey Ave.	34	2	66.5	73.1	66	6.6	12	Snd Lvl	73.1	0.0	10	-10.0
35 Building 1290 Storey Ave.	35	2	66.5	73.6	66	7.1	12	Snd Lvl	73.6	0.0	10	-10.0
36 Building 1289 Storey Ave.	36	2	66.5	72.8	66	6.3	12	Snd Lvl	72.8	0.0	10	-10.0
37 Building 1263 Storey Ave.	37	2	0.0	69.1	66	69.1	12	Snd Lvl	69.1	0.0	10	-10.0
38 Building 682/Cross Cultural Center	38	0	65.5	65.2	66	-0.3	12	—	65.2	0.0	10	-10.0
39 Building 661/Cavalry Stable Pen	39	0	64.0	59.5	71	-4.5	12	—	59.5	0.0	10	-10.0
40 Building 662/Cavalry Stable	40	0	64.0	62.2	71	-1.8	12	—	62.2	0.0	10	-10.0
41 Building 663/Cavalry Stable	41	0	64.0	63.2	71	-0.8	12	—	63.2	0.0	10	-10.0
42 Building 667/Cavalry Stable	42	0	64.0	67.1	71	3.1	12	—	67.1	0.0	10	-10.0
43 National Cemetery Grave Site	43	0	69.0	63.1	66	-5.9	12	—	63.1	0.0	10	-10.0
44 Building 129	44	1	0.0	56.9	66	56.9	12	—	56.9	0.0	10	-10.0
45 Building 122	45	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
46 Building 108	46	0	0.0	61.9	71	61.9	12	—	61.9	0.0	10	-10.0
47 Building 107	47	0	0.0	67.1	71	67.1	12	—	67.1	0.0	10	-10.0
48 Building 104	48	0	74.0	58.4	71	-15.6	12	—	58.4	0.0	10	-10.0
49 Building 105	49	0	74.0	73.1	71	-0.9	12	Snd Lvl	73.1	0.0	10	-10.0
50 Building 106	50	0	76.0	71.7	71	-4.3	12	Snd Lvl	71.7	0.0	10	-10.0
51 Building 211	51	0	0.0	65.4	71	65.4	12	—	65.4	0.0	10	-10.0
52 Building 204	52	0	0.0	59.1	71	59.1	12	—	59.1	0.0	10	-10.0
53 Building 210	53	0	0.0	62.3	71	62.3	12	—	62.3	0.0	10	-10.0
54 Building 201	54	0	0.0	57.6	71	57.6	12	—	57.6	0.0	10	-10.0
55 Building 220	55	0	0.0	53.5	71	53.5	12	—	53.5	0.0	10	-10.0
56 Building 231	56	0	0.0	66.0	71	66.0	12	—	66.0	0.0	10	-10.0
57 Building 228	57	0	0.0	62.2	71	62.2	12	—	62.2	0.0	10	-10.0
58 Building 229	58	0	0.0	59.3	71	59.3	12	—	59.3	0.0	10	-10.0
59 Building 223	59	0	0.0	57.3	71	57.3	12	—	57.3	0.0	10	-10.0
60 Building 230	60	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
61 Building 1029/Swords to Plowshares	61	100	57.0	60.1	66	3.1	12	—	60.1	0.0	10	-10.0
62 Building 1030/Swords to Plowshares	62	100	57.0	57.6	66	0.6	12	—	57.6	0.0	10	-10.0
63 Building 1063	63	0	68.5	62.8	71	-5.7	12	—	62.8	0.0	10	-10.0

64 Building 1062	64	0	68.5	59.6	71	-8.9	12	----	59.6	0.0	10	-10.0
65 Building 1060	65	0	68.5	60.0	71	-8.5	12	—	60.0	0.0	10	-10.0
66 Building 1167	66	0	68.0	65.1	71	-2.9	12	----	65.1	0.0	10	-10.0
67 Building 1163	67	0	0.0	65.2	71	65.2	12	----	65.2	0.0	10	-10.0
68 Building 1169	68	0	68.0	64.8	71	-3.2	12	----	64.8	0.0	10	-10.0
69 Building 1162	69	0	0.0	63.4	71	63.4	12	—	63.4	0.0	10	-10.0
70 Building 1170	70	0	68.0	71.8	71	3.8	12	Snd Lvl	71.8	0.0	10	-10.0
71 Building 1161	71	0	0.0	67.4	71	67.4	12	----	67.4	0.0	10	-10.0
72 Building 1160	72	0	0.0	71.9	71	71.9	12	Snd Lvl	71.9	0.0	10	-10.0
73 Building 1152/YMCA	73	0	0.0	71.5	66	71.5	12	Snd Lvl	71.5	0.0	10	-10.0
74 Building 1151/YMCA Pool	74	0	0.0	72.9	66	72.9	12	Snd Lvl	72.9	0.0	10	-10.0
75 Building 1004	75	0	0.0	57.1	71	57.1	12	----	57.1	0.0	10	-10.0
76 Residences at 3234 Lyon St.	76	8	76.5	74.3	66	-2.2	12	Snd Lvl	74.3	0.0	10	-10.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	229	0.0	0.0	0.0
All Impacted	27	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

APPENDIX E

DETAILED RECEPTOR LOCATION INFORMATION

RECEPTOR LOCATIONS

ID #	Name of Location	Detailed Description of Prediction Location
1	Palace of Fine Arts Building	19 meters east of NB Richardson and 165 meters north of Gorgas Avenue at the back edge (west side) of the building.
2	Palace of Fine Arts Building	16 meters south of EB Doyle Drive at the NW corner of the back edge of the building.
3	Buildings 1187/1188 Mason Warehouses	9 meters north of WB Doyle Drive at the SE corner of the building.
4	Building 1182 Mason Warehouses	8 meters north of WB Doyle Drive at the SE corner of the building.
5	Building 1183/1186 Mason Warehouses	10 meters north of WB Doyle Drive at the SE corner of the building.
6	Building 1184/1185 Mason Warehouse	11 meters north of WB Doyle Drive at the SW corner of the building.
7	Building 603/Crissy Interpretative Center	40 meters north of the Richardson WB on-ramp to Doyle Drive at the SE corner of the building.
8	PX Building	19 meters north of WB Doyle Drive at the center of the south side of the building.
9	Building 610/Post Commissary Sports Basement	14 meters north of WB Doyle Drive at the SE corner of the building.
10	Battery Blaney	20 meters north of WB Doyle Drive at the southern edge of the site.
11	Battery Slaughter	5 meters north of WB Doyle Drive at the southern edge of the site.
12	Battery Sherwood	21 meters north of WB Doyle Drive at the southern edge of the site.
13	Battery Baldwin	8 meters north of WB Doyle Drive at the southern edge of the site.
14	Building 644/Unit Motor Pool	61 meters north of WB Doyle Drive at the SE corner of the building.
15	Building 649/Army Reserves	20 meters north of WB Doyle Drive at the SW corner of the building.
16	Building 650/Stilwell Hall	5 meters north of WB Doyle Drive at the SE corner of the building.
17	Landrum Court/Officers Quarters – residential	91 meters north of WB Doyle Drive at the SE corner of the building.
18	1253 Armistead Road/Officers Quarters – residential	100 meters north of WB Doyle Drive at the SW corner of the building.
19	Building 969/Garage	142 meters north of WB Doyle Drive at the SE corner of the building.

ID #	Name of Location	Detailed Description of Prediction Location
20	Building 968/Garage	82 meters north of WB Doyle Drive at the SE corner of the building.
21	Building 967/Film Vault	31meters north of WB Doyle Drive at the SW corner of the building.
22	Building 966/Radio Receiver Station	32 meters north of WB Doyle Drive at the SE corner of the building.
23	Building 964/Officer Family Housing (pilots)	63 meters north of WB Doyle Drive at the SE corner of the building.
24	Building 963/Officer Family Housing (pilots)	75 meters north of WB Doyle Drive at the SE corner of the building.
25	Building 962/Officer Family Housing (pilots)	91 meters north of WB Doyle Drive at the SE corner of the building.
26	Building 1659/Data Center	25 meters south of EB Doyle Drive at the NE corner of the building.
27	Log Cabin Picnic Area	61 meters south of EB Doyle Drive at the NE corner of the area.
28	Ft. Scott Chapel	115 meters south of EB Doyle Drive at the NE corner of the building.
29	1298 Storey Avenue/Enlisted Family Housing	86 meters south of EB Doyle Drive at the NE corner of the building.
30	1297 Storey Avenue/Enlisted Family Housing	67 meters south of EB Doyle Drive at the NE corner of the building.
31	1295 Storey Avenue/Enlisted Family Housing	51 meters south of EB Doyle Drive at the NE corner of the building.
32	1294 Storey Avenue/Enlisted Family Housing	44 meters south of EB Doyle Drive at the NW corner of the building.
33	1293 Storey Avenue/Enlisted Family Housing	37 meters south of EB Doyle Drive at the NE corner of the building.
34	1291 Storey Avenue/Enlisted Family Housing	33 meters south of EB Doyle Drive at the NE corner of the building.
35	1290 Storey Avenue/Enlisted Family Housing	33 meters south of EB Doyle Drive at the NW corner of the building.
36	1289 Storey Avenue/Enlisted Family Housing	43 meters south of EB Doyle Drive at the NW corner of the building.
37	1263 Storey Avenue/Enlisted Family Housing	30 meters west of SB Park Presidio Blvd. at the SE corner of the
38	Building 682/Cross Cultural Environmental Center	33 meters east of SB Park Presidio Blvd. at the SW corner of the building
39	Building 661/Cavalry Stables	89 meters south of EB Doyle Drive at the NW corner of the pens.

ID #	Name of Location	Detailed Description of Prediction Location
40	Building 662/Cavalry Stables	103 meters south of EB Doyle Drive at the north side of the building.
41	Building 663/Cavalry Stables	136 meters south of EB Doyle Drive at the NE corner of the building.
42	Building 667/Cavalry Stables	87 meters south of EB Doyle Drive at the NE corner of the building.
43	National Cemetery Grave Site	27 meters south of EB Doyle Drive at a gravesite in the National Cemetery next to the iron fence near the corner of Lincoln and Sheridan Avenue.
44	Building 129/Enlisted Family Quarters	19 meters south of EB Doyle Drive at the NW corner of the building.
45	Building 122/Gymnasium (Main Post Community Center)	20 meters south of EB Doyle Drive at the NW corner of the building.
46	Building 108/Storage Electrical Shop	23 meters south of EB Doyle Drive at the NW corner of the building.
47	Building 107/Switching Station	11 meters south of EB Doyle Drive at the NW corner of the building.
48	Building 104/Barracks and Mess Hall	57 meters south of EB Doyle Drive at the NW corner of the building.
49	Building 105/Barracks and Mess Hall	19 meters south of EB Doyle Drive at the NW corner of the building.
50	Building 106/Band Barracks Union Pacific offices	13 meters south of EB Doyle Drive at the NW corner of the building.
51	Building 211 (former Burger King)	23 meters south of EB Doyle Drive at the NW corner of the building.
52	Building 204/Exchange Store (Presidio Thrift Shop)	17 meters south of EB Doyle Drive at the NW corner of the building.
53	Building 210/Guard House	62 meters south of EB Doyle Drive at the NW corner of the building.
54	Building 201/Exchange Store	9 meters south of EB Doyle Drive at the NW corner of the building.
55	Building 220/Bakers and Cooks School and Barracks	118 meters south of EB Doyle Drive at the NW corner of the building.
56	Building 231/Exchange Gas Service Station	31 meters south of EB Doyle Drive at the NW corner of the building.
57	Building 228/Bakery	57 meters south of EB Doyle Drive at the NW corner of the building.
58	Building 227/Warehouse	85 meters south of EB Doyle Drive at the NW corner of the building.
59	Building 223/Warehouse	133 meters south of EB Doyle Drive at the NE corner of the building.
60	Building 230/Warehouse	20 meters south of EB Doyle Drive at the NW corner of the building.

ID #	Name of Location	Detailed Description of Prediction Location
61	Building 1029/Swords to Plowshares	120 meters south of EB Doyle Drive at the NW corner of the building.
62	Building 1030/Swords to Plowshares	153 meters south of EB Doyle Drive at the NW corner of the building.
63	Building 1063/Medical Supply Warehouse	117 meters south of EB Doyle Drive at the NW corner of the building.
64	Building 1062/Quartermaster Shop	160 meters south of EB Doyle Drive at the NW corner of the building.
65	Building 1060/Medical Supply Warehouse	195 meters south of EB Doyle Drive at the NW corner of the building.
66	Building 1167/Gorgas Warehouse	80 meters south of EB Doyle Drive at the NW corner of the building.
67	Building 1163/Gorgas Warehouse	94 meters south of EB Doyle Drive at the NW corner of the building.
68	Building 1169/Gorgas Warehouse	135 meters south of EB Doyle Drive at the NW corner of the building.
69	Building 1162/Gorgas Warehouse	146 meters south of EB Doyle Drive at the NW corner of the building.
70	Building 1170/Gorgas Warehouse	220 meters south of EB Doyle Drive and 15 meters west of Richardson Avenue at the east center of the building.
71	Building 1161/Gorgas Warehouse	248 meters south of EB Doyle Drive and 28 meters west of Richardson Avenue at the east center of the building.
72	Building 1160/Gorgas Warehouse	247 meters south of EB Doyle Drive and 9 meters west of Richardson Avenue at the NE corner of the building.
73	Building 1152/Presidio YMCA Gym	270 meters south of EB Doyle Drive and 6 meters west of Richardson Avenue at the NE corner of the building.
74	Building 1151/Presidio YMCA Warehouse	345 meters south of EB Doyle Drive and 4 meters west of Richardson Avenue at the east center of the building.
75	Building 1004/Officers Quarters	137 meters west of Richardson Avenue and at the corner of Edie Road and O'Reilly Avenue at the SE corner of the building.
76	3234 Lyon Street	3 meters east of Lyon and 5 meters east of Richardson at the center of the building.

EXECUTIVE SUMMARY

This addendum to the December 2004 Final Noise and Vibration Study (NVS) presents the results of the noise impact assessment of two new and previously unstudied design options associated with the Presidio Parkway Diamond Alternative (PPA). The first design option is related to a change in the vertical alignment of the PPA in the area between the east and west tunnels. The second design option is related to the proposed Temporary Construction Detour (TCD) for the PPA with the Diamond option. The proposed detour is realigned both horizontally and vertically from the previously studied detour, primarily the segment from the eastern end of the western tunnel to the Richardson/Gorgas intersection. This report was prepared in support of, and will be summarized in, the Final Environmental Impact Report (FEIS/FEIR) for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project).

Doyle Drive is 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. 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.

The noise analysis was conducted following guidelines in 23 CFR 772 and Caltrans' Traffic Noise Analysis Protocol. Compliance with 23 CFR 772, the Federal Highway Administration's (FHWA) noise standard, satisfies National Environmental Policy Act (NEPA) requirements with respect to traffic noise impacts. The traffic noise analysis was conducted following methodologies that are consistent with the California Environmental Quality Act (CEQA). In addition, the analysis also considered City of San Francisco Noise Ordinance requirements, as appropriate.

Traffic noise levels were predicted at selected receptor sites identified in the 2004 NVS that were near the proposed realignment segments for both the PPA and the TCD for year 2030 conditions. Results of the analysis indicate that traffic noise would exceed the FHWA and Caltrans criteria at 8 of the 14 receptor locations studied under the modeled conditions for the PPA and 13 of 38 modeled sites under the TCD. The abatement measures considered to reduce the predicted traffic noise impacts including horizontal and vertical shifts in the roadway alignment and noise barriers. Both methods of reducing the impact of traffic noise, although feasible, do not appear to be reasonable noise abatement measures.

Since the realignment of both segments of the PPA and the TCD have resulted in this reassessment of noise impacts for the Doyle Drive project, the likelihood of alignment changes resulting in reduced noise impacts is limited. However, this possibility will continue to be investigated during the construction phase to determine if alternative options may be available that currently is unforeseen.

Construction of a temporary noise barrier in the vicinity of the Crissy Field Center was investigated but the cost of providing the wall is expected to exceed the Caltrans reasonable cost allowance. Since lower cost wall options are available in the form of wood, plastic or metal as compared to the standard masonry wall used by Caltrans to set the reasonable cost allowance for a noise barrier, it is possible that a reasonable cost alternative can be developed as part of the design phase reevaluation process. This effort will be coordinated with the Crissy Field Center management to ensure that traffic noise levels from the operation of the TCD are reduced to the extent that is reasonable and feasible.

The application of building insulation techniques at the Crissy Interpretive Center will be explored during the design phase of the proposed project to determine if abatement is needed. The extent and options that would be appropriate will be assessed in coordination with the owners/operators of the building and incorporated into the final design of the project if needed and found to be reasonable and feasible.

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SECTION 1: INTRODUCTION

This addendum presents the results of the reanalysis of traffic noise impacts associated with the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). The addendum addresses potential noise impacts from the Doyle Drive Project associated with two changed elements of the project: 1) the segment of Doyle Drive within the Presidio Parkway Diamond Alternative (PPA) from Stations 112 to Station 119 that represents a substantial change in the vertical alignment and 2) the realignment of the proposed Temporary Construction Detour (TCD) with the Diamond option associated with the reconstruction of Doyle Drive from a mostly elevated roadway to a mostly at-grade roadway. The findings of this study will be incorporated into the final 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.

1.1 PROJECT DESCRIPTION

Doyle Drive is 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). In 1994, when the US Army transferred jurisdiction of the Presidio to the National Park Service (NPS), it became part of the National Park system and Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), the agency responsible for oversight of 80 percent of the Presidio delineated as Area B; and the NPS, which is responsible for management of the coastal portions of the park (the remaining 20 percent) that are delineated as Area A. Doyle Drive lies predominately 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, the southern approach of Route 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which 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 Veterans Boulevard (State Route 1) merges into Doyle Drive approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach (see Figure 1-1). 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.

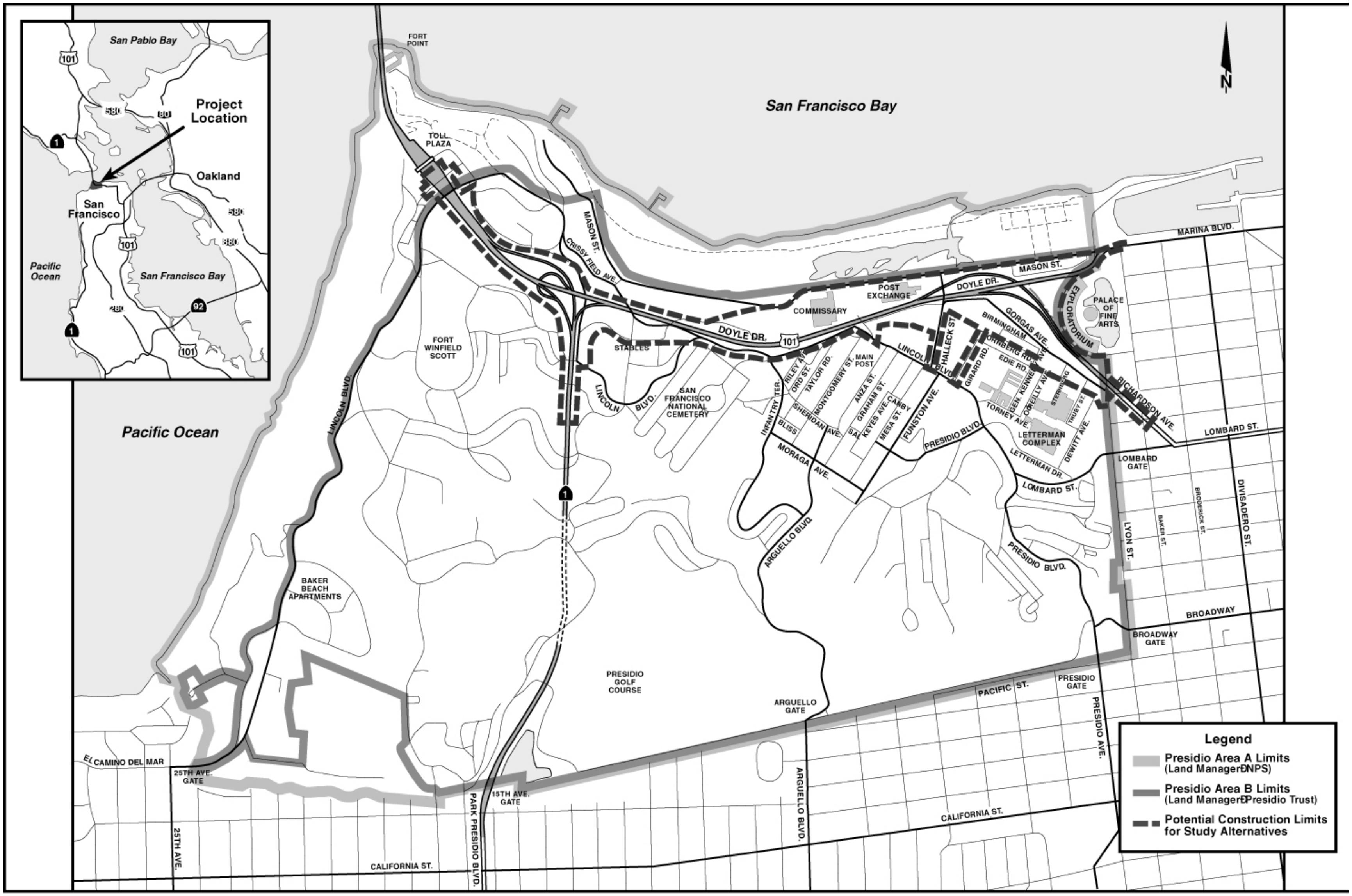
Doyle Drive is nearly 70 years old and it is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic 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 facility 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 manually moved 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).

1.2 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 1-1
PROJECT LOCATION



1.3 ALTERNATIVES DEVELOPMENT

This section describes the build alternatives presented in the DEIS/R, the preferred alternative and a No-Build Alternative in terms of physical and operating characteristics and identifies the recommended preferred alternative. As shown in Figure 1-1, the limits of the project study area are from Merchant Road, just south of the Golden Gate Bridge Toll Plaza, to the intersection of Lombard Avenue/ Broderick Street and Marina Boulevard/ Broderick Street. During the screening process, all alternatives were evaluated for their ability to meet the project's Purpose and Need.

1.3.1 Project Alternatives

This section describes the realigned PPA in terms of physical and operating characteristics and the TCD only. Other alternatives, including the No-Build Alternative, are discussed in detail in the 2004 Final Noise and Vibration Study (NVS) for the Doyle Drive Project.

Alternative 5: Presidio Parkway Alternative (PPA)

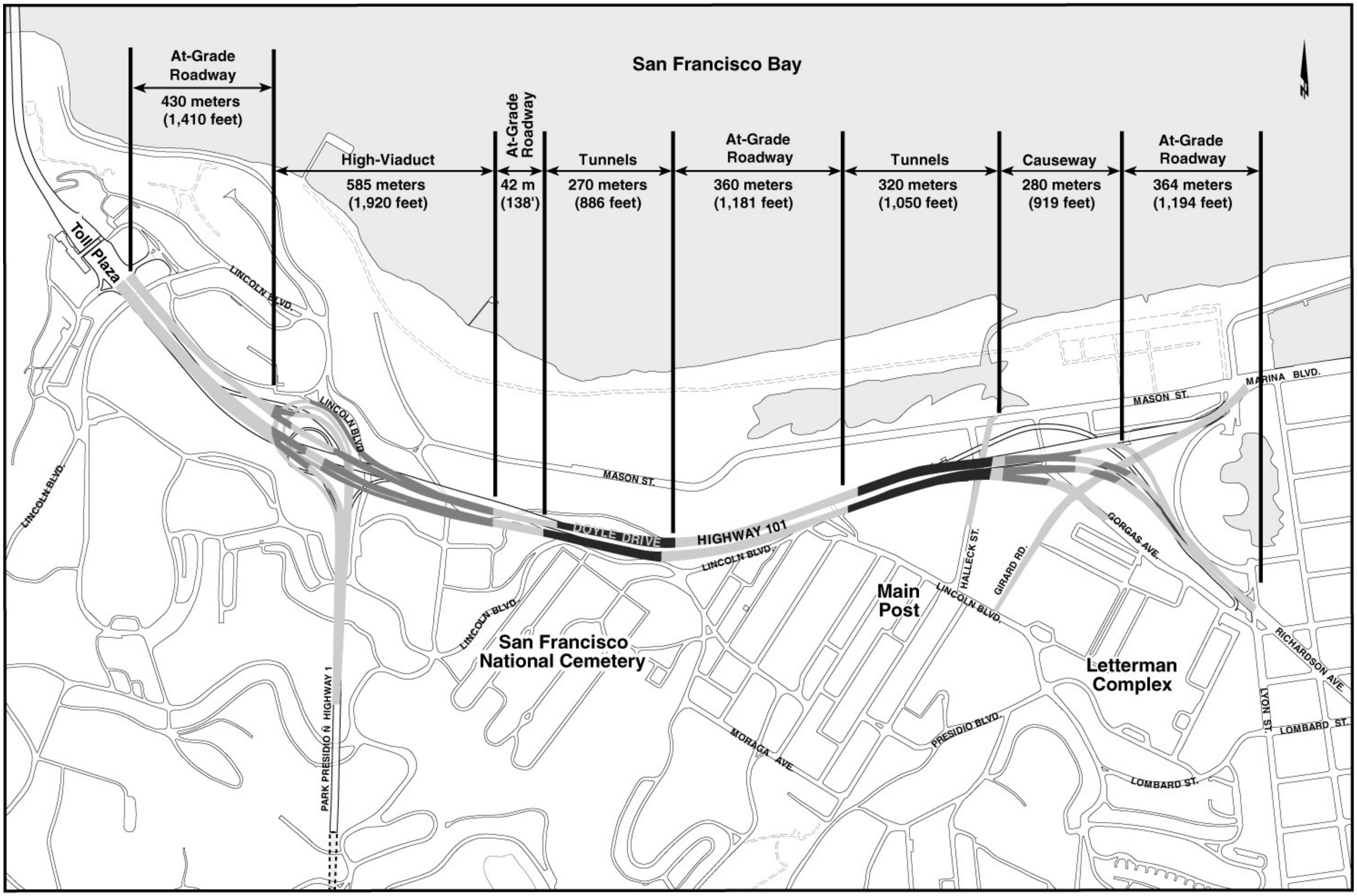
The alignment of the PPA analyzed in this Addendum has been modified when compared to the alignment shown in the 2004 NVS, specifically between Stations 114+00 and 117+80. This generally encompasses the area between the tunnels. The PPA would replace the existing facility with a new six-lane facility and an eastbound auxiliary lane, between the Park Presidio interchange and the new Presidio access at Girard Road (see Figure 1-2). 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. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend 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 existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

At the intersection with Merchant Road, just east of the toll plaza, a design option has been developed for a Merchant Road slip ramp. This 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.

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.

The PPA includes options for direct access to the Presidio and Marina Boulevard at the eastern end of the project.

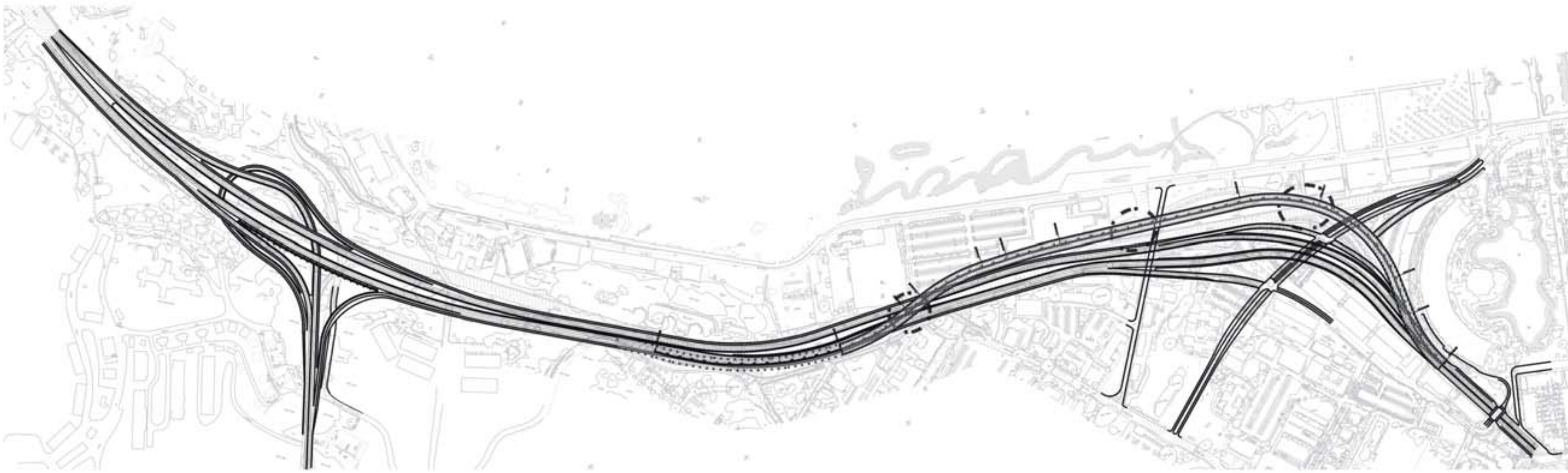
FIGURE 1-2
ALTERNATIVE 5: PRESIDIO PARKWAY



Temporary Construction Detour (TCD)

The proposed TCD associated with the construction of the PPA would be primarily an at-grade roadway as opposed to the mostly elevated roadway that was assessed in the 2004 NVS. The segment of the detour under study would extend from Station 114+00 south and eastward to Station 126+07 north of the intersection of Gorgas and Richardson. The detour would generally occupy the proposed southbound corridor to approximately Station 115+70 and then begin a northeasterly transition into the parking lot of Building 610 (Post Commissary) and then remain north and east of the existing Doyle Drive alignment until it transitions back onto Richardson in the vicinity of the Palace of Fine Arts. The TCD is anticipated to be at or near the existing ground level between the tunnel exit and Richardson, which is the major change in the alignment (see Figure 1-3). The detour is expected to have an overall width of 16.5 meters.

FIGURE 1-3
TEMPORARY CONSTRUCTION DETOUR



SECTION 2: FUNDAMENTALS OF TRAFFIC NOISE

2.1 NOISE PRINCIPLES AND DESCRIPTORS

Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB). Zero dB is typically the threshold of human hearing and 120 to 140 dB is typically the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in Figure 2-1.

This time-varying characteristic of environmental noise is described using the noise descriptor, Leq, which is the equivalent sound level used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

1 All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

FIGURE 2-1
COMPARATIVE SOUND LEVELS

Sound Level (dBA, L_{eq})	Common Indoor Sound Levels	Common Outdoor Sound Levels	Description
	Rock Band		
110			
		Jet Flyover at 305 meters (1,000 feet)	
100			
	Inside Subway Train (New York)	Gas Lawn Mower at 0.9 meter (3 feet)	**Very Annoying**
90			**Loss of Hearing with Prolonged Exposure**
	Food Blender at 0.9 meter (3 feet) Garbage Disposal at 0.9 meter (3 feet)	Diesel Truck at 0.9 meter (3 feet) Noisy Urban Daytime	
80			**Annoying**
	Shouting at 0.9 meter (3 feet) Vacuum Cleaner at 0.9 meter (3 feet)	Gas Lawn Mower at 30 meters (100 feet)	
70			
		Commercial Area Heavy Traffic at 91 meters (300 feet)	**Intrusive**
60			
	Large Business Office		
50	Dishwasher Next Room	Quiet Urban Daytime	**Quiet**
		Quiet Urban Nighttime	
40	Small Theater		
	Large Conference Room (Background) Library	Quiet Suburban Nighttime	
30			
	Concert Hall (Background)	Quiet Rural Nighttime	**Very Quiet**
20			
	Broadcast and Recording Studio		
10			
			Threshold of Hearing
0			

Sources: Caltrans Transportation Laboratory Noise Manual 1982.

SECTION 3: FEDERAL AND STATE POLICIES AND PROCEDURES FOR NOISE

3.1 OPERATIONAL PHASE

3.1.1 Federal Requirements

Noise is identified in the National Environmental Policy Act as an area for review in terms of environmental impacts of Federal actions. For the Federal Highway Administration (FHWA), the applicable standard is 23 CFR 772. Compliance with 23 CFR 772 will satisfy National Environmental Policy Act (NEPA) requirements with respect to traffic noise impacts. Under 23 CFR 772, noise abatement must be considered for Type I projects when the project would result in a substantial noise increase, or when the predicted noise levels approach, meet, or exceed the "Noise Abatement Criteria," shown in Table 3-1. Following guidance in the Caltrans Traffic Noise Analysis Protocol, "approach" is defined as being within 1 dBA of the FHWA criteria and a noise increase is substantial when the predicted noise levels with the project exceed existing noise levels by 12 dBA, Leq (h).[2]

TABLE 3-1
ACTIVITY CATEGORIES AND NOISE ABATEMENT CRITERIA (NAC)

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA, Leq(h))	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, and auditoriums.

Source: 23 CFR 772.

The Presidio Parkway is considered to be a Type I project as defined in 23 Code of Federal Regulations (CFR) 772. A Type I project is defined as a proposed Federal or Federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes.

Operational noise impacts for roadway projects with a Federal Highway Administration (FHWA) nexus are defined in 23 CFR 772. An impact occurs if a project would result in a substantial noise increase, or when the predicted noise levels approach, or exceed the Noise Abatement Criteria (NAC) shown in Table 3-1. The

2 Leq (h) refers to the noisiest one-hour-average noise level over the course of a 24-hour due to motor vehicle traffic. Depending upon average speeds during the peak (traffic) periods, the Leq (h) may or may not coincide with the peak traffic hour.

FHWA noise abatement criteria represent a balance between what is desirable and what is achievable and are based on speech interference.

For park lands, use determines the appropriate criteria. Category A areas include certain pristine or meditative areas. Category B is applicable to open space used for recreational and educational activities, and is the appropriate designation for much of the outdoor use areas at the Presidio and Palace of Fine Arts. Category C applies to any areas with retail or office use.

The National Park Service (NPS) and the Presidio Trust have a desire to provide additional emphasis on noise within the project corridor that lies within the control of each of these two entities. While there are no existing federal noise standards that are specific to the Presidio or the NPS other than the FHWA criteria noted above, the NPS does have a policy set forth in Director's Order #47 *Soundscape Preservation and Noise Management*, which requires that all park facilities be managed to minimize noise pollution. The Presidio Trust Management Plan Final EIS identifies the FHWA criteria as the appropriate federal criteria to apply to the Presidio Trust lands. The EIS also identifies those areas of the Presidio that the Trust's believes warrant special consideration as noise sensitive areas.

3.1.2 State and Local Requirements

Under the California Environmental Quality Act (CEQA), a substantial noise increase may result in a significant adverse environmental effect and must be mitigated or identified as a noise impact for which it is likely that no, or only partial abatement measures are available. For the purposes of CEQA analysis, Caltrans considers a noise increase to be substantial when the predicted noise levels with the project exceed existing noise levels by 12 dBA, Leq(h). Further requirements are found in the California Streets and Highway Code Section 216. Caltrans has also established noise analysis policies in the Traffic Noise Analysis Protocol and the Highway Design Manual. Additional guidance from Caltrans can be found in the Technical Noise Supplement of October 1998 (TeNS), Chapter 30 of the Project Development Procedures Manual, and in Chapter 12 of the Standard Environmental References.

3.2 CONSTRUCTION PHASE

3.2.1 Federal Requirements

FHWA requires that construction noise impacts be addressed consistent with 23 CFR 772.19. The general requirement is to:

- identify potentially impacted land uses or activities which may be affected by noise from construction of the project;
- determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts; and
- incorporate the abatement into the plans and specifications for the project.

Those portions of the NPS Director's Order #47 and the Presidio Trust Management Plan that relate to construction noise impacts and abatement was also used to evaluate the need for and appropriateness of construction noise mitigation.

3.2.2 State and Local Requirements

Caltrans protocol requires that construction noise impacts be addressed on a case-by-case basis, along with likely abatement measures. It is expected that specifications related to noise may be required for this project. General construction-related noise impact analysis is qualitative in nature and is based on a description of the expected construction phases, including the nature of the construction activity (e.g., such as pile driving) and its duration, the types of equipment that would be used, and proximity to noise-sensitive uses.

Additionally, the Presidio Trust Management Plan Final EIS identifies Title 24 of the California Code of Regulation as a regulatory approach to noise control. The noise standards found in this code are related to interior spaces and apply to all new multifamily residential units (hotels, motels, apartments, condominiums, and other attached dwellings that were permitted after 1974. As part of the Trust compliance process, the Trust would enforce the noise insulation requirements equivalent to the standards of Title 24 with building permit conditions.

Compliance with the San Francisco Noise Ordinance requirements would also be required of this project. Details of the anticipated construction phase noise impacts and abatement considerations are noted in Section 8.

SECTION 4: NOISE STUDY METHODS AND PROCEDURES

4.1 SELECTION OF RECEIVERS

The selection of receiver points for modeling the impact of the two alternatives under consideration for this noise study addendum were based on those receivers identified in the 2004 NVS that were within the impact areas of the proposed changes. The receptor points were selected to represent all of the existing buildings within The Presidio that were or might be considered noise sensitive based on existing or anticipated usage and that might be impacted by traffic or construction noise associated with the portion of the Presidio Parkway that was realigned and the realigned temporary construction detour. Receptors outside of these areas were not analyzed in this addendum since no known design factors had changed that would cause the noise impacts to be altered.

4.2 NOISE PREDICTION METHOD

The FHWA Traffic Noise Model (TNM) version 2.5 was used for all future year traffic noise predictions used in this study. This model was developed for FHWA under the guidance of the Noise Analysis Facility at the Volpe National Transportation Systems Center of the U.S. Department of Transportation. First released for use by FHWA in March of 1998, the model has undergone a series of updates. The current version (2.5) was released for use in April of 2004 and has replaced all previously approved noise prediction models used on Federal-aid highway projects. TNM propagates sound energy, in one-third octave bands, between highways and receptors (noise sensitive locations) taking the intervening ground’s acoustical characteristics and topography into account.

Future noise levels for both the PPA and the TCD were modeled using TNM. Input to TNM includes traffic volumes (for the noisiest hour), speeds, vertical and horizontal elevations of roadway segments and receptors, and topographic shielding. Vehicle traffic volumes were input by vehicle type to account for the “noisier” engines and elevated emission points of medium-duty and heavy-duty trucks, buses, and motorcycles. Traffic data prepared by DKS Associates was input into the TNM to predict noise levels within the project. The motor vehicle fleet used in the analysis for both the existing and future conditions consisted of automobiles, medium trucks (cargo vehicles with two axles and six tires), heavy trucks (cargo vehicles with three or more axles), buses (9 passenger or more), and motorcycles.

SECTION 5: EXISTING NOISE ENVIRONMENT

5.1 EXISTING NOISE SENSITIVE LAND USES

The Doyle Drive corridor lies within a National Park and land uses in the immediate area are not zoned like a typical urban area within the jurisdiction of a city or county. The corridor contains a mix of open space, residential and office land uses as well as a cemetery and institutional uses related to operations of the Presidio Trust, NPS, YMCA and other conservatory agencies.

5.2 FUTURE LAND USES

The Presidio Trust recently finalized the Presidio Trust Management Plan and certified the accompanying Environmental Impact Statement (EIS). The Management Plan examines future land use expectations within the Presidio. The document shows locations of planned housing retention, removal and replacement within the Presidio and does not identify any location proposed for conversion to residential use within one mile of the project alignment. The Final EIS identifies traffic-generated noise as the major source of environmental noise. The Final EIS further points out that natural sounds are intrinsic elements of the environment that are inherent components of the Presidio’s significant natural, historic, cultural, scenic, and recreational resources to be protected. The Final EIS also identifies specific examples of areas where quiet is of significance. These areas include Crissy Marsh, Tennessee Hollow, the Fort Scott parade ground, the National Cemetery, and the World War II Memorial. It is the intent of the Trust to maintain or enhance the noise environment within the Presidio whenever possible.

5.3 SENSITIVE RECEPTORS

Land uses considered to be sensitive to noise and vibration, are referred to as sensitive receptors. Some land uses are considered more sensitive to ambient noise and vibration levels than others, due to the types of activities typically occurring. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise and vibration than are commercial (other than lodging facilities) and industrial land uses.

Noise sensitive receptors that could be affected by the Doyle Drive Project (either the segment of the PPA under consideration for this study or the realigned TCD) have been identified.

5.3.1 Sensitive Receptors within the Doyle Drive Corridor

Sensitive receptors within the Doyle Drive corridor include residential areas. In some cases, these residential areas are in active use. Other residential areas appear to be vacant but are designated as residential and are not slated for removal under the Presidio's General Management Plan Amendment. These areas are presumed to be available for residential purposes in the future. Additional noise-sensitive uses within the study corridor include the National Cemetery and Crissy Field.

SECTION 6: FUTURE NOISE ENVIRONMENT

The future noise environment within the proposed realigned Presidio Parkway alternative and the realigned temporary construction detour was predicted using the TNM Version 2.5 model. All noise level predictions associated with the update of this study use receptor sites gathered in 2004.

6.1 MODELING INPUT PARAMETERS

The basic input parameters used in predicting traffic noise levels associated with this study include the following:

- Roadway data included the width of the roadway, the location of the roadway in relation to other physical features via an x, y, z coordinate system, the type of pavement, flow controls (if any), and whether the roadway was on structure or not.
- Traffic data included vehicle classification, vehicle speed, and vehicle counts.
- Receiver data included location by the x, y, z coordinate system, the height of the receiver above ground, the impact criteria applicable to the receiver, existing noise levels (if available), and the number of dwelling units represented by a receiver (if applicable).

Other parameters that were available for consideration included ground cover, tree zones, terrain lines, and shielding, any or all of which may have been used on a location by location basis.

6.1.1 Traffic Assumptions

The basic traffic assumptions used in this study included traffic classification broken down into five (5) vehicle types: autos, medium trucks, heavy trucks, buses, and motorcycles. Each roadway segment was assigned a volume of traffic based on information provided by DKS Associates. Traffic was split directionally for AM and PM peak hour conditions and was classified based on the same variables. Detailed traffic data can be found in Appendix C of the 2004 NVS.

Speed data used in this study was based on existing posted speeds or a generalized speed based on roadway design or ramp configuration. Mainline traffic was generally set at 88 kph (55 mph) while ramp traffic was generally assigned at 56 kph (35 mph). Most local streets, especially the lower volume two lane streets, were set at 32 kph (20 mph). The speeds assigned are consistent with the traffic speeds measured during the gathering of field data at peak and off-peak traffic conditions within the Doyle Drive corridor during the 2004 NVS.

6.1.2 Results of Modeling

6.1.2.1 Future Year 2030 Results for the Presidio Parkway Alternative (PPA) Realignment

To determine the likely impact of the project on traffic noise levels in the vicinity of the PPA Realignment, 14 of the original 76 receptor sites shown on Figure 6-1(sites 7, 9, 10, 11, 43, 44, 45, 46, 47, 48, 49, 50, 51, and 53) were reanalyzed using TNM Version 2.5. These receptor locations represent a variety of land uses and physical distances to the Doyle Drive project within the realigned segment of the PPA. Future year 2030 conditions only were analyzed for this noise study addendum. A worst case peak traffic level condition was evaluated. Table 6-1 illustrates the predicted noise levels for 2030 traffic for the new alignment design option of the PPA and compares the results with those provided in the 2004 NVS for the original alignment of the PPA. A review of the results shown in Table 6-1 reveals that of the 14 receptor sites reanalyzed, the noise levels of the new PPA realignment design option when compared to the original PPA alignment are expected to decrease or remain the same at 6 sites and increase at 8 sites. The future noise levels are expected to approach or exceed the NAC at sites 10, 44, 45, 46, 47, 48, 49, and 50. Of the 8 sites with an increase, 2 of these sites are classified as Category B land uses (residential, recreational, etc.) while the remaining 6 are identified as commercial, office or mixed use sites under Category C. Of the 14 sites, 11 already approach or exceed the NAC. The average increase in the traffic noise level as a result of the proposed realignment of the Presidio Parkway is predicted to be about 7.9 dBA over the levels predicted for the original alignment, a change which is typically detectable to the human ear in an exterior setting. This indicates that the proposed realignment of the PPA will create higher noise levels than those predicted in the 2004 NVS.

6.1.2.2 Future Year 2030 Results for the Temporary Construction Detour (TCD) Realignment

To determine the likely impact of the project on traffic noise levels in the vicinity of the proposed realignment of TCD associated with the PPA, 38 of the original 76 receptor sites shown on Figure 6-1(sites 1, 2, 4, 5, 6, 7, 9, 10, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 59, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 75, and 76) were reanalyzed using TNM Version 2.5. These receptor locations represent a variety of land uses and physical distances to the Doyle Drive project within the realigned segment of the PPA. Future year 2030 traffic volumes were used to predict the traffic noise from the TCD for the noise study addendum. A worst case peak traffic level condition was evaluated. Table 6-2 illustrates the predicted noise levels for 2030 traffic for the new temporary construction detour alignment associated with the PPA and compares the results with those provided in the 2004 NVS for the original TCD alternative. A review of the results shown in Table 6-2 reveals that of the 38 receptor sites reanalyzed, the noise levels of the new TCD realignment design option when compared to the original TCD alignment are expected to decrease or remain the same at 8 sites and increase at 30 sites. The future noise levels are expected to approach or exceed the NAC at sites 1, 6, 7, 10, 43, 47, 49, 50, 70, 71, 72, 73, and 76. Of the 30 sites with an increase, 6 of these sites are classified as Category B land uses (residential, recreational, etc.) while the remaining 24 are identified as commercial, office and mixed use sites under Category C. Of the 38 sites, 15 already approach or exceed the NAC. The average increase in the traffic noise level as a result of the proposed realignment of the Presidio Parkway TCD is predicted to be about 5 dBA over the previously predicted detour noise levels, a change which is typically detectable to the human ear in an exterior setting. This indicates that the proposed realignment of the Presidio Parkway TCD would create higher noise levels than those predicted in the 2004 NVS.

Following is a brief explanation of each site and the anticipated traffic noise impacts associated with the PPA realignment and the TCD realignment:

Site 1, located at the southwest side of the Palace of Fine Arts to represent the noise levels that could be expected at the exterior of the building closest to Richardson Avenue. Under the TCD realignment, this location is expected to exceed the NAC by 11 dBA.

Site 2, located at the northwest side of the Palace of Fine Arts, represents the noise levels that could be expected at the exterior of the building closest to the Doyle Drive/Girard Road connection to Marina Boulevard. Under the TCD realignment, this location is expected to be below the NAC approach by 6 dBA.

Site 4, located at the southeast corner of Building 1182 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. The NAC would not be exceeded with the TCD realignment.

Site 5, located at the southeast corner of Building 1183/1186 (Mason Street Warehouse), represents an area where exterior noise levels are not expected to have an adverse impact on the facility. The NAC would not be exceeded with the TCD realignment.

Site 6, located at the southwest corner of Building 1184/1185 (Mason Street Warehouse), represents an area where exterior noise levels are expected to exceed the NAC with the TCD realignment due to the fact that the new roadway would be shifted considerably further north and closer to the building and also be at grade.

FIGURE 6-1
NOISE RECEPTOR PREDICTION LOCATIONS

(9) Noise Receptor Predition Locations

TABLE 6-1
PREDICTED TRAFFIC NOISE LEVELS DURING OPERATION OF PRESIDIO PARKWAY ALTERNATIVE (PPA)

Receptor[1]	Site Description	Assumed Future Land Use[2]	NAC Approach[3]	Existing Condition	Presidio Parkway Alternative		
					Original PPA Diamond 2030[4]	PPA Realignment Diamond Option 2030	Change between Original PPA and PPA Realignment Option
7	Building 603/Crissy Interpretive Center	Educational	66	**68***	56	54	-2
9	Building 610/Post Commissary	Museum	71	69	**71***	68	-3
10	Battery Blaney	Historic	66	**75***	**70***	**72***	2
11	Battery Slaughter	Historic	66	**79***	**66***	63	-3
43	National Cemetery	Cemetery	66	**72***	64	57	-7
44	Building 129/Enlisted Family Quarters	Residential	66	65	57	**71***	14
45	Building 122/Gym	Mixed Use	71	**74***	62	**73***	11
46	Building 108/Storage	Undetermined/ Commercial	71	**74***	63	**73***	10
47	Building 107/Switching Station	Undetermined/ Commercial	71	**76***	68	**74***	6
48	Building 104/Mess Hall	Office	71	70	59	**71***	12
49	Building 105/Mess Hall	Office	71	**76***	**74***	**77***	3
50	Building 106/Offices	Office	71	**80***	**73***	**78***	5
51	Building 211/Former Burger King	Restaurant	71	**75***	66	66	0
53	Building 210/Guard House	Bank and Post Office	71	**71***	63	63	0
Number of sites approaching or exceeding the NAC				11	5	8	

Source: ESA 2006

Notes: [1]For details regarding the receptor location, see Appendix E of the 2004 NVS.

[2]Based on Presidio Trust Management Plan and consultation with Presidio Trust and NPS staff. IN cases where future land use was undetermined, the existing land use was assumed for land use.

[3]FHWA noise abatement criterion approach based on existing or anticipated land use. Approach is defined by Caltrans as being within one 1dBA of the noise abatement criterion. The applicable NAC is based on either the existing use or the future intended use as defined by the Presidio Trust, where appropriate.

[4]The noise levels predicted for this alternative as presented in the 2004 Noise and Vibration Study.

Bolded numbers indicate a noise level that approaches, equals, or exceeds the NAC.

TABLE 6-2
PREDICTED TRAFFIC NOISE LEVELS DURING THE TEMPORARY CONSTRUCTION DETOUR (TCD) PHASE

Receptor[1]	Site Description	Assumed Future Land Use[2]	NAC Approach[3]	Existing Condition	Temporary Construction Detour Alternatives		
					Presidio Parkway Diamond DEIS TCD Alignment 2030[4]	TCD Realign-ment Option 2030	Change between Presidio Parkway Diamond DEIS TCD and TCD Realignment Option
1	Palace of Fine Arts	Educational	66	**71***	**69***	**77***	8
2	Palace of Fine Arts	Educational	66	**70***	61	60	-1
4	Mason St. Warehouse Building 1182	Office	71	68	55	60	5
5	Mason St. Warehouse Building 1183/1186	Office	71	68	56	65	9
6	Mason St. Warehouse Building 1184/1185	Office	71	69	59	**75***	16
7	Building 603/ Crissy Interpretive Center	Educational	66	**68***	56	**74***	18
9	Building 610 / Post Commissary	Museum	71	69	69	70	1
10	Battery Blaney	Historic	66	**75***	**68***	**69***	1
43	National Cemetery	Cemetery	66	**72***	63	**67***	4
44	Building 129/Enlisted Family Quarters	Residential	66	65	57	61	4
45	Building 122/Gym	Mixed Use	71	**74***	61	65	4
46	Building 108/Storage	Undetermined/ Commercial	71	**74***	61	65	4
47	Building 107/Switching Station	Undetermined/ Commercial	71	**76***	66	**72***	6
48	Building 104/Mess Hall	Office	71	70	58	62	4
49	Building 105/Mess Hall	Office	71	**76***	**72***	**76***	4
50	Building 106/Offices	Office	71	**80***	**71***	**74***	3
51	Building 211/Former Burger King	Restaurant	71	**75***	65	69	4
52	Building 204/Exchange Store	Office	71	68	58	70	12
53	Building 210/Guard House	Bank and Post Office	71	**71***	61	63	2
55	Building 220/Bakers and Cooks School	Office	71	64	54	59	5

TABLE 6-2 (Continued)
PREDICTED TRAFFIC NOISE LEVELS DURING THE TEMPORARY CONSTRUCTION DETOUR (TCD) PHASE

Receptor[1]	Site Description	Assumed Future Land Use[2]	NAC Approach[3]	Existing Condition	Temporary Construction Detour Alternatives		
					Presidio Parkway Diamond DEIS TCD Alignment 2030[4]	TCD Realign-ment Option 2030	Change between Presidio Parkway Diamond DEIS TCD and TCD Realignment Option
56	Building 231/Exchange Gas Station	Undetermined/ Commercial	71	65	66	67	1
57	Building 228/Bakery	Retail	71	65	63	63	0
58	Building 227/Warehouse	Retail	71	64	61	61	0
59	Building 223/Warehouse	Office	71	60	58	60	2
61	Building 1029/Swords to Plowshares	Residential	66	63	60	60	0
62	Building 1030/Swords to Plowshares	Residential	66	63	57	57	0
63	Building 1063/Medical Warehouse	Water Recycling Facility	71	61	61	60	-1
64	Building 1062/Quartermaster Shop	Undetermined/ Commercial	71	59	58	58	0
66	Building 1167/Gorgas Avenue Warehouse	Office	71	65	64	66	2
67	Building 1163/Gorgas Avenue Warehouse	Office	71	64	64	63	-1
68	Building 1169/Gorgas Avenue Warehouse	Office	71	66	64	68	4
69	Building 1162/Gorgas Avenue Warehouse	Office	71	62	62	66	4
70	Building 1170/Gorgas Avenue Warehouse	Office	71	70	**71***	**75***	4

TABLE 6-2 (Continued)
PREDICTED TRAFFIC NOISE LEVELS DURING THE TEMPORARY CONSTRUCTION DETOUR (TCD) PHASE

Receptor[1]	Site Description	Assumed Future Land Use[2]	NAC Approach[3]	Existing	Temporary Construction Detour Alternatives		
					Presidio Parkway Diamond DEIS TCD Alignment 2030[4]	TCD Realign-ment Option 2030	Change between Presidio Parkway Diamond DEIS TCD and TCD Realignment Option
71	Building 1161/Gorgas Avenue Warehouse	Office	71	66	66	**72***	6
72	Building 1160/Gorgas Avenue Warehouse	Office	71	**72***	**71***	**75***	4
73	Building 1152/Presidio YMCA Gym	Office	71	**71***	**71***	**73***	2
75	Building 1004/Officers Quarters	Office	71	55	56	58	2
76	3234 Lyon St.	Residential	66	**75***	**74***	**75***	1
Number of sites approaching or exceeding the NAC				15	8	13	

Notes: [1]For details regarding the receptor location, see Appendix E of the 2004 NVS.
[2]Based on Presidio Trust Management Plan and consultation with Presidio Trust and NPS staff. IN cases where future land use was undetermined, the existing land use was assumed for land use.
[3]FHWA noise abatement criterion approach based on existing or anticipated land use. Approach is defined by Caltrans as being within one 1dBA of the noise abatement criterion.
[4] The noise levels predicted for this alternative as presented in the 2004 Noise and Vibration Study.
***Bolded** numbers indicate noise levels that approach, equal, or exceed the NAC.

Site 7, located at the southeast corner of Building 603 (Crissy Field Center), represents an area where exterior noise levels are expected to exceed the NAC with the realigned TCD by 7 dBA. Noise levels from the PPA realignment would not approach or exceed the NAC due to the fact that Doyle Drive in this area would be enclosed in a tunnel.

Site 9, located at the southeast corner of Building 610/Post Commissary, represents the noise levels that would be expected at the exterior of the building closest to the Doyle Drive. With the realigned PPA and the TCD, the noise level is not expected to equal or exceed the NAC.

Site 10, located at the south side of Battery Blaney, represents the noise levels that would be expected at this outdoor area closest to Doyle Drive. The realigned PPA would exceed the NAC by 5 dBA while the TCD realignment would exceed the NAC by 2 dBA.

Site 11, located at the south side of Battery Slaughter, represents the noise levels that would be expected at this outdoor area next to Doyle Drive. The NAC would not be approached or exceeded by the realigned PPA due to the fact that Doyle Drive would be entering a tunnel near this location. The TCD realignment would not impact this area.

Site 43, located at a gravesite in the National Cemetery south of Doyle Drive (near the intersection of Sheridan Avenue and Lincoln Boulevard), represents the noise levels that would be expected near the northern edge of the cemetery. Noise levels are not expected to exceed the NAC for the realigned PPA. The TCD realignment is expected to equal the NAC.

Site 44, located at the northwest corner of Building 129/Enlisted Family Quarters, represents the noise levels that this residential area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by the realigned PPA by 4 dBA while the TCD realignment would not approach or exceed the NAC.

Site 45, located at the northwest corner of Building 122/Gymnasium (Main Post Community Center), represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by the realigned PPA by 1 dBA and would not be approached or exceeded by the TCD.

Site 46, located at the northwest corner of Building 108/Storage, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC approach would be exceeded by the realigned PPA by 2 dBA. The realigned TCD is not expected to approach or exceed the NAC.

Site 47, located at the northwest corner of Building 107/Switching Station, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by 2 dBA by the realigned PPA. The realigned TCD would equal to the NAC at this location.

Site 48, located at the northwest corner of Building 104/ Mess Hall, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be approached by the realigned PPA while the realigned TCD is not expected to approach or exceed the NAC.

Site 49, located at the northwest corner of Building 105/ Mess Hall, represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by the realigned PPA by 5 dBA with the TCD exceeding the NAC by 4 dBA.

Site 50, located at the northwest corner of Building 106/Band Barracks (Union Pacific offices), represents the noise levels that this area south of Doyle Drive and Lincoln Boulevard would expect. The NAC would be exceeded by the realigned PPA by 6 dBA, with the realigned TCD exceeding the NAC by 2 dBA.

Site 51, located at the northwest corner of Building 211 (former Burger King), represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be exceeded by the realigned PPA or the realigned TCD.

Site 53, located at the northwest corner of Building 210/Guard House, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by either the realigned PPA or the realigned TCD at this location.

Site 55, located at the northwest corner of Building 220/Bakers and Cooks School, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by realigned TCD.

Site 56, located at the northwest corner of Building 231/Exchange Gas Service Station, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 57, located at the northwest corner of Building 228/Bakery, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 58, located at the northwest corner of Building 227/Warehouse, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 59, located at the northeast corner of Building 223/Warehouse, represents the noise levels that this area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 61, located at the northwest corner of Building 1029/Swords to Plowshares, represents the noise levels that this residential area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 62, located at the northwest corner of Building 1030/Swords to Plowshares, represents the noise levels that this residential area south of Doyle Drive would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 63, located at the northwest corner of Building 1063/Medical Supply, represents the noise levels that this area south of Doyle Drive and west of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 64, located at the northwest corner of Building 1062/Quartermaster Shop, represents the noise levels that this area south of Doyle Drive and west of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 66, located at the northwest corner of Building 1167/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 67, located at the northwest corner of Building 1163/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 68, located at the northwest corner of Building 1169/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 69, located at the northwest corner of Building 1162/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 70, located on the east side of Building 1170/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be exceeded by 3 dBA by the realigned TCD.

Site 71, located on the east side of Building 1161/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be equaled by the realigned TCD.

Site 72, located at the northeast corner of Building 1160/Gorgas Avenue Warehouse, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be exceeded by 3 dBA by the realigned TCD.

Site 73, located at the northeast corner of Building 1152/Presidio YMCA, represents the noise levels that this area west of Richardson Avenue and east of Gorgas Avenue would expect. The NAC would be exceeded by 1 dBA for the realigned TCD.

Site 75, located at the southeast corner of Building 1004/Officers Quarters, represents the noise levels that this area west of Richardson Avenue and at the corner of O'Reilly Avenue and Edie Road would expect. The NAC would not be approached or exceeded by the realigned TCD.

Site 76, located at the center of the residential building at 3234 Lyon Street at the corner of Lyon Street and Richardson Avenue, represents the noise levels that this residential area east of Richardson Avenue would expect. The NAC would be exceeded by the realigned TCD by 8 dBA.

The realignment of the Presidio Parkway Alternative, as noted in Table 6-1, is expected to have a noticeable traffic noise level increase on Building 129, 122, 108, 107, 104, and 106 with a minor increase as Building 105 and a minor decrease at Building 610. As noted in the detailed information for each site shown above, the bulk of these buildings are currently vacant or are designated for commercial use with no exterior areas of frequent human use where a lowered noise level would be of benefit. Therefore additional consideration of noise abatement in the form of noise barrier walls beyond those considered in the 2004 NVS was determined to be unwarranted. As noted in the 2004 NVS, the use of soundproofing and quieter pavement surfaces will be explored in detail as part of the design phase of this project

The realigned Temporary Construction Detour, as shown in Table 6-2, has the potential is increase the noise levels at 28 sites when compared to the predicted noise levels for the TCD shown in the 2004 NVS. This increase is expected to range from 1 to 18 dBA. The increase in the expected traffic noise level associated with the aligned TCD is primarily attributable to the general shift to the north and to the placement of the roadway in an at-grade condition in areas where it was previously anticipated to be elevated.

The greatest increase in noise level is expected to be at the Crissy Interpretive Center, Buildings 1183, 1184 1185 and 1186 (Mason St. Warehouses), Building 204 and the Palace of Fine Arts. While all buildings and public use areas within the Doyle Drive corridor that could be impacted by traffic noise from the TCD were evaluated, specific concerns related to the impacts on the Crissy Field Center were reviewed in detail. The Crissy Interpretive Center is a community environmental facility that offers a wide variety of programs such as workshops and special events. The Center also houses a media lab, arts workshop, urban ecology lab, and resource library and is used for many educational functions such as summer programs. Concerns about the continued operation of the Center during and following construction have been raised.

Based on the results of the traffic noise modeling effort completed as part of this study, no basic increase in traffic noise is expected over the No-Build scenario with either the original Presidio Parkway Alternative or the realigned alternative. The greatest concern related to traffic noise impacts is associated with the TCD and the construction process itself. While the construction impacts have been noted in detail in the 2004 NVS, the impacts associated with the realigned TCD are noticeably greater (5 dBA or more increase) at 9 locations.

SECTION 7: NOISE ABATEMENT ALTERNATIVES

Consistent with 23 CFR 772, noise abatement must be considered for Type I projects when the predicted noise level approaches or exceeds the NAC or when the project results in a substantial noise increase (defined by Caltrans as an increase of 12 dBA or more). Section 5 identified a number of locations where traffic noise exposure currently is anticipated to approach, equal, or exceed the NAC within the realigned segment of the PPA. Since abatement for this area was considered in the 2004 NVS, further consideration of abatement is not warranted since the overall composition of this alternative has not changed.

However, the change in the horizontal and vertical alignment of the proposed realigned TCD associated with the PPA does warrant further consideration of abatement options, especially in the vicinity of the Crissy Field Center. Consistent with Caltrans protocol and FHWA requirements, noise abatement is only considered where noise impacts are predicted and where frequent human use occurs and a lowered noise level would be of benefit. This approach gives primary consideration to exterior areas. If there are no exterior activities that are affected by traffic noise, then the interior criterion shown in Category E of the FHWA regulations will be used as the basis for determining whether noise abatement is reasonable and feasible.

The abatement measures considered for the traffic noise associated with the TCD to reduce the predicted exterior traffic noise impacts were:

- Alteration of horizontal and vertical roadway alignment,
- Temporary noise barriers, and
- Building insulation.

7.1 ALTERATION OF HORIZONTAL AND VERTICAL ROADWAY ALIGNMENT

Alteration of the horizontal and vertical roadway alignment of the TCD has resulted in a minimization of impacts on the removal of several buildings within the Doyle Drive corridor but has also resulted in an increase in operational traffic noise levels at a number of buildings within the project area, most notably the Crissy Field Center. Because of the limited space to place the TCD between the existing roadway and nearby buildings, further options to shift the horizontal or vertical roadway alignment appear to be very limited. While minor adjustments are possible, it is unlikely that major shifts in alignment will be possible that would provide substantial noise relief to the impacted sites. Detailed assessment of this possibility will continue as part of the design process.

7.2 TEMPORARY NOISE BARRIERS

When evaluating temporary noise barriers, a number of factors must be considered including:

- Lateral clearances (sufficient distances from the traveled way to the barrier),
- Sight distance requirements (providing for sufficient stopping sight distance),
- Access requirements for the properties being protected,
- Barrier dimensions (length and height),
- Construction materials, and
- Aesthetics

Construction of a temporary noise barrier at sites that are on local streets such as Richardson Avenue, Lyon Street, Marina Boulevard, Mason Street, Lincoln Boulevard, Gorgas Avenue, Montgomery Street, Girard Road and Halleck Street that intersect or cross the TCD would not be feasible because driveways would need to be maintained to provide access to those properties. As such, there appear to be no reasonable measures to reduce the predicted traffic noise with the proposed TCD Alternative at Sites 1 and 2 (the Palace of Fine Arts Building), Sites 6 (the Mason Street Warehouses), Site 47 (Building 107), Site 49 (Building 105), Site 50 (Building 106), Site 70 and 72 (Gorgas Avenue Warehouses), Site 73 (YMCA Building) and at Receptor 76 (residential area along Lyon St. and Richardson Avenue).

Site 7 (the Crissy Field Center) appears to have the potential to be benefited by the construction of a temporary noise barriers along the TCD, depending upon cost and effectiveness considerations. To determine whether a temporary noise barrier would be reasonable and feasible at this location, the Caltrans protocol was applied to a series of noise barrier options for this site. The Caltrans protocol identifies a reasonable noise barrier as one that provides at least 5 dBA of traffic noise reduction at a reasonable cost. The cost effectiveness of a noise barrier is determined by a base allowance of $32,000 per benefited receiver that is adjusted upwards based on the absolute noise levels predicted to occur, the increase between the Build and No-Build Alternatives, the amount of noise reduction that can be achieved, and the antiquity of the impacted receptors in the project corridor. This provides for a total noise abatement allowance for noise barriers that are considered feasible. This protocol was applied to the noise barrier concepts discussed below.

Since the Caltrans protocol is based on a noise barrier wall design, all noise barriers were treated as though a wall was used. In fact, this may not actually be the final decision as the project progresses towards final design and construction. There are a wide variety of noise barrier options, in terms of both material and design, than can minimize the visual impact as well as reducing the traffic noise level. The primary options include a rigid wall, an earth berm, or a combination of the two. There are also variations of the earth berm concept such as crib walls or living walls, which are typically a concrete structure in a triangular shape filled with soil and planted to resemble a mount of earth. The advantage of this design over an earth berm is that less horizontal space is required to achieve a similar height, which can be important in a limited space environment such as the Doyle Drive corridor.

Within the rigid wall concept, which is probably the most common structural noise abatement method employed, there are a number of combinations of design elements including glass, plastic, metal, concrete, steel, and other materials. The details of the noise abatement option would be coordinated during the design phase for any noise barrier option that is determined to be preliminarily reasonable and feasible. This would give all interested parties the opportunity to provide input into the aesthetics of the barrier as well as the materials to be employed. Due to the constraints that may be placed on noise barrier design such as utility locations, drainage, structural loading limits, and maintenance issues, the specific type of barrier material to be used and the exact placement of the barrier can only be estimated at this time. Where visual impacts could result from the placement of a noise barrier, a decision would have to be made as to what constitutes a reasonable compromise between the two in order to accommodate both desires.

Table 7-1 illustrates the results of an assessment of the reasonableness and feasibility of providing a temporary noise barrier in the vicinity of the Crissy Field Center to reduce the impact of the traffic noise levels that would be generated during the operational life of the TCD. A variety of noise barriers were investigated at heights of 2.44 m to 4.88 m and at lengths varying from 117 m to 147 m. The barrier was analyzed as though it was placed at the edge of the safety shoulder of the roadway along the north side of the TCD and optimized at 3.05 meters in height and 117 meters in length. The barrier wall is predicted to achieve a 6 dBA reduction at these dimensions.

The most recent Caltrans information regarding noise barrier costs was employed, which includes a base allowance of $32,000 with an increase of $4,000 because the absolute noise levels are between 70 and 74 dBA. An additional $2,000 was allowed because the build versus existing noise levels are between 3 and 7 dBA. Another $2,000 was added because the achievable noise reduction was between 6 and 8 dBA. Finally an additional $10,000 was incorporated into the allowable amount because the building pre-dated 1978. This created a total reasonable allowance for this site of $50,000.

Using the current cost estimate of $175/m^2 for a masonry wall, the estimated cost of the temporary noise barrier is $62,448.75, which exceeds the allowable cost of $50,000. It is possible that a lower cost material such as wood, plastic or metal could be substituted for the masonry wall and creates a lower cost wall option.

7.3 BUILDING INSULATION

Consideration of the noise level impacts inside the Crissy Interpretive Center has identified that no interior noise levels that approach or exceed the FHWA Interior NAC of 52 dBA will results from the operation of the TCD under a closed window condition. Given the type of building structure (masonry with single-glazed windows) found at the Crissy Interpretive Center, it could be reasonably assumed that the noise reduction (exterior to interior) would be on the magnitude of 49 dB (minus the lower reduction for the windows, which would be on the order of 24 dB) using the HUD guidance offered in *The Noise Guidebook.* Therefore, an effective inside/outside reduction on the order of 25 dB could be expected with the doors and windows closed. This would reduce the predicted TCD interior noise level to approximately 50 dB, which is 2 dB below the FHWA interior criteria found in the NAC,

Given this anticipated condition, additional noise reduction would not be required to ensure that the interior space would continue to be usable as an educational facility. However, if open-window conditions are routinely experienced, the noise reduction provided by the building envelope would be less, depending upon the amount of wall space with open windows. This reduction could result in an interior noise level that would approach or exceed the interior NAC. Since the Crissy Interpretive Center is a two story building with limited window space on the ground floor level, it is anticipated that only second-story activities would be impacted by the noise from the TCD, especially when one considers that the second floor would receive very limited (if any) benefit from the proposed temporary construction noise barrier.

To ensure that potential noise impacts to the Crissy Interpretive Center associated with the TCD can meet or exceed the FHWA NAC, the following commitments are made.

1. A detailed building noise reduction analysis will be conducted during the design phase of this project that will evaluate the building's construction material and the location and volume of window space within the building envelope.
2. Operational characteristics of the building envelope will be investigated during the design phase (in concert with the owner/operator of the building) to determine the amount of time (if any) that windows and/or doors remain in the open position during normal operating hours (if any).
3. If open window or door conditions are found to exist on a routine basis during the design phase investigation, the economic reasonableness of keeping these openings closed will be investigated. This may result in the required use of air conditioning during warmer days to ensure that the windows and doors will remain closed to ensure that the noise reduction is at its maximum. By keeping the doors and windows closed, further noise reduction is not required.
4. If the building is not air conditioned, the feasibility of retrofitting the building for this condition will be investigated during the design phase. If the use of air conditioning is feasible and economically reasonable, air conditioning installation as part of the construction project is recommended.
5. If the detailed building noise reduction analysis conducted during the design phase identifies other potential sources of noise leaks (ventilation openings, damaged or missing door gaskets, etc.) that could cause the interior noise level to approach or exceed the NAC, the feasibility and economic reasonableness of having these repairs made as part of the construction project will be pursued to ensure that the interior noise levels will not exceed the NAC.

The views of the impacted property owner would be a major consideration in reaching a final decision on the reasonableness of abatement measures to be provided. The opinions of the property owners would be obtained through the use of public involvement techniques that may include public hearings, community meetings, or other means as appropriate.

If pertinent parameters change substantially during the final project design, the preliminary noise abatement design could be changed or eliminated from the final project design. A final decision of the construction of the noise abatement would be made upon completion of the project design.

TABLE 7-1
NOISE BARRIER PRELIMINARY REASONABLENESS DETERMINATION

Alternative	Location	Length (m)	Height (m)	Preliminary Reasonable Cost Allowance Per Benefited Unit[1]	Number of Benefited Units*	Preliminary Reasonable Barrier Total Construction Cost Allowance	Estimated Barrier Construction Cost[2]	Preliminary Reasonable (Yes/No)
Presidio Parkway Temporary Construction Detour	Crissy Field Center	117	3.05	$50,000	1	$50,000	$62,448.75	No

Source: Environmental Science Associates, 2006

Notes: [1]Based on Caltrans TNAP, October 1998 as modified.

[2]Barrier cost is based on Caltrans TNAP value of $175/meter^2 for a standard masonry block wall.

*The number of benefited units is based on a frontage factor of 30.5 meters being equivalent to one residential lot where the area will receive a reduction of 5 dBA or more based on Caltrans TNAP.

The height and length of the barrier were optimized to enhance the cost effectiveness of this barrier.

SECTION 8.0: REFERENCES

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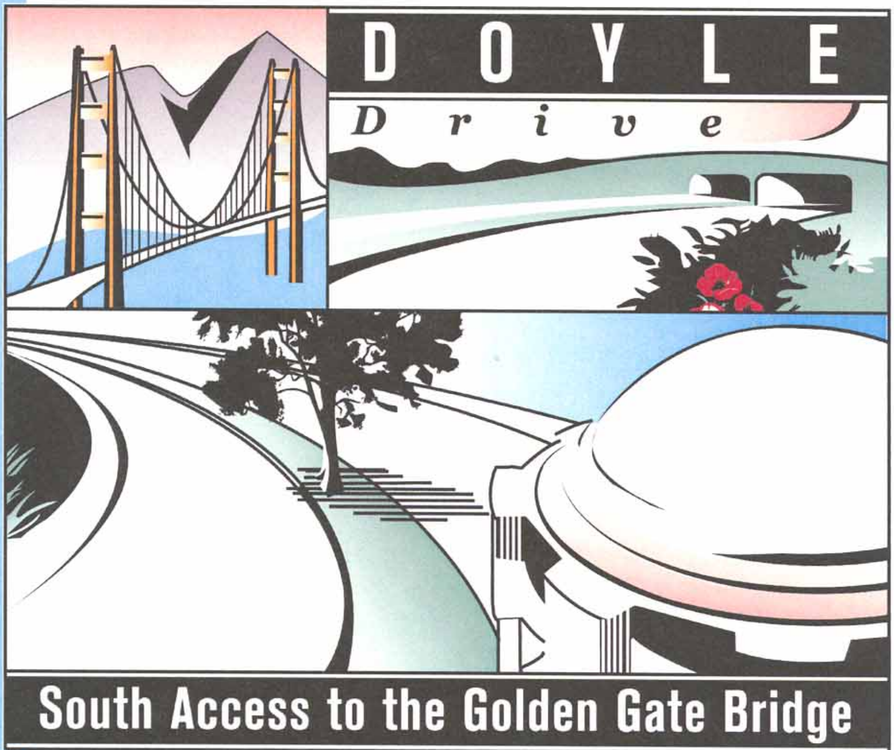

FINAL PARKING IMPACT ANALYSIS

September 2004

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SECTION 1: INTRODUCTION

This memorandum provides an overview of the alternatives that are being considered for further detailed analysis within the South Access to the Golden Gate Bridge - Doyle Drive Project Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR).

1.1 OVERVIEW

Doyle Drive is 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). In 1994, when the US Army transferred jurisdiction of the Presidio to the National Park Service (NPS), it became part of the National Park system and Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), the agency responsible for oversight of 80 percent of the Presidio delineated as Area B; and the NPS, which is responsible for management of the coastal portions of the park (the remaining 20 percent) that are delineated as Area A. Doyle Drive lies predominately 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, the southern approach of US 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which 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 1-1). 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.

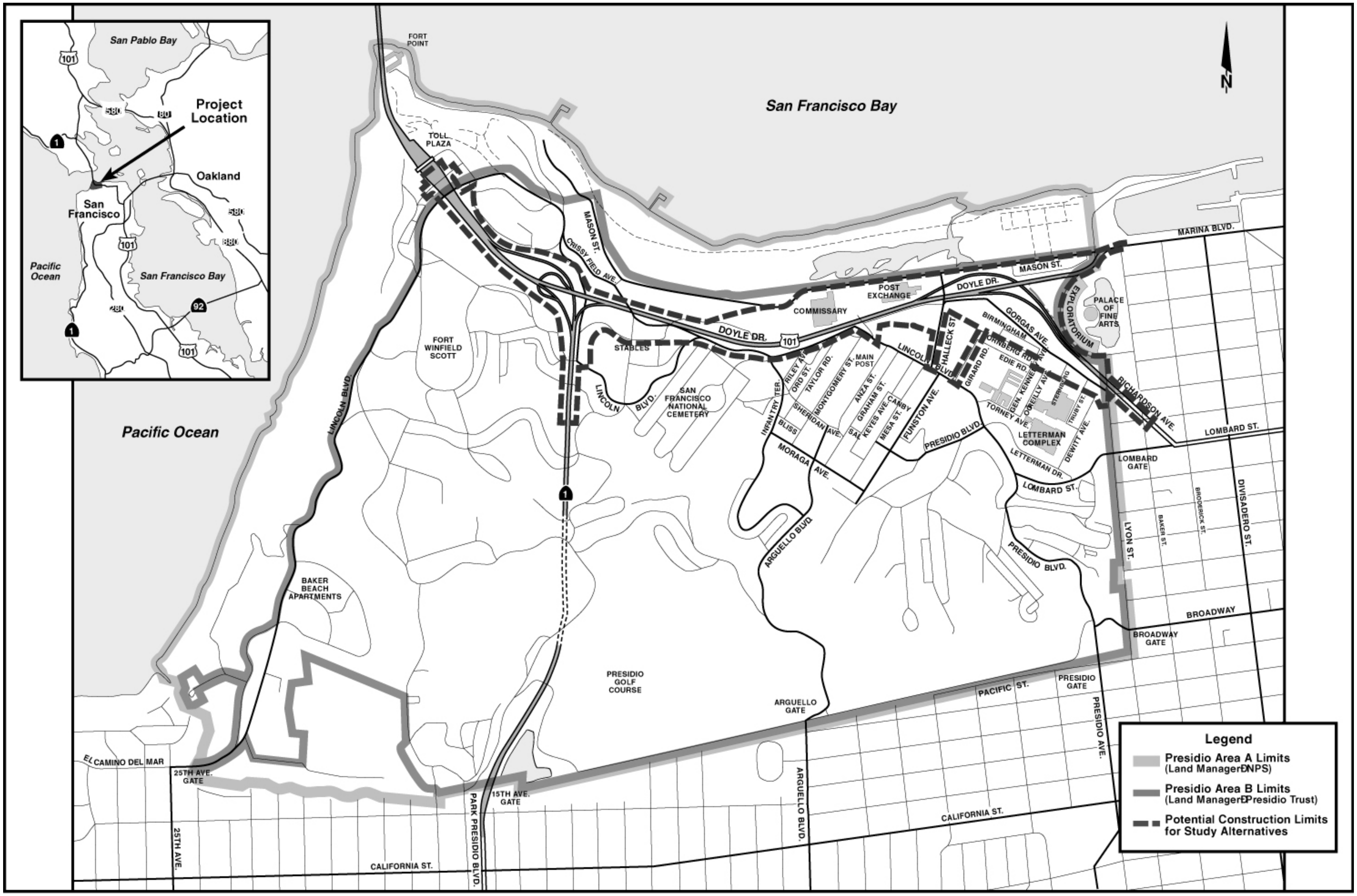
Doyle Drive is nearly 70 years old and it is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic 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 facility 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 manually moved to provide a median lane as well as to reverse the direction of traffic flow of several lanes (<u>Project Study Report: Doyle Drive Reconstruction</u>, 1993).

1.2 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 1-1
PROJECT LOCATION



1.3 ALTERNATIVES DEVELOPMENT

The build alternatives for the Doyle Drive Project were developed with input from public scoping and reflected the parkway concept that evolved from previous studies. Through the screening analysis, six alternatives were selected for consideration in the Administrative DEIS/DEIR: Alternative 1, No-Build; Alternative 2, Replace and Widen; Alternatives 3a and 3b, Long Tunnels; and Alternatives 4a and 4b, Short Tunnels.

Subsequent to the Administrative DEIS/DEIR in 2002, a fifth alternative, the Presidio Parkway, was added to the list of alternatives for more detailed study. In comparison to the tunnel alternatives it was determined that Alternative 5, Presidio Parkway, would provide all the benefits and functions of Alternatives 3a, 3b, 4a, and 4b with less cost, construction duration and environmental impact. Hence, in November 2003 the four tunnel alternatives were recommended to be removed from further consideration and analysis in the DEIS/DEIR.

At a public meeting held in February 2004, the public agreed with the decision to drop Alternatives 3a, 3b, 4a, and 4b and retain Alternative 1, No-Build, Alternative 2, Replace and Widen, and Alternative 5, Presidio Parkway for consideration in the DEIS/DEIR.

1.3.1 Project Alternatives

This section describes the build alternatives in terms of physical and operating characteristics and a No-Build Alternative. As shown in Figure 1-1, the project limits are from Merchant Road, just south of the Golden Gate Bridge Toll Plaza, to the intersection of Richardson Avenue/Francisco Street and Marina Boulevard/Lyon Street. During the screening process, all alternatives were evaluated for their ability to meet the project's Purpose and Need. Detailed drawings showing the plan and profile of each alternative in addition to the various design options can be found in Appendix A.

Alternative 1: No-Build Alternative

The No-Build Alternative represents the future year 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 1-2). 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 (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. Presidio access at the east end of the project will be provided for southbound traffic via a right turn from Richardson Avenue to Gorgas Avenue. Presidio access for northbound traffic will be provided by a slip ramp from Richardson Avenue to Gorgas Avenue, which is currently under construction.

Alternative 2: Replace and Widen Alternative

The Replace and Widen Alternative would replace the 463-meter (1,519-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 1-3). 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 and a 3.6-meter (12-foot) eastbound auxiliary lane with a fixed median barrier or six 3.6-meter (12-foot) lanes with a moveable median barrier. The new facility would have an overall width of 38.0 meters (124 feet). The fixed median barrier 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 32.4 meters (106 feet). 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 and the ramp connecting westbound Doyle Drive to southbound 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.

The Replace and Widen Alternative includes two options for the construction staging:

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 the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

With 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.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. Presidio access at the east end of the project will be provided for southbound traffic via a right turn from Richardson Avenue to Gorgas Avenue. There would be no Presidio access for northbound traffic at the east end of Doyle Drive due to geometric constraints and concerns for traffic safety.

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 1-4). 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. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend 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 existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The Presidio Parkway Alternative would include an underground parking facility at the eastern end of the project corridor between the Mason Street Warehouses, Gorgas Street Warehouses and Palace of Fine Arts. The parking garage would supply approximately 500 spaces to maintain the existing parking supply in the area and improve pedestrian and vehicular access between the Presidio and the Palace of Fine Arts.

At the intersection with Merchant Road, just east of the toll plaza, a design option has been developed for a Merchant Road slip ramp. This 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.

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. 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 Calvary 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.

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, Gorgas Avenue is a one-way street and 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.

FIGURE 1-2
ALTERNATIVE 1: NO-BUILD

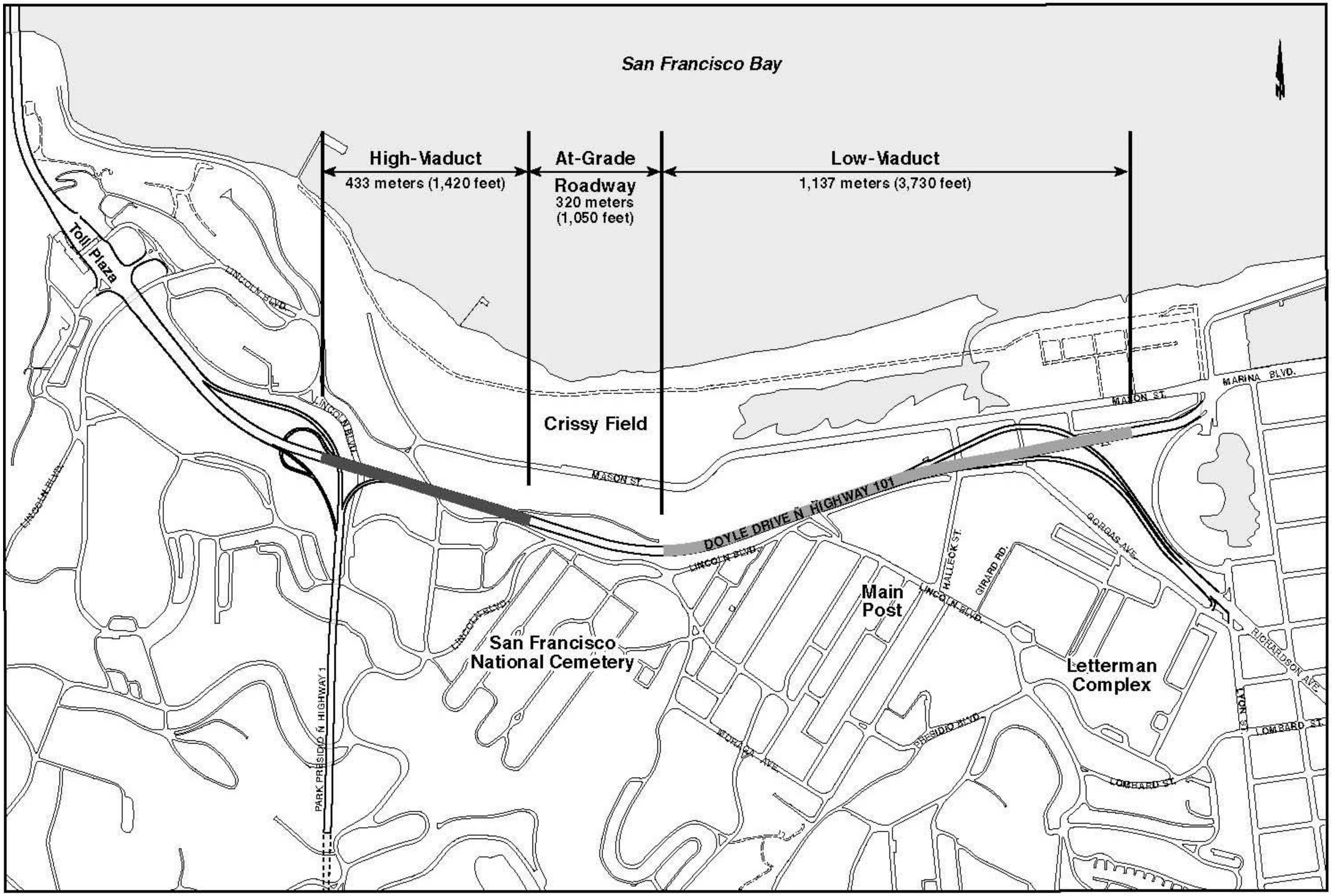


FIGURE 1-3
ALTERNATIVE 2: REPLACE AND WIDEN

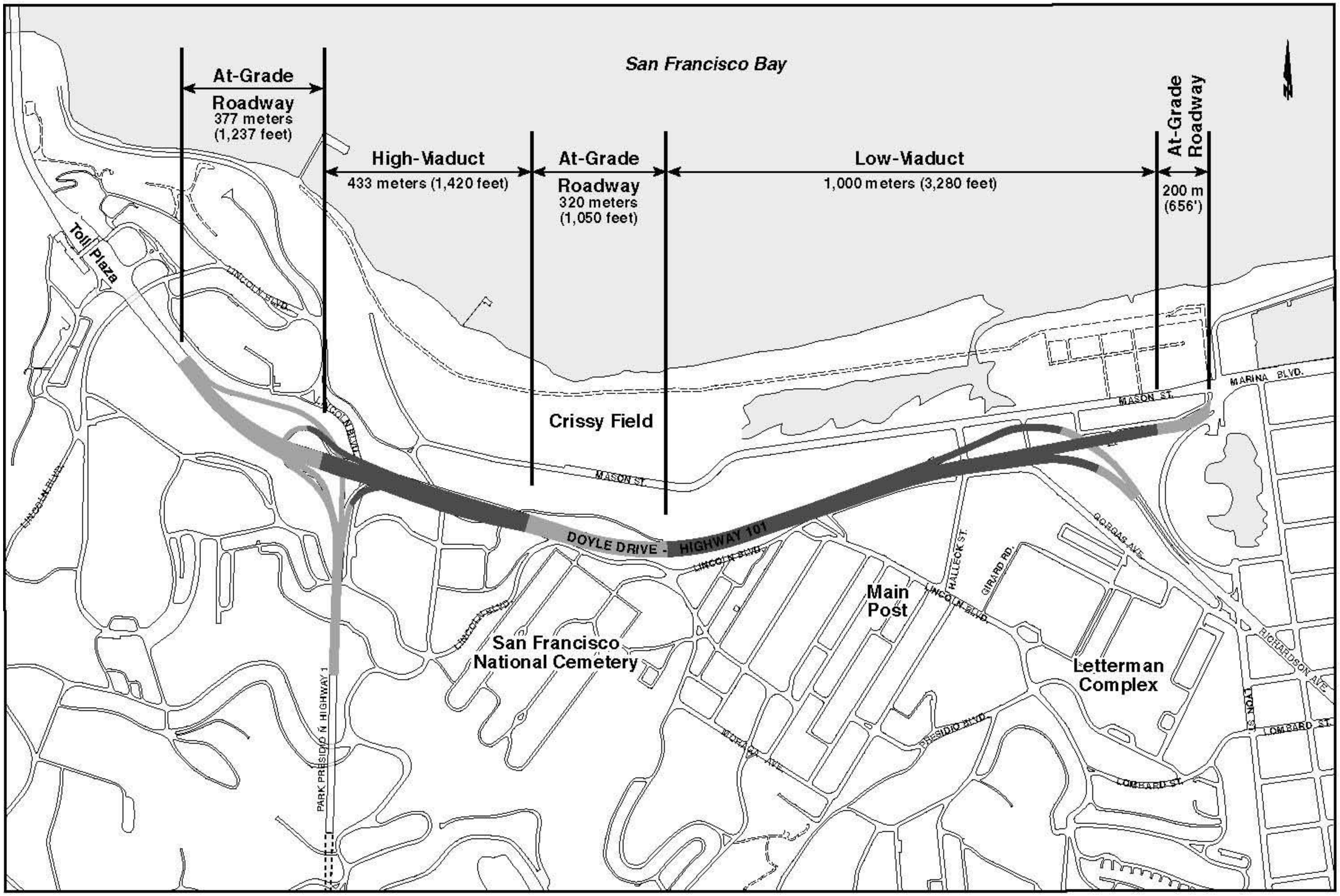
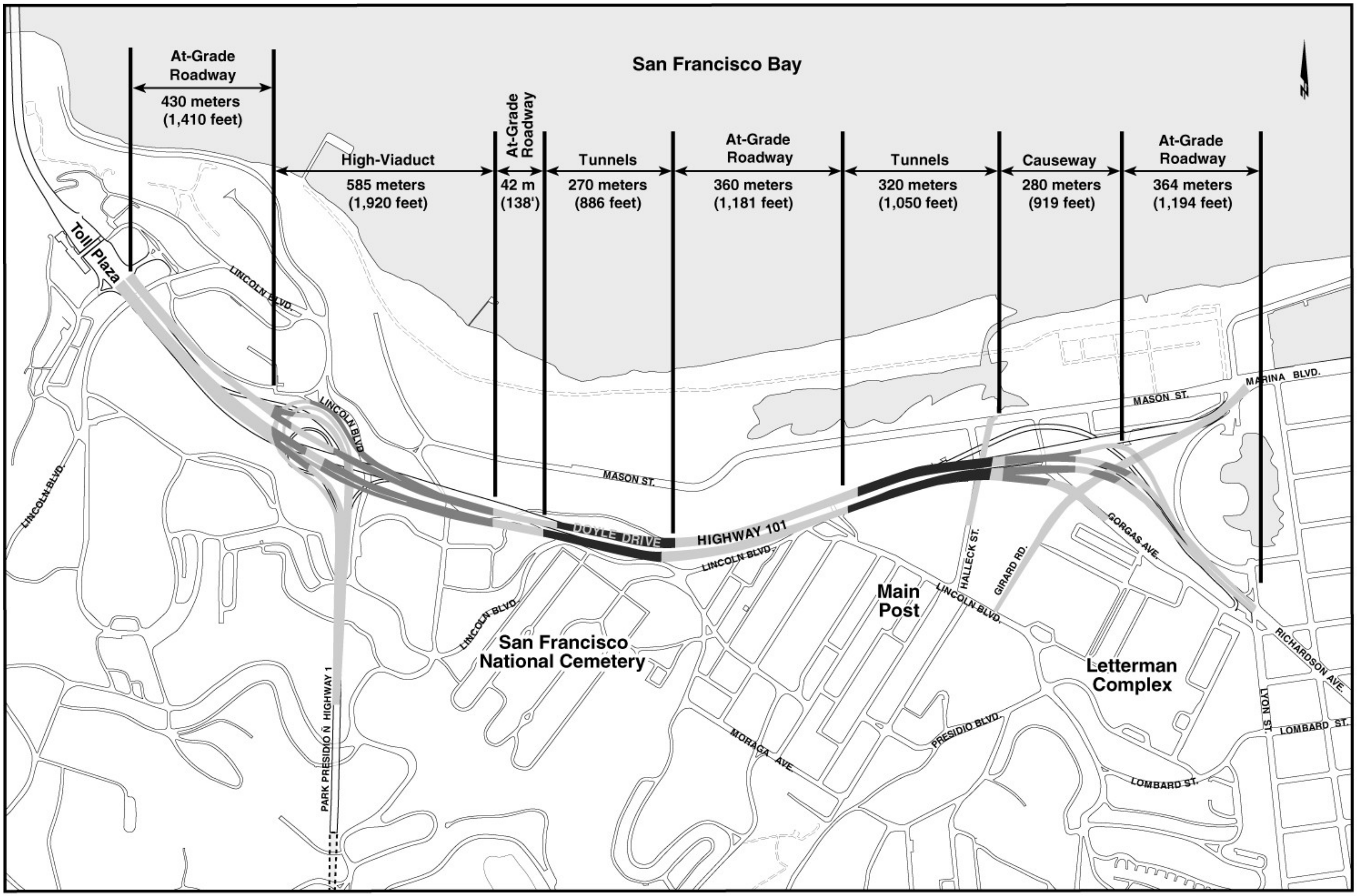


FIGURE 1-4
ALTERNATIVE 5: PRESIDIO PARKWAY



SECTION 2: METHODOLOGY

This section describes the methodology for conducting the Parking Impact Analysis for the Doyle Drive Project. Existing parking supply and demand were determined in order to establish a baseline scenario for those areas where parking spaces could be lost due to construction and operation of the Doyle Drive Project alternatives. Future supply and demand were estimated for each of the project alternatives (permanent) as well as during the short-term construction period (temporary). Based on the number of spaces removed, potential temporary and permanent impacts to the surrounding land uses were assessed. The parking impacts due to the project alternatives represent any parking deficiencies beyond those identified under the No-Build conditions.

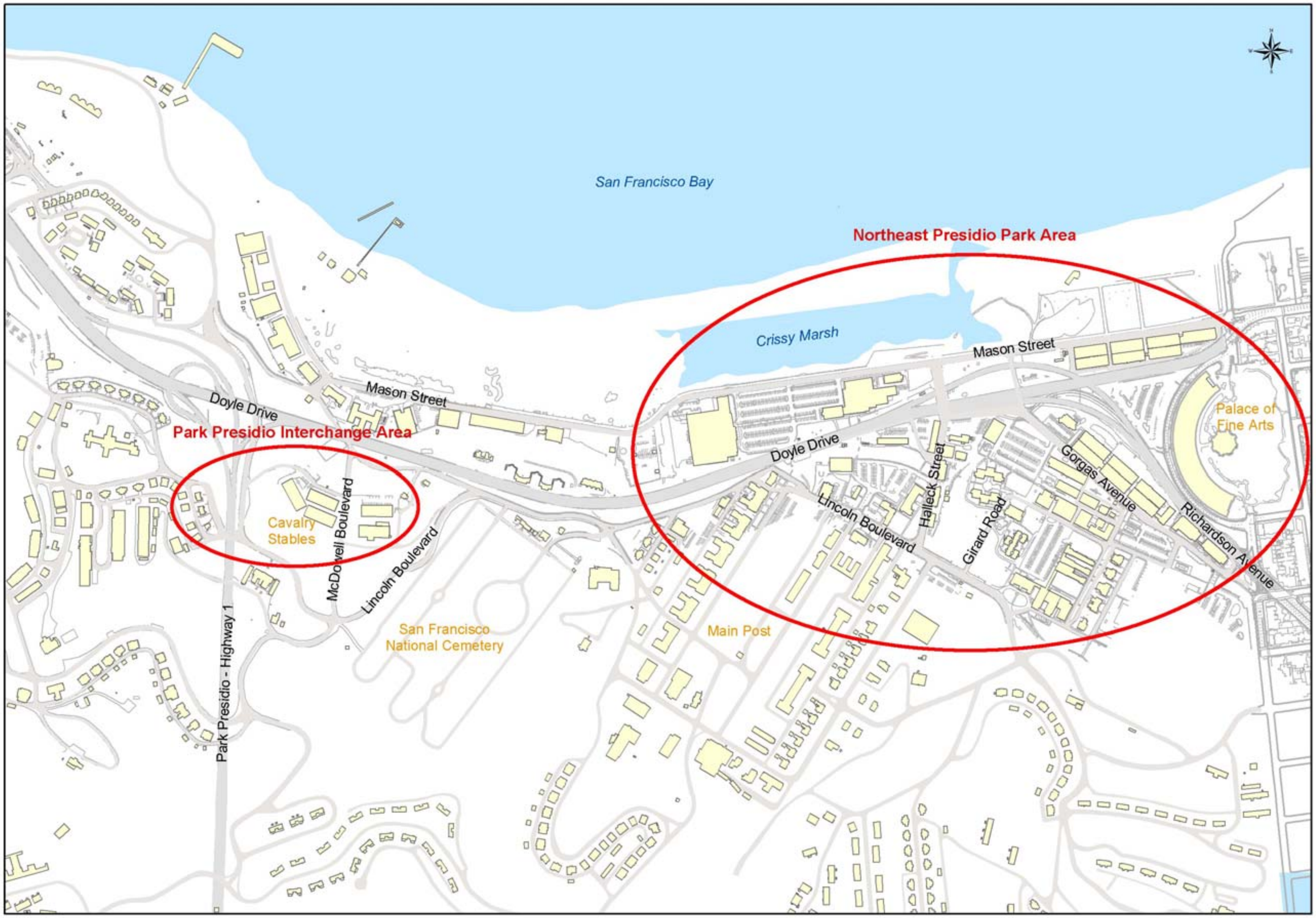
The Parking Impact Analysis was completed for three scenarios: existing conditions, construction impacts scenario (temporary impacts), and the Doyle Drive project scenario (permanent impacts). The existing conditions scenario analyzes existing average weekday parking demand and compares it to the parking supply that is currently available to the general public. Inventory of parking spaces available was based on information provided by the Presidio Trust and additional inventory data collected by Parsons Brinckerhoff (PB) during field investigations. The construction impacts scenario was assumed to take place in year 2010 and would reflect when construction activities for Doyle Drive would have the greatest effect on the parking supply. These impacts would be temporary. The Doyle Drive Project scenario was assumed to occur in year 2030 and would reflect conditions when the Doyle Drive Project would be in operation. These impacts would be permanent. The parking supply estimates for both 2010 and 2030 conditions take into account certain parking areas that would be relocated or modified by the project, either temporarily or permanently. A rate of 350 square feet per space of unmarked pavement area, consistent with industry standards, was used to estimate parking supply for these areas. Due to fluctuations in land use and parking area conditions, existing parking demand was calculated using land use assumptions provided by the Presidio Trust, instead of observations of parking demand in Presidio Lots.

The study area for this analysis is based on the location of parking areas that could be affected due to construction activities or the actual Doyle Drive Project. Potential project-related impacts could be due to the construction of new facilities such as the detour facilities or space needed for construction activities. The construction period would be no more than five years with many activities in localized areas taking, on average, two years to complete. Most of the study area is concentrated on either side of Doyle Drive at the east end of the Presidio. Additional areas near the Park Presidio interchange were also evaluated. The study area is shown in Figure 2-1.

The analysis also investigates and reviews potential alternative parking facilities and mitigations, as a result of parking spaces eliminated (temporary and permanent) by the Doyle Drive Project. The parking areas recommended for mitigation are within walking distance, 400 meters (1/4 mile) or less, of the buildings affected by the loss of parking. Additional parking for some uses, including retail, medical and the Swords to Plowshares buildings (Buildings 1029 and 1030) were evaluated within a smaller area (200 meters, 1/8 mile). Potential mitigations are proposed for both the temporary and permanent phases of the project.

Due to the dynamic nature of the Presidio land use, quantifying the available parking supply and expected parking demand is a speculative exercise. Changes and variations to current land uses and expectations may occur that could have noticeable impacts on this parking assessment. Unfortunately, these changes are unknown and it has been proposed that the Parking Impact Analysis be updated on a regular basis to include updated uses and modified proposals for better assessment and more effective use of the Presidio parking facilities.

FIGURE 2-1
PARKING STUDY AREA



SECTION 3: EXISTING CONDITIONS

3.1 EXISTING PARKING SUPPLY

An inventory of the number of existing parking spaces available at the identified parking areas or parking lots was done in September 2003 in order to establish the base case parking supply. Table 3-1 summarizes this parking inventory, and Figures 3-1 and 3-2 depict the existing parking locations in the study area. Because many parking areas within the Presidio are in a transitional state (that is, they are currently being used for activities related to the Letterman project or are closed due to security concerns), the Parking Impact Analysis evaluates only parking areas that are currently available to the general public. Overall, there are approximately 1,723 parking spaces available to the general public in the study area. A discussion of the parking supply within the study area is provided below, grouped generally according to the planning areas defined in the Presidio Trust Management Plan (PTMP).[1] Figure 3-3 shows the boundaries for the planning areas that were used in this analysis to analyze parking supply and demand.

Crissy Field – Mason Warehouses

Buildings 1182, 1183, 1184, 1185, 1186, 1187, and 1188 are referred to as the Mason Street warehouses. This area has a total parking supply of approximately 165 spaces. There are 26 spaces south and east of Building 1188. There are also approximately 13 spaces south of Buildings 1184, 1183 and 1182, consisting of about nine spaces along the south side of Lundeen Street (a one-way, westbound street) and four spaces along the fence on the west side of Crook Street at Lundeen Street. On the south side of Mason Street, adjacent to Buildings 1185, 1186, 1187 and 1188, there are 36 on-street parking spaces. There is also an unmarked parking area located between Marshall Street and Buildings 1184 and 1185. The Presidio Trust estimates that this area could accommodate 90 parking spaces.

Crissy Field – Post Exchange/Commissary

The total parking supply in the Crissy Field – Post Exchange (PX)/Commissary area is approximately 695 spaces. The parking supply includes a 443-space marked lot between Buildings 610 and 653 and Buildings 605 and 606. In addition, there are eight marked spaces south of Building 605, six street parking spaces south of Building 603, and a 380-space unmarked lot west of Building 610. The unmarked lot includes the area between Buildings 640 and 610 as well as the area behind the Commissary. For purposes of this report, it was assumed that only 130 spaces would be available in this lot to meet demand in the study area. The remaining spaces were assumed to be used to meet the demand of Buildings 640, 643, 644, 649, 650 and 651, outside of the study area.

The 108-space lot between Marshall and Halleck Street is fenced off to the general public and is currently used for construction staging and parking for construction workers. Although the area is not currently open to the public, it may be open to the public when the Letterman Digital Arts Center opens at the end of 2005. Therefore, this area is viewed as a temporary loss of parking spaces and was included in the estimate of available parking for all scenarios.

West of Halleck Street, under Doyle Drive, the Presidio Trust estimated that this unmarked parking area could accommodate 144 parking spaces. However, this area is currently fenced off for security reasons and not accessible for parking, so it was not included in the existing supply.

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[1] Presidio Trust Management Plan, May 2002, Presidio Trust, Chapter 3 – Planning Districts: Concepts & Guidelines.

FIGURE 3-1
AFFECTED PARKING LOCATIONS – NORTHEAST PRESIDIO PARK AREA

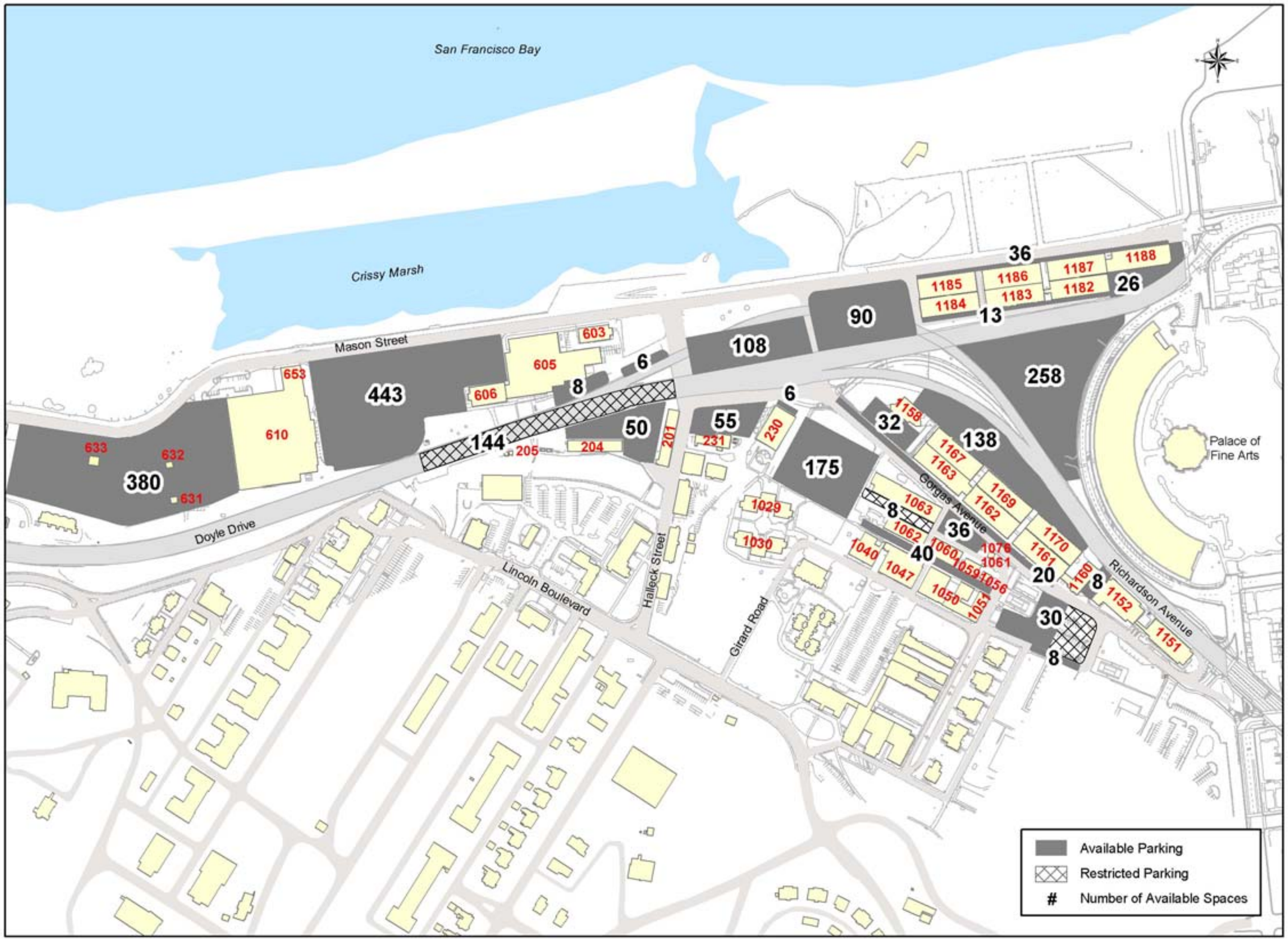


FIGURE 3-2
AFFECTED PARKING LOCATIONS – PARK PRESIDIO INTERCHANGE AREA

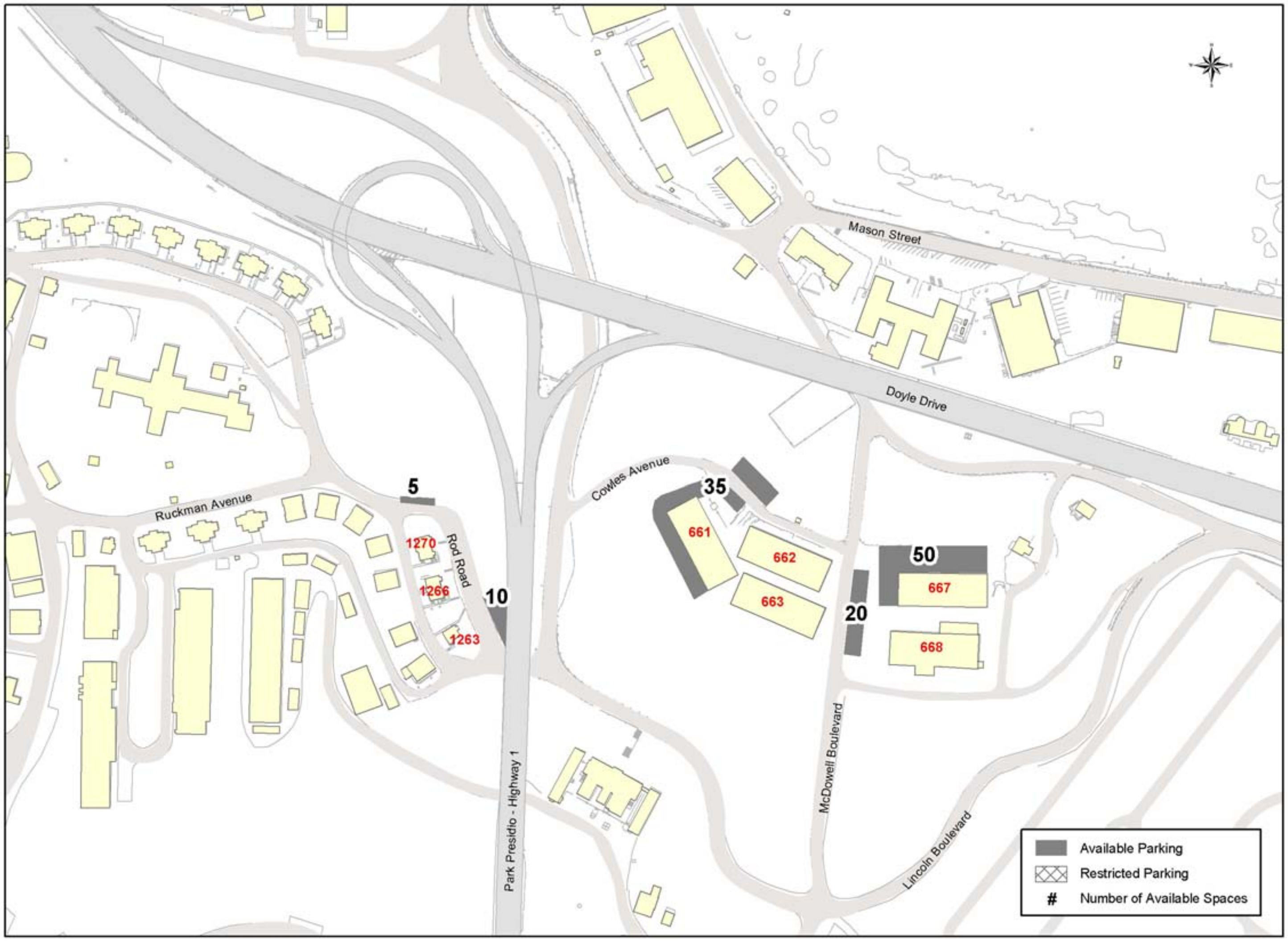
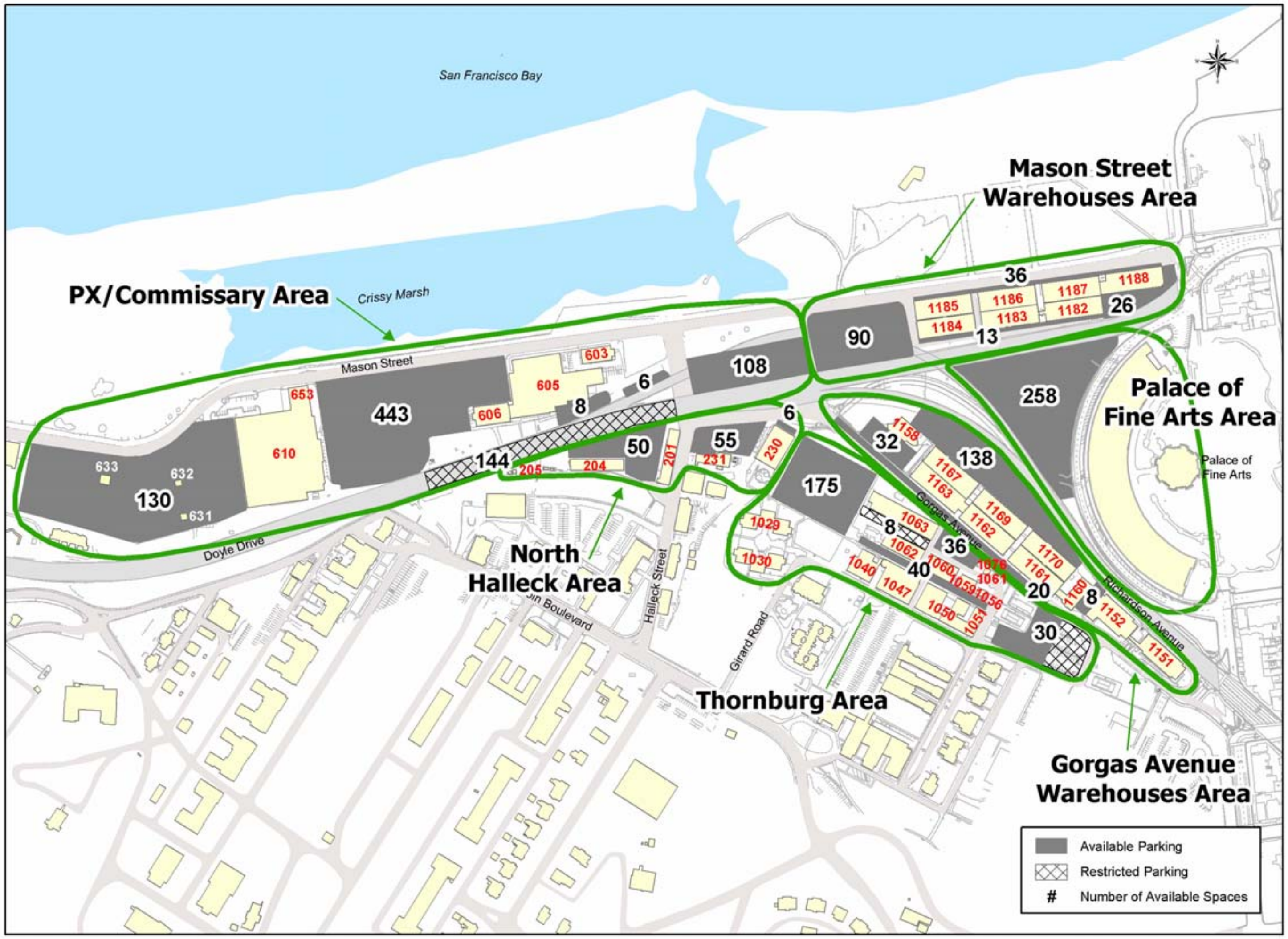


FIGURE 3-3
PLANNING AREAS



Letterman – Gorgas Warehouses

This area includes the Gorgas Warehouses and the Presidio YMCA Pool and Gym, located along Gorgas Avenue. It has a total parking supply of approximately 198 spaces. There is a 138-space marked lot behind the warehouses, as well as an 8-space marked lot east of Building 1160 and on-street parking for 20 vehicles along the east side of Gorgas Avenue. Although it is not currently needed, there is also a 32-space marked parking area south of Building 1158. The parking areas located south of Building 1160 are currently not available for public access due to Letterman construction.

Letterman – Thornburg Area

The total parking supply in the Thornburg area is approximately 281 spaces. There are an estimated 40 on-street parking spaces on Thornburg Road. The parking spaces are presently used primarily by consultants for the Letterman Digital Arts Center (LDA) but are available to the general public. East of Building 1063 and south of Gorgas Avenue, there are currently 36 parking spaces.

The parking lot located northeast of Building 1029 provides parking for Buildings 1029 and 1030 (Swords to Plowshares) and the Gorgas Warehouses. It has 175 parking spaces.

The Birmingham area between Buildings 1062 and 1063 is currently fenced off. If the space becomes available, there could be 8 spaces south of Building 1063. However, because this space is not currently available to the general public, it was not included in the existing parking supply. Although it is not anticipated that Building 1062 will be rented in the near future, it is anticipated that Building 1063 will house a water treatment plant in 2004.

North Halleck Area

The North Halleck Area includes a number of parking areas, with a total of approximately 111 spaces. There is a 55-space parking lot west of Building 230, a 50-space parking lot west of Building 201, six -on-street spaces north of Building 230.

Fort Scott – Rod Road

In the Fort Scott – Rod Road area, there is a total of approximately 15 spaces, including five marked on-street spaces along Rod Road near Storey Avenue and a 10-space lot near Lincoln Boulevard.

Palace of Fine Arts

A parking lot with 258 marked spaces is located west of the Exploratorium and the Palace of Fine Arts. This lot is located near the Mason Warehouses and Gorgas Warehouses.

TABLE 3-1
PARKING AREAS POTENTIALLY AFFECTED BY THE DOYLE DRIVE PROJECT

Area	Parking Location	Spaces
Crissy Field – Mason Warehouses	South and East of Building 1188	26
Crissy Field – Mason Warehouses	South of Buildings 1184, 1183, 1182	13
Crissy Field – Mason Warehouses	Street parking along south side of Mason Street adjacent warehouses	36
Crissy Field – Mason Warehouses	Area between mainline Doyle Viaduct and Mason Street	90
	SUBTOTAL	**165**

Area	Parking Location	Spaces
Crissy Field – PX/Commissary	Post Exchange/Commissary	443
Crissy Field – PX/Commissary	South of Building 605	8
Crissy Field – PX/Commissary	Street parking south of Building 603	6
Crissy Field – PX/Commissary	West of Building 610	130[a]
Crissy Field – PX/Commissary	Area between Halleck Street and Marshall Street	108[b]
Crissy Field – PX/Commissary	Under Doyle Drive (west of Halleck)	[c]
	SUBTOTAL	**695**
Letterman – Gorgas Warehouses	Behind Gorgas Warehouses	138
Letterman – Gorgas Warehouses	Street parking along east side of Gorgas Avenue	20
Letterman – Gorgas Warehouses	South of Building 1160	[c]
Letterman – Gorgas Warehouses	South of Building 1063	[c]
Letterman – Gorgas Warehouses	South of Building 1158	32
Letterman – Gorgas Warehouses	East of Building 1160	8
	SUBTOTAL	**198**
Letterman – Thornburg Area	Northeast of Building 1029	175
Letterman – Thornburg Area	East of Building 1063	36
Letterman – Thornburg Area	Thornburg Road	40
Letterman – Thornburg Area	East of Building 1051	30[d]
	SUBTOTAL	**281**
North Halleck Area	North of Building 230	6
North Halleck Area	West of Building 230	55
North Halleck Area	West of Building 201	50
	SUBTOTAL	**111**
Fort Scott	Street parking and parking lot along Rod Road	15
	SUBTOTAL	**15**
Palace of Fine Arts	Palace of Fine Arts/Exploratorium	258
	SUBTOTAL	**258**
	TOTAL	**1,723**

Source: Presidio Trust, 2004.

Note: [a] The available parking supply in this lot could be impacted by demand generated by Building 640, 643, 644, 649, 650 and 651. Therefore it was assumed that 130 spaces would be available.

[b] After construction of the Letterman Digital Arts Center is completed, 108 parking spaces will be available in this lot.

[c] Parking supply assumed to be not available in this lot.

[d] After construction of the Letterman Digital Arts Center is completed, 30 parking spaces will be available in this lot.

3.2 EXISTING PARKING DEMAND

This section examines whether the existing demand for parking is being met with the current supply. It is important to establish the existing parking demand to establish a baseline scenario for those parking areas affected by the Doyle Drive Project alternatives.

Currently, many of the parking areas are in flux in the Presidio. Some of the areas are blocked off for security reasons (such as those under the Doyle Drive viaduct) and others have been co-opted for activities related to the construction of the Letterman complex. Parking demand related to the Letterman project is temporary and, therefore, could not be considered as part of "typical" Presidio demand for the study area in either the existing or future scenarios. Therefore, it was not possible to identify current demand for parking based on a conventional demand survey by counting cars on a lot-by-lot basis. Instead, existing demand was calculated by applying parking demand rates to the buildings within the study area. The parking demand rates were supplied by the Presidio Trust. They are the same rates that were used in their PTMP effort, and they represent average weekday demand.[2] These rates are used in Table 3-2.

The calculation of parking demand is based on the square footage of each building and the activity for which the building is currently being used. The Presidio Trust provided this information. Table 3-2 shows the existing parking demand estimated for the study area.

TABLE 3-2
EXISTING PARKING DEMAND

Area	Building	Gross Square Footage	Existing Conditions		
			Use	Rate	Demand (spaces)
Crissy Field - Mason Warehouses	1182	12,072	industrial/warehouse	1.12	14
Crissy Field - Mason Warehouses	1183	12,862	vacant	0	0
Crissy Field - Mason Warehouses	1184	12,112	vacant	0	0
Crissy Field - Mason Warehouses	1185	13,600	cult./ed.	1.36	18
Crissy Field - Mason Warehouses	1186	12,630	vacant	0	0
Crissy Field - Mason Warehouses	1187	13,440	industrial/warehouse	1.12	15
Crissy Field - Mason Warehouses	1188	13,520	industrial/warehouse	1.12	15
	SUBTOTAL	90,236			**62**
Crissy Field - PX/Commissary	603	11,801	cult./ed.	1.36	16
Crissy Field - PX/Commissary	631	480	vacant	0	0
Crissy Field - PX/Commissary	632	480	vacant	0	0
Crissy Field - PX/Commissary	633	480	vacant	0	0
Crissy Field - PX/Commissary	605	42,319	vacant	0	0
Crissy Field - PX/Commissary	606	7,416	vacant	0	0
Crissy Field - PX/Commissary	610	92,722	warehouse retail	1.32	122
Crissy Field - PX/Commissary	653	5,413	vacant	0	0
	SUBTOTAL	161,111			**138**
Letterman - Gorgas Warehouses	1151	11,907	fitness	5.2	62
Letterman - Gorgas Warehouses	1152	13,847	fitness	5.2	72
Letterman - Gorgas Warehouses	1158	4,164	fitness	5.2	0

[2] Source: Correspondence from the Presidio Trust

Area	Building	Gross Square Footage	Existing Conditions		
			Use	Rate	Demand (spaces)
Letterman - Gorgas Warehouses	1160	5,453	vacant	0	0
Letterman - Gorgas Warehouses	1161	12,000	vacant	0	0
Letterman - Gorgas Warehouses	1162	12,175	office	2.17	26
Letterman - Gorgas Warehouses	1163	13,156	vacant	0	0
Letterman - Gorgas Warehouses	1167	12,095	vacant	0	0
Letterman - Gorgas Warehouses	1169	13,117	office	2.17	28
Letterman - Gorgas Warehouses	1170	12,596	vacant	0	0
	SUBTOTAL	110,510			**188**
Letterman - Thornburg Area	1029	100	dorms	n/a	25
Letterman - Thornburg Area	1030	-- [a]	dorms	-- [a]	-- [a]
Letterman - Thornburg Area	1040	7,520	vacant	0	0
Letterman - Thornburg Area	1063	28,797	industrial/warehouse	0.99	29
Letterman - Thornburg Area	1047	17,590	vacant	0	0
Letterman - Thornburg Area	1050	21,690	vacant	0	0
Letterman - Thornburg Area	1051	17,580	office	2.17	38
Letterman - Thornburg Area	1059	3,672	vacant	0	0
Letterman - Thornburg Area	1060	14,030	office	2.17	30
Letterman - Thornburg Area	1061	82	vacant	0	0
Letterman - Thornburg Area	1056	620	vacant	0	0
Letterman - Thornburg Area	1062	12,700	industrial/warehouse	0.99	13
Letterman - Thornburg Area	1076	390	Industrial/warehouse	0.99	0
	SUBTOTAL	124,281			**135**
North Halleck Area	205	121	industrial/warehouse	1.13	0
North Halleck Area	230	10,060	industrial/warehouse	1.13	11
North Halleck Area	231	3,842	industrial/warehouse	1.13	4
North Halleck Area	201	11,458	industrial/warehouse	1.13	13
North Halleck Area	204	12,144	office	2.18	26
	SUBTOTAL	56,515			**55**
Fort Scott - Rod Road	1263	10	residential	1.5	15
Fort Scott - Rod Road	1266	-- [b]	residential	-- [b]	-- [b]
Fort Scott - Rod Road	1270	-- [b]	residential	-- [b]	-- [b]
					15
Palace of Fine Arts	n/a	-- [c]	special use/museum	-- [c]	**258** [c]
			TOTAL DEMAND (SPACES)		**851**

Source: Presidio Trust, 2004

Note:

[a] Swords to Plowshares – There are a total of 100 dorm rooms in Buildings 1029 and 1030. Demand is based on current lease arrangement of 25 parking spaces.

[b] Fort Scott - Rod Road – There is a total of ten one-bedroom units in Buildings 1263, 1266 and 1270.

[c] Palace of Fine Arts – Existing parking demand varies based on special events at the Palace of Fine Arts; therefore parking demand is assumed to be equivalent to parking supply for the Palace of Fine Arts lot, as a conservative estimate.

The total existing demand for parking in the affected project area was calculated to be about 851 spaces, while the total existing supply is approximately 1,723 spaces. Overall, the supply of spaces exceeds demand and there is a net surplus of roughly 872 spaces.

Potential parking deficiencies were also analyzed on a more localized basis; that is, by analyzing the supply in the immediate area (400 m or less) of each building or each group of buildings; a 200-m distance was used for retail, medical-related uses and the Swords to Plowshares buildings (Buildings 1029 and 1030).

The existing parking demand for the Mason Street warehouses (Buildings 1182, 1183, 1184, 1185, 1186, 1187, and 1188) is 62 spaces on average, while the supply of parking spaces adjacent to the warehouses is approximately 165 spaces. Therefore, supply exceeds the demand by 103 spaces. Of the Mason Street warehouses, Buildings 1183, 1184, and 1186 are presently vacant, while Building 1182 is used for storage, Building 1185 is used for cultural/educational purposes, and Buildings 1187 and 1188 are used for industrial/warehouse purposes.

For the Commissary area near Crissy Field (Buildings 603, 605, 606, 610, 653, and 631), the existing demand for parking is 138 spaces, while the supply for parking far exceeds the demand with a total of approximately 695 spaces available. Building 603 is used for educational purposes, and the existing demand is 16 spaces. Building 610 is presently used for retail and has a parking demand of 122 spaces. The other buildings in the area, Buildings 605, 606, 653 and 631, are currently vacant.

Overall, the Letterman – Gorgas Warehouses area has an existing demand of 188 spaces. The Presidio YMCA Pool and Gym occupy Buildings 1151 and 1152; and the existing demand for the two buildings is 134 spaces. Building 1158 is currently occupied by a dance studio, Building 1162 currently houses an office and a wellness clinic, and Building 1169 is used for office space. The existing demand for parking for the three buildings is 76 spaces. Buildings 1160, 1161, 1163, 1167, and 1170 are presently vacant. The existing parking supply in areas that are a close distance from the warehouses is approximately 198 spaces. Therefore, the area currently has a total parking surplus of approximately 10 spaces.

For the Letterman - Thornburg area, the total demand for parking is 135 spaces, among five occupied buildings. Building 1051 (the Hospital Ward) is used for office space; Building 1060 (the Medical Supply Warehouse) is used for office space; Building 1062 (the Quartermaster Shop) is used for storage; Building 1063 (the Medical Supply Warehouse) is used for storage; and Building 1076 (the Ambulance Garage) is used for industrial/warehouse purposes. Buildings 1040, 1047, 1050, 1056, 1059, and 1061 are currently vacant. In terms of supply, there is street parking along Thornburg Road for 40 vehicles, as well as parking for 36 vehicles east of Building 1063. The 8-space lot south of Building 1063 is currently fenced off and not accessible to the general public. Residential dorms currently occupy Buildings 1029 and 1030, and the demand for parking is 25 spaces. This demand is met by the 175 parking lot northeast of Building 1029. In total, the parking supply in this area is approximately 281 spaces. There is a surplus of 146 parking spaces.

The total existing demand for parking for the North Halleck Area is approximately 55 spaces. With the exception of Building 205, the sewer lift station, there is parking demand for each building in this area. The existing demand for Buildings 201 and 204 is 39 spaces. The current use of Building 201, the Exchange Store, is for Presidio Trust storage and office space. Building 204 is currently NPS/Trust office space. In terms of existing parking supply, there is a 50-space lot west of Building 201 as well as a 55-space lot west of Building 230 that may be shared by visitors to Buildings 230 and 231. Building 230 is used as NPS/Presidio Trust storage, classroom, and office space, and Building 231 is currently used as an office and a warehouse. A small six-space parking area is located north of Building 230. There is an overall surplus of 56 spaces.

Buildings 1263, 1266, and 1270 (all Enlisted Family Housing Buildings) are located in the Fort Scott area along Rod Road. They are currently residential buildings and the existing parking demand is only 15 spaces. This demand is met by parking supply provided by five on-street parking spaces and a 10-space surface lot located along Rod Road. With a total of 15 spaces, this area currently has no parking shortfalls.

The Palace of Fine Arts area currently includes the Palace of Fine Arts Theater and the Exploratorium. Average or typical peak parking demand for the area is difficult to determine, since the demand generated by the Palace of Fine Arts Theater varies based on special events held there. The Exploratorium is a museum of science, art and human perception that is currently housed at the Palace of Fine Arts; however, it will be terminating its lease of the space within the next several years. The 258-space parking lot at the Palace of Fine Arts provides visitor parking as well as serves as a staging area for buses. The Exploratorium uses the parking lot to stage up to 30 school and/or tour buses at a single time and as a queue area for visitor groups of up to 200 people. The current capacity of the lot satisfies the needs of the Exploratorium visitors.[3] As a conservative estimate, parking demand was assumed to be approximately equal to parking supply in the Palace of Fine Arts lot.

[3] Mary Hobson, Project Director, City and County of San Francisco, Recreation and Park Department, personal correspondence, June 28, 2004.

SECTION 4: PARKING IMPACT ANALYSIS SCENARIOS

4.1 FUTURE NO-BUILD ALTERNATIVE

For future No-Build Conditions (without the Doyle Drive Project), the parking supply is assumed to remain the same as under existing conditions (described in Section 3.1). Although there are several areas that could be converted to parking areas in the future, it was determined that the forces that would be driving these conversions (such as the leasing out of some buildings or changes in security requirements) can not be known at this time and are too speculative. The future No-Build parking supply is summarized by area in Table 4-1.

TABLE 4-1
FUTURE SUPPLY BY AREA FOR THE FUTURE NO-BUILD CONDITIONS

Area	2010 No-Build Supply (spaces)	2030 No-Build Supply (spaces)
Mason Street Warehouses	165	165
PX/Commissary	695	695
Gorgas Avenue Warehouses	198	198
Thornburg Area	281	281
North Halleck Area	111	111
Fort Scott – Rod Road	15	15
Palace of Fine Arts	258	258
Total	**1,723**	**1,723**

Source: Parsons Brinckerhoff, Inc. September 2004

Table 4-2 summarizes future No-Build average weekday parking demand by area. Some of the building uses are expected to change under 2010 and/or 2030 conditions, based on information provided by the Presidio Trust. Table B-1 in the Appendix shows the land uses assumed for each building for each future scenario. Changes in land use affect the parking demand generated by each building. Under 2010 No-Build conditions, Buildings 631, 632 and 633 in the PX/Commissary area are assumed to be vacant. In 2030, only Building 1158 is assumed to be vacant.

TABLE 4-2
FUTURE AVERAGE WEEKDAY DEMAND BY AREA FOR FUTURE NO-BUILD CONDITIONS

Area	2010 No-Build Demand (spaces)	2030 No-Build Demand (spaces)
Mason Street Warehouses	111	163
PX/Commissary	188	217
Gorgas Avenue Warehouses	336	274
Thornburg Area	276	439
North Halleck Area	67	52
Fort Scott – Rod Road	15	15
Palace of Fine Arts	258	258
Total	**1,251**	**1,418**

Source: Parsons Brinckerhoff, Inc. September 2004.

Tables 4-3 and 4-4 compare the supply and demand of each area to determine if there would be surpluses or deficiencies of parking spaces within each area as part of No-Build conditions. This serves as a baseline for comparison with changes in the supply and demand for parking under each of the project alternatives. By identifying baseline conditions, it will be possible to determine if any of the Doyle Drive alternatives would result in conditions different to those than would be expected under No-Build conditions.

TABLE 4-3
SUPPLY AND DEMAND COMPARISON BY AREA FOR FUTURE NO-BUILD CONDITIONS (2010)

Area	Supply (spaces)	Demand (spaces)	Surplus/ Deficiency (spaces)	Adjusted Surplus/ Deficiency (spaces)
Mason Street Warehouses	165	111	54	0
PX/Commissary	695	188	561	477
Gorgas Avenue Warehouses	198	336	-138	0
Thornburg Area	281	276	-5	-5
North Halleck Area	111	67	44	44
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	258	258	0	0
Total	**1,723**	**1,251**	**516**	**516**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: the Mason Street Warehouses surplus (54 spaces) and 84 spaces of the 108-space lot in the PX/Commissary area was applied to the Gorgas Warehouses deficiency.

TABLE 4-4
SUPPLY AND DEMAND COMPARISON BY AREA FOR FUTURE NO-BUILD CONDITIONS (2030)

Area	Supply (spaces)	Demand (spaces)	Surplus/ Deficiency (spaces)	Adjusted Surplus/ Deficiency (spaces)
Mason Street Warehouses	165	163	2	2
PX/Commissary	695	217	478	370
Gorgas Avenue Warehouses	198	274	-76	0
Thornburg Area	281	439	-158	-126
North Halleck Area	111	52	59	59
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	258	258	0	0
Total	**1,723**	**1,418**	**305**	**305**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: 76 spaces of the 108-space lot in the PX/Commissary area was applied to the Gorgas Warehouse deficiency and 32 spaces were applied to the Thornburg Area deficiency.

Tables 4-3 and 4-4 show that most areas in the study area would have a surplus of parking spaces under future No-Build conditions. Two areas, however, would experience more demand within their area than the available supply (Gorgas Avenue warehouses – under 2010 conditions only, and Thornburg Area). Overall, the study area would experience a surplus of parking of approximately 516 spaces in 2010 and approximately 305 spaces in 2030. The PX/Commissary Area would have the largest surplus (between 478 and 561 spaces). The surplus and deficiencies for some areas was adjusted to show that there is overlap in the use of parking lots between areas. The overall total surplus or deficiency for the total study area was not affected.

Tables 4-3 and 4-4 show this information. The adjusted surplus/deficiency figure was used in the calculation of potential unmet demand later in this report.

Overall, the study area would not have a parking shortage in the future (in the no-build conditions). This is consistent with the Presidio Trust Management Plan (PTMP) that indicates that some parking spaces would be removed and some existing parking spaces would be relocated to in order to provide adequate parking to meet tenants' needs.

4.2 CONSTRUCTION SCENARIO IMPACTS

The temporary impacts analysis reflects conditions when construction activities for the Doyle Drive project would have the most impact in terms of the number of parking areas affected. It is assumed that this would be year 2010. Construction of the entire Doyle Drive project would take, at most, five years with most activity at individual locations lasting, on average, about two years. For all the Doyle Drive alternatives parking supply under the construction scenario would be affected by the temporary loss of parking spaces due to construction staging and related activities. Parking needed for construction workers is not currently reflected in these numbers. Contractors would be required to provide to provide employee parking in the staging areas that have been identified and/or they will negotiate with the Presidio Trust to identify off-site parking areas and implement a shuttle system to worksites. In most cases, the spaces would be reinstated once the project is complete. The parking demand for each alternative reflects buildings that would be temporarily or permanently removed during construction. Impacts would occur when the demand for parking would not be met by the available supply, excluding any parking deficiencies that would occur under the no-build conditions.

4.2.1 Replace and Widen Alternative

The Replace and Widen Alternative has two possible construction methods: Detour Option and No Detour Option. The potential parking impacts associated with each option under 2010 construction conditions are described below.

4.2.1.1 Replace and Widen Alternative - Detour Option

This section describes parking impacts related to the Replace and Widen Alternative using the "Detour Option" construction method. The Detour Option involves constructing a temporary detour structure to the north of the existing Doyle Drive roadway, through the Mason Street warehouses and Crissy Field – PX/Commissary areas.

Supply

Construction of the Replace and Widen Alternative – Detour Option would result in a temporary loss of 714 parking spaces within the study area (Table 4-5). Most of the losses would occur in the Crissy Field areas and around the Gorgas Avenue Warehouses. There would be a remaining total parking supply of 1,009 parking spaces.

TABLE 4-5
FUTURE SUPPLY BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2010)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Replace and Widen – Detour Option Supply (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	56	-109
PX/Commissary	695	238	-457

Area	Future No-Build Supply (spaces) [from Table 4-1]	Replace and Widen – Detour Option Supply (spaces)	Change in Supply (spaces)
Gorgas Avenue Warehouses	198	60	-138
Thornburg Area	281	281	0
North Halleck Area	111	101	-10
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,723**	**1,009**	**-714**

Source: Parsons Brinckerhoff, Inc. September 2004.

Approximately 109 spaces would be temporarily displaced in the Mason Street Warehouses area, between the mainline Doyle Drive viaduct and Mason Street, to accommodate the temporary detour structure and related construction activities. Over half of the spaces in the Post Exchange/Commissary parking area (457 spaces) would also be removed due to the temporary detour structure. In addition, all of the spaces located behind the Gorgas Warehouses (138 spaces) and 10 spaces in the North Halleck Area would be removed during construction. There would no change in the parking supply in the Thornburg, Rod Road and Palace of Fine Arts areas.

Demand

Table 4-6 shows the demand by area for year 2010 with the Replace and Widen Alternative – Detour Option. There would be a net decrease in parking demand in the area due to a loss of buildings and land use changes in the Mason Street Warehouses and PX/Commissary areas. Four buildings in the Mason Street warehouses area (Buildings 1182, 1183, 1184, and 1185) and four buildings in the PX/Commissary (Buildings 605, 606, 610, and 653) are assumed to be removed to accommodate the project. Buildings 631, 632 and 633 are assumed to be vacant.

TABLE 4-6
FUTURE DEMAND BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE - DETOUR OPTION (2010)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Replace and Widen – Detour Option Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	111	44	-67
PX/Commissary	188	16	-172
Gorgas Avenue Warehouses	336	336	0
Thornburg Area	276	276	0
North Halleck Area	67	67	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,251**	**1,012**	**-239**

Source: Parsons Brinckerhoff, Inc. September 2004.

Most of this demand generated within the study area would be concentrated south of the existing Doyle Drive viaduct in the Gorgas Warehouses, and Thornburg Area (612 spaces total). The North Halleck Area is located to the west of these areas and would generate a peak demand of 67 parking spaces. On the north side of the Doyle Drive structure, the Crissy Field Center in the PX/Commissary area would generate a peak demand for 16 spaces; and the Mason Warehouses area would generate a peak demand for 44 spaces. The

Rod Road area would generate an additional peak demand of 15 parking spaces. Appendix B (Table B-2) shows the 2010 parking demand calculated for this alternative.

Impacts

Table 4-7 compares the estimated parking supply and demand in each area under the Replace and Widen Alternative – Detour Option conditions in 2010.

TABLE 4-7
SUPPLY AND DEMAND COMPARISON BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE - DETOUR OPTION (2010)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	56	44	12	0
PX/Commissary	238	16	222	114
Gorgas Avenue Warehouses	60	336	**-276**	**-156**
Thornburg Area	281	276	5	5
North Halleck Area	101	67	34	34
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	258	258	0	0
Total	**1,009**	**1,012**	**-3**	**-3**

Source: Parsons Brinckerhoff, Inc. September 2004.

Notes: The adjusted surplus/deficiency calculation that a portion of parking surpluses in adjacent areas can be used for deficiencies: the Mason Street warehouses (12 spaces) surplus and all spaces of the 108-space lot in the PX/Commissary area was applied to the Gorgas Warehouse area deficiency.

The numbers in this table indicate that under the Replace and Widen Alternative – Detour Option, there would be parking deficiencies in two areas: Gorgas Avenue Warehouses, and Thornburg Area. In the remaining areas, estimated parking supply would meet or exceed estimated parking demand under the Replace and Widen Alternative – Detour Option. Overall, there would be a parking deficiency of 3 spaces in the study area.

When adjusted for the use of parking surplus in adjacent areas, the Gorgas Warehouse area would have a deficiency of 156 spaces.

Table 4-8 compares the parking surpluses or deficiencies by area identified for the Replace and Widen Alternative – Detour Option with 2010 No-Build conditions. The Replace and Widen Alternative – Detour Option would not create any new impacts in most areas. In the Gorgas Avenue Warehouses area, the parking deficiency would increase from no spaces to 156 spaces. Therefore, unmet demand due to the Replace and Widen Alternative – Detour Option would be a total of 156 spaces.

TABLE 4-8
ESTIMATED UNMET DEMAND DUE TO REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2010)

Area	Replace and Widen – Detour Option Surplus/Deficiency (spaces)	2010 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Replace and Widen – Detour Option (spaces)
Mason Street Warehouses	0	54	0
PX/Commissary	114	477	0
Gorgas Avenue Warehouses	**-156**	**0**	**-156**
Thornburg Area	5	-5	0
North Halleck Area	34	44	0
Fort Scott – Rod Road	0	0	0
Palace of Fine Arts	0	0	0
Total	**-3**	**516**	**-156**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Mitigation is required to replace the 156 parking spaces (net loss) that would be lost in the Gorgas Avenue Warehouses area during construction of the Replace and Widen Alternative – Detour Option. The availability of replacement parking would depend on the availability of parking during construction. Availability would be based on the type of construction activities taking place, their location and duration. The parking study should be updated periodically to determine the location and extent of available parking for parking lost during construction activities. It is possible that some areas of replacement parking would be needed but their extent and duration would be dependent upon the availability and management of parking elsewhere within the Presidio.

There are several large parking lots located within 400 meters (1/4 mile) of the Gorgas Avenue Warehouses area which would be candidate locations for replacement parking. The 175-space lot located east of Building 230 would provide the closest alternative parking. Two other lots, the 55-space lot west of Building 230 and the 30-space area located east of Building 1051 (in the North Halleck area) are also located within 400 meters of the warehouses and could also be available for Gorgas Avenue Warehouse users. The 108-space lot between Halleck and Marshall Streets could be available as well.

4.2.1.2 Replace and Widen Alternative - No Detour Option

The Replace and Widen Alternative – No Detour Option would not require the temporary detour structure through the Mason Street Warehouses and PX/Commissary areas. However, areas of the PX/Commissary would still be used for construction staging and construction in the Gorgas Avenue Warehouses and Palace of Fine Arts areas would be altered to provide temporary access ramps for rerouting traffic.

Supply

Construction of the Replace and Widen Alternative – No Detour Option would result in a temporary loss of 934 parking spaces within the study area (Table 4-9). Most of the losses would occur in the PX/Commissary, Gorgas Avenue warehouses, and Palace of Fine Arts areas. There would be a remaining total parking supply of 792 parking spaces.

TABLE 4-9
FUTURE SUPPLY BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE - NO DETOUR OPTION (2010)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Replace and Widen – No Detour Option Supply (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	152	-13
PX/Commissary	695	46	-649
Gorgas Avenue Warehouses	198	60	-138
Thornburg Area	281	281	0
North Halleck Area	111	85	-26
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	153	-108
Total	**1,723**	**792**	**-934**

Source: Parsons Brinckerhoff, Inc. September 2004.

Approximately 13 spaces would be removed in the Mason Street Warehouses area, along the south side of Lundeen Street, due to the widening of Doyle Drive. In the PX/ Commissary area, a majority of the parking spaces would be temporarily displaced to provide areas for construction staging (649 spaces); however, adequate parking would be retained to meet projected demand in the area. The 138-space parking lot behind the Gorgas Warehouses would be removed to accommodate the realignment of Richardson Avenue. Approximately 26 spaces in the North Halleck Area would be temporarily removed during construction. In addition, approximately 108 spaces would be removed in the Palace of Fine Arts parking lot to accommodate construction of a temporary ramp between Doyle Drive and Richardson Avenue. There would be no change in the parking supply in the Thornburg, and Rod Road areas.

Demand

Table 4-10 shows the demand by area for year 2010 with the Replace and Widen Alternative – No Detour Option. There would be a net decrease in parking demand in the area, compared to No-Build conditions, due to the removal of Building 1158 in the Gorgas Avenue Warehouse area. Building 1158 would be removed to accommodate the realignment of Richardson Avenue. The Appendix B (Table B-3) shows the 2010 parking demand calculated for this alternative. Buildings 631, 632 and 633 in the PX/Commissary are assumed to be vacant.

TABLE 4-10
FUTURE DEMAND BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE - NO DETOUR (2010)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Replace and Widen – No Detour Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	111	111	0
PX/Commissary	188	188	0
Gorgas Avenue Warehouses	336	327	-9
Thornburg Area	276	276	0
North Halleck Area	67	67	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,251**	**1,242**	**-9**

Source: Parsons Brinckerhoff, Inc. September 2004.

Impacts

Table 4-11 compares the estimated parking supply and demand in each area under the Replace and Widen Alternative – No Detour Option conditions in 2010.

TABLE 4-11
SUPPLY AND DEMAND COMPARISON BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2010)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	152	111	41	0
PX/Commissary	**46**	**188**	**-142**	**-142**
Gorgas Avenue Warehouses	**60**	**327**	**-267**	**-226**
Thornburg Area	281	276	5	5
North Halleck Area	85	67	18	18
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	**153**	**258**	**-105**	**-105**
Total	**792**	**1,242**	**-450**	**-450**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: the Mason Street Warehouses surplus (41 spaces) was applied to the Gorgas Warehouse area deficiency.

The numbers in this table indicate that under the Replace and Widen Alternative – No Detour Option, there would be parking deficiencies in the following three areas: PX/Commissary, Gorgas Avenue Warehouses, and Palace of Fine Arts. In the four remaining areas, estimated parking supply would meet or exceed estimated parking demand under the Replace and Widen Alternative – No Detour Option. Overall, there would be a parking deficiency of 450 spaces in the study area.

If deficiencies are adjusted fro surpluses in adjacent areas, the deficiency in the Gorgas Warehouse area would decrease to 226 spaces.

Table 4-12 compares the parking surpluses or deficiencies by area identified for the Replace and Widen Alternative – No Detour Option with 2010 No-Build conditions. In the Gorgas Avenue Warehouses area, the parking deficiency would be 226 spaces under the Replace and Widen Alternative – No Detour Option compared to no spaces under 2010 No-Build conditions, resulting in an additional unmet demand of 226 spaces. In the Palace of Fine Arts area, the Replace and Widen Alternative – No Detour Option would result in a temporary parking deficiency of 105 spaces. Therefore, unmet demand due to the Replace and Widen Alternative – No Detour Option would be a total of 473 spaces.

TABLE 4-12
ESTIMATED UNMET DEMAND DUE TO THE REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2010)

Area	Replace and Widen – No Detour Option Surplus/Deficiency (spaces)	2010 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Replace and Widen – No Detour Option (spaces)
Mason Street Warehouses	0	0	0
PX/Commissary	**-142**	**477**	**-142**
Gorgas Avenue Warehouses	**-226**	**0**	**-226**
Thornburg Area	5	-5	0
North Halleck Area	18	44	0
Fort Scott – Rod Road	0	0	0
Palace of Fine Arts	**-105**	**0**	**-105**
Total	**-450**	**516**	**-473**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Mitigation is required to replace the 142 spaces lost in PX/Commissary area (net loss), the 226 parking spaces (net loss) that would be removed in the Gorgas Street Warehouses area and the 105 spaces that would be displaced in the Palace of Fine Arts area during construction of the Replace and Widen Alternative – No Detour Option. The availability of replacement parking would depend on the availability of parking during construction. Availability would be based on the type of construction activities taking place, their location and duration. The parking study should be updated periodically to determine the location and extent of available parking for parking lost during construction activities. It is possible that some areas of replacement parking would be needed but their extent and duration would be dependent upon the availability and management of parking elsewhere within the Presidio.

There are several large parking lots located within 400 meters (1/4 mile) of the Gorgas Avenue Warehouses area which would be candidate locations for replacement parking. The 175-space lot located east of Building 230 would provide the closest alternative parking. Two other lots, the 55-space lot west of Building 230 and the 30-space area located east of Building 1051 (in the North Halleck area) are also located within 400 meters of the warehouses and could also be available for Gorgas Avenue Warehouse users. Due to the loss of parking at the Palace of Fine Arts (PFA), additional space may be needed for bus staging. The Parade Grounds would be a candidate location to stage buses and transport visitors to PFA via shuttle buses. The availability of parking at this location would depend on parking demand generated by additional land use and any modifications made to the parking supply by the year 2010. On-street parking next to the Parade Grounds may also be available.

Wayfarer signage would be used to direct users to alternative parking locations.

4.2.2 Parkway Alternative

The Parkway Alternative has two design options for local access to the Presidio: Diamond Option and Circle Drive Option. For both design options, the anticipated parking supply in the study area would be the same under 2010 conditions. However, the parking demand under Diamond Option would be slightly greater since Building 1151 (in the Gorgas Warehouses area) would be retained, whereas this building would be removed under the Circle Drive Option. The parking demand under the Diamond Option, which includes Building 1151, is evaluated in the 2010 analysis since it is more conservative.

Supply

The construction of the Parkway Alternative would result in an overall loss of parking of approximately 1,364 spaces (Table 4-13). In the PX/Commissary area, a majority of the parking spaces would be temporarily displaced to provide areas for construction staging (692 spaces); however, adequate parking would be retained to meet projected demand in the area. The parking areas adjacent to the Gorgas Street warehouses would be reduced by 170 parking spaces; parking in the Swords and Plowshares area would be reduced by approximately 130 spaces; and parking in the North Halleck area would be reduced by approximately 111 spaces. In addition, approximately three spaces would be displaced in the Rod Road area and the 258 spaces in the Palace of Fine Arts parking lot would be removed for construction staging related to construction of an underground parking garage. About 714 spaces would remain in this study area during construction.

TABLE 4-13
FUTURE SUPPLY BY AREA FOR PARKWAY ALTERNATIVE (2010)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Parkway Alternative Supply (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	165	0
PX/Commissary	695	3	-692
Gorgas Avenue Warehouses	198	28	-170
Thornburg Area	281	151	-130
North Halleck Area	111	0	-111
Fort Scott – Rod Road	15	12	-3
Palace of Fine Arts	258	0	-258
Total	**1,723**	**359**	**-1,364**

Source: Parsons Brinckerhoff, Inc. September 2004.

Demand

Under Parkway Alternative conditions, there would be a reduction in the average weekday parking demand of about 119 parking spaces. Only the PX/Commissary, Gorgas Warehouses, and North Halleck areas would have a reduced demand in parking. The overall demand for the study area would be approximately 1,132 parking spaces. Buildings 631, 632 and 633 in the PX/Commissary area are assumed to be vacant. Buildings 605 and 606, and Buildings 1158 in the Thornburg area and all of the Buildings in the North Halleck Area are assumed to removed for the project.

TABLE 4-14
FUTURE AVERAGE WEEKDAY PARKING DEMAND BY AREA FOR PARKWAY ALTERNATIVE (2010)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Parkway Alternative Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	111	111	0
PX/Commissary	188	145	-43
Gorgas Avenue Warehouses	336	327	-9
Thornburg Area	276	276	0
North Halleck Area	67	0	-67

Area	Future No-Build Demand (spaces) [from Table 4-2]	Parkway Alternative Demand (spaces)	Change in Demand (spaces)
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,251**	**1,132**	**-119**

Source: Parsons Brinckerhoff, Inc. September 2004.

Impacts

Table 4-11 compares the estimated parking supply and demand in each area under the Parkway Alternative in 2010.

TABLE 4-15
SUPPLY AND DEMAND COMPARISON BY AREA FOR THE PARKWAY ALTERNATIVE (2010)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	165	111	54	0
PX/Commissary	**3**	**145**	**-142**	**-142**
Gorgas Avenue Warehouses	**28**	**327**	**-299**	**-245**
Thornburg Area	**151**	**276**	**-125**	**-125**
North Halleck Area	0	0	0	0
Fort Scott – Rod Road	12	15	-3	-3
Palace of Fine Arts	**0**	**258**	**-258**	**-258**
Total	**359**	**1,132**	**-773**	**773**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: the Mason Street warehouses area surplus (54 spaces) was applied to the Gorgas Warehouse deficiency.

The numbers in this table indicate that under the Parkway Alternative, there would be parking deficiencies in the following four areas: PX/Commissary, Gorgas Avenue Warehouses, Thornburg Area, Fort Scott – Rod Road, and Palace of Fine Arts. In the two remaining areas, estimated parking deficiency would meet or exceed estimated parking demand under the Parkway Alternative. Overall, there would be a parking deficiency of 773 spaces in the study area.

Table 4-16 compares the parking surpluses or deficiencies by area identified for the Parkway Alternative with 2010 No-Build conditions. As shown in the table, the parking deficiencies in the Thornburg Area would increase from five spaces to 125 spaces with the Parkway Alternative. In the Gorgas Avenue Warehouses area, the parking deficiency would be 245 spaces under the Parkway Alternative compared to a deficiency of no spaces under 2010 No-Build conditions. In the Palace of Fine Arts area, the Parkway Alternative would result in a parking deficiency of 258 spaces due to removal of the surface parking lot during construction. Overall, unmet demand due to the Parkway Alternative would be a total of 768 spaces.

TABLE 4-16
ESTIMATED UNMET DEMAND DUE TO THE PARKWAY ALTERNATIVE (2010)

Area	Parkway Alternative Surplus/Deficiency (spaces)	2010 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Parkway Alternative (spaces)
Mason Street Warehouses	0	0	0
PX/Commissary	**-142**	**477**	**-142**
Gorgas Avenue Warehouses	**-245**	**0**	**-245**
Thornburg Area	**-125**	**-5**	**-120**
North Halleck Area	0	44	0
Fort Scott – Rod Road	**-3**	**0**	**-3**
Palace of Fine Arts	**-258**	**0**	**-258**
Total	**-773**	**516**	**-768**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Construction-period parking impacts due to the Parkway Alternative would occur in the Gorgas Avenue Warehouses, and Palace of Fine Arts areasThe availability of replacement parking would depend on the availability of parking during construction. Availability would be based on the type of construction activities taking place, their location and duration. The parking study should be updated periodically to determine the location and extent of available parking for parking lost during construction activities. It is possible that some areas of replacement parking would be needed but their extent and duration would be dependent upon the availability and management of parking elsewhere within the Presidio.

There are several large parking lots located within 400 meters (1/4 mile) of the Gorgas Avenue Warehouses area which would be candidate locations for replacement parking. The 175-space lot located east of Building 230 would provide the closest alternative parking. Two other lots, the 55-space lot west of Building 230 and the 30-space area located east of Building 1051 (in the North Halleck area) are also located within 400 meters of the warehouses and could also be available for Gorgas Avenue Warehouse users. Due to the loss of parking at the Palace of Fine Arts (PFA), additional space may be needed for bus staging. The Parade Grounds would be a candidate location to stage buses and transport visitors to PFA via shuttle buses. The availability of parking at this location would depend on parking demand generated by additional land use and any modifications made to the parking supply by the year 2010. On-street parking next to the Parade Grounds may also be available. This location should also be considered to accommodate visitors arriving by private vehicle. These patrons could also use the shuttle bus arrangement to access PFA.

Wayfarer signage would be used to direct users to alternative parking locations.

4.3 DOYLE DRIVE PROJECT SCENARIO (LONG-TERM IMPACTS)

4.3.1 Replace and Widen Alternative

The potential long-term parking impacts associated with the Replace Widen Alternative, with either the Detour Option or No Detour Option, are described in the following sections. As with the construction scenario impacts, long-term parking impacts would occur when demand would exceed the available supply, excluding any parking deficiencies identified under No-Build conditions.

4.3.1.1 Replace and Widen Alternative – Detour Option

Supply

The construction of the Replace and Widen Alternative – Detour Option would result in an overall loss of parking of 53 spaces (Table 4-17). These spaces would be permanently lost in the lot adjacent to Building 610 and in the Gorgas Avenue warehouses area. About 1,670 spaces would remain in this study area after the completion of the Replace and Widen Alternative – Detour Option.

TABLE 4-17
FUTURE SUPPLY BY AREA FOR REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2030)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Replace and Widen – Detour Option Supply (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	165	0
PX/Commissary	695	662	-33
Gorgas Avenue Warehouses	198	178	-20
Thornburg Area	281	281	0
North Halleck Area	111	111	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,723**	**1,670**	**-53**

Source: Parsons Brinckerhoff, Inc. September 2004.

Demand

Under Replace and Widen Alternative – Detour Option, there would be a reduction in the average weekday parking demand of about 201 parking spaces from 2030 No-Build conditions (Table 4-18). The decrease would occur in the PX/Commissary area where four buildings would be removed. The overall demand for the study area would be approximately 1,353 parking spaces.

TABLE 4-18
FUTURE AVERAGE WEEKDAY PARKING DEMAND BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2030)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Replace and Widen – Detour Option Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	163	163	0
PX/Commissary	217	152	-65
Gorgas Avenue Warehouses	274	274	0
Thornburg Area	439	439	0
North Halleck Area	52	52	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,418**	**1,353**	**-65**

Source: Parsons Brinckerhoff, Inc. September 2004.

Impacts

Table 4-19 shows a comparison of estimated parking supply and demand under the Replace and Widen Alternative – Detour Option in 2030.

TABLE 4-19
SUPPLY AND DEMAND COMPARISON BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2030)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	165	163	2	2
PX/Commissary	662	152	510	402
Gorgas Avenue Warehouses	178	274	-96	0
Thornburg Area	**281**	**439**	**-158**	**-146**
North Halleck Area	111	52	59	59
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	258	258	0	0
Total	**1,670**	**1,353**	**317**	**317**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that portion of parking surpluses in adjacent areas can be used for deficiencies: 96 spaces in the 108-space lot in the PX/Commissary area were applied to the Gorgas Warehouse deficiency and 12 spaces were applied to the Thornburg deficiency.

The numbers in this table indicate that under the Replace and Widen Alternative – Detour Option, there would be parking deficiencies in the Thornburg area and Gorgas Avenue Warehouses area. In the remaining areas, estimated parking supply would meet or exceed estimated parking demand under the Parkway Alternative. Overall, there would be a parking surplus of 317 spaces in the study area.

If adjustments are made to reduce deficiencies with surplus in adjacent areas, then the deficiency in the Thornburg areas would be reduced to 146 spaces and the Gorgas Avenue Warehouses deficiency would be eliminated.

Table 4-20 compares the parking surpluses or deficiencies by area identified for the Replace and Widen Alternative – Detour Option with 2030 No-Build conditions. As shown in the table, unmet demand beyond that calculated for No-Build conditions would occur in the Thornburg area. There would be an unmet deficiency of 20 spaces.

TABLE 4-20
ESTIMATED UNMET DEMAND DUE TO THE REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION (2030)

Area	Replace and Widen – Detour Option Surplus/Deficiency (spaces)	2030 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Replace and Widen – Detour Option (spaces)
Mason Street Warehouses	2	2	0
PX/Commissary	402	370	0
Gorgas Avenue	0	0	0

Area	Replace and Widen – Detour Option Surplus/Deficiency (spaces)	2030 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Replace and Widen – Detour Option (spaces)
Warehouses			
Thornburg Area	**-146**	**-126**	**-20**
North Halleck Area	59	59	0
Fort Scott – Rod Road	0	0	0
Palace of Fine Arts	0	0	0
Total	**317**	**305**	**-20**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Mitigation would be required to replace the 20 spaces that would be lost in the Thornburg area with the Replace and Widen Alternative – Detour Option.

In 2030, most of the parking that would be lost during construction of the build alternatives would be regained. It is expected that remaining parking deficits would be met through the management of available supply by the Presidio Trust within the study area and in other nearby areas.

There are several parking lots located within 400 meters (1/4 mile) of the Thornburg Area which would be candidate locations for replacement parking. They include the 55-space and 50-space lots in the North Halleck area.

4.3.1.2 Replace and Widen Alternative – No Detour Option

Supply

The construction of the Replace and Widen Alternative – No Detour Option would result in an overall loss of parking of 43 spaces (Table 4-21). Spaces would be permanently lost in the Mason Street Warehouses, PX/Commissary, and Gorgas Avenue Warehouses areas. The 138-space parking lot behind the Gorgas Warehouses would be removed due to realignment of Richardson Avenue; however, approximately 96 spaces would be replaced in the area previously occupied by the existing roadway, resulting in a net loss of approximately 42 spaces in this area. Approximately 35 spaces would also be added to the Palace of Fine Arts area, adjacent to the realigned Richardson Avenue roadway. In total, about 1,680 spaces would remain in this study area after the completion of the Replace and Widen Alternative – No Detour Option.

TABLE 4-21
FUTURE SUPPLY BY AREA FOR REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2030)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Replace and Widen – No Detour Option Supply (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	162	-3
PX/Commissary	695	662	-33
Gorgas Avenue Warehouses	198	156	-42
Thornburg Area	281	281	0
North Halleck Area	111	111	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	293	35
Total	**1,723**	**1,680**	**-43**

Source: Parsons Brinckerhoff, Inc. September 2004

Demand

Under Replace and Widen Alternative – No Detour Option conditions, there would be no change in the average weekday parking demand compared to the 2030 No-Build conditions (total demand of 1,292 spaces).

TABLE 4-22
FUTURE AVERAGE WEEKDAY PARKING DEMAND BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2030)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Replace and Widen – No Detour Option Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	163	163	0
PX/Commissary	217	217	0
Gorgas Avenue Warehouses	274	274	0
Thornburg Area	439	439	0
North Halleck Area	52	52	0
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,418**	**1,418**	**0**

Source: Parsons Brinckerhoff, Inc. September 2004.

Impacts

Table 4-23 shows a comparison of estimated parking supply and demand under the Replace and Widen Alternative – No Detour Option in 2030.

TABLE 4-23
SUPPLY AND DEMAND COMPARISON BY AREA FOR THE REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2030)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	**162**	**163**	**-1**	**-1**
PX/Commissary	662	217	445	337
Gorgas Avenue Warehouses	156	274	-118	-10
Thornburg Area	**281**	**439**	**-158**	**-158**
North Halleck Area	111	52	59	59
Fort Scott – Rod Road	15	15	0	0
Palace of Fine Arts	293	258	35	35
Total	**1,680**	**1,418**	**262**	**262**

Source: Parsons Brinckerhoff, Inc. September 2004.

Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: all of the spaces in the 108-space lot in the PX/Commissary area were applied to the Gorgas Warehouse deficiency.

The numbers in this table indicate that under the Replace and Widen Alternative – No Detour Option, there would be parking deficiencies in the following two areas: Mason Street Warehouses and Thornburg Area. In the remaining areas, estimated parking supply would meet or exceed estimated parking demand under the Replace and Widen Alternative – No Detour Option. Overall, there would be a parking surplus of 262 spaces in the study area.

If deficiencies area adjusted to reflect available surplus in adjacent areas, then the deficiency in the Gorgas Avenue warehouse area would be reduced to ten spaces. A deficiency of 158 spaces would remain in the Thornburg Area.

Table 4-24 compares the parking surpluses or deficiencies by area identified for the Replace and Widen Alternative – No Detour Option with 2030 No-Build conditions. In the Mason Street Warehouses area, there would be a parking deficiency of one space under the Replace and Widen Alternative – No Detour Option (compared to a parking surplus of two spaces under 2030 No-Build conditions). Therefore, total unmet demand due to the Replace and Widen Alternative – No Detour Option would be one space.

TABLE 4-24
ESTIMATED UNMET DEMAND DUE TO THE REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION (2030)

Area	Replace and Widen – No Detour Option Surplus/Deficiency (spaces)	2030 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Replace and Widen – No Detour Option (spaces)
Mason Street Warehouses	**-1**	**2**	**-1**
PX/Commissary	337	478	0
Gorgas Avenue Warehouses	-10	-76	0
Thornburg Area	**-158**	**-158**	**0**
North Halleck Area	59	59	0
Fort Scott – Rod Road	0	0	0
Palace of Fine Arts	35	0	0
Total	**262**	**305**	**-1**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Mitigation would be required to replace the one space that would be lost in the Mason Street Warehouses area with the Replace and Widen Area – No Detour Option.

In 2030, most of the parking that would be lost during construction of the build alternatives would be regained. It is expected that remaining parking deficits would be met through the management of available supply by the Presidio Trust within the study are and in other nearby areas.

It is anticipated that the additional 35 spaces provided by the project in the Palace of Fine Arts area would be available to meet the parking shortfall identified for the Mason Street Warehouses area.

4.3.2 Parkway Alternative

As discussed in Section 4.2.2, the Parkway Alternative has two design options for local access to the Presidio: Diamond Option and Circle Drive Option. For both design options, the anticipated parking supply in the study area would be the same under 2030 conditions. However, the parking demand under Diamond Option would slightly greater since Building 1151 (in the Gorgas Warehouses area) would be retained, whereas this building would be removed under the Circle Drive Option. The parking demand under the Diamond Option, which includes Building 1151, is evaluated in the 2030 analysis since it is more conservative.

Supply

The construction of the Parkway Alternative would result in an overall reduction in parking supply of 386 spaces from No-Build conditions (Table 4-25). Most of these spaces would be lost in the lot east of Building 610 which serves the PX/Commissary area, the lot northeast of Building 1029 serving the Swords to Plowshares area, and the parking areas serving the North Halleck Area. In addition, approximately three spaces would be removed due to the project in the Rod Road area. Parking areas displaced in the Gorgas Warehouse area and at the Palace of Fine Arts would be replaced with new surface parking and underground parking garage in the immediate vicinity. About 1,337 spaces would remain in this study area during construction.

The underground parking garage is assumed to have, at a minimum, 258 parking spaces to replace the parking lost in the surface lot. Table 4-25 assumes that there is no net loss of parking under 2030 conditions with the Parkway Alternative in the Palace of Fine Arts area.

TABLE 4-25
FUTURE SUPPLY BY AREA FOR PARKWAY ALTERNATIVE (2030)

Area	Future No-Build Supply (spaces) [from Table 4-1]	Parkway Alternative (spaces)	Change in Supply (spaces)
Mason Street Warehouses	165	165	0
PX/Commissary	695	538	-157
Gorgas Avenue Warehouses	198	198	0
Thornburg Area	281	166	-115
North Halleck Area	111	0	-111
Fort Scott – Rod Road	15	12	-3
Palace of Fine Arts	258	258	0
Total	**1,723**	**1,337**	**-386**

Source: Parsons Brinckerhoff, Inc. September 2004.

Demand

Under Parkway Alternative conditions, there would be a reduction in the average weekday parking demand of about 104 parking spaces. The decrease in demand would occur in the PX/Commissary and North Halleck areas. Buildings 605, 606, 1158 and all buildings except 201 would be removed in the North Halleck Area. The overall demand for the study area would 1,314 parking spaces.

TABLE 4-26
FUTURE AVERAGE WEEKDAY PARKING DEMAND BY AREA FOR THE PARKWAY ALTERNATIVE (2030)

Area	Future No-Build Demand (spaces) [from Table 4-2]	Parkway Alternative Demand (spaces)	Change in Demand (spaces)
Mason Street Warehouses	163	163	0
PX/Commissary	217	149	-68
Gorgas Avenue Warehouses	274	274	0
Thornburg Area	439	439	0
North Halleck Area	52	16	-36
Fort Scott – Rod Road	15	15	0
Palace of Fine Arts	258	258	0
Total	**1,418**	**1,314**	**-104**

Source: Parsons Brinckerhoff, Inc. September 2004.

Impacts

Table 4-27 shows a comparison of estimated parking supply and demand under the Parkway Alternative in 2030.

TABLE 4-27
SUPPLY AND DEMAND COMPARISON BY AREA FOR PARKWAY ALTERNATIVE (2030)

Area	Supply (spaces)	Demand (spaces)	Surplus/Deficiency (spaces)	Adjusted Surplus/Deficiency (spaces)
Mason Street Warehouses	165	163	2	2
PX/Commissary	538	149	389	281
Gorgas Avenue Warehouses	198	274	-76	0
Thornburg Area	**166**	**439**	**-273**	**-241**
North Halleck Area	**0**	**16**	**-16**	**-16**
Fort Scott – Rod Road	**12**	**15**	**-3**	**-3**
Palace of Fine Arts	258	258	0	0
Total	**1,337**	**1,314**	**23**	**23**

Source: Parsons Brinckerhoff, Inc. September 2004.
Notes: The adjusted surplus/deficiency calculation assumes that a portion of parking surpluses in adjacent areas can be used for deficiencies: 76 spaces of the 108-space parking lot in the PX/Commissary area were applied to the Gorgas Warehouses deficiency and 32 spaces were applied to the Thornburg area deficiency.

The numbers in this table indicate that under the Parkway Alternative, there would be parking deficiencies in the following three areas: Thornburg Area, North Halleck Area, and Fort Scott – Rod Road. In the remaining areas, estimated parking supply would meet or exceed estimated parking demand under the Parkway Alternative. Overall, there would be a parking surplus of 23 spaces in the study area.

If deficiencies were adjusted to reflect available surpluses in adjacent areas, then the deficiency in the Gorgas Avenue Warehouses area would reduced to zero and the deficiency in the Thornburg area would be reduced to 241 spaces.

Table 4-28 compares the parking surpluses or deficiencies by area identified for the Parkway Alternative with 2030 No-Build conditions. The Thornburg area would experience unmet demand beyond that of No-Build conditions of 115 spaces. In the Fort Scott – Rod Road area, the parking deficiency would change from two spaces under No-Build conditions to five spaces under the Parkway Alternative, for an additional unmet demand of three spaces. Overall, unmet demand due to the Parkway Alternative would be a total of 56 spaces.

TABLE 4-28
ESTIMATED UNMET DEMAND DUE TO THE PARKWAY ALTERNATIVE (2030)

Area	Parkway Alternative Surplus/Deficiency (spaces)	2030 No-Build Surplus/Deficiency (spaces)	Unmet Demand due to Parkway Alternative (spaces)
Mason Street Warehouses	2	2	0
PX/Commissary	281	370	0
Gorgas Avenue Warehouses	0	0	0
Thornburg Area	**-241**	**-126**	**-115**
North Halleck Area	**-16**	**59**	**-16**
Fort Scott – Rod Road	**-3**	**0**	**-3**
Palace of Fine Arts	0	0	0
Total	**23**	**305**	**-134**

Source: Parsons Brinckerhoff, Inc. September 2004.

Mitigation

Mitigation would be required to replace the 115 parking spaces that would be lost in the Thornburg Area, the 16 spaces that would be lost in the North Halleck Area and the three spaces that would be lost in the Rod Road area with the Parkway Alternative.

In 2030, most of the parking that would be lost during construction of the build alternatives would be regained. It is expected that remaining parking deficits would be met through the management of available supply by the Presidio Trust within the study area and in other nearby areas.

In the Rod Road area, additional parking would be provided by extending the existing parking lot on Rod Road to the north, to replace the parking spaces removed by the project.

The parking lost in the North Halleck and Thornburg areas could be replaced by expanding the underground parking garage that has been proposed for the Palace of Fine Arts area to accommodate these deficiencies. Planning for this garage is still at the conceptual stage and further analysis would be required to determine the number of parking spaces that would be feasible for this site.

SECTION 5: CONCLUSIONS/COMPARISONS

Tables 5-1 and 5-2 summarize the estimated parking supply and demand under existing and future conditions for each alternative. Although there would be localized parking impacts in specific areas within the study area, overall parking supply exceeds parking demand under 2010 and 2030 future conditions for each alternative. In areas where parking impacts have been identified, parking deficiencies beyond those identified under the No-Build conditions have been specified. A comparison of parking impacts for each alternative is provided below and summarized in Tables 5-3 and 5-4. Table 5-5 summarizes the net demand that would not be met in each alternative.

Under 2010 construction conditions, the Replace and Widen Alternative – Detour Option would result in an unmet demand (net loss) over No-Build conditions of 156 spaces in the Gorgas Avenue Warehouses area, the Replace and Widen Alternative – No Detour Option would result in a total unmet demand of 473 spaces in the Gorgas Warehouses and Palace of Fine Arts areas, and the Parkway Alternative would result in a total unmet demand of 768 spaces in the PX/Commissary, Gorgas Warehouses, Rod Road, and Palace of Fine Arts areas.

To meet this unmet demand, the availability of parking of replacement parking would depend on the availability of parking during construction. Availability would be based on the type of construction activities taking place, their location and duration. The parking study should be updated periodically to determine the location and extent of available parking for parking lost during construction activities. It is possible that some areas of replacement parking would be needed but their extent and duration would be dependent upon the availability and management of parking elsewhere within the Presidio.

Parking shortfalls identified during construction conditions (2010 conditions) for the project alternatives can generally be addressed through the use of surplus parking in adjacent areas and overall management of parking within the Presidio, consistent with the PTMP. For both the Replace and Widen – No Detour Option and the Parkway Alternative, parking displaced at the Palace of Fine Arts area, the Parade Grounds may be a candidate location additional bus staging and visitor parking. A shuttle would be provided between the Parade Grounds lot and the Palace of Fine Arts area for visitors. The Parkway Alternative would also require extension of existing parking in the Rod Road area to replace three parking spaces.

In 2030, most of the parking that would be lost during construction of the build alternatives would be regained. It is expected that remaining parking deficits would be met through the management of available supply by the Presidio Trust within the study area and other nearby areas. Under 2030 project conditions, the Replace and Widen Alternative – Detour Option would result in an unmet demand of 20 spaces in the Thornburg area, the Replace and Widen Alternative – No Detour Option would result in a total unmet demand of one space in the Mason Street Warehouses area, and the Parkway Alternative would result in a total unmet demand of 134 spaces in the Thornburg, North Halleck and Rod Road areas.

Management of the study areas parking facilities would include providing proper wayfaring signage and enforcement especially to those areas adjacent to the Presidio. Signage and information should be provided directing motorists of the available parking facilities and prohibited areas. This would especially be needed during construction to inform the public of any parking facility and access closures due to the construction activities (this would be part to the Transportation Management Plan [TMP]). Signage and enforcement would assist in minimizing any Presidio spill over parking impacts to the Yacht Club and Marina areas and facilities adjacent to Marina Boulevard.

Due to the dynamic nature of the Presidio land use, quantifying the available parking supply and expected parking demand is a speculative exercise. Changes and variations to current land uses and expectations may occur that could have noticeable impacts on this parking assessment. Unfortunately, these changes are unknown and it has been proposed that the Parking Impact Analysis be updated on a regular basis to include updated uses and modified proposals for better assessment and more effective use of the Presidio parking facilities.

Overall, the parking impact under the 2030 project conditions would be considerably less than during the 2010 construction conditions. No long-term parking impact was identified for the Replace and Widen Alternative – No Detour Option; and the majority of parking that would be temporarily displaced for the Replace and Widen – No Detour Option and Parkway Alternative would be restored under the 2030 project conditions. The remaining parking shortfalls identified for these alternatives would be addressed through the use of surplus parking in adjacent areas and overall management of parking within the Presidio, consistent with the PTMP.

TABLE 5-1
PARKING SUPPLY BY ALTERNATIVE

Alternative	Year	Crissy Field - Mason Ware-Houses	Crissy Field - PX/ Commis-sary	Letterman - Gorgas Ware-houses	Letterman - Thornburg Area	North Halleck Area	Fort Scott - Rod Road	Palace of Fine Arts	TOTAL
Existing	**2003**	165	695	198	281	111	15	258	**1,723**
Future No-Build	**2010**	165	695	198	281	111	15	258	**1,723**
	2030	165	695	198	281	111	15	258	**1,723**
Replace & Widen Alternative Detour Option	**2010**	56	238	60	281	101	15	258	**1,009**
	2030	165	662	178	281	111	15	258	**1,670**
Replace & Widen Alternative No Detour Option	**2010**	152	46	60	281	85	15	153	**792**
	2030	162	662	156	281	111	15	293	**1,680**
Parkway Alternative	**2010**	165	3	28	151	0	12	0	**359**
	2030	165	538	198	166	0	12	258	**1,337**

Source: Parsons Brinckerhoff Quade & Douglas, Inc., September 2004.

TABLE 5-2
PARKING DEMAND BY ALTERNATIVE

Alternative	Year	Crissy Field - Mason Ware-Houses	Crissy Field - PX/ Commis-sary	Letterman - Gorgas Ware-houses	Letterman - Thornburg Area	North Halleck Area	Fort Scott - Rod Road	Palace of Fine Arts	TOTAL
Existing	**2003**	62	138	188	135	55	15	258	**851**
Future No-Build	**2010**	111	188	336	276	67	15	258	**1,251**
	2030	163	217	274	439	52	15	258	**1,418**
Replace & Widen Alternative Detour Option	**2010**	44	16	336	276	67	15	258	**1,012**
	2030	163	152	274	439	52	15	258	**1,353**
Replace & Widen Alternative No Detour Option	**2010**	111	188	327	276	67	15	258	**1,242**
	2030	163	217	274	439	52	15	258	**1,418**
Parkway Alternative	**2010**	111	188	336	276	67	15	258	**1,251**
	2030	163	149	274	439	16	15	258	**1,314**

Source: Parsons Brinckerhoff Quade & Douglas, Inc., September 2004.

TABLE 5-3
OVERALL PARKING DEMAND AND SUPPLY COMPARISON- 2010

Area	Alternative															
	No Build				Replace and Widen Alternative - Detour Option				Replace and Widen Alternative - No Detour Option				Parkway Alternative			
	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency
Crissy Field - Mason St Warehouses	165	111	-49%	54	56	44	-27%	12	152	111	-37%	41	165	111	-49%	54
Crissy Field - PX/ Commissary	695	188	-270%	507	238	16	-1388%	222	46	188	76%	-142	253	145	-74%	108
Letterman - Gorgas Warehouses	198	336	41%	-138	60	336	82%	-276	60	327	82%	-267	28	327	91%	-299
Letterman - Thornburg Area	281	276	-2%	5	281	276	-2%	5	281	276	-2%	5	106	251	58%	-145
Main Post - North Halleck Area	111	67	-66%	44	101	67	-51%	34	85	67	-27%	18	0	0	0	0
Fort Scott - Rod Road	15	15	0%	0	15	15	0%	0	15	15	0%	0	12	15	20%	-3
Palace of Fine Arts	258	258	0%	0	258	258	0%	0	153	258	41%	-105	0	258	100%	-258
Total	1,723	1,251		472	1,009	1,012		-3	792	1,242		-450	564	1,107		-543

Source: Parsons Brinckerhoff, September 2004.

TABLE 5-4
OVERALL PARKING DEMAND AND SUPPLY COMPARISON- 2030

	Alternative															
	No Build				Replace and Widen Alternative - Detour Option				Replace and Widen Alternative - No Detour Option				Parkway Alternative			
Area	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency	Supply	Demand	Percent Difference	Surplus/ Deficiency
Crissy Field - Mason St Warehouses	165	163	-1%	2	165	163	-1%	2	162	163	1%	-1	165	163	-1%	2
Crissy Field - PX/ Commissary	695	217	-220%	478	662	152	-336%	510	662	217	-205%	445	538	149	-261%	389
Letterman - Gorgas Warehouses	198	274	28%	-76	178	274	35%	-96	156	274	43%	-118	198	274	28%	-76
Letterman - Thornburg Area	281	439	36%	-158	281	439	36%	-158	281	439	36%	-158	166	439	62%	-273
Main Post - North Halleck Area	111	52	-113%	59	111	52	-113%	59	111	52	-113%	59	0	16	100%	-16
Fort Scott - Rod Road	15	15	0%	0	15	15	0%	0	15	15	0%	0	12	15	20%	-3
Palace of Fine Arts	258	258	0%	0	258	258	0%	0	293	258	-14%	35	258	258	0%	0
Total	1,723	1,418		305	1,670	1,353		317	1,680	1,418		262	1,337	1,314		23

Source: Parsons Brinckerhoff, September 2004.

TABLE 5-5
SUMMARY OF UNMET DEMAND BY ALTERNATIVE – 2010 AND 2030

	Alternative					
	Replace and Widen Alternative - Detour Option		Replace and Widen Alternative - No Detour Option		Parkway Alternative	
Area	2010	2030	2010	2030	2010	2030
Crissy Field - Mason St Warehouses	0	0	0	-1	0	0
Crissy Field - PX/Commissary	0	0	-142	0	-142	0
Letterman - Gorgas Warehouses	-156	0	-226	0	-245	0
Letterman - Thornburg Area	0	-20	0	0	-120	-115
North Halleck Area	0	0	0	0	0	-16
Fort Scott - Rod Road	0	0	0	0	-3	-3
Palace of Fine Arts	0	0	-105	0	-258	0
Total	**-156**	**-20**	**-473**	**-1**	**-768**	**-234**

Source: Parsons Brinckerhoff, September 2004.

APPENDIX A

PROJECT DESCRIPTION DETAILED FIGURES

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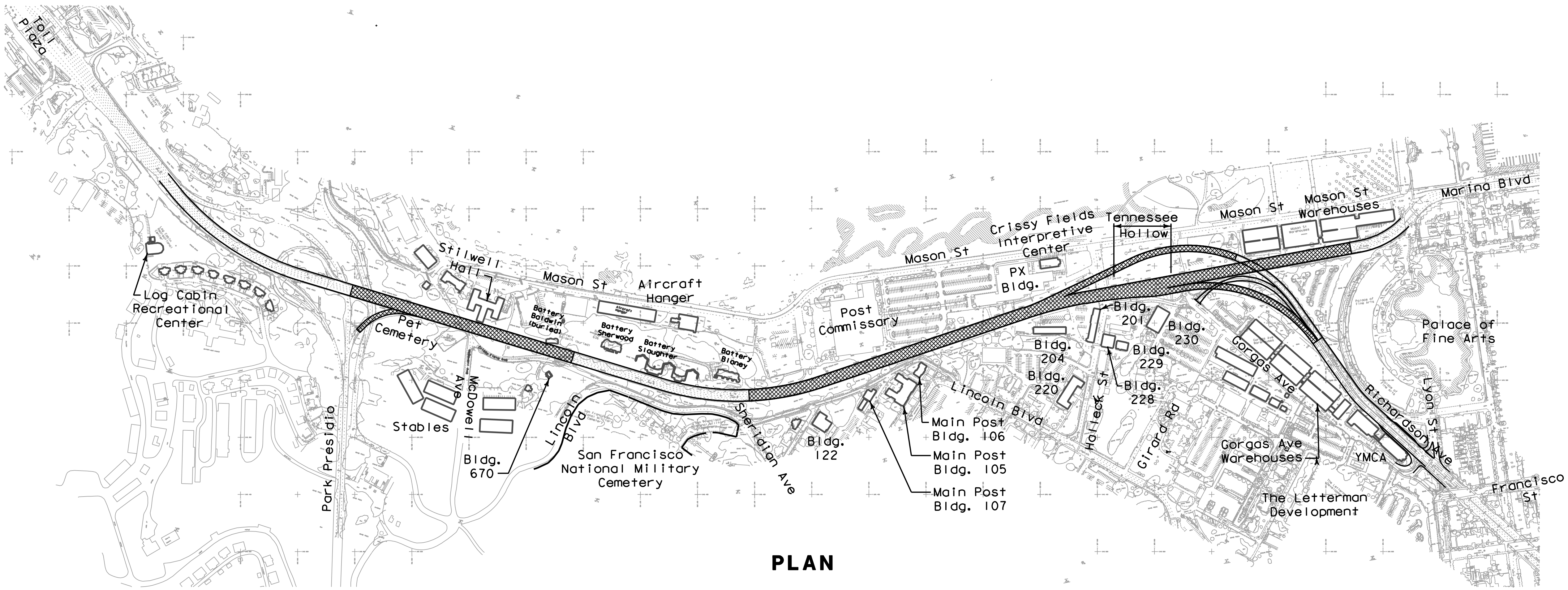

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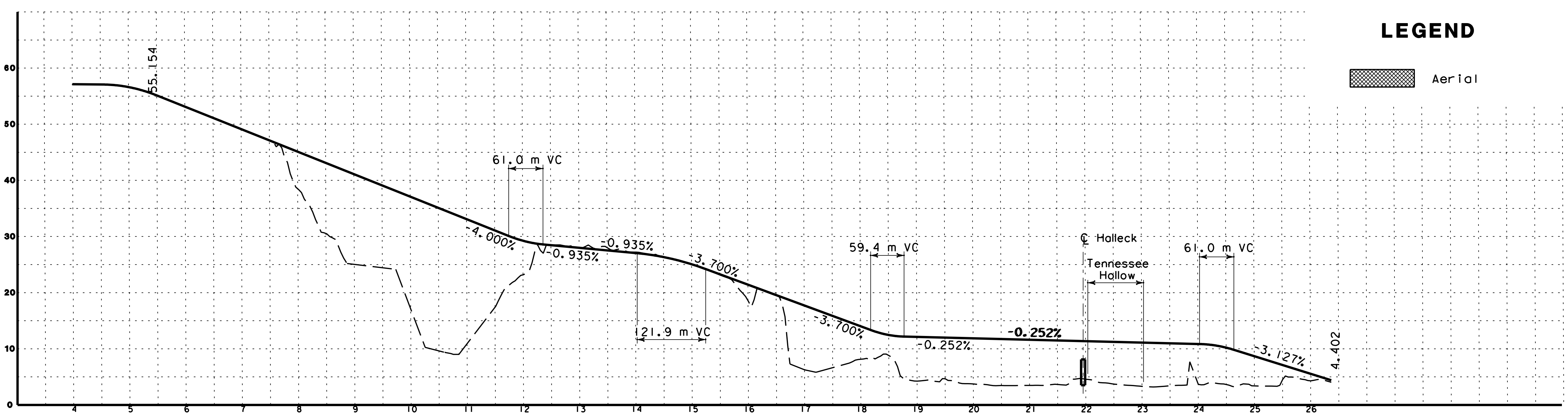

PROFILE

LEGEND

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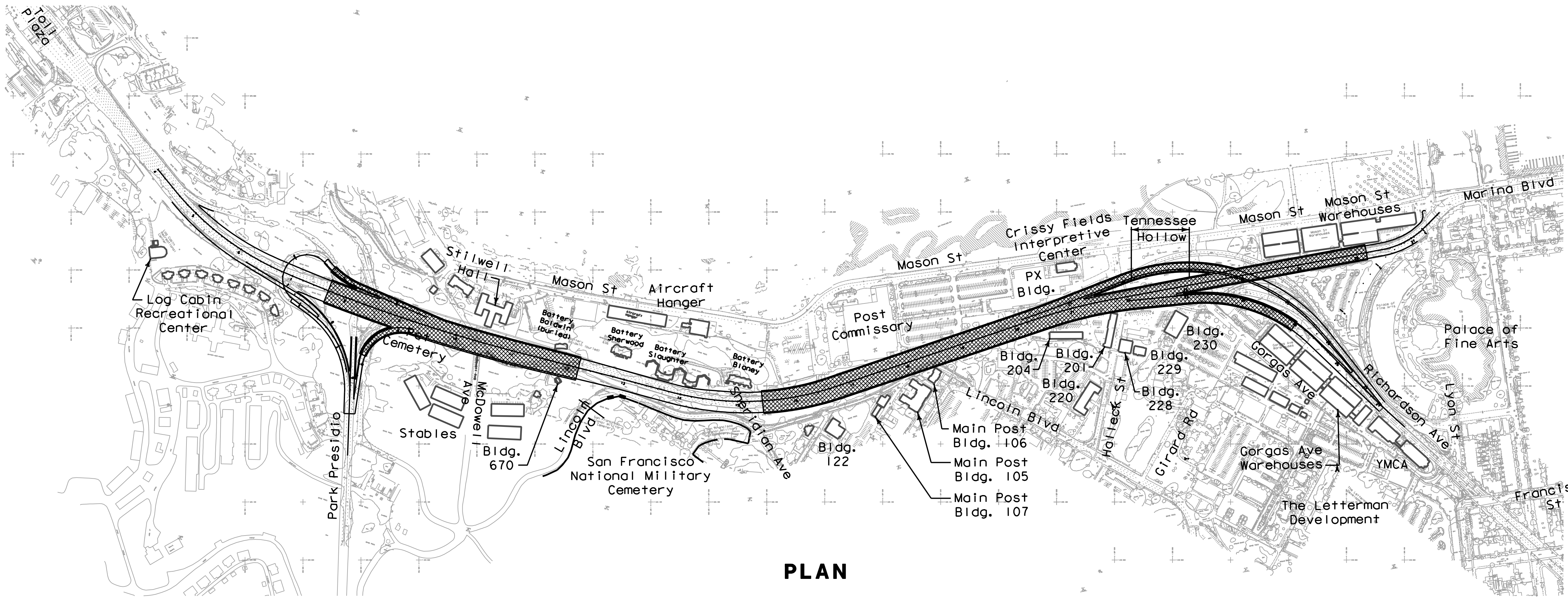
2a. Replace and Widen - No Detour



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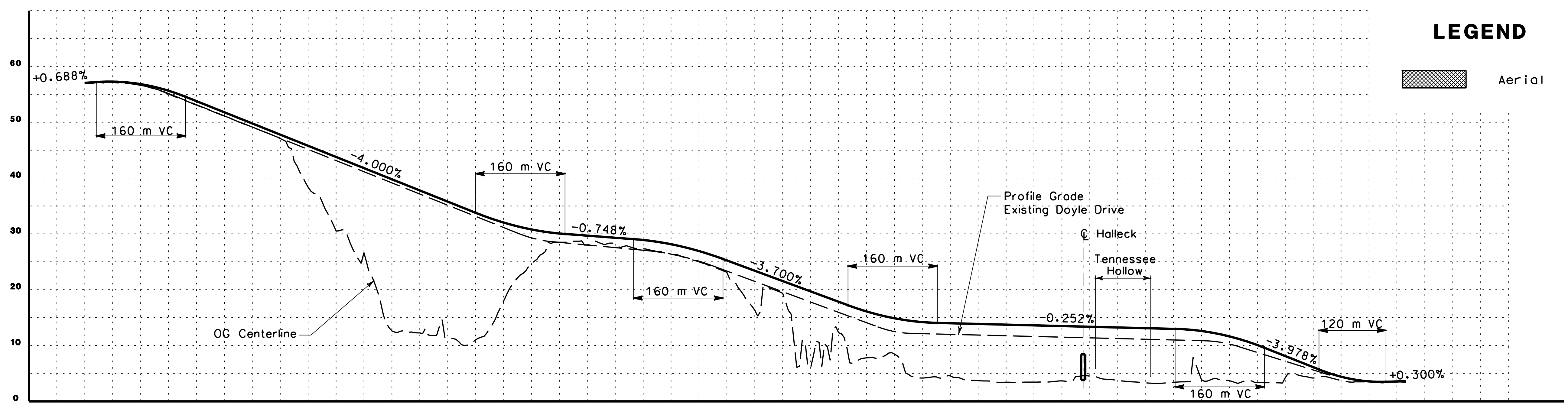

PROFILE

LEGEND

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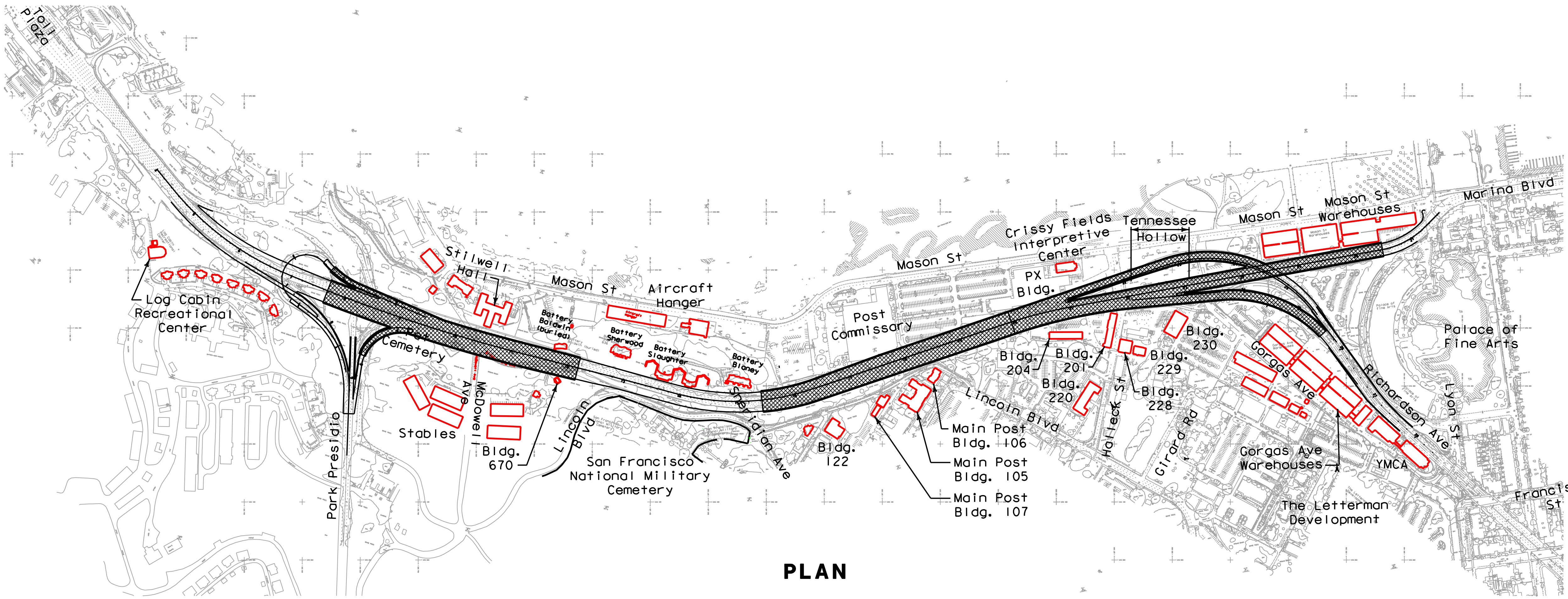
2. Replace and Widen



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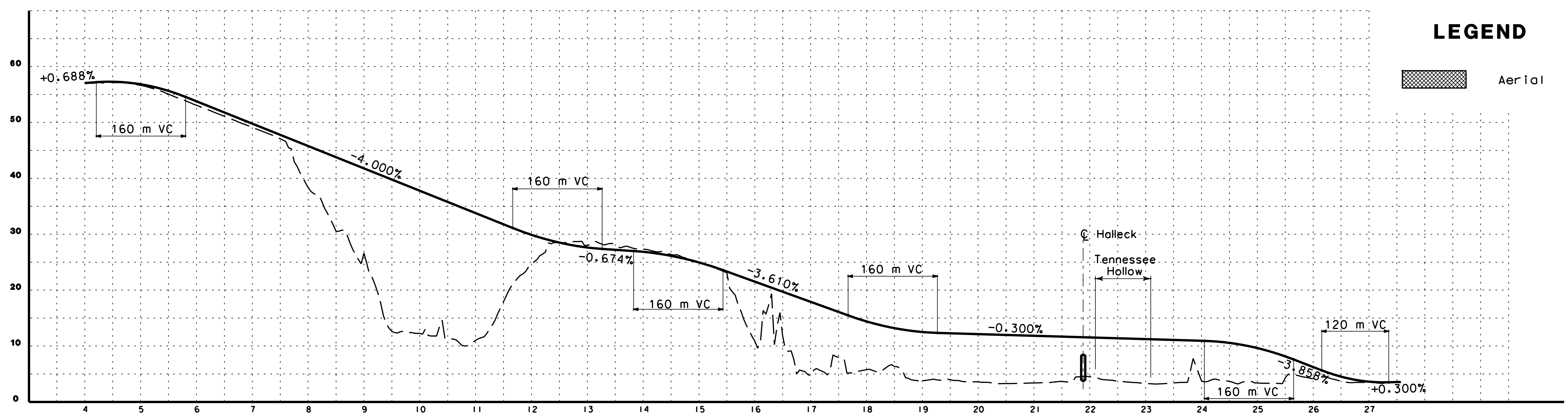

PROFILE

LEGEND

Aerial

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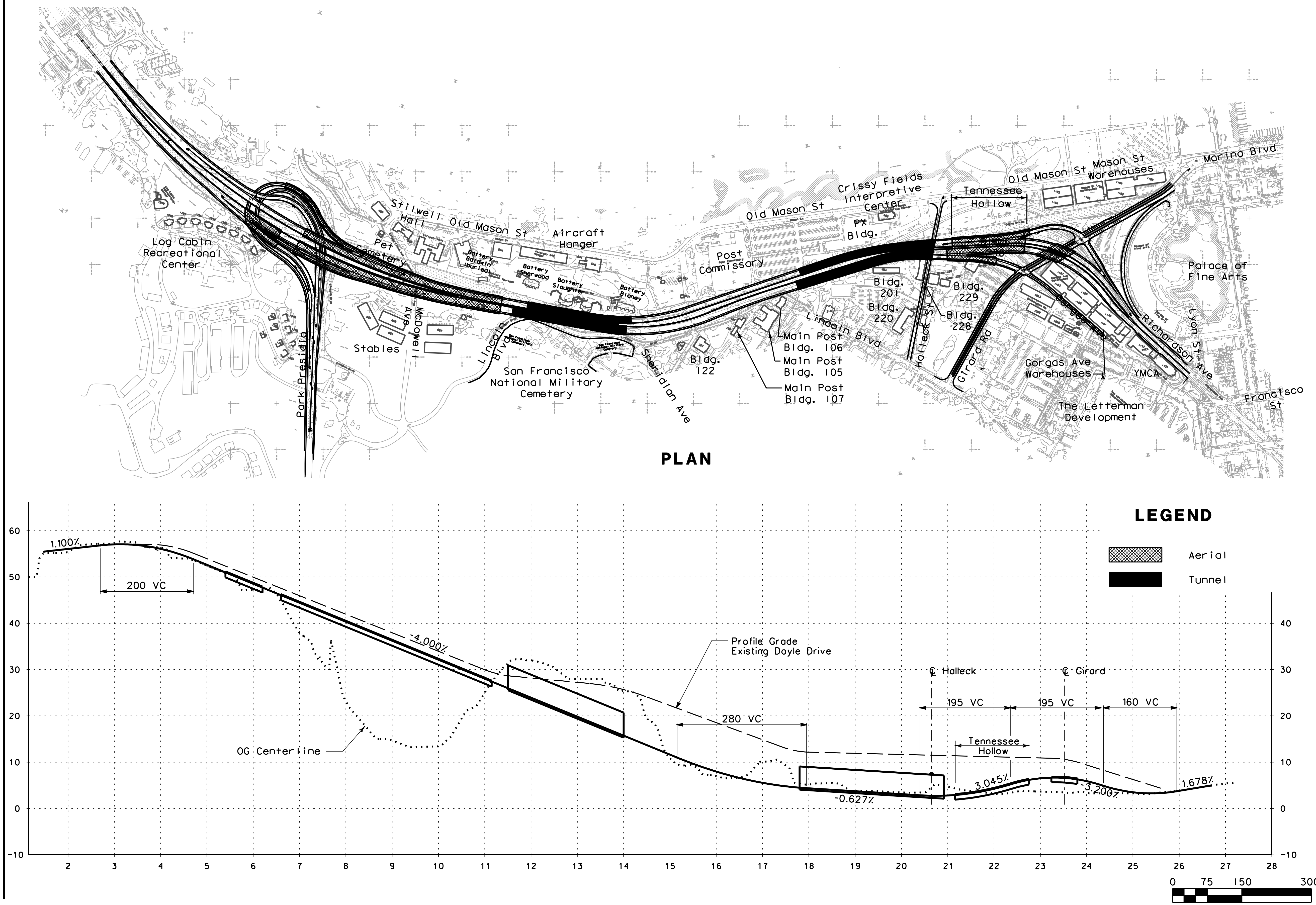
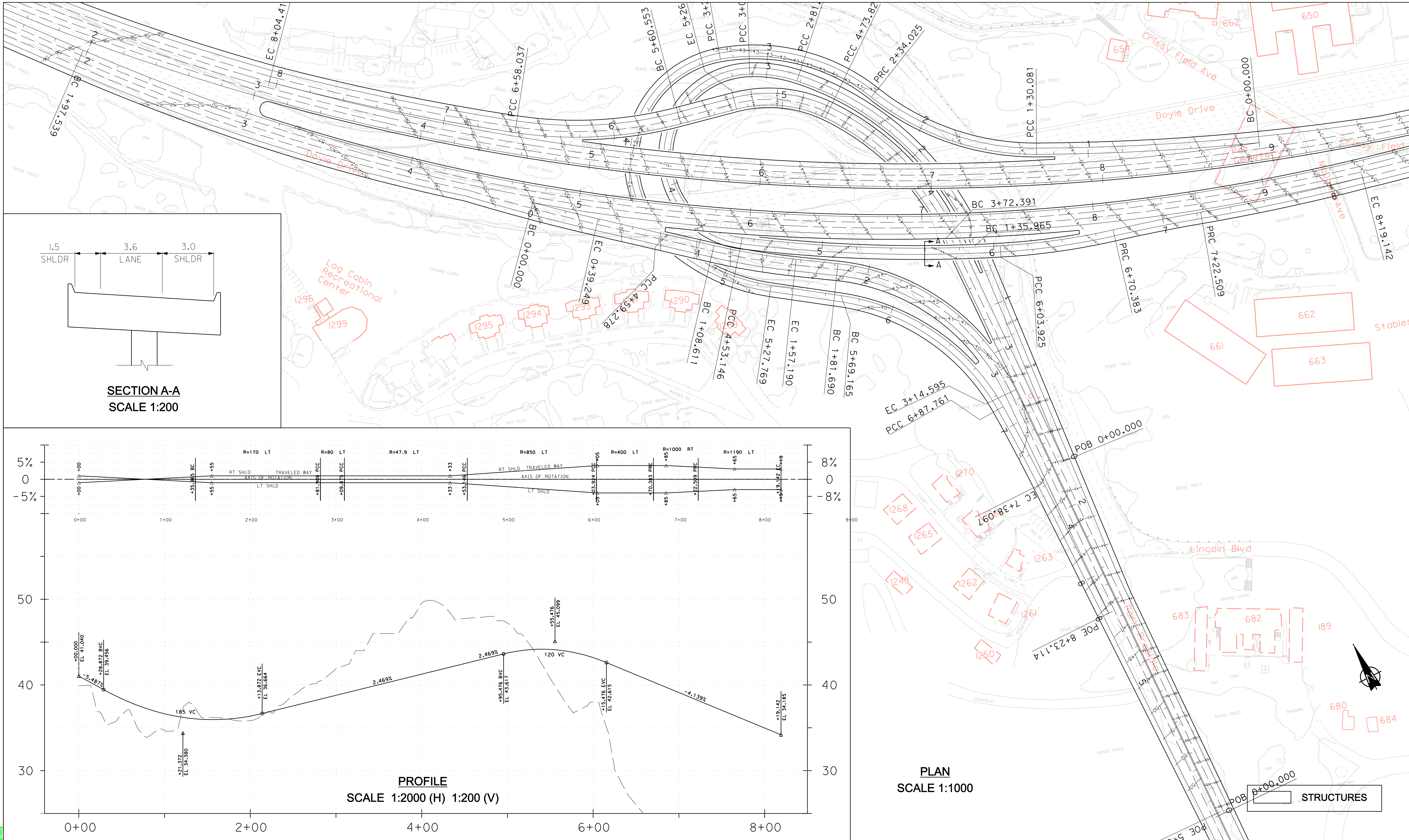
5. Presidio Parkway





SECTION A-A
SCALE 1:200

PROFILE
SCALE 1:2000 (H) 1:200 (V)

PLAN
SCALE 1:1000

Issue	Date	By	Chkd	Appd

Job Title: ALTERNATIVE 5 PRESIDIO PARKWAY

Drawing Title: OPTION 1: LOOP RAMP

Scale: AS SHOWN

File Name

Drawing Status: PRELIMINARY

Job No: 130168-00 | Drawing No: SFSK-054A | Issue

19/64 Ove Arup Partnership Ltd

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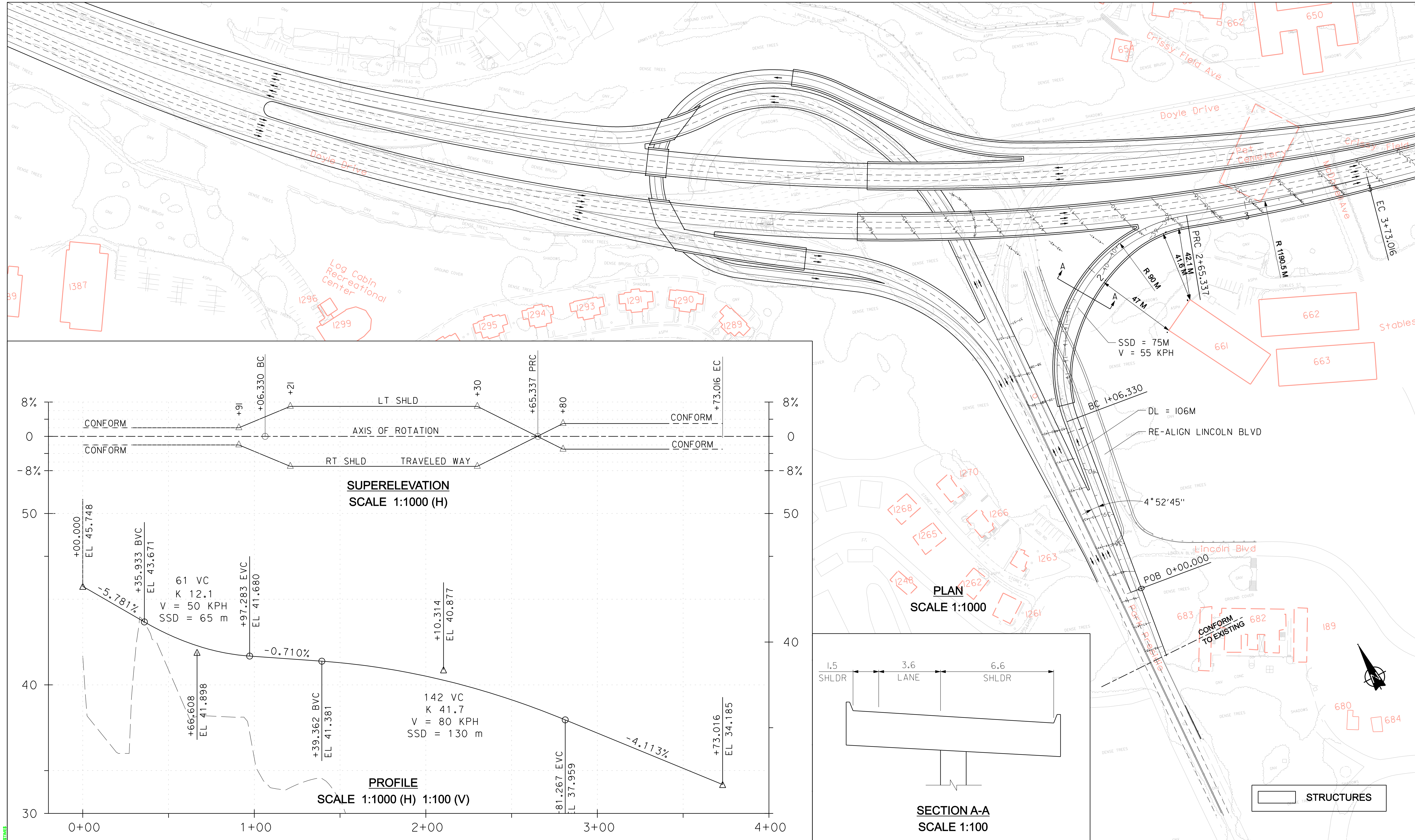

Caltrans

Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
OPTION 2: HOOK RAMP (WITH GEOMETRIC REFINEMENTS)

Scale: AS SHOWN
File Name
Drawing Status: PERLIMINARY
Job No: 130168-00
Drawing No: SFSK-054
Issue

19/64 Ove Arup Partnership Ltd

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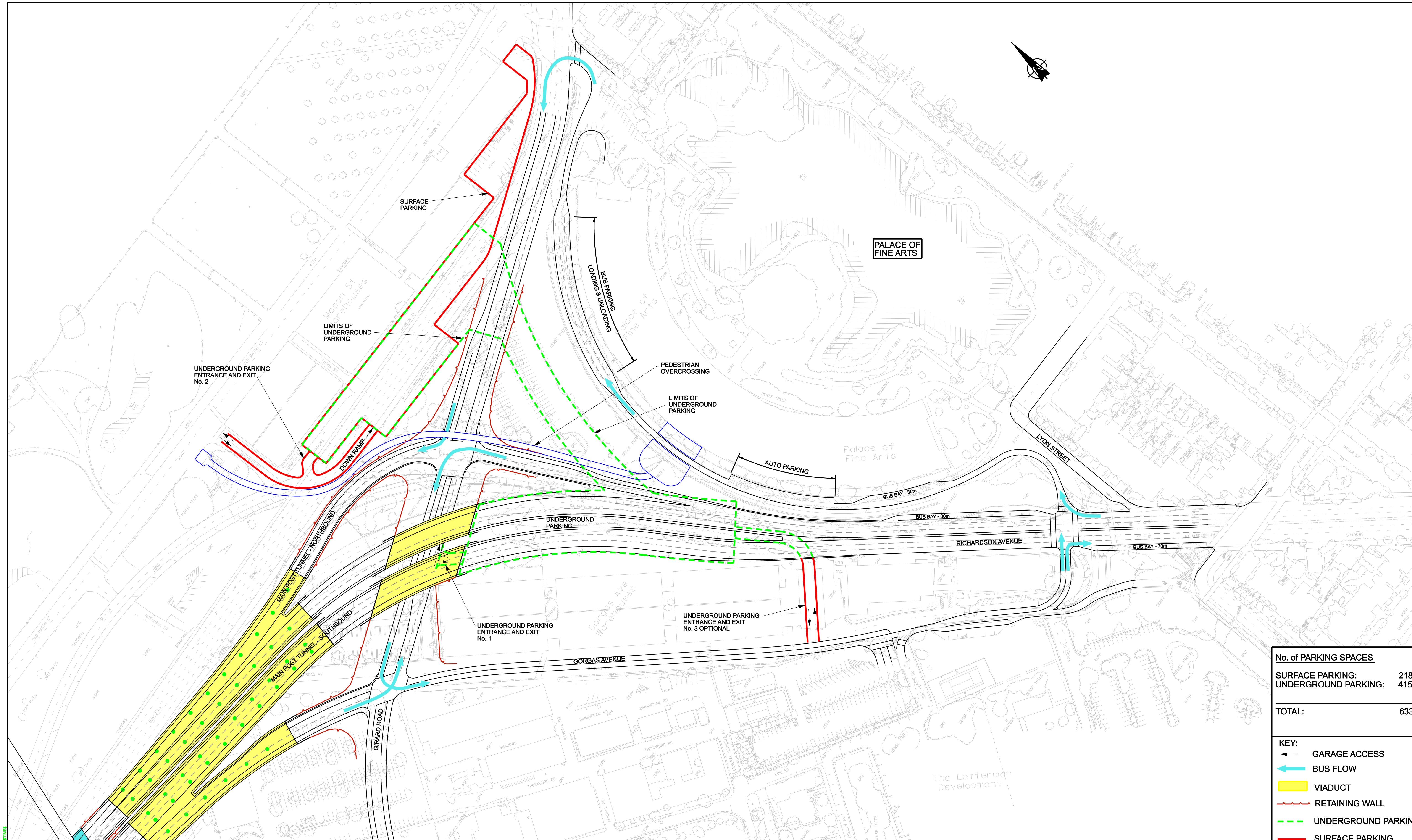

No. of PARKING SPACES

SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

NOTES.

1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:

1m Structure

3m Min

Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
DIAMOND OPTION
EAST END
PARKING & CIRCULATION

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Drawing No SFSK-052
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19/64 Ove Arup Partnership Ltd

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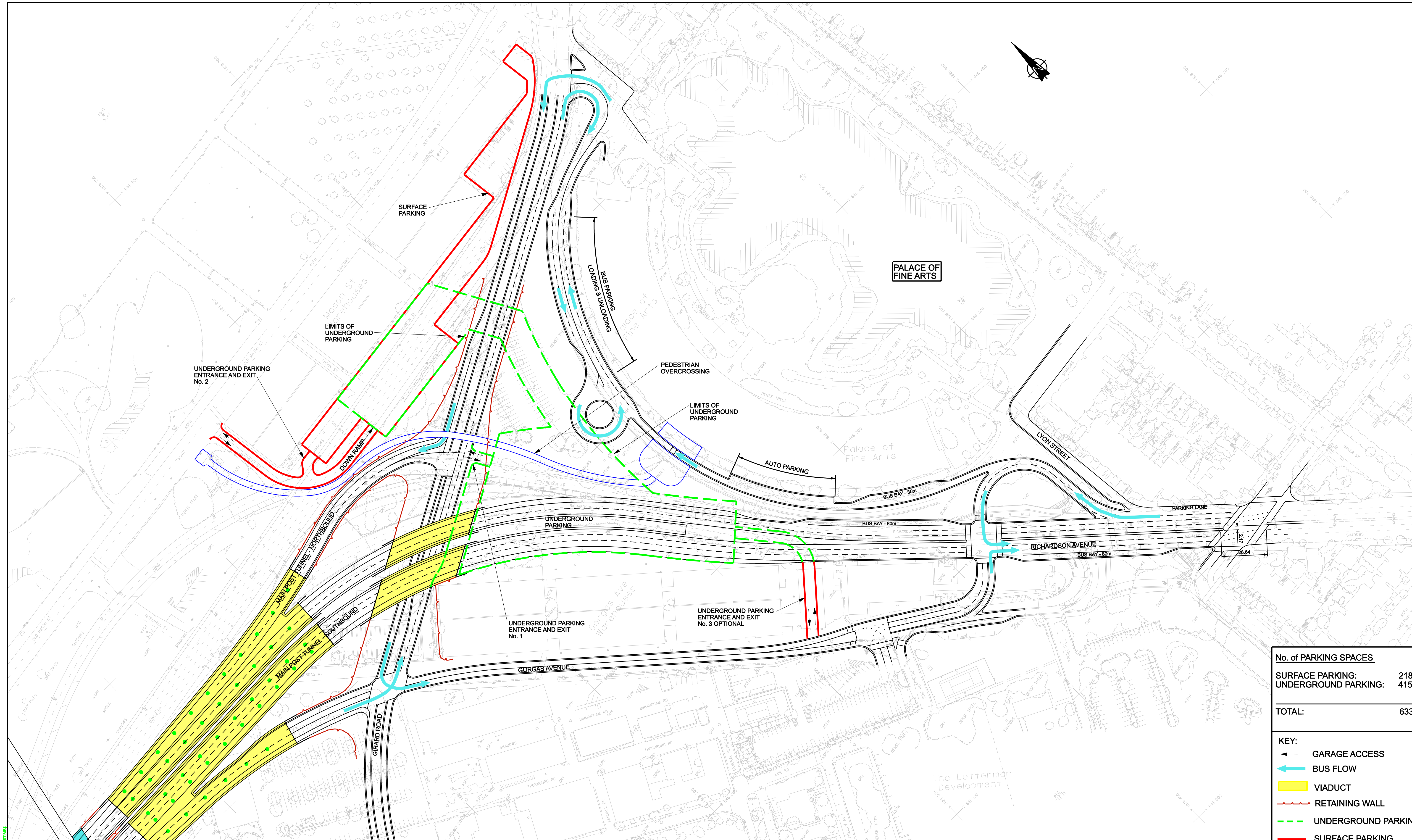

No. of PARKING SPACES	
SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

KEY:
- GARAGE ACCESS
- BUS FLOW
- VIADUCT
- RETAINING WALL
- UNDERGROUND PARKING
- SURFACE PARKING

NOTES.
1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:
1m Structure
3m Min

Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
CIRCLE DRIVE
EAST END
PARKING & CIRCULATION

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Drawing Status DRAFT
Job No 130168-00
Drawing No SFSK-051
Issue -

19/64 Ove Arup Partnership Ltd

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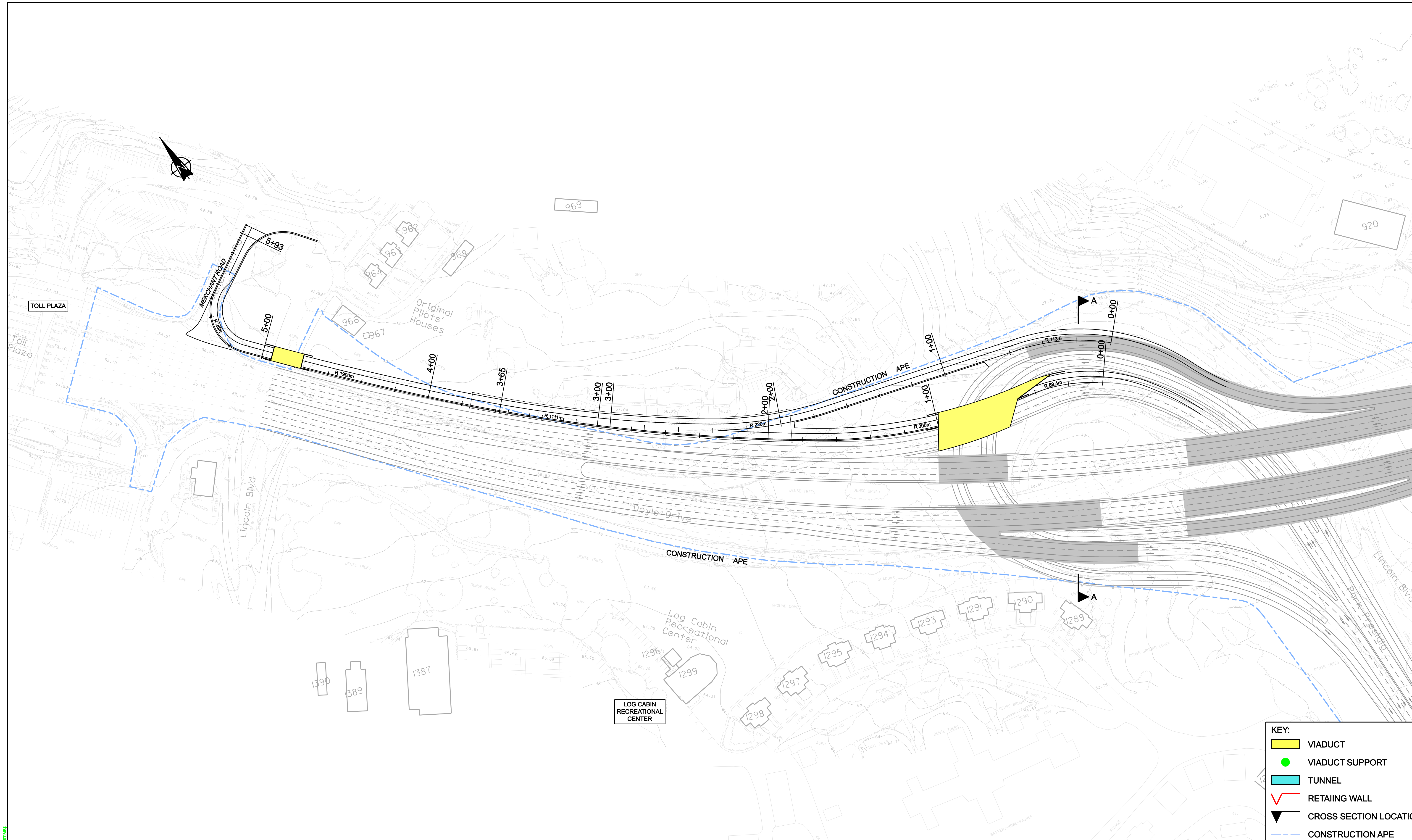

Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
MERCHANT ROAD OFF-RAMP

Scale: 1:1000
File Name: SFSK-M01.DGN
Drawing Status: DRAFT

Job No	Drawing No	Issue
130168-00	SFSK-M01	-

19/64 Ove Arup Partnership Ltd

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APPENDIX B

PARKING DEMAND CALCULATIONS

The parking demand calculations were provided by the Presidio Trust and reflect rates used in their Presidio Traffic Management Plan (PTMP). The following text was obtained from the PTMP Background Transportation Report and provided by the Presidio Trust. It provides information on the source of the parking demand rates:

> *"Parking demand for buildings in the Doyle Drive corridor consists of both long-term demand (i.e., employee and resident parking) and short-term demand (i.e. visitor parking). Long-term parking for non-housing land uses was estimated by determining the number of employees for each land use and applying the average mode split and vehicle occupancy from the trip generation estimates for both external and internal trips. Each employee vehicle trip was assumed to require one space per day. The parking demand for lodging was estimated as long-term only, with a rate of 1.0 spaces per room, which accounts for both employees and guests. A long-term rate of 1.5 spaces per dwelling unit was used for all housing components.*
>
> *"Short-term parking was estimated based on the total daily visitor trips and the average turnover rate. A short-term parking turnover rate of 6.0 vehicles per space per day was applied to most land uses for all alternatives, with the exception of retail and cultural/educational uses for which a turnover rate of 10 vehicles per space per day was used, as well as conference uses for which a turnover rate of 3 vehicles per space per day was used. The parking demand rates shown in this appendix represent a combination of long-term and short-term demand and reflect the travel demand assumptions used in the transportation analysis for the Presidio Trust Management Plan EIS."*

TABLE B-1
FUTURE PARKING DEMAND – NO-BUILD CONDITIONS

		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
Crissy Field – Mason Warehouses							
1182	12,072	cult./ed. (artists studios)	1.36	16	Office	2.17	26
1183	12,862	cult./ed. (artists studios)	1.36	17	office	2.17	28
1184	12,112	cult./ed. (artists studios)	1.36	16	office	2.17	26
1185	13,600	cult./ed. (artists studios)	1.36	18	office	2.17	30
1186	12,630	industrial/warehouse	1.12	14	cult./ed.	1.36	17
1187	13,440	industrial/warehouse	1.12	15	cult./ed.	1.36	18
1188	13,520	industrial/warehouse	1.12	15	cult./ed.	1.36	18
TOTAL	90,236			**111**			**163**
Crissy Field – PX/ Commissary							
603	11,801	cult./ed.	1.36	16	cult./ed.	1.36	16
631	480	vacant	0	0	military	0	0
632	480	vacant	0	0	military	0	0
633	480	vacant	0	0	military	0	0
605	42,319	recreation	0.31	13	cult./ed.	1.36	58
606	7,416	retail	4.1	30	cult./ed.	1.36	10
610	92,722	warehouse retail	1.32	122	cult./ed.	1.36	126
653	5,413	warehouse retail	1.32	7	cult./ed.	1.36	7
TOTAL	161,111			**188**			**217**
Letterman – Gorgas Warehouses							
1151	11,907	fitness	5.2	62	fitness	5.2	62
1152	13,847	fitness	5.2	72	fitness	5.2	72
1158	4,164	office	2.17	9	vacant	0	0
1160	5,453	office	2.17	12	office	2.17	12
1161	12,000	office	2.17	26	office	2.17	26
1162	12,175	Fitness/office	2.17 & 5.2	45	office	2.17	26
1163	13,156	office	2.17	29	office	2.17	29
1167	12,095	office	2.17	26	cult./ed.	1.24	15
1169	13,117	office	2.17	28	cult./ed.	1.24	16
1170	12,596	office	2.17	27	cult./ed.	1.24	16
TOTAL	110,510			**336**			**274**
Letterman – Thornburg Area							
1029	100	dorm rooms	1	25	dorm rooms	1	100
1030	--	dorm rooms			dorm rooms		
1040	7,520	industrial/warehouse	0.99	7	industrial/warehouse	0.99	7
1063	28,797	industrial/warehouse	0.99	29	industrial/warehouse	0.99	29
1047	17,590	office	2.17	38	retail	3.97	70
1050	21,690	office	2.17	47	retail	3.97	86
1051	17,580	office	2.17	38	retail	3.97	70

		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
1059	3,672	office	2.17	8	retail	3.97	15
1060	14,030	office	2.17	30	office	2.17	30
1061	82	office	2.17	0	retail	3.97	0
1056	620	retail	3.97	2	retail	3.97	2
1062	12,700	retail	3.97	50	office	2.17	28
1076	390	retail	3.97	2	retail	3.97	2
TOTAL	124,671			**276**			**439**
Main Post – North Halleck Area							
205	121	industrial/warehouse	1.13	0	infrastructure	0.41	0
230	10,060	industrial/warehouse	1.13	11	n/a	0	0
231	3,842	industrial/warehouse	1.13	4	n/a	0	0
201	11,458	office	2.18	25	office	2.18	25
204	12,144	office	2.18	26	office	2.18	26
TOTAL	37,625			**67**			**52**
Fort Scott – Rod Road							
1263	10	1 bdrm du's	1.5	15	1 bdrm du's	1.5	15
1266	--	1 bdrm du's			1 bdrm du's		
1270	--	1 bdrm du's			1 bdrm du's		
				15			**15**
Palace of Fine Arts							
n/a	--	special use/museum		**258**	special use/museum		**258**
		TOTAL		**1,255**			**1,418**

Note: Buildings that are crossed-out would be lost due to the Doyle Drive Project; buildings identified as "vacant" are assumed to be vacant by the Presidio Trust.

TABLE B-2
FUTURE PARKING DEMAND – REPLACE AND WIDEN ALTERNATIVE – DETOUR OPTION

		REPLACE AND WIDEN – DETOUR OPTION					
		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
Crissy Field - Mason Street Warehouses							
1182	12,072	~~cult./ed. (artists studios)~~	~~1.36~~	~~16~~	office	2.17	26
1183	12,862	~~cult./ed. (artists studios)~~	~~1.36~~	~~17~~	office	2.17	28
1184	12,112	~~cult./ed. (artists studios)~~	~~1.36~~	~~16~~	office	2.17	26
1185	13,600	~~cult./ed. (artists studios)~~	~~1.36~~	~~18~~	office	2.17	30
1186	12,630	industrial/warehouse	1.12	14	cult./ed.	1.36	17
1187	13,440	industrial/warehouse	1.12	15	cult./ed.	1.36	18
1188	13,520	industrial/warehouse	1.12	15	cult./ed.	1.36	18
TOTAL	90,236			**44**			**163**
Crissy Field - PX/Commissary							
603	11,801	cult./ed.	1.36	16	cult./ed.	1.36	16
631	480	vacant	0	0	military	0	0
632	480	vacant	0	0	military	0	0
633	480	vacant	0	0	military	0	0
605	42,319	~~recreation~~	~~0.31~~	~~13~~	~~cult./ed.~~	~~1.36~~	~~58~~
606	7,416	~~retail~~	~~4.1~~	~~30~~	cult./ed.	1.36	10
610	92,722	~~warehouse retail~~	~~1.32~~	~~122~~	cult./ed.	1.36	126
653	5,413	~~warehouse retail~~	~~1.32~~	~~7~~	~~cult./ed.~~	~~1.36~~	~~7~~
TOTAL	161,111			**16**			**152**
Letterman - Gorgas Avenue Warehouses Area							
1151	11,907	fitness	5.2	62	fitness	5.2	62
1152	13,847	fitness	5.2	72	fitness	5.2	72
1158	4,164	office	2.17	9	vacant	0	0
1160	5,453	office	2.17	12	office	2.17	12
1161	12,000	office	2.17	26	office	2.17	26
1162	12,175	office	2.17 & 5.2	45	office	2.17	26
1163	13,156	office	2.17	29	office	2.17	29
1167	12,095	office	2.17	26	cult./ed.	1.24	15
1169	13,117	office	2.17	28	cult./ed.	1.24	16
1170	12,596	office	2.17	27	cult./ed.	1.24	16
TOTAL	110,510			**336**			**274**
Letterman - Thornburg Area							
1029	100	dorm rooms	1	25	dorm rooms	1	100
1030	--	dorm rooms			dorm rooms		
1040	7,520	industrial/warehouse	0.99	7	industrial/warehouse	0.99	7
1063	28,797	industrial/warehouse	0.99	29	industrial/warehouse	0.99	29
1047	17,590	office	2.17	38	retail	3.97	70
1050	21,690	office	2.17	47	retail	3.97	86
1051	17,580	office	2.17	38	retail	3.97	70

		REPLACE AND WIDEN – DETOUR OPTION					
		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
1059	3,672	office	2.17	8	retail	3.97	15
1060	14,030	office	2.17	30	office	2.17	30
1061	82	retail	2.17	0	vacant	3.97	0
1056	620	office	3.97	2	retail	3.97	2
1062	12,700	retail	3.97	50	office	2.17	28
1076	390	retail	3.97	2	vacant	3.97	2
TOTAL	124,671			**276**			**439**
North Halleck Area							
205	121	industrial/warehouse	1.13	0	infrastructure	0.41	0
230	10,060	industrial/warehouse	1.13	11	vacant	0	0
231	3,842	industrial/warehouse	1.13	4	vacant	0	0
201	11,458	office	2.18	25	office	2.18	25
204	12,144	office	2.18	26	office	2.18	26
TOTAL	37,625			**67**			**52**
Fort Scott - Rod Road							
1263	10	1 bdrm du's	1.5	15	1 bdrm du's	1.5	15
1266	--	1 bdrm du's			1 bdrm du's		
1270	--	1 bdrm du's			1 bdrm du's		
				15			**15**
Palace of Fine Arts							
n/a	--	special use/museum		**258**	special use/museum		**258**
	TOTAL			**1,014**			**1,353**

Note: Buildings that are crossed-out would be lost due to the Doyle Drive Project; buildings identified as “vacant” are assumed to be vacant by the Presidio Trust.

TABLE B-3
FUTURE PARKING DEMAND – REPLACE AND WIDEN ALTERNATIVE – NO DETOUR OPTION

		REPLACE AND WIDEN – NO DETOUR OPTION					
		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
Crissy Field - Mason Street Warehouses							
1182	12,072	cult./ed. (artists studios)	1.36	16	office	2.17	26
1183	12,862	cult./ed. (artists studios)	1.36	17	office	2.17	28
1184	12,112	cult./ed. (artists studios)	1.36	16	office	2.17	26
1185	13,600	cult./ed. (artists studios)	1.36	18	office	2.17	30
1186	12,630	industrial/warehouse	1.12	14	cult./ed.	1.36	17
1187	13,440	industrial/warehouse	1.12	15	cult./ed.	1.36	18
1188	13,520	industrial/warehouse	1.12	15	cult./ed.	1.36	18
TOTAL	90,236			**111**			**163**
Crissy Field - PX/Commissary							
603	11,801	cult./ed.	1.36	16	cult./ed.	1.36	16
631	480	vacant	0	0	military	0	0
632	480	vacant	0	0	military	0	0
633	480	vacant	0	0	military	0	0
605	42,319	recreation	0.31	13	cult./ed.	1.36	58
606	7,416	retail	4.1	30	cult./ed.	1.36	10
610	92,722	warehouse retail	1.32	122	cult./ed.	1.36	126
653	5,413	warehouse retail	1.32	7	cult./ed.	1.36	7
TOTAL	161,111			**188**			**217**
Letterman - Gorgas Avenue Warehouses Area							
1151	11,907	fitness	5.2	62	fitness	5.2	62
1152	13,847	fitness	5.2	72	fitness	5.2	72
1158	4,164	~~office~~	~~2.17~~	~~9~~	~~vacant~~	~~0~~	~~0~~
1160	5,453	office	2.17	12	office	2.17	12
1161	12,000	office	2.17	26	office	2.17	26
1162	12,175	office	2.17 & 5.2	45	office	2.17	26
1163	13,156	office	2.17	29	office	2.17	29
1167	12,095	office	2.17	26	cult./ed.	1.24	15
1169	13,117	office	2.17	28	cult./ed.	1.24	16
1170	12,596	office	2.17	27	cult./ed.	1.24	16
TOTAL	110,510			**327**			**274**
Letterman - Thornburg Area							
1029	100	dorm rooms	1	25	dorm rooms	1	100
1030	--	dorm rooms			dorm rooms		
1040	7,520	industrial/warehouse	0.99	7	industrial/warehouse	0.99	7
1063	28,797	industrial/warehouse	0.99	29	industrial/warehouse	0.99	29
1047	17,590	office	2.17	38	retail	3.97	70
1050	21,690	office	2.17	47	retail	3.97	86
1051	17,580	office	2.17	38	retail	3.97	70

		REPLACE AND WIDEN – NO DETOUR OPTION					
		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
1059	3,672	office	2.17	8	retail	3.97	15
1060	14,030	office	2.17	30	office	2.17	30
1061	82	retail	2.17	0	vacant	3.97	0
1056	620	office	3.97	2	retail	3.97	2
1062	12,700	retail	3.97	50	office	2.17	28
1076	390	retail	3.97	2	vacant	3.97	2
TOTAL	124,671			**276**			**439**
North Halleck Area							
205	121	industrial/warehouse	1.13	0	infrastructure	0.41	0
230	10,060	industrial/warehouse	1.13	11	vacant	0	0
231	3,842	industrial/warehouse	1.13	4	vacant	0	0
201	11,458	office	2.18	25	office	2.18	25
204	12,144	office	2.18	26	office	2.18	26
TOTAL	37,625			**67**			**52**
Fort Scott - Rod Road							
1263	10	1 bdrm du's	1.5	15	1 bdrm du's	1.5	15
1266	--	1 bdrm du's			1 bdrm du's		
1270	--	1 bdrm du's			1 bdrm du's		
				15			**15**
Palace of Fine Arts							
n/a	--	special use/museum		**258**	special use/museum		**258**
	TOTAL			**1,247**			**1,418**

Note: Buildings that are crossed-out would be lost due to the Doyle Drive Project; buildings identified as “vacant” are assumed to be vacant by the Presidio Trust.

TABLE B-4
FUTURE PARKING DEMAND – PARKWAY ALTERNATIVE

		PARKWAY ALTERNATIVE					
		2010			2030		
Building	GSF	Use	Rate	Demand (spaces)	Use	Rate	Demand (spaces)
Crissy Field - Mason Street Warehouses							
1182	12,072	cult./ed. (artists studios)	1.36	16	office	2.17	26
1183	12,862	cult./ed. (artists studios)	1.36	17	office	2.17	28
1184	12,112	cult./ed. (artists studios)	1.36	16	office	2.17	26
1185	13,600	cult./ed. (artists studios)	1.36	18	office	2.17	30
1186	12,630	industrial/warehouse	1.12	14	cult./ed.	1.36	17
1187	13,440	industrial/warehouse	1.12	15	cult./ed.	1.36	18
1188	13,520	industrial/warehouse	1.12	15	cult./ed.	1.36	18
TOTAL	90,236			**111**			**163**
Crissy Field - PX/Commissary							
603	11,801	cult./ed.	1.36	16	cult./ed.	1.36	16
631	480	vacant	0	0	military	0	0
632	480	vacant	0	0	military	0	0
633	480	vacant	0	0	military	0	0
605	42,319	~~recreation~~	~~0.31~~	~~13~~	~~cult./ed.~~	~~1.36~~	~~58~~
606	7,416	~~retail~~	~~4.1~~	~~30~~	~~cult./ed.~~	~~1.36~~	~~10~~
610	92,722	warehouse retail	1.32	122	cult./ed.	1.36	126
653	5,413	warehouse retail	1.32	7	cult./ed.	1.36	7
TOTAL	161,111			**145**			**149**
Letterman - Gorgas Avenue Warehouses Area							
*1151	11,907	fitness	5.2	62	fitness	5.2	62
1152	13,847	fitness	5.2	72	fitness	5.2	72
1158	4,164	~~office~~	~~2.17~~	~~9~~	~~vacant~~	~~0~~	~~0~~
1160	5,453	office	2.17	12	office	2.17	12
1161	12,000	office	2.17	26	office	2.17	26
1162	12,175	office	2.17 & 5.2	45	office	2.17	26
1163	13,156	office	2.17	29	office	2.17	29
1167	12,095	office	2.17	26	cult./ed.	1.24	15
1169	13,117	office	2.17	28	cult./ed.	1.24	16
1170	12,596	office	2.17	27	cult./ed.	1.24	16
TOTAL	110,510			**327**			**274**
Letterman - Thornburg Area							
1029	100	dorm rooms	1	25	Dorm rooms	1	100
1030	--	dorm rooms			Dorm rooms		
1040	7,520	industrial/warehouse	0.99	7	industrial/warehouse	0.99	7
1063	28,797	industrial/warehouse	0.99	29	industrial/warehouse	0.99	29
1047	17,590	office	2.17	38	retail	3.97	70
1050	21,690	office	2.17	47	retail	3.97	86
1051	17,580	office	2.17	38	retail	3.97	70

		PARKWAY ALTERNATIVE					
		2010			2030		
Building	**GSF**	**Use**	**Rate**	**Demand (spaces)**	**Use**	**Rate**	**Demand (spaces)**
1059	3,672	office	2.17	8	retail	3.97	15
1060	14,030	office	2.17	30	office	2.17	30
1061	82	retail	2.17	0	vacant	3.97	0
1056	620	office	3.97	2	retail	3.97	2
1062	12,700	retail	3.97	50	office	2.17	28
1076	390	retail	3.97	2	vacant	3.97	2
TOTAL	124,671			**276**			**439**
North Halleck Area							
205	121	~~industrial/warehouse~~	~~1.13~~	~~0~~	~~infrastructure~~	~~0.41~~	~~0~~
230	10,060	~~industrial/warehouse~~	~~1.13~~	~~11~~	~~vacant~~	~~0~~	~~0~~
231	3,842	~~industrial/warehouse~~	~~1.13~~	~~4~~	~~vacant~~	~~0~~	~~0~~
**201	11,458	~~office~~	~~2.18~~	~~25~~	office	2.18	16
204	12,144	~~office~~	~~2.18~~	~~26~~	~~office~~	~~2.18~~	~~26~~
TOTAL	37,625			**0**			**16**
Fort Scott - Rod Road							
1263	10	1 bdrm du's	1.5	15	1 bdrm du's	1.5	15
1266	--	1 bdrm du's			1 bdrm du's		
1270	--	1 bdrm du's			1 bdrm du's		
				15			**15**
Palace of Fine Arts							
n/a	--	special use/museum		**258**	special use/museum		**258**
	TOTAL			**1,247**			**1,314**

Notes:
* Building 1151 remains under Diamond option, but removed under Circle Drive option
** Building 201 – building area reduced to approximately 7,112 sq. ft. under 2030 conditions

Buildings that are crossed-out would be lost due to the Doyle Drive Project; buildings identified as “vacant” are assumed to be vacant by the Presidio Trust.

APPENDIX C

BUILDING REMOVAL & VACANCY ASSUMPTIONS

TABLE C-1
BUILDING REMOVAL AND VACANCY ASSUMPTIONS

	No Build		Replace & Widen – Detour Alternative		Replace & Widen – No Detour Alternative		Parkway Alternative	
Building	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**
Crissy Field – Mason St. Warehouses Area								
1182			Removed					
1183			Removed					
1184			Removed					
1185			Removed					
1186								
1187								
1188								
Crissy Field – PX/Commissary Area								
603								
631	Vacant		Vacant		Vacant		Vacant	
632	Vacant		Vacant		Vacant		Vacant	
633	Vacant		Vacant		Vacant		Vacant	
605			Removed	Removed			Removed	Removed
606			Removed				Removed	Removed
610			Removed					
653			Removed	Removed				
Letterman – Gorgas Ave. Warehouses Area								
1151								
1152								
1158		Vacant		Vacant	Removed	Vacant/ Removed	Removed	Vacant/ Removed
1160								
1161								
1162								
1163								
1167								
1169								
1170								
Letterman – Thornburg Area								
1029								

	No Build		Replace & Widen – Detour Alternative		Replace & Widen – No Detour Alternative		Parkway Alternative	
Building	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**
1030								
1040								
1063								
1047								
1050								
1051								
1059								
1060								
1061				Vacant		Vacant		Vacant
1056								
1062								
1076				Vacant		Vacant		Vacant
North Halleck Area								
205							Removed	Removed
230		Vacant		Vacant		Vacant	Removed	Vacant/ removed
231		Vacant		Vacant		vacant	Removed	Vacant/ removed
201							Removed	
204							Removed	Removed
Fort Scott – Rod Road Area								
1263								
1266								
1270								
Palace of Fine Arts								

Source: Parsons Brinckerhoff and the Presidio Trust, September 2004.

Notes: Denoting a building as “vacant” is based on building use assumptions made by the Presidio Trust. The identification of buildings for removal was based on the construction staging plans developed for the Doyle Drive project alternatives by Parsons Brinckerhoff. All other buildings would be occupied as identified in Appendix B during construction and/or permanently.

SOUTH ACCESS TO THE GOLDEN GATE BRIDGE

DOYLE DRIVE

ADDENDUM TO THE FINAL PARKING IMPACT ANALYSIS

OCTOBER 2006

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FIGURES

TABLES

I. INTRODUCTION

As part of the South Access to the Golden Gate Bridge – Doyle Drive Project, a technical report titled "Final Parking Impact Analysis – September 2004" was prepared which evaluated parking impacts of various project alternatives under several scenarios. Specifically, the alternatives studied included:

- Alternative 1 – No-Build Alternative,
- Alternative 2 – Replace and Widen Alternative (including two construction staging options, namely No Detour and With Detour), and
- Alternative 5 – Presidio Parkway Alternative, Diamond option.

The three scenarios evaluated were:

- Existing Conditions,
- Construction Impacts (or Temporary Impacts in year 2010), and
- Doyle Drive Project Impacts (or Permanent Impacts in year 2030).

The results were incorporated into the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR) documenting various environmental impacts, which served to facilitate public comments and the Preferred Alternative selection. In July 2006, the Doyle Drive Subcommittee to the Citizens Advisory Committee, the Citizens Advisory Committee, and the Doyle Drive Executive Committee all recommended Alternative 5 – Presidio Parkway Alternative (Modified Hook Ramp and Diamond options) as the Preferred Alternative.

The September 2004 technical report recommended that the parking impact analysis be updated on a regular basis to account for changes and variations to the current and proposed land uses. This addendum to the September 2004 technical report is prepared to reflect changes to the Presidio Trust's building use assumptions in the study area, as well as design modifications that were incorporated into the Preferred Alternative (as illustrated in Figure 1) primarily to reduce construction costs and to address environmental concerns. This addendum updates the parking impact analysis to evaluate the recommended Preferred Alternative following the initial study methodology.

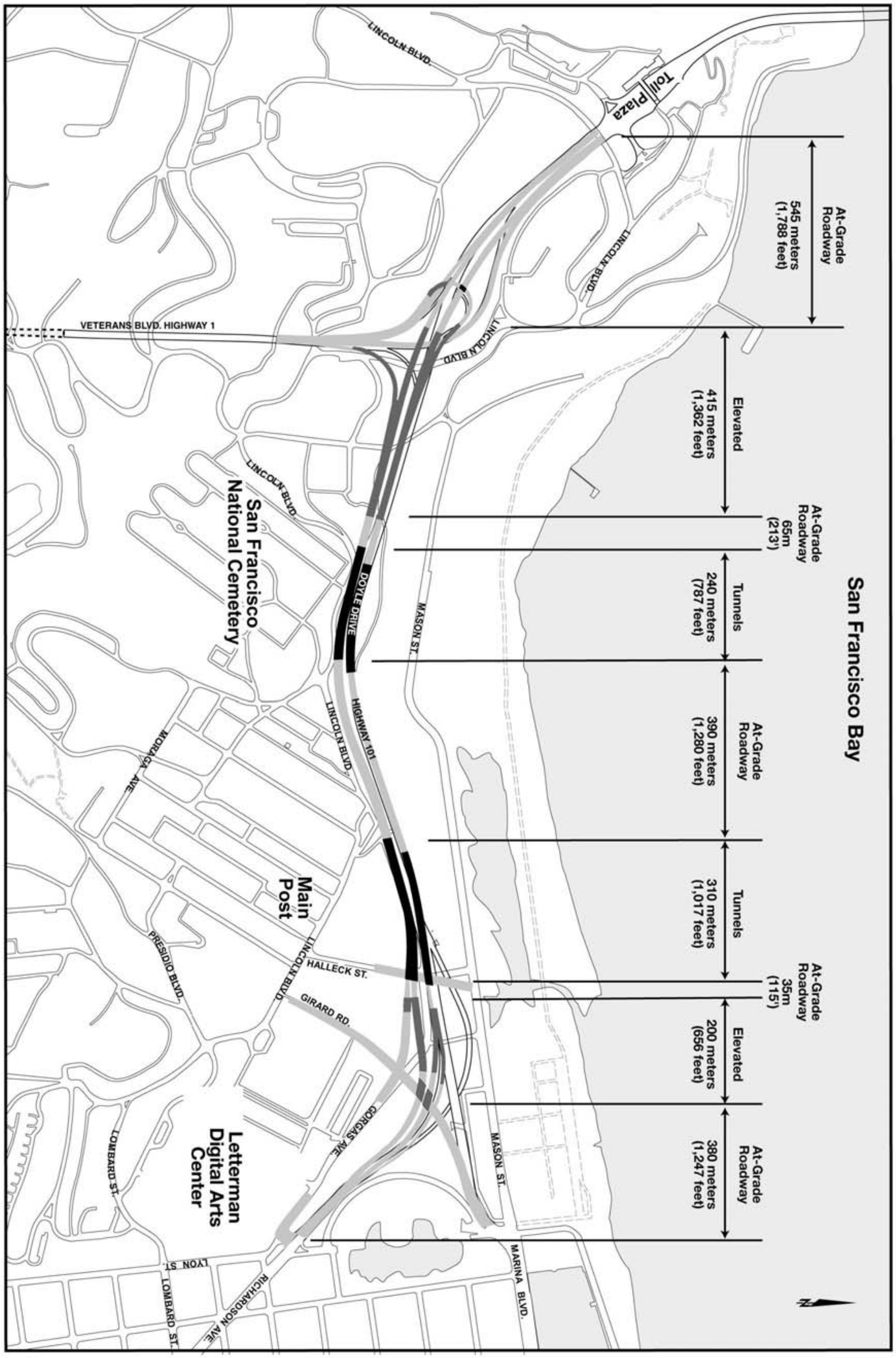

FIGURE 1
PREFERRED ALTERNATIVE – ALTERNATIVE 5 – REFINED PRESIDIO PARKWAY

II. PARKING IMPACT ANALYSIS

Considering the average weekday parking demand and the parking supply generally available to the public of the No-Build Alternative as the baseline, potential parking impacts of the Preferred Alternative are analyzed under the Construction Impacts (Temporary Impacts) and the Doyle Drive Project Impacts (Permanent Impacts) scenarios. Parking deficiencies greater than those of the baseline are identified as unmet demand, and mitigation measures are proposed to address these project-related impacts. Per industry standards, a rate of 350 square feet of unmarked pavement area for each parking space is used to estimate potential supply in parking areas affected by the project either temporarily or permanently.

Construction Impacts (Temporary Impacts)

Alternative 1: No-Build Alternative

Parking supply of the No-Build Alternative in year 2010 is assumed to be identical to current conditions. A field visit to the project site undertaken in July 2006 verifies that the parking areas as documented in the initial technical report are still operational, with the general assumption that the number of spaces in each parking facility remains unchanged. The 108-space parking lot in the PX/Commissary Area and the 30-space parking lot in the Thornburg Area which were lost during construction of the Letterman Digital Arts Center are now available. In addition, the unpaved 36-space lot to the east of Building 1063 in the Thornburg Area is now demarcated with 45 spaces. Figures 2 and 3 illustrate locations of the current parking supply. Similar information grouped by parking areas is presented in tabular format in Appendix A.

In terms of parking demand, the estimation is revised according to the recently amended building use assumptions provided by the Presidio Trust in July 2006, as documented in Appendix B. Accordingly, parking surpluses/deficiencies of the No-Build Alternative in year 2010 are identified as shown in Table 1. Taking into consideration parking surpluses inside the study area that are within 400 meters or 1/4 mile of locations with parking deficiencies (200 meters or 1/8 mile for retail, medical and the Swords to Plowshares buildings) as potential replacement lots, the adjusted parking surpluses/deficiencies are computed.

FIGURE 2
EXISTING PARKING SUPPLY – NORTHEAST PRESIDIO PARK AREA

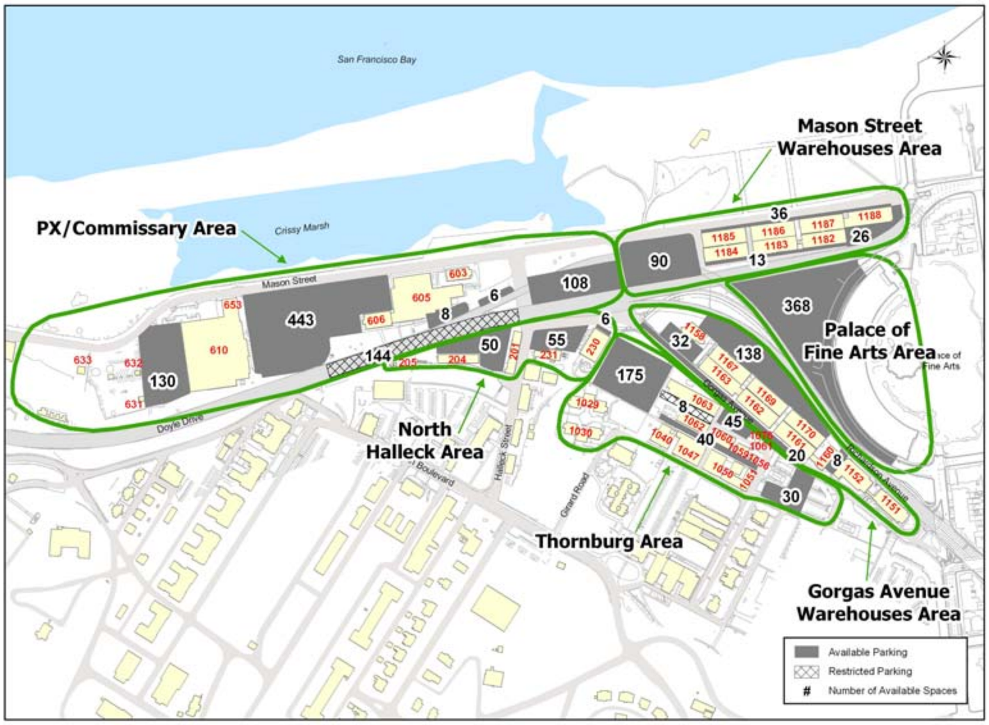

FIGURE 3
EXISTING PARKING SUPPLY – PARK PRESDIO INTERCHANGE AREA

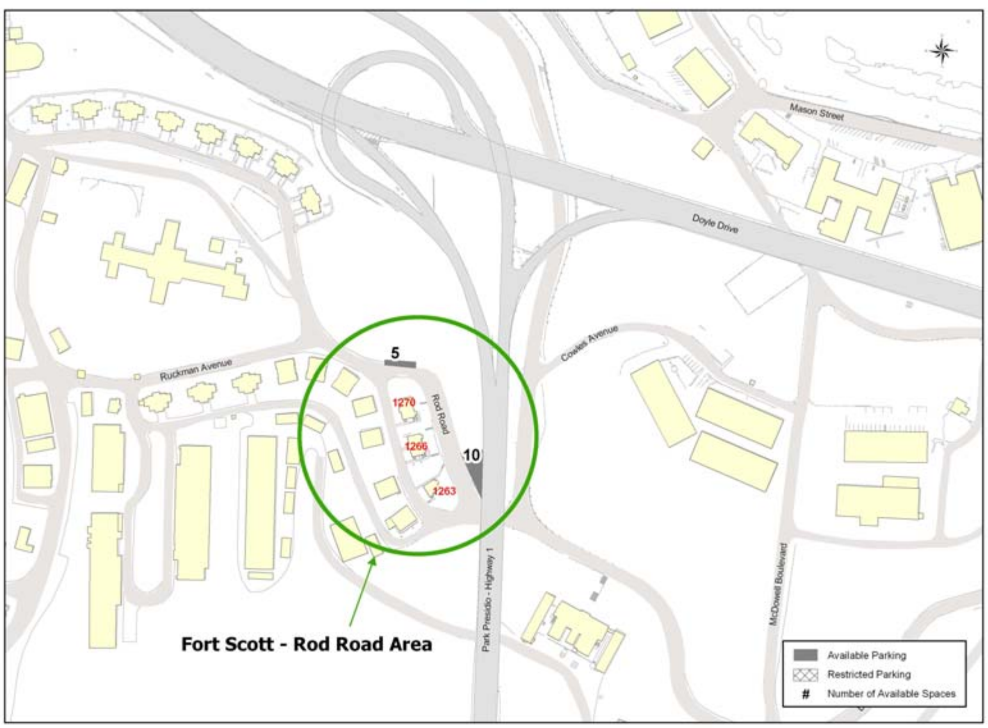

TABLE 1
2010 NO-BUILD ALTERNATIVE PARKING CONDITIONS

Parking Area	2010 No-Build Alternative			
	Supply	Demand	Surplus / Deficiency	Adjusted Surplus / Deficiency
	Number of Spaces			
Mason Street Warehouses Area	165	155	10	0
PX / Commissary Area	695	202	493	385
Gorgas Avenue Warehouses	198	303	-105	0
Thornburg Area	290	377	-87	-26
North Halleck Area	111	63	48	0
Fort Scott – Rod Road Area	15	15	0	0
Palace of Fine Arts	368	368	0	0
Total	**1842**	**1484**	**358**	**358**

Source: Parsons Brinckerhoff, Inc. August 2006.

Notes: The adjusted surplus/deficiency calculations assume that the Mason Street Warehouses surplus (10 spaces) and 95 spaces of the 108-space lot in the PX/Commissary Area could reduce the Gorgas Warehouses deficiency. Similarly, the North Halleck Area surplus (48 spaces) and the remaining surplus of the 108-space lot (13 spaces) in the PX/Commissary Area could reduce the Thornburg Area deficiency.

Based on the parking surpluses available in nearby areas, parking deficiencies within the Gorgas Avenue Warehouses could be alleviated and those of the Thornburg Area could be reduced. The adjusted surpluses/deficiencies are subsequently used to identify any potential unmet parking demand of the Preferred Alternative.

Alternative 5: Presidio Parkway Alternative

A considerable portion of the available parking supply would be used for construction staging purposes and/or lost due to the design of the Preferred Alternative. For instance, the accommodation of an improved access from Doyle Drive to the Presidio would affect parking conditions in the Thornburg Area. The parking supply by area associated with the Preferred Alternative is summarized in Table 2 with the detailed information documented in Appendix A. Although the construction period would last less than five years with many activities occurring in localized areas which on average would take two years to complete, conditions when the project construction activities would have the greatest effect on parking supply are reviewed. In terms of parking demand, some buildings (namely Buildings 605, 606, 1158, 204[1], 205, 230) within the study area would be removed and Building 201 would be temporarily relocated and left vacant to accommodate the Preferred Alternative, as presented in Appendix B. Enough parking supply would be provided near the Crissy Center (approximately at the location of Building 605 upon its demolition) to meet its demand during the construction period, as presented in Appendix A. Accordingly, parking surpluses/deficiencies and the corresponding adjusted values are identified. Based on the adjusted parking surpluses/deficiencies of the No-Build Alternative, the potential unmet parking demand of the Preferred Alternative during construction is computed as presented in Table 2.

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[1] A separate analysis evaluating the feasibility of temporarily relocating or permanently removing Building 204 will be undertaken. For the purposes of the parking impact analysis, it is assumed that the building is removed.

TABLE 2
2010 PREFERRED ALTERNATIVE PARKING CONDITIONS

Parking Area	2010 Preferred Alternative				2010 No-Build Alternative Adjusted Surplus / Deficiency	Unmet Demand due to Preferred Alternative
	Supply	Demand	Surplus / Deficiency	Adjusted Surplus / Deficiency		
	Number of Spaces					
Mason Street Warehouses Area	75	155	-80	-80	0	-80
PX / Commissary Area	146	146	0	0	385	0
Gorgas Avenue Warehouses	28	297	-269	-269	0	-269
Thornburg Area	115	377	-262	-262	-26	-236
North Halleck Area	0	0	0	0	0	0
Fort Scott – Rod Road Area	15	15	0	0	0	0
Palace of Fine Arts	110	368	-258	-258	0	-258
Total	**489**	**1358**	**-869**	**-869**	**358**	**-843**

Source: Parsons Brinckerhoff, Inc. August 2006.

Notes: During construction, there would not be any parking surplus in any parking areas.

Unmet parking demand is noted in the following parking areas during construction: Mason Street Warehouses, Gorgas Avenue Warehouses, Thornburg, and Palace of Fine Arts. Depending on the type, location, and duration of construction activities taking place, replacement parking might be available both within and outside the study area during construction. Proper signage should be provided to inform motorists of any parking changes and to direct them to the available parking facilities.

Generally, the Parade Grounds located to the southeast of the study area might be considered as replacement parking to accommodate the identified unmet demand. With coordination, the shuttle service currently operated by the Presidio Trust might be used to transport individuals to and from their destinations. The Doyle Drive Project will compensate for additional shuttle service required during the construction period. Also, the Presidio Trust has indicated the area to the southeast corner of Girard and Eddie Roads may be converted to a parking facility to address some of the temporary unmet parking demand. In addition, depending on the construction activities taking place, part of the 90-space lot in the Mason Street Warehouses Area, as well as the green space adjacent to the 108-space lot in the PX/Commissary Area, might be established as potential parking areas to help alleviate the deficiencies.

Temporary pedestrian and/or bicycle access would be provided in the vicinity of Halleck Street, the exact location of which would be determined based on construction sequencing.

Doyle Drive Project Impacts (Permanent Impacts)

Alternative 1: No-Build Alternative

Similar to the Construction Impacts (Temporary Impacts) scenario, parking supply of the No-Build Alternative in year 2030 is assumed to be identical to current conditions as verified in July 2006, while the estimated parking demand is revised according to the recently updated building use assumptions as documented in Appendix B. Accordingly, parking surpluses/deficiencies and the corresponding adjusted values of the No-Build Alternative in year 2030 are identified as shown in Table 3.

TABLE 3
2030 NO-BUILD ALTERNATIVE PARKING CONDITIONS

Parking Area	2030 No-Build Alternative			
	Supply	Demand	Surplus / Deficiency	Adjusted Surplus / Deficiency
	Number of Spaces			
Mason Street Warehouses Area	165	155	10	0
PX / Commissary Area	695	218	477	369
Gorgas Avenue Warehouses	198	303	-105	0
Thornburg Area	290	377	-87	-26
North Halleck Area	111	63	48	0
Fort Scott – Rod Road Area	15	15	0	0
Palace of Fine Arts	368	368	0	0
Total	**1842**	**1499**	**343**	**343**

Source: Parsons Brinckerhoff, Inc. August 2006.

Notes: The adjusted surplus/deficiency calculations assume that the Mason Street Warehouses surplus (10 spaces) and 95 spaces of the 108-space lot in the PX/Commissary Area could reduce the Gorgas Warehouses deficiency. Similarly, the North Halleck Area surplus (48 spaces) and the remaining surplus of the 108-space lot (13 spaces) in the PX/Commissary Area could reduce the Thornburg Area deficiency.

Similar to year 2010, parking deficiencies within the Gorgas Avenue Warehouses could be alleviated and those of the Thornburg Area could be reduced based on the parking surpluses available in nearby areas in year 2030. The adjusted surpluses/deficiencies are subsequently used to identify any potential unmet parking demand of the Preferred Alternative.

Alternative 5: Presidio Parkway Alternative

Upon completion of the Preferred Alternative, some of the parking supply lost during construction would become available while others would be lost permanently due to design elements such as the improved access from Doyle Drive to the Presidio in the Thornburg Area. The parking supply by area is summarized in Table 4 with the detailed information provided in Appendix A. In terms of parking demand, buildings indicated for removal to accommodate the Preferred Alternative during construction (namely Buildings 605, 606, 1158, 204[2], 205, and 230) would be permanently removed while only the top portion of Building 201 would be returned as shown in Appendix B. The resulting parking surpluses/deficiencies and the corresponding adjusted values of the Preferred Alternative in year 2030, along with the potential unmet parking demand, are identified as presented in Table 4.

[2] A separate analysis evaluating the feasibility of temporarily relocating or permanently removing Building 204 will be undertaken. For the purposes of the parking impact analysis, it is assumed that the building is removed.

TABLE 4
2030 PREFERRED ALTERNATIVE PARKING CONDITIONS

Parking Area	2030 Preferred Alternative				2030 No-Build Alternative Adjusted Surplus / Deficiency	Unmet Demand due to Preferred Alternative
	Supply	Demand	Surplus / Deficiency	Adjusted Surplus / Deficiency		
	Number of Spaces					
Mason Street Warehouses Area	344	155	189	0	0	0
PX / Commissary Area	679	150	529	421	369	0
Gorgas Avenue Warehouses	47	297	-251	0	0	0
Thornburg Area	178	377	-199	-168	-26	-142
North Halleck Area	0	16	-16	0	0	0
Fort Scott – Rod Road Area	15	15	0	0	0	0
Palace of Fine Arts	368	368	0	0	0	0
Total	**1631**	**1378**	**253**	**253**	**343**	**-142**

Source: Parsons Brinckerhoff, Inc. August 2006.

Notes: The adjusted surplus/deficiency calculations assume that the Mason Street Warehouses surplus (189 spaces) and 61 spaces of the 92-space lot in the PX/Commissary Area could reduce the Gorgas Warehouses deficiency. Similarly, the remaining 31 spaces of the 92-space lot in the PX/Commissary Area could reduce the Thornburg Area deficiency. Also, the PX/Commissary Area surplus (16 spaces of the 443-space lot) could reduce the North Halleck deficiency.

In year 2030, most of the parking demand within the overall study area would be met through surplus/deficiency adjustments made to adjacent parking areas. The only exception is the Thornburg Area, the parking deficiency of which is partly attributed to the provision of an improved access from Doyle Drive to the Presidio via the extension of Girard Road. To address the unmet demand of 142 parking spaces in the Thornburg Area, additional parking in the vicinity might be provided as mitigation. As areas of deficiency are generally located to the south of Doyle Drive, the Presidio Trust has indicated the area west of Halleck Street and south of the Main Post tunnels might be considered for potential location of a new underground parking facility to mitigate any unmet parking demand. Also, the area to the southeast corner of Girard and Eddie Roads which may be converted to a parking facility to address some of the temporary unmet parking demand may still be available in 2030 as well.

Pedestrian and/or bicycle access would be provided across Doyle Drive at several locations including: along Halleck Street connecting the Mason Street Warehouses Area and the North Halleck Area, along the new Girard Road extension as well as mid-block (as an underpass) of the Gorgas Warehouses connecting the Palace of Fine Arts and the Gorgas Warehouses Area. Another pedestrian and/or bicycle underpass access would be provided across the new Girard Road extension connecting the Mason Street Warehouses Area and the Palace of Fine Arts.

III. CONCLUSIONS/RECOMMENDATIONS

Under both of the Temporary and Permanent Impacts scenarios, the Parkway Alternative would result in unmet parking demand in various areas. Depending on the type, location, and duration of construction activities taking place, replacement parking might be available during construction both within and outside the study area. Proper signage should be provided to inform motorists of any parking changes and to direct them to the available parking facilities.

During the construction period, the Parade Grounds located to the southeast of the study area, augmented with the shuttle service currently operated by the Presidio Trust, could serve as general replacement parking. The Doyle Drive Project will compensate for additional shuttle service required during the construction period. Also, the Presidio Trust has indicated the area to the southeast corner of Girard and Eddie Roads may be converted to a parking facility to address some of the temporary unmet parking demand. In addition, depending on the construction activities taking place, part of the 90-space lot in the Mason Street Warehouses Area, as well as the green space adjacent to the 108-space lot in the PX/Commissary Area, might be used as parking areas.

Temporary pedestrian and/or bicycle access would be provided in the vicinity of Halleck Street, the exact location of which would be determined based on construction sequencing.

Upon completion of the Preferred Alternative, there would be an unmet demand of 142 spaces in the Thornburg Area. The area to the west of Halleck Street and south of the tunnel is identified as a location for a potential new underground parking facility. Also, the area to the southeast corner of Girard and Eddie Roads which may be converted to a parking facility to address some of the temporary unmet parking demand may still be available in 2030 as well.

Pedestrian and/or bicycle access would be provided across Doyle Drive at several locations including: along Halleck Street connecting the Mason Street Warehouses Area and the North Halleck Area, along the new Girard Road extension as well as mid-block (as an underpass) of the Gorgas Warehouses connecting the Palace of Fine Arts and the Gorgas Warehouses Area. Another pedestrian and/or bicycle underpass access would be provided across the new Girard Road extension connecting the Mason Street Warehouses Area and the Palace of Fine Arts.

Detailed design of parking facilities affected by the Preferred Alternative would take pedestrian circulation, traffic safety, and parking access into consideration. The detailed design would also comply with the Americans with Disabilities Act (ADA) Standards for Accessible Design.

As noted in the September 2004 technical report, quantifying the available parking supply and expected parking demand is a speculative exercise due to the dynamic nature of the Presidio building use. Changes and variations to current building uses and expectations may occur that could have considerable impacts on parking assessment. It is therefore recommended that the parking impact analysis be updated on a regular basis to include latest uses and modified proposals for better assessment and more effective use of the Presidio parking facilities.

APPENDIX A

PARKING SUPPLY

Parking Location	2010		2030	
	No-Build Alternative	Preferred Alternative	No-Build Alternative	Preferred Alternative
	Number of Spaces			
Mason Street Warehouses Area				
[a] South and East of Building 1188	26	26	26	218
South of Buildings 1184, 1183, 1182	13	13	13	
Street parking along south side of Mason Street adjacent warehouses	36	36	36	36
[b] Area between mainline Doyle Viaduct and Mason Street	90	0	90	90
SUBTOTAL	**165**	**75**	**165**	**344**
PX / Commissary Area				
[c] Post Exchange / Commissary	443	16	443	443
[d] South of Building 605	8	0	8	8
[d] Street parking south of Building 603	6	0	6	6
[e] West of Building 610	130	130	130	130
[f] Area between Halleck Street and Marshall Street	108	0	108	92
[g] Under Doyle Drive (west of Halleck)	0	0	0	0
SUBTOTAL	**695**	**146**	**695**	**679**
Gorgas Avenue Warehouses Area				
[h] Behind Gorgas Warehouses	138	0	138	19
Street parking along east side of Gorgas Avenue	20	20	20	20
[g] South of Building 1160	0	0	0	0
[g] South of Building 1063	0	0	0	0
[i] South of Building 1158	32	0	32	0
East of Building 1160	8	8	8	8
SUBTOTAL	**198**	**28**	**198**	**47**
Thornburg Area				
[h] Northeast of Building 1029	175	0	175	63
[j] East of Building 1063	45	45	45	45
Thornburg Road	40	40	40	40
East of Building 1051	30	30	30	30
SUBTOTAL	**290**	**115**	**290**	**178**
North Halleck Area				
[i] North of Building 230	6	0	6	0
[i] West of Building 230	55	0	55	0
[i] West of Building 201	50	0	50	0
SUBTOTAL	**111**	**0**	**111**	**0**
Fort Scott - Road Road Area				
Street parking and parking lot along Rod Road	15	15	15	15
SUBTOTAL	**15**	**15**	**15**	**15**
Palace of Fine Arts				
[d] Triangular parking lot to the west of the Palace	258	0	258	258
Angle parking along the Palace	110	110	110	110
SUBTOTAL	**368**	**110**	**368**	**368**
TOTAL	**1842**	**489**	**1842**	**1631**

Source: Presidio Trust, August 2006.

No-Build Alternative - For year 2010 and 2030, parking supply is assumed identical to conditions at the time this addendum is prepared.

Preferred Alternative - For year 2010 and 2030, parking supply is assumed based on the design developed by Parsons Brinckerhoff.

[a] Preferred Alternative - For year 2030, a new surface parking lot is assumed added to the south of the Mason Street Warehouses which would provide a total of 218 spaces.

[b] Preferred Alternative - This parking lot is assumed lost during construction but would be available upon project completion. The Doyle Drive project would coordinate with the Tennessee Hollow project for any potential expansion of the Crissy Marsh.

[c] Preferred Alternative - This parking lot is assumed to provide enough parking spaces to meet the PX/Commissary Area parking demand, while the remaining parking area would be lost during construction; the entire parking lot would be available upon project completion.

[d] Preferred Alternative - This parking lot is assumed lost during construction but would be available upon project completion.

[e] No-Build Alternative - The available parking supply could be impacted by demand generated by Buildings 640, 643, 644, 649, 650 and 651; it is assumed that only 130 spaces would be available.

[f] Preferred Alternative - This parking lot is assumed lost during construction but would be available upon project completion (with about 16 spaces permanently lost due to re-alignment of Halleck Street).

[g] No-Build and Preferred Alternatives - This parking lot is assumed unavailable.

[h] Preferred Alternative - This parking lot is assumed lost during construction; a smaller and re-striped area would be available upon project completion.

[i] Preferred Alternative - This parking lot is assumed lost both during construction and upon project completion.

[j] No-Build Alternative - The parking lot currently has 45 demarcated parking spaces upon completion of the Letterman Digital Arts Center, which is more than the 30 spaces assumed in the previous Final Parking Impact Analysis Report (September 2004).

APPENDIX B

PARKING DEMAND CALCULATIONS

The parking demand calculations are provided by the Presidio Trust and reflect rates used in their Presidio Traffic Management Plan (PTMP). The following text is obtained from the PTMP Background Transportation Report and provided by the Presidio Trust. It provides information on the source of the parking demand rates:

> *"Parking demand for buildings in the Doyle Drive corridor consists of both long-term demand (i.e., employee and resident parking) and short-term demand (i.e. visitor parking). Long-term parking for non-housing land uses was estimated by determining the number of employees for each land use and applying the average mode split and vehicle occupancy from the trip generation estimates for both external and internal trips. Each employee vehicle trip was assumed to require one space per day. The parking demand for lodging was estimated as long-term only, with a rate of 1.0 spaces per room, which accounts for both employees and guests. A long-term rate of 1.5 spaces per dwelling unit was used for all housing components.*
>
> *"Short-term parking was estimated based on the total daily visitor trips and the average turnover rate. A short-term parking turnover rate of 6.0 vehicles per space per day was applied to most land uses for all alternatives, with the exception of retail and cultural/educational uses for which a turnover rate of 10 vehicles per space per day was used, as well as conference uses for which a turnover rate of 3 vehicles per space per day was used. The parking demand rates shown in this appendix represent a combination of long-term and short-term demand and reflect the travel demand assumptions used in the transportation analysis for the Presidio Trust Management Plan EIS."*

Building	GSF	2010						2030					
		No-Build Alternative			Preferred Alternative			No-Build Alternative			Preferred Alternative		
		Use	Rate (spaces / 1000 ft^2)	Parking Demand (spaces)	Use	Rate (spaces / 1000 ft^2)	Parking Demand (spaces)	Use	Rate (spaces / 1000 ft^2)	Parking Demand (spaces)	Use	Rate (spaces / 1000 ft^2)	Parking Demand (spaces)
Mason Street Warehouses Area													
1182	12,072	Office	2.18	26	Office	2.18	26	Office	2.18	26	Office	2.18	26
1183	12,862	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17
1184	12,112	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16
1185	13,600	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18
1186	12,630	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17
1187	13,440	Office	2.18	29	Office	2.18	29	Office	2.18	29	Office	2.18	29
1188	13,520	Office	2.18	29	Office	2.18	29	Office	2.18	29	Office	2.18	29
SUBTOTAL	90,236			**155**			**155**			**155**			**155**
PX / Commissary Area													
603	11,801	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16	Cultural/Educational	1.36	16
631	480	Vacant	0	0	Vacant	0	0	Infrastructure	0.41	0	Infrastructure	0.41	0
632	480	Vacant	0	0	Vacant	0	0	Infrastructure	0.41	0	Infrastructure	0.41	0
633	480	Vacant	0	0	Vacant	0	0	Infrastructure	0.41	0	Infrastructure	0.41	0
605	42,319	Industrial/Warehouse	1.14	48	~~Industrial/Warehouse~~	~~1.14~~	0	Cultural/Educational	1.36	58	~~Cultural/Educational~~	~~1.36~~	0
606	7,416	Industrial/Warehouse	1.14	8	~~Industrial/Warehouse~~	~~1.14~~	0	Cultural/Educational	1.36	10	~~Cultural/Educational~~	~~1.36~~	0
610	92,722	Warehouse Retail	1.32	122	Warehouse Retail	1.32	122	Cultural/Educational	1.36	126	Cultural/Educational	1.36	126
653	5,413	Warehouse Retail	1.32	7	Warehouse Retail	1.32	7	Cultural/Educational	1.36	7	Cultural/Educational	1.36	7
SUBTOTAL	161,111			**202**			**146**			**218**			**150**
Gorgas Avenue Warehouses Area													
1151	11,907	Fitness	5.2	62	Fitness	5.2	62	Fitness	5.2	62	Fitness	5.2	62
1152	13,847	Fitness	5.2	72	Fitness	5.2	72	Fitness	5.2	72	Fitness	5.2	72
1158	4,164	Cultural/Educational	1.36	6	~~Cultural/Educational~~	~~1.36~~	0	Cultural/Educational	1.36	6	~~Cultural/Educational~~	~~1.36~~	0
1160	5,453	Cultural/Educational	1.36	7	Cultural/Educational	1.36	7	Cultural/Educational	1.36	7	Cultural/Educational	1.36	7
1161	12,000	Retail	4.13	50	Retail	4.13	50	Retail	4.13	50	Retail	4.13	50
1162	12,175	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17
1163	13,156	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18	Cultural/Educational	1.36	18
1167	12,095	Office	2.18	26	Office	2.18	26	Office	2.18	26	Office	2.18	26
1169	13,117	Office	2.18	29	Office	2.18	29	Office	2.18	29	Office	2.18	29
1170	12,596	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17	Cultural/Educational	1.36	17
SUBTOTAL	110,510			**303**			**297**			**303**			**297**
Thornburg Area													
1029	100	Residential (dorm rooms)	1	25	Residential (dorm rooms)	1	25	Residential (dorm rooms)	1	25	Residential (dorm rooms)	1	25
1030	--	Residential (dorm rooms)			Residential (dorm rooms)			Residential (dorm rooms)			Residential (dorm rooms)		
1040	7,520	Industrial/Warehouse	1.14	9	Industrial/Warehouse	1.14	9	Industrial/Warehouse	1.14	9	Industrial/Warehouse	1.14	9
1063	28,797	Industrial/Warehouse	1.14	33	Industrial/Warehouse	1.14	33	Industrial/Warehouse	1.14	33	Industrial/Warehouse	1.14	33
1047	17,590	Retail	4.13	73	Retail	4.13	73	Retail	4.13	73	Retail	4.13	73
1050	21,690	Retail	4.13	90	Retail	4.13	90	Retail	4.13	90	Retail	4.13	90
1051	17,580	Retail	4.13	73	Retail	4.13	73	Retail	4.13	73	Retail	4.13	73
1059	3,672	Retail	4.13	15	Retail	4.13	15	Retail	4.13	15	Retail	4.13	15
1060	14,030	Office	2.18	31	Office	2.18	31	Office	2.18	31	Office	2.18	31
1061	82	Infrastructure	0.41	0	Infrastructure	0.41	0	Infrastructure	0.41	0	Infrastructure	0.41	0
1056	620	Retail	4.13	3	Retail	4.13	3	Retail	4.13	3	Retail	4.13	3
1062	12,700	Office	2.18	28	Office	2.18	28	Office	2.18	28	Office	2.18	28
1076	390	Infrastructure	0.41	0	Infrastructure	0.41	0	Infrastructure	0.41	0	Infrastructure	0.41	0
SUBTOTAL	124,771			**377**			**377**			**377**			**377**
North Halleck Area													
205	121	Infrastructure	0.41	0	~~Infrastructure~~	~~0.41~~	0	Infrastructure	0.41	0	~~Infrastructure~~	~~0.41~~	0
230	10,060	Industrial/Warehouse	1.14	11	~~Industrial/Warehouse~~	~~1.14~~	0	Industrial/Warehouse	1.14	11	~~Industrial/Warehouse~~	~~1.14~~	0
~~231~~	~~3,842~~	~~Industrial/Warehouse~~	~~1.14~~	~~0~~	~~Industrial/Warehouse~~	~~1.14~~	~~0~~	~~Industrial/Warehouse~~	~~1.14~~	~~0~~	~~Industrial/Warehouse~~	~~1.14~~	~~0~~
201	11,458	Office	2.18	25	Vacant	0	0	Office	2.18	25	Office	2.18	16
204	12,144	Office	2.18	26	~~Office~~	~~2.18~~	0	Office	2.18	26	~~Office~~	~~2.18~~	0
SUBTOTAL	37,625			**63**			**0**			**63**			**16**
Fort Scott – Rod Road Area													
1263	10	Residential (1 bedroom du's)	1.5	15	Residential (1 bedroom du's)	1.5	15	Residential (1 bedroom du's)	1.5	15	Residential (1 bedroom du's)	1.5	15
1266	--	Residential (1 bedroom du's)			Residential (1 bedroom du's)			Residential (1 bedroom du's)			Residential (1 bedroom du's)		
1270	--	Residential (1 bedroom du's)			Residential (1 bedroom du's)			Residential (1 bedroom du's)			Residential (1 bedroom du's)		
SUBTOTAL	10			**15**			**15**			**15**			**15**
Palace of Fine Arts													
n/a	--	Special Use/Museum		368	Special Use/Museum		368	Special Use/Museum		368	Special Use/Museum		368
SUBTOTAL	0			**368**			**368**			**368**			**368**
		TOTAL		**1484**	**TOTAL**		**1358**	**TOTAL**		**1499**	**TOTAL**		**1378**

Source: President Trust, July 2006.

The identification of buildings for removal is based on construction staging plans as developed by Parsons Brinckerhoff.

Buildings 1029 and 1030 (Swords to Plowshares) - There are a total of 100 dorm rooms in these two buildings. Parking demand is based on the lease arrangement of 25 parking spaces.

Buildings 1263, 1266, and 1270 - There is a total of ten one-bedroom units in these three buildings.

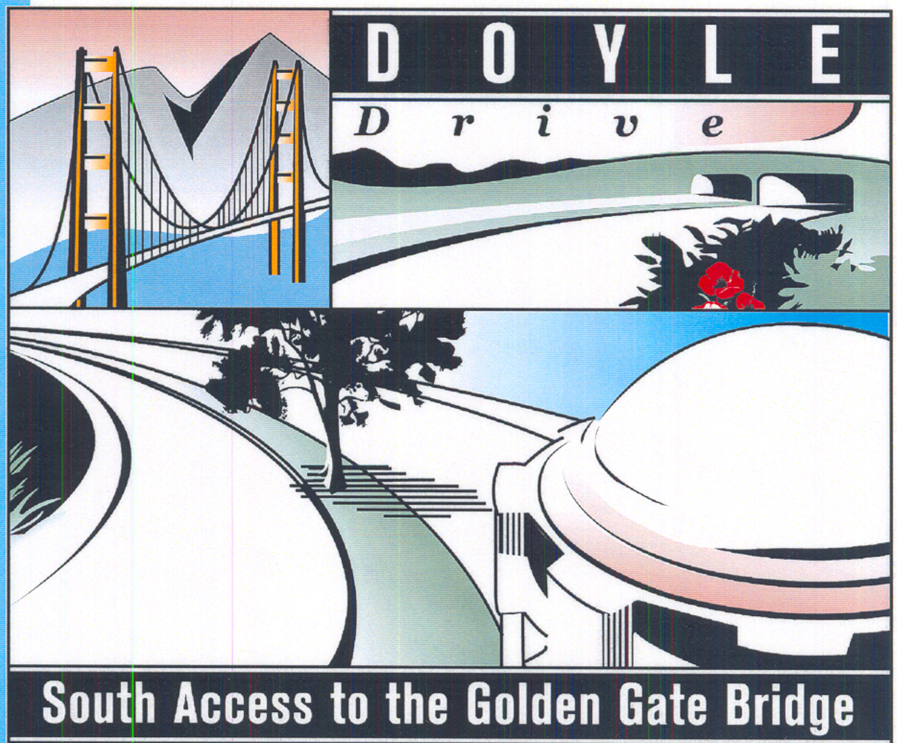
Building 231 - The building is assumed to be demolished by year 2010 under No-Build conditions.

Building 201 – Under the Preferred Alternative, the building is assumed to be relocated and left vacant in year 2010; the building area is assumed to be reduced to approximately 7,112 ft^2 (i.e. the top portion remains) in year 2030.

Building 204 - Under the Preferred Alternative, the building is assumed to be removed by year 2010. A separate analysis evaluating the feasibility of temporarily relocating or permanently removing Building 204 will be undertaken.

Palace of Fine Arts - Existing parking demand varies based on special events at the Palace of Fine Arts; parking demand is assumed to be equivalent to parking supply as a conservative estimate.

SFCTA Contract Number 99/00-7



FINAL PRELIMINARY TUNNEL SYSTEMS REPORT

OCTOBER 2004

Prepared By:

Mark Grodzki, Parsons Brinckerhoff

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Summary

The purpose of the Doyle Drive project is to replace the existing southern approach to the Golden Gate Bridge - US 101 (Doyle Drive) to improve the seismic, structural and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its status as a National Park. One of the alternatives (Presidio Parkway) incorporates tunnels to better accommodate Doyle Drive within the Presidio. The area above the tunnel can be returned to park use, increasing the land available for public use.

The Presidio Parkway alternative includes the Battery Tunnels which are 240 m (790 feet) and 230 m (750 feet) in length and the Main Post Tunnels which are 280 m (920 feet) and 315 m (1030 feet) in length. The tunnels provide for four southbound lanes, including an auxillary lane, three northbound lanes and continuous shoulders. The north tunnel portal for the two sets of tunnels will be located just west of the National Cemetery with the southern tunnel portal for the second set of tunnels located just east of Halleck Street.

The Presidio Parkway alternative includes an open roadway section between the Battery Tunnels and Main Post Tunnels. This reduces the risks associated with fires and emergencies in long roadway tunnels, adds to the motorists driving experience and reduces costly construction of longer underground structures.

Ventilation

The Battery Tunnels and Main Post Tunnels will be ventilated by means of ceiling mounted jet fans or nozzles located inside the tunnel structure, minimizing the size of necessary ancillary structures to house equipment. The ventilation system capacity will be based on use by motorized vehicles only as non-motorized vehicles and pedestrians will continue to be prohibited from the facility. In normal operation the jet fans maintain a flow of air along the entire length of the tunnel when needed depending on natural air currents and traffic piston effects.

Fire Protection

The fire protection system for both the Battery Tunnels and Main Post Tunnels will consist of a wet standpipe with valves regularly spaced along the sidewall in each tunnel. The standpipe system needs to supply 1920 liters of water per minute (500 gpm) for one hour’ s duration. The Presidio has sufficient on-site water storage to supply the necessary water. The water will be supplied to the standpipes by means of fire pumps. Closed circuit television and alarm systems will provide early detection of any incident.

Power and Lighting

PG&E will provide the primary electrical power to the tunnels for ventilation, lighting, and the auxiliary systems . The secondary power supply will come from a different source, either a separate PG&E substation or the Presidio Trust grid. Further consultation with the utility providers will be needed to determine the final location of service and power requirements once a preferred alternative is selected.

Tunnel lighting will consist of fluorescent lamps for the full length of the tunnel combined with high pressure sodium lamps to provide the higher level of luminance needed at the tunnel entrance to transition from daylight to the tunnel interior. Automatic photocontrols will adjust the tunnel lighting to match the exterior natural light.

Drainage

Storm water run-off from the roadway will be intercepted before entering the tunnel. Gravity drains within the tunnel will convey liquids from tunnel washing and fire fighting to an oil/waste separator located at the tunnel low point. The 115,200 liter (30,000 gal) separator sump will fully contain the water needed during one hour of fire fighting. Once the water has passed through the separator and collected in the sump, the waste water will then be discharged via a submersible sump pump to the local sewer system.

Traffic Control and Tunnel Systems

The traffic control system will be semi-automatic, with a set of pre-programmed responses, verified by an operator in the remote control center. The tunnel systems will be operated primarily from the existing Caltrans facility in Oakland. However, provisions will be made so if communications are lost between the tunnel and the Oakland center - the tunnel facilities can be operated on a temporary, emergency basis locally, from either of the switchgear and motor control centers at the tunnels themselves.

SECTION 1: INTRODUCTION

The Presidio Parkway alternative is one of the three alternatives being considered for further detailed analysis within the South Access to the Golden Gate Bridge - Doyle Drive Project Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR). The following provides a review of the three alternatives.

1.1 OVERVIEW

Doyle Drive is 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). In 1994, when the US Army transferred jurisdiction of the Presidio to the National Park Service (NPS), it became part of the National Park system and Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), the agency responsible for oversight of 80 percent of the Presidio delineated as Area B; and the NPS, which is responsible for management of the coastal portions of the park (the remaining 20 percent) that are delineated as Area A. Doyle Drive lies predominately 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, the southern approach of US 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which 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 1-1). 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.

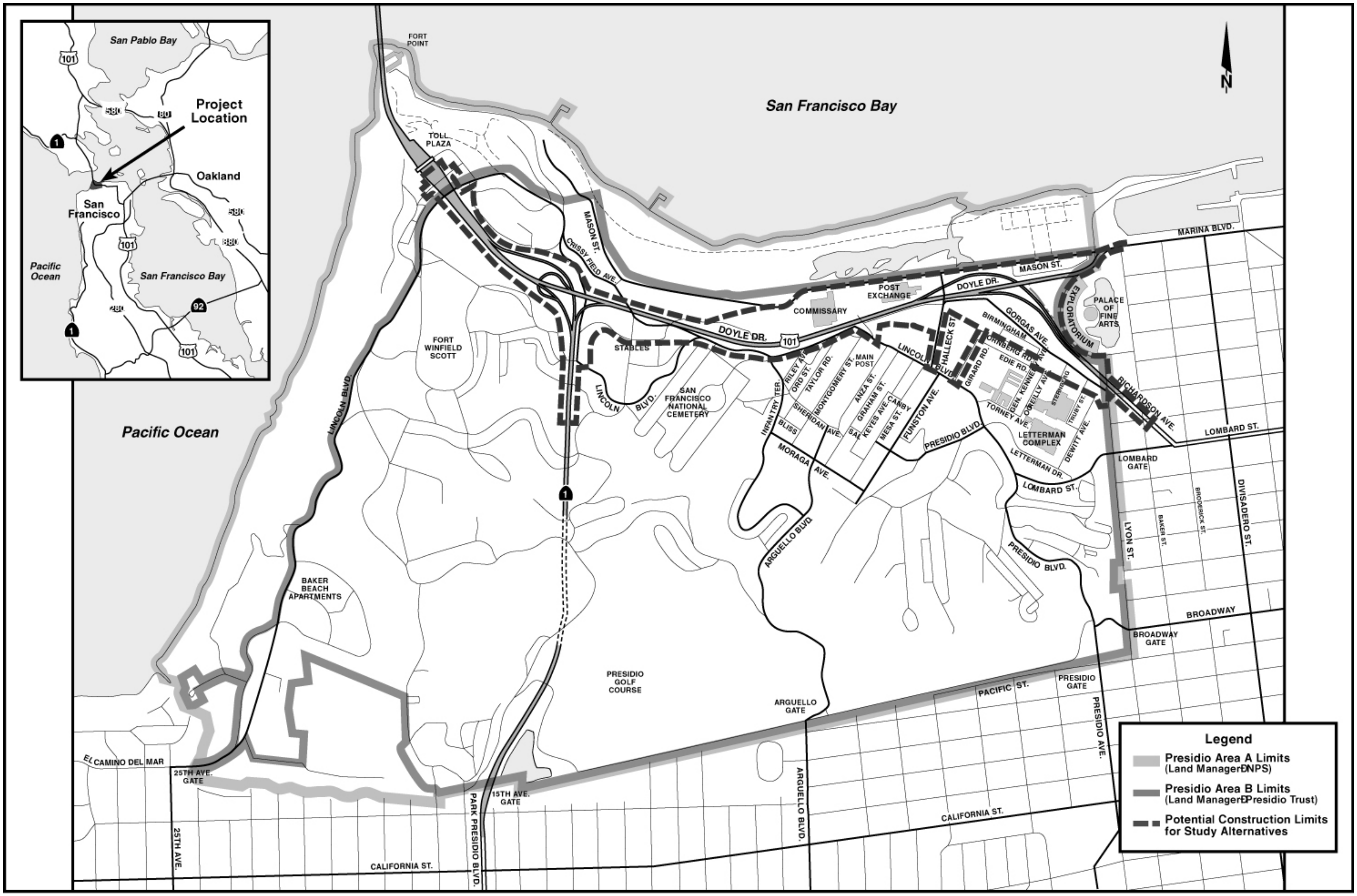
Doyle Drive is nearly 70 years old and it is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic 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 facility 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 manually moved 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).

1.2 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 1-1
PROJECT LOCATION



1.3 ALTERNATIVES THAT ARE BEING CONSIDERED

This section describes the build alternatives in terms of physical and operating characteristics and a No-Build Alternative. During the screening process, all alternatives were evaluated for their ability to meet the project's Purpose and Need. Detailed drawings showing the plan and profile of each alternative in addition to the various design options can be found in Appendix A.

1.3.1 ALTERNATIVE 1: NO-BUILD ALTERNATIVE

The No-Build Alternative represents the future year 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 1-2). 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 (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

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.

1.3.2 ALTERNATIVE 2: REPLACE AND WIDEN ALTERNATIVE

The Replace and Widen Alternative would replace the 463-meter (1,519-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 1-3). 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 and a 3.6-meter (12-foot) eastbound auxiliary lane with a fixed median barrier or six 3.6-meter (12-foot) lanes with a moveable median barrier. The new facility would have an overall width of 38 meters (124 feet). The fixed median barrier 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 32.4 meters (106 feet). 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 and the ramp connecting westbound Doyle Drive to southbound 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.

The Replace and Widen Alternative includes two options for the construction staging:

Detour Option - A 20.4-meter (67-foot) wide temporary detour facility would be constructed to the north of 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.

FIGURE 1-2
ALTERNATIVE 1: NO-BUILD

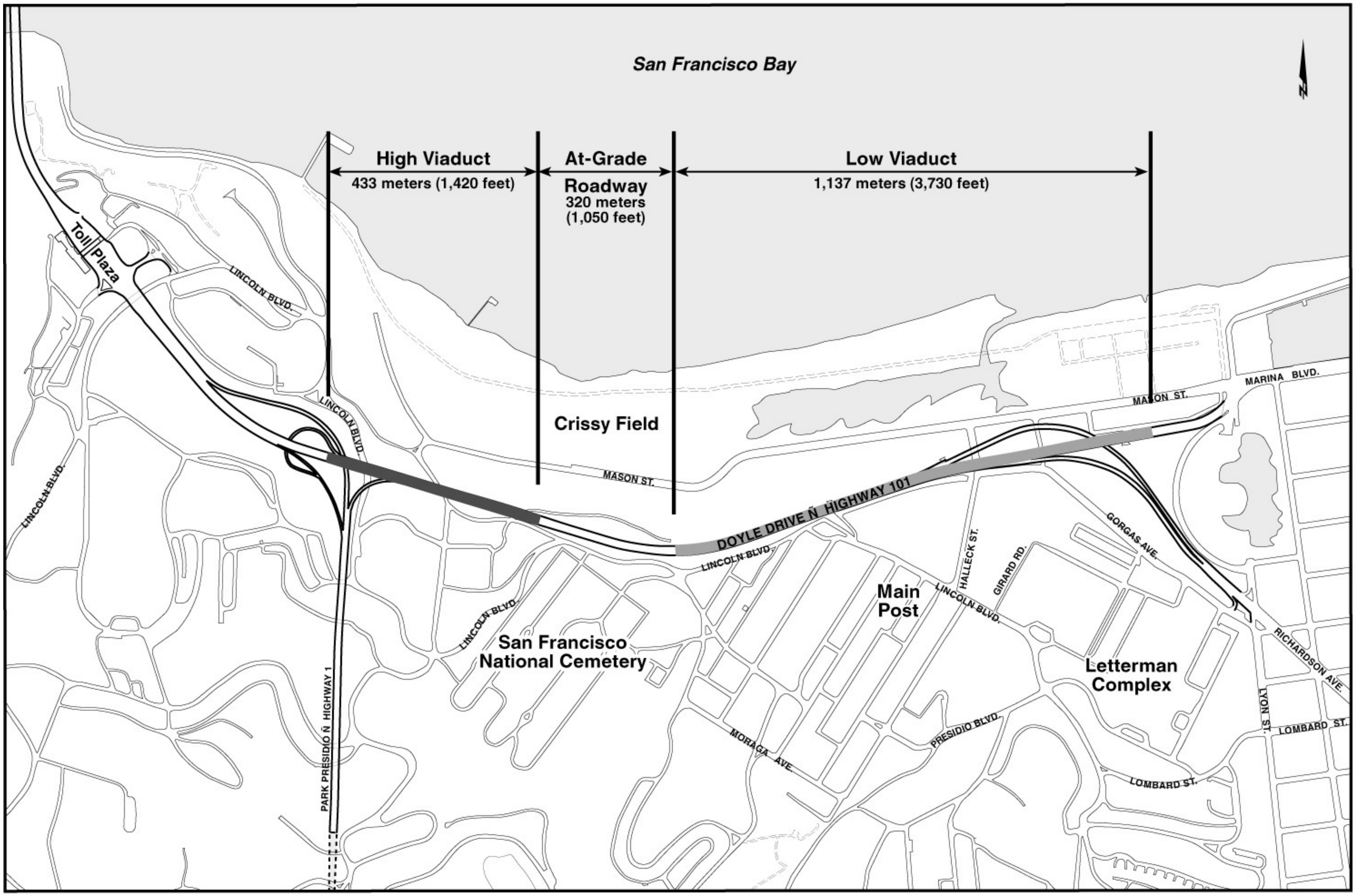
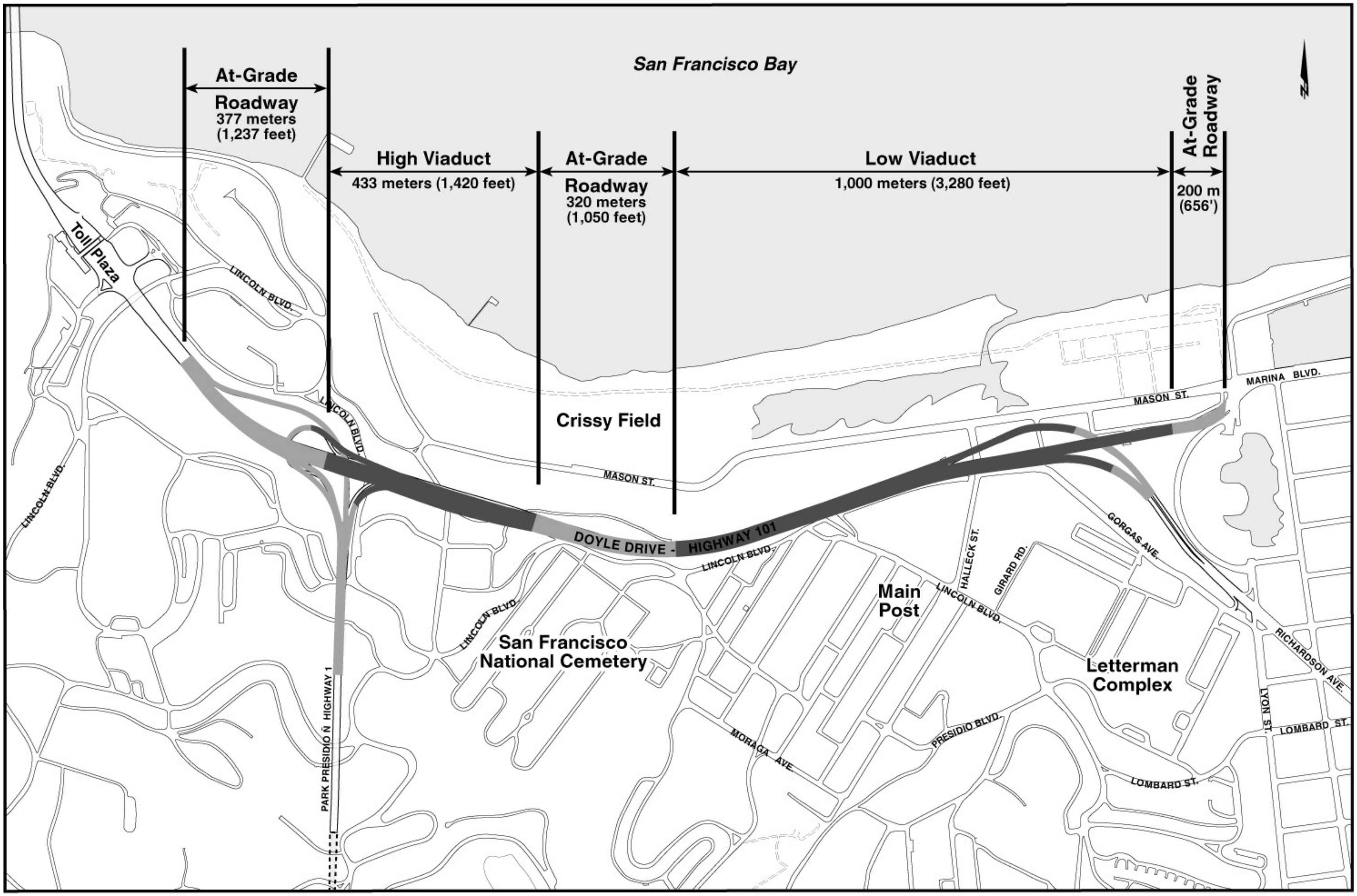


FIGURE 1-3
ALTERNATIVE 2: REPLACE AND WIDEN



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 the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. There would be no Presidio access at the east end of Doyle Drive due to geometric constraints and concerns for traffic safety.

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 1-4). 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. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend 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 existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The Presidio Parkway Alternative would include an underground parking facility at the eastern end of the project corridor between the Mason Street Warehouses, Gorgas Street Warehouses and Palace of Fine Arts. The parking garage would supply approximately 500 spaces to maintain the existing parking supply in the area and improve pedestrian and vehicular access between the Presidio and the Palace of Fine Arts.

At the intersection with Merchant Road, just east of the toll plaza, a design option has been developed for a Merchant Road slip ramp. This 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.

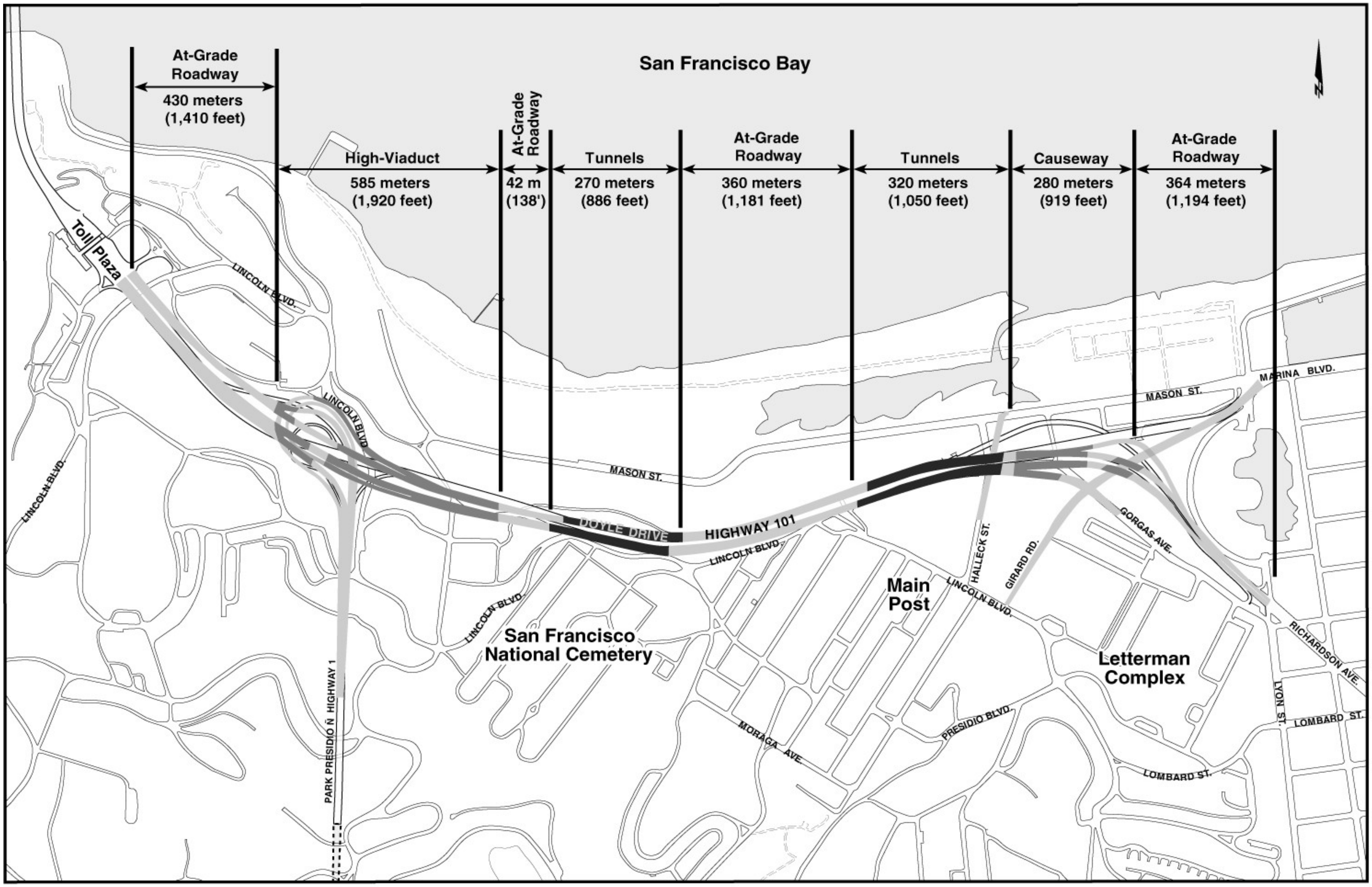
The Park Presidio interchange would be reconfigured due to the realignment of Doyle Drive to the south. The exit ramp from eastbound Doyle Drive to southbound Park Presidio Boulevard would be replaced with standard exit ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit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

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, Gorgas Avenue is a one-way street and 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 access would access the Presidio and Palace Drive through a jug handle intersection with Gorgas Avenue.

FIGURE 1-4
ALTERNATIVE 5: PRESIDIO PARKWAY



SECTION 2: TUNNEL OPERATION

2.1 TUNNEL ENVIRONMENT

The enclosed space of a tunnel creates a special environment. Major differences in system requirements depend upon the tunnel design. The primary factor is the length of the tunnel since this has the biggest impact on tunnel lighting, ventilation and emergency evacuation requirements. Other geometric factors are the cross section, grades, and horizontal and vertical curvature. Non-geometric factors are the traffic volume and composition, especially the percentage of trucks and whether hazardous cargo is allowed.

A fire is much more dangerous within the confined space of a tunnel than a similar fire along the open road. The smoke can block vision and create hazardous driving conditions. Individuals on foot trying to escape the fire may be hit by other vehicles or may become lost in the smoke. Also the smoke and other gases can be poisonous. The heat danger comes not just from the flames themselves, but also from the radiation of heat from these super hot gases spreading along the ceiling from a large fire. Temperatures can be in excess of 980 Celsius (1,800 degrees Fahrenheit). There is the possibility of panic among the stranded motorists and tunnel users. These all contribute to the difficulty of fighting a fire in a tunnel and the primary importance of the fire/life safety systems.

An effective program for fire/life safety in tunnels is dependent upon the coordinated interaction of several different factors. These factors include detection, verification, incident location, communications, response plan, personnel evacuation, smoke control, and fire suppression. Given the interdependence of the various systems associated with these factors, all systems contribute to the level of total system safety.

Rapid detection of a fire is critical in order for the tunnel controllers to prevent other vehicles from entering into a dangerous area; to properly activate the ventilation system to control the smoke, flames, and hot gases that threaten motorists trapped behind the fire; and in order to alert the proper fire fighting authorities.

While most vehicle fires in tunnels are not associated with an accident, traffic accidents can develop into fire if a fuel line is broken or there is an electrical short. In addition to fire, a vehicle stalled within a tunnel may cause a safety hazard and be struck from behind creating an accident. Consequently, the ability to detect a single stopped vehicle is essential. Similarly, a traffic control system of variable message signs and traffic signals is needed to alert the following motorists, to stop them from entering the tunnel or, if already in the tunnel, from proceeding further towards any hazardous area.

2.2 REMOTE OPERATIONS

The goal is to provide a safe and cost-effective tunnel design. With state of the art surveillance, control and communications, it is no longer necessary that the tunnel be under constant local supervision; rather, computers can monitor sensors and ring alarms if a problem arises. Traffic signals, the radio override system, and variable message signs operated remotely can communicate with the motorist if any emergency action is required. Thus, there is an opportunity to significantly reduce the personnel costs of ongoing tunnel operations by operating the tunnel from some other location that is already staffed 24-hours a day.

The remote tunnel operations center would be located in Oakland, either at the Bay Bridge Toll Plaza, Caldecott Tunnel or at the Transportation Management Center (TMC) at the Caltrans District 4 office building. These locations are staffed 24 hours a day. For the purposes of this study, we assume that the remote tunnel control will be at the TMC in Oakland.

In the case of a loss of communications between the tunnel and the TMC in Oakland, or during local emergencies, tunnel operations can be managed temporarily from the tunnels themselves. The switchgear room and the motor control center will have adequate facilities from which to operate plug-in portable equipment, computers, monitors, etc., which can be used to manage all tunnel functions locally.

2.3 EMERGENCY RESPONSE

The types of emergencies that could occur in the tunnels include fire and smoke, vehicle collision, loss of electric power, rescue/evacuation of motorists, disabled vehicles, spillage of materials, damage to structures, vandalism, medical attention for motorists, extreme weather, and earthquakes. An emergency response plan will be developed after selection of the preferred alternative to govern the actions of responding agencies and include the policy and procedures to conduct traffic and safety operations during emergency conditions. As part of the emergency response plan, a hazard analysis would identify and assess fire hazards and confirm that adequate provisions are made in the design for the safety of public, staff and emergency services. The following considerations are expected to be part of the planning for emergency conditions that involve the tunnel.

Caltrans is responsible for tunnel operations and maintenance, but for emergency response, they are dependent on other agencies. The TMC in Oakland may be the first to receive an alarm. The TMC provides a coordination center for Caltrans and California Highway Patrol (CHP) and it provides communication for contacting the other agencies. In the event of an emergency involving a fire, the responding agency would assume local control.

Any special equipment required for tunnel emergencies, such as dry chemical extinguishers and dry powder extinguishers for Class D metal fires, would either be supplied to the local emergency response service or stored at the tunnel portals for use by the responding emergency service. It is not anticipated that additional large equipment will be needed by the emergency services for a tunnel emergency.

2.3.1 POLICE

The CHP has jurisdiction over Doyle Drive and Park Presidio Boulevard. It is expected that the CHP would be supported by the US Park Police of the Golden Gate National Recreation Area (GGNRA), the bridge patrol of the Golden Gate Bridge Highway and Transportation District (GGBHTD), and the San Francisco Police Department (SFPD).

2.3.2 FIRE AND AMBULANCE

The Presidio Fire Department provides fire and emergency services within the Presidio, and is the first responding unit on the Golden Gate Bridge, Doyle Drive, and Park Presidio north of MacArthur Tunnel. The closest fire station is in the Presidio, in Building 218 on Lincoln Boulevard, near Halleck Street. This station includes both fire trucks and ambulance. A second GGNRA station is located in the Marin Headlands at Fort Cronkite, on the north side of the Golden Gate Bridge, and has an ambulance and fire trucks with paramedics. Other fire services are the San Francisco Fire Department (SFFD) with its closest station (Station 16) at 2251 Greenwich Street and the GGBHTD with a fire truck at the Toll Plaza.

2.3.3 TOW TRUCKS

Currently the GGBHTD provides tow truck service for Doyle Drive under an arrangement with Caltrans. For the Golden Gate Bridge, the first responding vehicle to a traffic incident (stopped vehicle, accident, spill, etc.) is a tow truck, which has some limited fire fighting capability. The same arrangement could also apply to the Doyle Drive and tunnels. However, the existing Doyle Drive has moveable pylons (tubes) to separate traffic; thus, it is currently possible for a tow truck to access an incident site by going over/around the pylons or to drive around blocked vehicles. However, since the proposed Doyle Drive will have a fixed median barrier, the tow truck may have to access an incident site against traffic (contra-flow) along the emergency shoulder. Before contra-flow operation can be initiated, the traffic at the incident site needs to be controlled via changeable message and lane use signs.

2.4 TRAFFIC CONTROL

Traffic control options along Doyle Drive and through the proposed tunnel(s) must accommodate a broad range of traffic conditions from normal to maintenance operations to congestion during traffic incidents to fire related life safety events. Although the incident record for serious motor incidents in tunnels is low, the consequence of the single accident can result in more serious and potentially life threatening events. The traffic control strategies for Doyle Drive are used to define traffic control considerations and the systems and equipment for each option

Considerations for traffic control are based on the experience of other tunnel agencies throughout in the US and national standards governing tunnel life safety. The national standard for Roadway Tunnels is Standard 502 "Standard for Road Tunnels, Bridges and Other Limited Access Highways", published by the National Fire Protection Association (NFPA). The following are traffic control considerations for normal conditions, traffic incidents, and maintenance:

2.4.1 NORMAL OPERATING TRAFFIC

The tunnel(s) will be just one component affecting the Doyle Drive traffic conditions. For most days of the week, traffic will flow smoothly through the tunnels, but for the weekday peak traffic periods and the weekend peak period, especially during periods of warm weather, the traffic may become congested. The existing traffic bottlenecks are at the ends of the project, and this will remain true for all of the alternatives. The addition of intersections and traffic signals may increase intermittent backups.

Northbound - The northbound bottlenecks are due to the limited number of traffic lanes northbound on the Golden Gate Bridge that varies between two and four lanes depending on the chosen lane configurations. During periods of weekday and weekend peak-hour northbound traffic, traffic queues are not expected to extend back to the tunnel. However, during extreme conditions, such as those resulting from a traffic accident or unusual congestion, traffic queues could extend into the tunnel.

Southbound – The use of electronic toll collection (FasTrak) on the Golden Gate Bridge has increased the southbound capacity of the bridge Toll Plaza but has increased congestion at the first signalized intersection at Richardson Avenue and Lyon Street. It is anticipated that only the southbound Main Post tunnel has the potential for backup of traffic within the tunnel during ordinary peak-hour traffic conditions.

Traffic congestion may be a regular occurrence in the southbound tunnel. Given the increased hazards of an accident within the confined space of a tunnel, and that the walls and roof limit sight distance as compared to open roadways, it is vital that approaching traffic be warned of stopped traffic ahead. On the plus side, the tunnel walls will limit sightseeing by motorists, as compared to the current spectacular views from Doyle Drive, and so motorists may be paying more attention to traffic ahead. Also the sides of the tunnel and most likely the ceiling will have surfaces that reflect the red taillights, providing motorists in the tunnel some advance warning of stopped traffic ahead. Nevertheless, it is important that the tunnel operators are able to monitor traffic flow in the tunnel, (see the Section 8, Tunnel Surveillance) and to warn traffic of stopped vehicles ahead (see Section 9, Tunnel Traffic Control).

2.4.2 TRAFFIC INCIDENTS

In the tunnel(s) a traffic incident could be defined as a stall, accident, fire, spill, debris on the roadway or a person in the tunnel – all requiring traffic control. These conditions need to be quickly identified, and appropriate traffic control action taken. The possible actions include closing the tunnel at the portal or closing a lane(s) to route traffic in the tunnel around the incident. Closing the tunnel requires Changeable Message Signs (CMS) and traffic signals, and closing a lane requires Lane Use Signals (LUS) supported by the CMS.

If a lane is closed for any reason, whether an incident or for maintenance, it is desirable to close the lane to the incident site at the beginning of the tunnel. By forcing a lane reduction outside the tunnel, traffic will move smoothly through the tunnel and the exposure to air pollutants inside the tunnel is minimized. (See Section 3-Tunnel Ventilation System for pollutants and exposure requirements.)

2.4.3 TRAFFIC CONTROL FOR FIRES

Traffic control for a fire condition is governed by the following safety requirements (National Fire Protection Association (NFPA) 502 "Standard for Road Tunnels, Bridges and Other Limited Access Highways").

Tunnels longer than 90 m (300 ft) shall have a means to stop approaching traffic from entering the tunnel following activation of a fire alarm within the tunnel. It is expected that each tunnel portal will have CMS to alert motorist and stop approaching traffic from entering the tunnel.

Road tunnels longer than 240 m (800 ft) shall have means to stop traffic from entering the direct approaches to the tunnel, to control traffic within the tunnel, and to clear traffic downstream of the fire site following activation of a fire alarm within the tunnel. It is expected that the Presidio Parkway alternative will have CMS to detour traffic from entering the direct approach to the tunnel(s). This can occur at the Park Presidio Boulevard exit where all traffic is diverted from the tunnel approach, and at the Marina Boulevard and Lombard Street intersections. Possible alternate locations could include Van Ness Avenue before California Street, Bay Street near Columbus Avenue, and Park Presidio Boulevard before Balboa Street. All efforts will be made to locate CMS in areas that minimize visual intrusion yet offer appropriate advanced warning to motorists. Alternatively, the use of smaller Extinguishable Message Signs (EMS) operating in conjunction with Highway Advisory Radio may be considered.

For the Presidio Parkway alternative, the approaches are closed in such a manner that responding emergency vehicles will have access to the fire site. Responding emergency vehicles may also arrive in the counter flow traffic direction to the incident location in either tunnel bore, or with flow direction in the opposite tunnel and fight the fire through the cross passage doors. Traffic control is provided downstream of the fire site to expedite the flow of vehicles from the tunnel so that no traffic is queued downstream of the fire site.

2.4.4 TRAFFIC CONTROL FOR MAINTENANCE

Traffic control needs to accommodate regular and non-scheduled maintenance in the tunnel. This occurs during re-lamping, maintenance of the ventilation system, tunnel washing, fire standpipe testing, and repair of signaling and signage equipment, etc. In addition to the standard Caltrans coning-off-lanes-for-maintenance-operations, the CMS and LUS would support the lane closures. During times of light traffic flows (10PM to 5AM), a single tunnel portal could be closed (under extreme circumstances) and traffic for that direction detoured over other streets, such as via Park Presidio Boulevard and Geary Boulevard, or via Lincoln Boulevard. In extraordinary circumstances it is possible to move unidirectional traffic through the opposite direction tunnel bore since the ventilation jet fans are reversible, however, local manual traffic control would be necessary since the remote traffic control CMS and LUS devices do not face the non-standard direction. Bi-directional traffic would still be prohibited in a single bore tunnel, since the jet fans are capable of directing smoke and heat from a fire in one direction only. The specific requirements need to be reviewed by the operating agency and conform to existing procedures at local tunnels.

2.5 HAZARDOUS CARGO RESTRICTIONS

The tunnel(s) shall be governed by the rules and regulations of the operating agency that apply to the transportation of hazardous materials. In developing such regulations, consideration shall be given to the following:

- Availability of a suitable alternative route that meets federal requirements as prescribed in Department of Transportation, Title 49, Code of Federal Regulations.
- Fire and accident experience of facilities similar to the facility for which rules and regulations are being adopted
- Anticipated traffic volumes in peak and off-peak periods

- Need for inspection of vehicles and cargo and the availability of a safe place to conduct inspections with a minimum of traffic interference
- Need and desirability of escort service with due consideration of the extent to which it could disrupt the orderly flow of traffic and create additional hazards.

With respect to the most potentially dangerous cargo, fuel trucks capable of creating a 100-megawatt fire, there are three basic options:

- Restriction Option 1 - Continue the hazardous cargo restrictions already implemented by the Golden Gate Bridge along Doyle Drive. GGBHTD defines hazardous cargo as explosives, and fuel or corrosives of 50 gallons or more. The concern is for cargo that could physically damage the bridge. Such cargo is prohibited during commute hours of 6:00 to 9:00 AM and 4:00 to 7:00 PM. For the rest of the day and for weekends these trucks are escorted across the bridge. Emergency phones at bridge approach pull-off areas allow the truck driver to call the Bridge Sergeant's Office, who would dispatch a tow truck to escort the truck. The escort tow truck with flashing lights warns other motorists, provides shielding, and provides instant communication if something does go wrong.

  Other commercial traffic including buses, vans, trucks, and tractor trailers are expected to use Doyle Drive. These vehicles represent a moderate combustible load and as such are estimated as a 20 MW design fire heat-release rate. A fire's heat-release rate, in megawatts, is designated in conjunction with the authority having jurisdiction as the design fire size.
- Restriction Option 2 - Based on prior experience at other tunnels, Caltrans could prohibit tanker trucks carrying combustible materials through the Doyle Drive tunnel(s). This would require trucks with combustible material to take an alternative route, presumably Park Presidio Boulevard through the MacArthur Tunnel. This moves the problem to another location, which may need special fire protection.
- No Restrictions - To allow tanker trucks to operate with combustible materials would require special fire protection including the application of foam suppression agents and an extensive control and monitoring system for its deployment.

Considering that the 20 MW design fire has been chosen for these tunnels (for a review of the selection methodology please reference Section 3.1 "System Design Parameters") it is proposed that the hazardous cargo restrictions already implemented by GGBHTD be continued. However, legislation would need to be passed to effectuate this restriction. Hazardous cargo vehicles would be prohibited from tunnel use during commute hours and would be instructed to use pull-off areas prior to being escorted through the tunnel. This restriction of hazardous cargo would be one of the considerations of the Emergency Response Plan, to be formulated after the preferred alternative is chosen.

A second category of concern is vehicles using alternative fuels. Most vehicles currently used in the United States are powered by either spark-ignition engines (gasoline) or compression-ignition engines (diesel). Vehicles that use alternative fuels include those powered from compressed natural gas (CNG), liquefied petroleum gas (LP-Gas), and liquefied natural gas (LNG). These vehicles do not represent a significant percentage of the total vehicle population but it is possible that they will affect fire-related life safety considerations in the future as the number of vehicles carrying combustible materials under pressure increases. At present, most road tunnel agencies throughout the world do permit the passage of alternative-fuel vehicles through tunnels.

2.6 TUNNEL EGRESS

This study considered the most appropriate pedestrian egress in case of emergencies. These include walking out of the tunnel on the shoulder or on a walkway and intermediate exits. NFPA 502 "Standard for Road Tunnels, Bridges and Other Limited Access Highways," recommends that emergency exits be spaced throughout the tunnel such that the travel distance to an exit is not greater than 300 m (1000 feet).

Since the longest of the tunnels is 315 m, at no time will a pedestrian be greater than 300 m from an exit. It is reasonable to assume that egress is acceptable by walking along the shoulder to either portal. Where portals of the tunnel are below surface grade, the surface shall be made accessible by a stair, vehicle ramp, or pedestrian ramp.

The final design of the preferred alternative will recognize the sensitive nature of providing stairways into the park and issues such as safety in dark corners and non-protected areas.

2.7 TUNNEL OPTIONS AND TUNNEL OPERATIONS

The Presidio Parkway alternative is designed for safe and free-flowing traffic conditions. Several features control traffic conditions along Doyle Drive in the vicinity of the proposed tunnel(s). West of the tunnel study area is the Highway 1 interchange. This allows vehicles to detour to the south of the tunnel(s) in the event of an incident or other blockage in the tunnel. East of the tunnel study area are Marina Boulevard and Richardson Avenue. These allow vehicles to detour to side streets should it be necessary.

The tunnel lengths for the Main Post Tunnels are greater than 240 m (800 feet), and provisions will be made to stop approaching traffic at the tunnel portals, and to stop traffic from entering the direct approaches leading to the tunnel(s). In each case CMS will communicate necessary information to the motorist. Overhead signage along Doyle Drive may be objectionable depending on its visibility to non-motorists. Similarly, CMS may be needed along Marina Boulevard and Lombard Street in vicinity of residential neighborhoods. The possibility of utilizing extinguishable message signs (EMS) in conjunction with Highway Advisory Radio will be considered, as EMS are generally smaller and less intrusive than changeable message signs, and was the option favored by the public at past traffic management public meetings.

A location to conduct inspection of northbound vehicles or to conduct an escort service for northbound vehicles with hazardous cargo has not been identified at this time. It is anticipated that the extended bus bay on northbound Richardson Avenue could serve for this purpose during non-peak hours.

From an operating strategy, the Presidio Parkway alternative has a combination of short tunnel and long tunnel requirements. The Battery tunnels will have ventilation for pollution control. The longer Main Post tunnels will have ventilation for both pollution and emergencies. At a tunnel length of 240 m (780 feet) emergency ventilation is a consideration but not a requirement. Tunnels with lengths of 240-300 m (800-1000 feet) typically require emergency ventilation but may substitute other methods if subject to approval by the authority having jurisdiction and where enhanced safety is provided by improved egress. The authority having jurisdiction will make a decision based on safety considerations, local experience and judgment. A tunnel length at 240 m (800 feet) is typically the basis for emergency ventilation for new applications and conservatively is used for the Main Post Tunnels.

Tunnel operations in the range of tunnel lengths for both the Battery Tunnels and the Main Post Tunnels typically include standpipe systems and traffic control systems for life safety and tunnel egress. Safety systems involving high capacity ventilation systems require systems for detection, verification and response to fire incidents. Shorter tunnels have less demanding operating conditions but may include the same safety features for longer tunnels when used for consistency in design and for quick response to tunnel incidents or motorists requiring assistance.

2.8 TUNNEL MAINTENANCE

It is anticipated that Caltrans will continue to maintain and operate the facility including the tunnel systems. It is anticipated that the need for any cooperative agreement will be addressed in the memorandum of understanding (MOU) currently being drafted by Caltrans.

SECTION 3: TUNNEL VENTILATION SYSTEM

The ventilation system is part of the tunnel operating strategies for normal traffic and fire fighting operations. System operation is in response to the level of pollutants, tunnel congestion, and fire and smoke conditions.

3.1 SYSTEM DESIGN PARAMETERS

System design is based on minimizing the footprint of the facility in a national park as well as capital and operation costs. System sizing is based on meeting acceptable levels for pollution in tunnels during normal and congested traffic operation. System sizing is also based on meeting a “critical velocity” for control of heat and smoke and to prevent back layering of gases in the tunnel during fire emergencies. Above a certain threshold of vehicle traffic and vehicle speed, the tunnel will be self-ventilating due to the piston-effect of vehicles.

System design for the removal or control of heat and smoke during a fire emergency is based on design parameters including tunnel length, cross-section, grade, prevailing wind, traffic direction and the design fire size. The selection of the design fire size (heat-release rate) takes into consideration types of vehicles and cargos in the tunnels as well as the capabilities of the participating agencies, prior operating experience, and emergency response planning. The selection of the design fire size has an effect on the magnitude of the critical air velocity necessary to prevent backlayering of gases in the tunnel and hence, the control or removal of heat and smoke during a fire emergency. The following are representative fire heat-release rates from various vehicle types as established by NFPA and PIARC (the World Road Association):

- Typical Heat Release Rate for Passenger Car is approximately 5 MW
- Typical Heat Release Rate for Bus/Truck is approximately 20 MW, and
- Typical Heat Release Rate for Gasoline Tanker is approximately 100 MW.

For the Doyle Drive tunnels, a 20 MW fire release rate was selected as representative of the fire size although fire sizes slightly larger in size can be accommodated within the design. This fire release rate is typical of many tunnels in the US. However, recent tunnel fires in Europe and discussions among fire experts have concluded that combustible loads from ordinary cargo such as margarine and plastics can result in fire release rate in excess of 20 MW. Substantially large heat release rates such as those from gasoline tanker trucks are possible but may be more effectively controlled by other methods such as escorting tankers through the tunnel area. As described in Section 2.5 “Hazardous Cargo Restrictions” given the proposed tunnel lengths and existing Golden Gate Bridge restrictions, escorting is determined to be an acceptable methodology.

Based on available data and considering the proposed tunnel configurations, the representative fire release rate of 20 MW has been deemed appropriate for preliminary design. This determination is subject to final review and approval during preparation of the emergency response plan and during final design.

3.1.1 VENTILATION RATE (CO/NOX/HAZE LEVELS)

The minimum air requirements are based on the maximum carbon monoxide (CO) concentrations in tunnels as established by EPA and FHWA. These requirements apply to tunnels located at or below at altitude of 1500 m (5000 feet). Ventilation for CO typically satisfies requirements for NOx and Haze. The following are allowable CO concentrations and exposure times:

- Max. 120 parts per million (ppm) for 15 minute exposure time
- Max. 65 ppm for 30 minute exposure time
- Max. 45 ppm for 45 minute exposure time

- Max. 35 ppm for 60-minute exposure time.

For the Doyle Drive study, the maximum CO concentration is 120 ppm for all operating conditions. It is assumed that congested traffic at 16 km/h (10 mph) will require 1.2 minutes to traverse a 315 m (1,030 foot) tunnel that is the equivalent of the long tunnel option. For tunnel blockage, it is assumed that a single lane of traffic can be closed to traffic to control CO exposure in the tunnel. CO concentrations in the tunnel will be monitored in the operations center via CO detectors spaced throughout the tunnel. At the predetermined CO concentration, the ventilation system will increase the airflow within the tunnel to maintain the supply of fresh air.

Non-motorized vehicles and pedestrians will continue to be prohibited from the facility. The Trust in cooperation with the NPS are in the process of developing the Presidio Trails and Bikeways Master Plan which will provide parallel routes through the Presidio suitable for non-motorized vehicles and pedestrians.

The ventilation rate is based on an estimate of CO emissions using Caltrans data and emission factors generated by computer modeling. For estimating purposes, it is assumed that the emission factors for Year 2005 at 16 km/h (10 mph) will result in a ventilation rate of approximately 80 liters per second/lane-meter (50 cubic feet per minute (cfm)/lane-foot) for congested conditions.

Ventilation for tunnel workers is based on US Occupational Safety and Health Administration (OSHA). Tunnel maintenance is typically conducted during off-peak hours; hence, the ventilation requirement is within the system capacity for air pollution. During maintenance in the tunnel, ventilation airflow is adjustable to satisfy fresh air requirements.

3.1.2 FIRE/SMOKE VENTILATION

The ventilation rate is based on the control of heat and smoke during fire fighting. It varies greatly due to such factors as fire size, tunnel grade, cross-section, and direction of airflow. The velocity of air for smoke control is predicted using the methodology developed from studies conducted by the US Bureau of Mines to determine the “critical velocity” at which the buoyant effect of the hot gases is overcome by longitudinal airflow. For estimating purposes, it is assumed that the “critical velocity” for a 20 MW fire for 0 to 5% grade, for typical 3-lane cross-section is 2.3-2.7 m/s (400-500 fpm) velocity.

For the Presidio Parkway alternative, the Main Post tunnels will require fire/smoke ventilation. The Battery Tunnels are exempt from this requirement since tunnel lengths are at or below 240 m (800 feet).

3.1.3 PREVAILING WIND

Ventilation in the tunnel considers prevailing winds in the vicinity of the tunnel portals. The primary wind direction is from the west, which is mitigated by ground cover and terrain in the vicinity of the portals. A refined analysis will be conducted during the detailed design phase of this project to ensure that the capacity of the ventilation system will be sufficient to overcome the effects of any adverse prevailing wind direction to maintain adequate air flow in the tunnels.

3.2 SYSTEM TYPES AND DESIGN CONSIDERATIONS

Both the jet fan longitudinal concept and the semi-transverse concept are acceptable solutions for tunnel ventilation and provide unique advantages and disadvantages to both normal operation and maintenance.

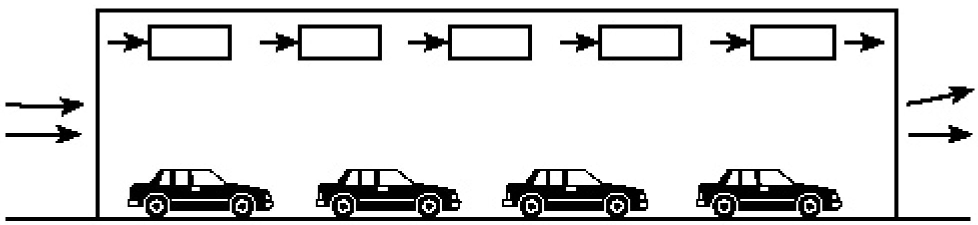
All ventilation fans will be connected to two power feeders derived from two separate sources (see Section 6, Power).

3.2.1 LONGITUDINAL VENTILATION

A longitudinal ventilation system introduces air into, or removes air from, the tunnel roadway at the portals, thus creating a longitudinal flow of air within the roadway, with discharge at the existing portal.

3.2.1.1 JET FANS

Longitudinal ventilation is created with a series of axial fans mounted at the ceiling level of the tunnel. They are used to introduce air into the tunnel roadway at the portals, thus creating a longitudinal flow of air within the roadway with discharge at the tunnel portals. The fans, due to the effects of the high velocity discharge, induce a longitudinal airflow through the length of the tunnel.



Longitudinal Ventilation System with Jet Fans

During normal tunnel operations, the jet fans operate to induce flow through the tunnel by pushing vitiated air through one end of the tunnel while introducing fresh air into the other end. Above a certain threshold of vehicle density and vehicle speed, the tunnel will be self-ventilating due to the piston-effect of vehicles and not require fan operation. Carbon monoxide sensors in the tunnels will automatically regulate the start/stop operation of the ventilation fans.

During a fire, the jet fans operate similar to normal operation. They are sized to push smoke and hot gases in the direction of traffic movement (to prevent back layering) and out of the tunnel. Additional fans insure the survivability of fans in close proximity to the fire, provide spare capacity, and permit fan de-rating for high temperature operation.

Jet fans are typically spaced at 90-150 m (300-500 feet) intervals along the length of the tunnel although longer and shorter intervals are acceptable. The interval is based on the distance between fans necessary to dissipate the discharge velocity from the fan before the air stream impacts the adjacent fan. The interval between fans provides sufficient distance for an efficient transfer of momentum from the jet fan to the surrounding air stream.

At each interval one or two fans are mounted in the tunnel to provide a uniform distribution of air from the fan discharge to the tunnel cross-section. With three to four lanes of traffic, jet fans mounted in pairs across the tunnel cross-section are desirable (See Figure 3.1). Where this is not possible, fans at greater capacities are used, or the fan discharge is directed toward the center of the tunnel.

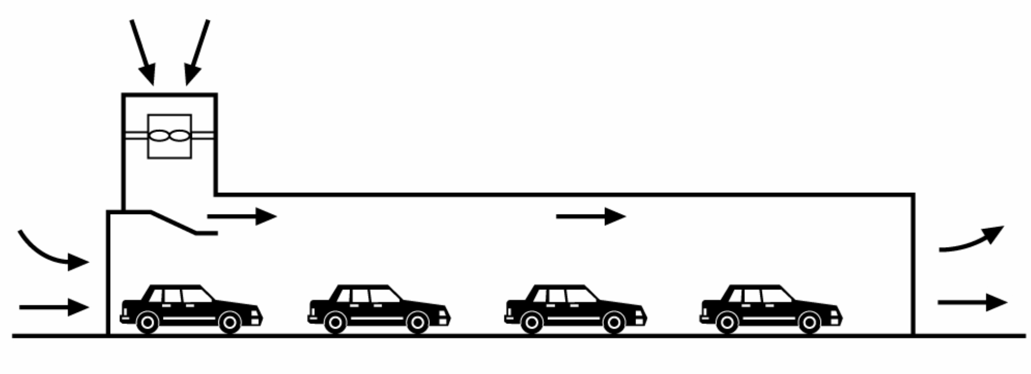
Jet fans are single speed and reversible. Reversible fans permit reverse traffic flow in the tunnel cell should it be desirable for maintenance or other purposes.

Jet fan unit are axial type fans with direct drive motors designed to deliver a wide range of thrust capabilities in both the forward and reverse direction. The thrust produced is governed by size, blade angle, and brake horsepower. Jet fans units are typically 0.9-1.2 m (3-4 feet) in diameter with thrust in the range of 1110-1250 newtons (N) (250-280 pounds force (lbf)) at 38 kW (50 brake horsepower (hp)). Sound attenuators are provided at both ends of the fan motor unit for noise control.

The jet fan system will discharge air to the downstream (direction of traffic) portal where air and pollutants are dispersed to atmosphere. Tunnel bores with jet fan systems are separated to the maximum extent practical. This decreases the probability of recirculation of air from one tunnel bore to the other.

3.2.1.2 SACCARDO NOZZLES

Longitudinal ventilation is also created with ventilation fans mounted external to the tunnel structure. They are used with specially designed nozzles to introduce air into the tunnel roadway at the portals, thus creating a longitudinal flow of air within the roadway. The ventilation fans have a nozzle that connects the fan to the tunnel environment. The ventilation fans, due to the effect of the high velocity discharge, induce a longitudinal airflow through the length of the tunnel.



Longitudinal Ventilation System with Saccardo Nozzles

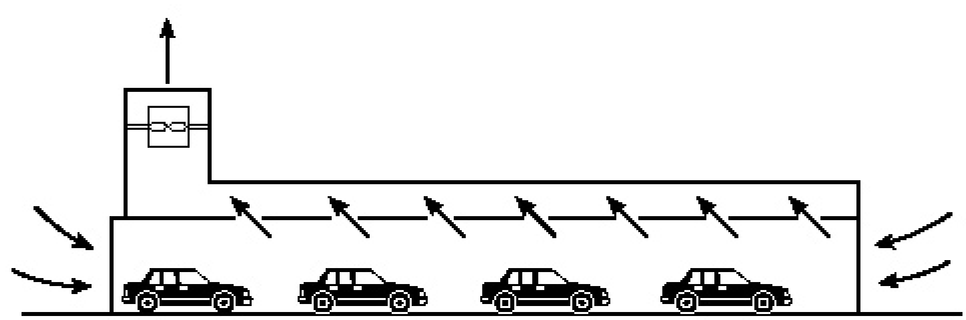
Ventilation fans with Saccardo nozzles operate similarly to jet fans by inducing flow through the tunnel during both normal tunnel operations and during a fire.

The ventilation fans for the Saccardo nozzles are located on top of the tunnel structure at the portals although longer tunnels can have more than one location. The fan is connected to the tunnel interior through an opening in the tunnel structure. For the Presidio Parkway alternative there are typically two fans per portal and a total of four fans per tunnel. Fans discharge in the direction of traffic flow.

The ventilation fans for the Saccardo nozzles are typically large axial type fans designed to provide the thrust of many smaller jet fans. Unlike jet fans they are designed to operate in the forward direction only. The thrust produced is governed by size, blade angle, and brake horsepower. Axial fan units are typically rated in excess of 95 000 L/s (200,000 cfm) and 150 kW (200 hp) and are more efficient than the equivalent thrust of many smaller jet fan units. Sound attenuators are provided at both ends of the fan motor unit for noise control.

3.2.2 SEMI-TRANSVERSE VENTILATION

Transverse ventilation systems feature the uniform collection or distribution of air throughout the length of the tunnel and .semi-transverse systems are equipped with only supply or exhaust elements. In an exhaust system, the exhaust from the tunnel is discharged through stacks.



Semi-transverse Exhaust Ventilation System

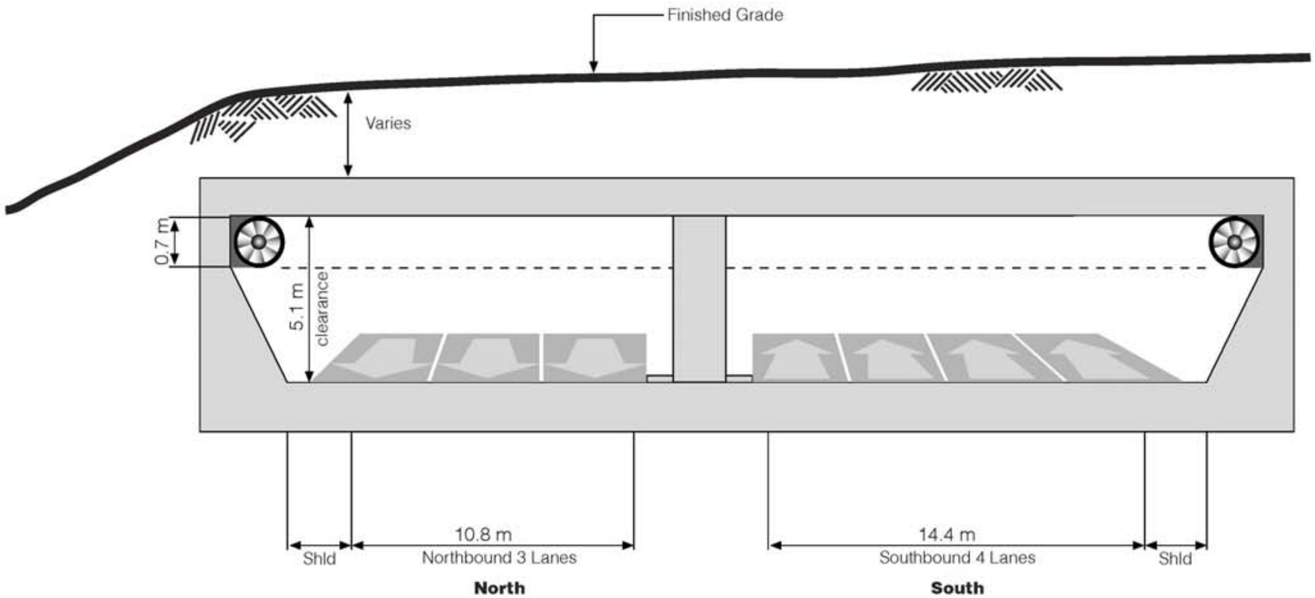
During normal traffic operations, ventilation fans operate to supply fresh air to the tunnel. The fan motors are multi-speed for capacity control and reversible.

During a fire, the ventilation fans operate to exhaust air from the tunnel and remove smoke and hot gases through large exhaust ports above the tunnel roadway. The large exhaust ports are controlled by dampers that concentrate airflow for single point extraction of heat and smoke. The combination supply/exhaust ductwork transfers air from ceiling ports to the system ventilation fans.

Ventilation fans are located at portal structures at either end of the tunnel, or at mid-tunnel structures along the top or side of the tunnel. The ventilation fans are axial type fans with direct drive motors that deliver a wide range of capabilities in both the forward and reverse direction. Tunnel ventilation fans are typically rated in excess of 95 000 L/s (200,000 cfm) and 150 kW (200 hp).

Centrifugal fans can be used in lieu of axial fans but separate ductwork and controls are necessary to make system operate in both the supply and reverse direction.

For a shorter tunnel, semi-transverse ventilation can feature a single point collection or distribution of air. This is typically located at the center of the tunnel and can include both tunnel cells connected to single length of ductwork. Ventilation fans are located at or near the mid-tunnel structures although other locations are possible with ductwork from the collection point to the exhaust fans. During normal operation and during a fire, the ventilation fans operate to exhaust air from the mid-point of the tunnel to the vent stack. Ventilation fans are as described above.

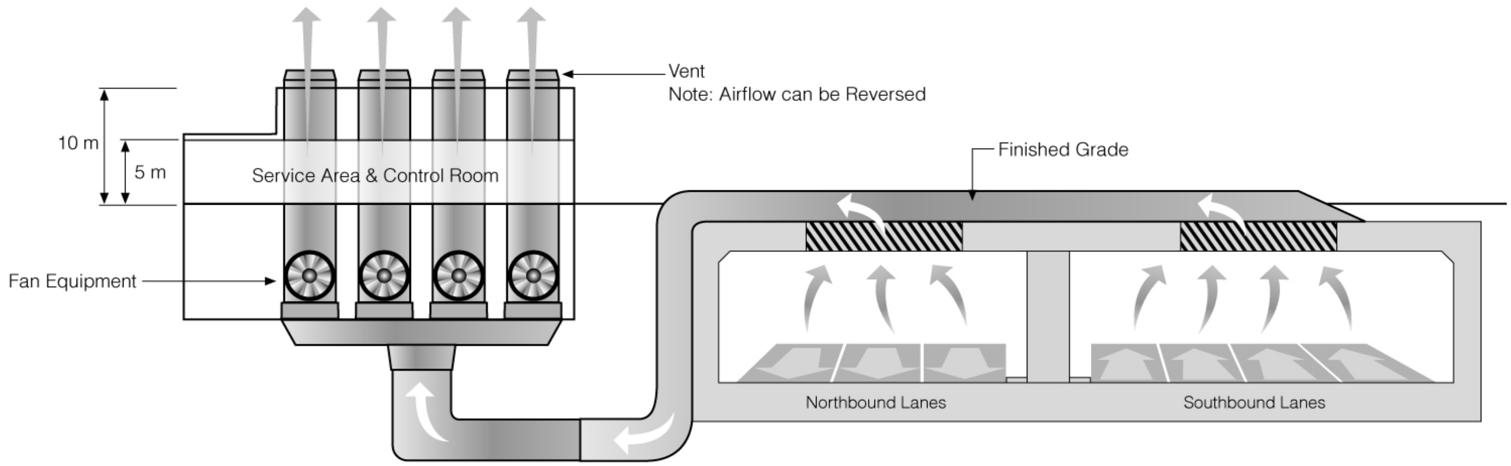


TYPICAL TUNNEL CROSS SECTION

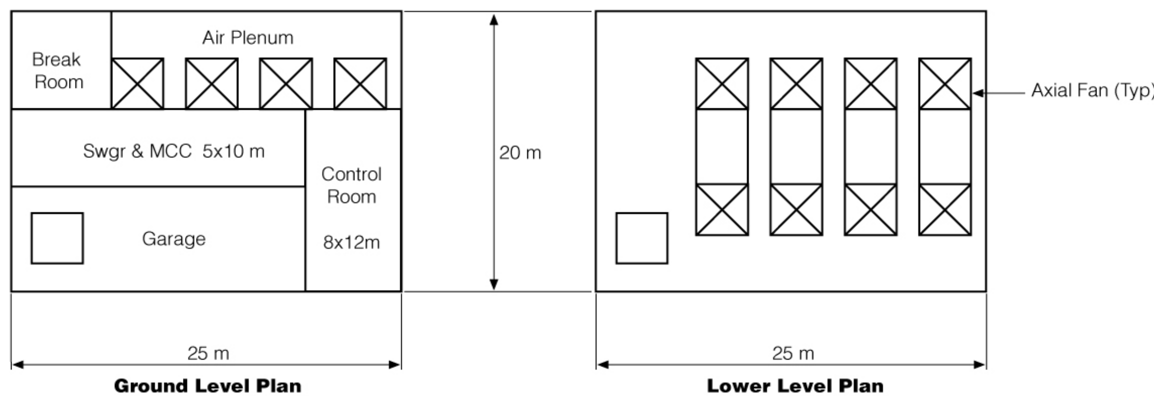
With Jet Fan Ventilation

TUNNEL SYSTEMS REPORT

Jet Fan Ventilation | **Figure 3.1**



Typical Mid Tunnel Extraction (700-1000FT Tunnels)



TUNNEL SYSTEMS REPORT

Semi-Transverse Ventilation Schematic Fan & Equipment Building

Figure 3.2

3.2.3 GRAVITY VENTILATION

The use of large gravity exhaust openings in the roof or sidewalls of the tunnels was considered and eliminated as being not entirely effective. By opening the tunnel to atmosphere at intervals no greater than 150 m (500 feet), the hot products of combustion are allowed to escape driven by the buoyancy of the heated gases (see Figure 3.3). Gravity ventilation is more likely to work effectively for large fires. Small fires that generate a significant amount of smoke but do not develop the high gas temperatures present in large fires may not develop sufficient buoyant forces to drive the smoke to open exhaust openings. Extensive investigation and modeling will be necessary to determine the feasibility of this concept and the size and location of openings.

3.3 TUNNEL OPTIONS AND VENTILATION SYSTEMS

The Presidio Parkway alternative has a combination of short tunnel and long tunnel requirements that are expected to be refined during the final design phase of the project. At a tunnel length in excess of 150 m (500 feet) the tunnel will require ventilation for pollution control. At lengths of 240-300 m (800-1000 feet) tunnels typically require emergency ventilation. The range in tunnel length allows a flexible design if subject to approval by the authority having jurisdiction and where enhanced safety is provided by improved egress. The two pairs of tunnels are discussed separately below.

3.3.1 BATTERY TUNNELS

The Presidio Parkway alternative includes the Battery Tunnels which are 240 m (790 feet) and 230 m (750 feet) in length. These tunnels are below the 240-300 m (800-1000 feet) required for emergency ventilation but will require ventilation for pollution control.

For minimum ventilation, both longitudinal ventilation with jet fans or Saccardo nozzles are viable concepts. The jet fans satisfy all air requirements while providing flexibility and low cost. Jet fans also minimize the adverse affects to surface features as equipment space requirements are less. Ancillary structures include switchgear, motor control and control equipment. These are located in a small structure 5 m (15 feet) x 10 m (30 feet) x 4 m (12 feet) high and are carefully located to minimize the impact to sensitive areas and surface features such as the high viaduct on the west end, the National Military Cemetery, and other view corridors. Since vehicle movement through the tunnel will result in some longitudinal airflow, the operation of the jet fans will be on an as-needed basis or scheduled during the day. Conversely, heavy traffic or adverse environmental conditions including west winds may require additional fan operating hours.

Longitudinal ventilation with Saccardo nozzles satisfy all air requirements with portal buildings having a pair of fans at either end of the tunnel. Ventilation fans with Saccardo nozzles have buildings on top of the portals approximately 10 m (35 feet) wide x 15 m (50 feet) long x 4 m (12 feet) high. Other ancillary structures are similar to the jet fan concept and are carefully located to minimize the impact to sensitive areas and surface features.

The method and location of pollution dispersion is not expected to impact ambient air quality standards. The pollution from longitudinal ventilation at the tunnel portals will be mitigated by separation of pedestrian areas from the portals by planted areas and other setbacks as necessary.

The use of fewer/larger fans for longitudinal ventilation with Saccardo nozzles provides potential maintenance and operational savings. The maintenance and operating savings with this system will need more detailed investigation during final design to define the owning and operating costs for the final tunnel and support structures. The owning and operating costs of any fan system must take into account first cost versus like-cycle costs. Jet fans(s) decidedly favor lower first costs over long-term maintenance that requires periodic operations to maintain the system in a state of readiness. Specifically, each time jet fan(s) require maintenance, traffic control in the tunnel is necessary. Given the traffic conditions, this maintenance must be done at night during periods of low traffic volume resulting in increased maintenance costs.

Ventilation fans with Saccardo nozzles favor long-term maintenance where the ability to do routine maintenance is not impacted by traffic control and tunnel access. The location of ventilation fans in building(s) allows ready access for repair and replacement. The energy savings for long term operation will also favor fewer/larger, more energy efficient ventilating fans.

No suitable location has been identified to construct the large fan and equipment (ancillary) building necessary for longitudinal ventilation using Saccardo nozzles as these structures would have to be directly above the tunnels. The jet fan concept is recommended for the short tunnels to minimize surface impacts and provide a flexible solution with fans installed in side niches

3.3.2 MAIN POST TUNNELS

The Presidio Parkway alternative includes the Main Post tunnels which are 280 m (920 feet) and 315 m (1030 feet) in length. These tunnels will require fire/smoke ventilation.

Both longitudinal ventilation with jet fans or Saccardo nozzles and semi-transverse ventilation concepts are viable for long tunnels. The jet fans satisfy all air requirements while providing flexibility and low cost. Jet fans also minimize the adverse affects to surface features as equipment space requirements are less.

Longitudinal ventilation with Saccardo nozzles satisfy all air requirements with portal buildings and pair of fans at either end of the tunnel. Ventilation fans with Saccardo nozzles have buildings on top of the portals approximately 10 m (35 feet) wide x 15 m (50 feet) long x 4 m (12 feet) high. Other ancillary structures are carefully located to minimize the impact to sensitive areas and surface features.

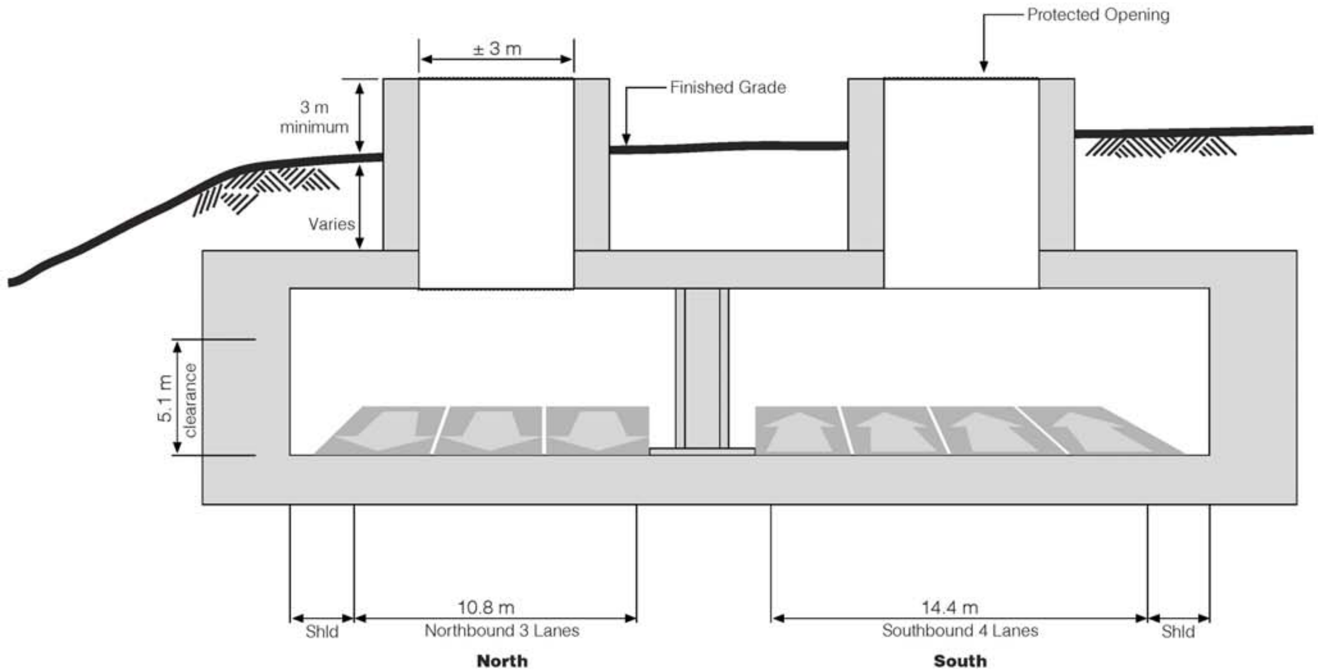
Semi-transverse ventilation with single mid-point tunnel extraction is also highly effective, although more expensive. The system provides the typical semi-transverse ventilation during normal operation and mid-tunnel extraction of smoke and heated gases during a fire incident. This will limit smoke and heated gases to one-half of the tunnel, thereby reducing the travel distance for motorists to a place of safety or emergency exit. The system will require ductwork from the point of extraction to the exhaust fans and a ventilation building or structure.

The method and location of pollution dispersion is not expected to impact ambient air quality standards. The pollution from longitudinal ventilation at the tunnel portals will be mitigated by separation of pedestrian areas from the portals by planted areas and other setbacks as necessary. The pollution from semi-transverse ventilation system will be dispersed to atmosphere via the ventilation stack.

The use of fewer/larger fans for longitudinal ventilation with Saccardo nozzles and semi-transverse systems provides potential maintenance and operational savings as discussed above. The energy savings for long term operation will also favor fewer/larger, more energy efficient ventilating fans. Energy requirements are also impacted by the requirement for ventilation during periods of congestion; particularly, traffic queues at the east portal.

Ventilation fans with Saccardo nozzles and semi-transverse systems favor long-term maintenance where the ability to do routine maintenance is not impacted by traffic control and tunnel access. The location of ventilation fans in building(s) allows ready access for repair and replacement. By it very nature, the semi-transverse system will require a higher tunnel section to accommodate a concrete mid-tunnel plenum above the roadway in addition to fan building and vent stacks. No suitable location has been identified to construct the fan and equipment building necessary for longitudinal ventilation using Saccardo nozzles or for the semi-transverse ventilation system.

The Main Post Tunnels are constrained horizontally where the alignment brings the tunnels near to historical structures. The jet fans provide a flexible solution with fans installed in ceiling niches or along one side of the tunnel bore. The tunnel does not provide sufficient vertical clearance to accommodate the mid-tunnel ducts for a semi-transverse system. The jet fan concept is recommended for the long tunnels to minimize surface impacts and provide a flexible solution with fans installed in ceiling niches along each side of the tunnel bore.



TYPICAL TUNNEL CROSS SECTION

With Gravity Ventilation (150-210 m (500-700 FT) Tunnels)

TUNNEL SYSTEMS REPORT

Gravity Ventilation | **Figure 3.3**

SECTION 4: FIRE LIFE SAFETY REQUIREMENTS

4.1 RESPONSE PLAN

Fire protection and motorist safety is achieved through a composite of facility design, operating equipment, hardware, software, subsystems, and procedures integrated to provide protection of life and property from the effects of fire. Emergency Response is discussed in the previous section. The following includes considerations for implementing that response by taking into account the following elements:

- Restricted vehicle access and egress
- Location of the local fire department and other rescue agencies.
- Fire alarm systems, standpipe systems, ventilation systems
- Evacuation and rescue requirements
- Emergency communications to appropriate agencies

The above elements result in equipment and subsystems provided for motorist safety or for responder use.

Minimum fire protection requirements are based on tunnel length. Where tunnel length is 240 m (800 feet) and where the maximum distance from any point within the tunnel to an area of safety exceeds 120 m (400 feet), all provisions of the NFPA 502 “Standard for Road Tunnels, Bridges and Other Limited Access Highways” apply.

4.2 MOTORIST LIFE SAFETY

The motorist is provided with several systems to aid in the protection of human life and private property. These systems include

Fire alarm boxes for notification of a traffic incident and fire extinguishers in well-marked cabinets for response in minor incidents by the motorist. Extinguishers rated 2-A:20-B:C are located along the roadway at intervals of not more than 90 meters (300 feet).

Two-way voice communications to the emergency response authority at a minimum of every 90 m (300 feet) in the tunnel and in any areas of refuge.

Tunnel ventilation systems that are installed in road tunnels are an important element of tunnel fire protection systems.

Emergency exits are normally required throughout a tunnel and spaced so the maximum distance to an emergency exist is not greater than 300 meters (1000 feet). As the longest tunnel under consideration here is 315 meters long, any point within the tunnel is within 300 meters to the main entry or exit.

Tunnel message signs, lane use signals, and signage will be provided to alert motorists of roadway conditions.

4.3 RESPONDER EQUIPMENT

The responder responsible for tunnel safety, including the Tunnel Control Center (TCC) personnel located in the Transportation Management Center (TMC), is provided with several systems to aid in the protection of human life and private property. Included among these are:

- Closed-circuit television systems (CCTV) with or without traffic-flow indication devices are permitted to identify fires in tunnels with 24-hour supervision. (See Section 8.2.) Automatic fire detection systems shall be installed in tunnels where 24-hour supervision is not provided.
- Radio communications systems, such as highway advisory radio (HAR) and AM/FM commercial station overrides, are provided to give motorists information regarding the nature of the emergency and the actions the motorist should take. (See Section 10.C.)
- Alarm system provides a means for detecting the removal of an extinguisher to alert emergency response authority of a possible incident involving a fire. (See Section 8.D.)
- Standpipe and water supply systems in road tunnels shall comply with the requirements of NFPA and local authority having jurisdiction. Valves will be provided at approximately 50 m (150 feet) intervals.
- Drainage systems are provided in tunnel to collect, store, or discharge effluent from the tunnel, from tunnel-cleaning operations, water from incidental seepage, and water from the fire protection system.
- Integrated command and control center for responding quickly to event and coordinating information with local authorities and response agencies. A storage location for equipment needed when responding to a tunnel emergency will be provided locally at the tunnels themselves.
- All related ancillary facilities that support the operation of road tunnels shall be protected as required by all applicable NFPA standards and local building codes. The electrical systems shall maintain ventilation, illumination, communications, drainage, and water supply; shall identify areas of refuge, exits, and exit routes; and shall provide remote annunciation and alarm under all operating and emergency modes associated with the facility.

4.4 TUNNEL OPTIONS AND FIRE LIFE SAFETY REQUIREMENTS

All of the tunnel options are expected to include systems for the protection of human life and private property as identified above. This includes the motorist self-help life safety systems and the responder equipment. At present, no fire fighting equipment is expected to be stored on site. Provision may be made to locate a fire response vehicle at the tunnel during critical peak periods of operation.

All of the tunnel options include an elevated highway or bridge, west of the proposed tunnels. Since this restricts access to water supplies, it is expected that the installation of the standpipe system or fire extinguishers, or both, will be considered for use on the elevated structure.

SECTION 5: TUNNEL LIGHTING

5.1 PORTAL DESIGN AND THRESHOLD LIGHTING REQUIREMENTS

The operational goal of highway tunnel lighting is to achieve the same capacity and equivalent safety within the tunnel as the approaching highways. On approaching a tunnel entrance portal, a driver is confronted with a situation where the interior illumination during daytime may impair visual continuity with objects located inside the portal. This is commonly referred to as the "black hole effect." The most important problem in daytime tunnel lighting design therefore is to provide a luminance level sufficient for a driver to maintain adequate visual perception at a point beyond the tunnel portal equal to the safe stopping distance on wet pavement. The issue is mainly related to the process of eye adaptation and the inability of the human eye to adjust to rapid decrease in luminance.

Based on IESNA RP-22-96, "Recommended Practice for Tunnel Lighting," the required threshold zone luminance (Lth) is determined to be 240 cd/m2. This will be verified during detailed design by field measurement over several days to establish the equivalent veiling luminance (Lseq) from which the required Lth can then be determined.

5.2 LIGHTING ZONES

Acceptable design practice requires that the lighting system be divided into several zones to allow the motorist's eyes to adapt progressively from bright daylight to the darker interior. The zones are defined as follows:

- Threshold Zone. The first zone inward from the portal that must have the highest illumination to avoid too abrupt a decrease from exterior daylight. The length of this zone is based on the standard wet pavement stopping sight distance (SSSD) measured from a point where the drivers' eyes begin to adapt to the new light level. For the Doyle Drive tunnels this zone will need to extend 119m (390 feet) from the portal.
- Transition Zone. A zone of diminished light level downstream of the threshold zone to enable gradual adaptation to the interior tunnel lighting level. The length of this zone is based on the minimum time needed for a motorist's eyes to adapt to the darker tunnel interior. For a design speed of 80 km/h (50mph) the transition zone should be 200 m (650 feet) long. The average luminance levels should decrease smoothly through the transition zone. For uniformity it is recommended that this zone be divided in to four equally spaced sections, starting from the Lth of 240 cd/m2, stepping down to a level of approximately 80 cd/m2, then 30 cd/m2, 16 cd/m2 and finally to 8 cd/m2.
- Interior Zone. The interior zone is the portion of the tunnel where the driver's vision has adapted to a low luminance. Based on an AADT of 114 000 vehicles, the interior of the tunnel should be illuminated to a level of approximately 8 cd/m2.

No intensified lighting is required at the tunnel exit because eyes adapt more quickly to the change from dark to light.

5.3 DAY/NIGHT/EMERGENCY ILLUMINATION LEVELS

In order to maintain the desired ratio between the exterior luminance level and the threshold luminance level, step switching will be provided to vary the output of the lighting system. Step switching will be controlled automatically by a set of electronic luminance meters with Lseq glare lenses that monitor outdoor light at the tunnel entrances and adjust the Lth accordingly. The system will be designed to prohibit response to sudden or short-duration light level changes and will respond to stable changes in order to preclude unnecessary changes in tunnel lighting levels.

During nighttime, the driver's eyes are adapted to the low exterior luminance. Therefore, a nighttime average luminance of 2.5 cd/m2 is recommended for the entire length of the tunnel. The approach and exits roadways will be designed to have a luminance of at least one-third the tunnel interior level for one SSSD.

Emergency power will be provided to selected luminaires from either individual power packs or a central emergency power unit. This will ensure a minimum level of illumination is maintained during a temporary power outage.

5.4 METHOD OF ILLUMINATION

A number of methods make it possible to provide the recommended luminance level inside the tunnel. These are symmetrical and asymmetrical, either counter-beam or pro-beam. Each of these techniques assesses the visibility of an object in a different manner and the method will be selected once the final tunnel geometry is determined.

In the interior of a tunnel where the luminaires are in full or partial view, the stroboscopic effect of passing closely spaced light sources may produce undesirable behavioral sensations. The annoyance range of these flicker effects is 5-10 cycles per second that equates to a spacing between 2.3 m and 4.5 m (7.5-15 feet) at the design speed of 80 km/h (50 mph).

The most common light sources used for tunnel lighting are fluorescent, Low Pressure Sodium (LPS), Metal Halide and High Pressure Sodium (HPS). Both Metal Halide and HPS lamps good lamp life, compact size and easily optically controlled. However, as point sources, they have the possibility of developing objectionable flicker effects and make it difficult to achieve the required uniformity at low nighttime levels. Metal halide lamps give the best color but are not as efficient as HPS. Fluorescent and LPS are available as linear sources to eliminate flicker effects. Fluorescent lamps are frequently used for the tunnel interior zones as they provide good uniformity and instant restrike in the event of momentary power interruption. LPS are often used in conjunction with fluorescent lamps to provide the high illumination levels required in the threshold and transition zones. However LPS have a high lamp replacement cost, shorter lamp life than HPS and minimal control of light distribution.

Luminaire types and quantities along with lamp type and wattage will be determined following detailed calculations to provide the necessary luminance levels.

5.5 PRESIDIO PARKWAY ALTERNATIVE

The recommended light sources for the tunnel are fluorescent lamps for the full length of the tunnel with HPS to provide the higher levels of luminance needed in the threshold and transition zones. This combination of light source will ensure uniform and uninterrupted illumination of the tunnel interior and provide efficient and controllable high intensity illumination where required. HPS are recommended because of their high efficiency and good lamp life. The recommended method of illumination will be similar for each tunnel with modifications to account for the different conditions created by each location.

SECTION 6: POWER

6.1 SUPPLY

Vehicular tunnels require a dependable power supply and a flexible power distribution system that will provide maximum reliability and power continuity for tunnel ventilation, lighting, signals, and communication systems. Minimum illumination levels must be maintained without interruption. During the daytime, when vehicles do not have their headlights on, a sudden loss of all tunnel illumination can cause driver confusion and result in an accident. However, brief interruption of the power to the ventilation system can be tolerated. An extended loss of power will require an emergency back up, either battery or diesel driven generator to maintain essential tunnel systems; otherwise the tunnel will have to be closed.

In order to provide reliability and continuity, diversity is needed in the power distribution system so that an alternate power source is available upon failure of the normal power source. Diversity can be provided by two basic systems, 1) a single-service system with an emergency generator backup and 2) a two-service system. As the placement of a high capacity diesel generator in the Presidio or surrounding residential neighborhoods is undesirable, a two-service system is recommended.

For the two-service system, two services from separate and independent sources of the utility's power are needed. The primary power source will be the existing PG&E 12 kV line that runs along Doyle Drive to serve the Golden Gate Bridge. This line will require upgrades to provide the necessary power, and will be replaced as part of this project. The secondary source is anticipated to come from either a separate PG&E transformer or the Presidio Trust grid.

Switchgear for the mechanical equipment will be located at each end of the tunnel. The switchgear will be sized for 100% of the total load and interconnected to allow all the systems to be powered from either end. It is also noted that the switchgear rooms will likely include provisions to operate the tunnels on an emergency basis should communication be lost between the tunnels and the Oakland TMC.

6.2 LOAD

The peak lighting load will occur during daylight hours due to the higher level of illumination required in the threshold and transition zones. The lighting load will be reduced at night when only minimum lighting will be needed throughout the tunnel.

The peak ventilation load will occur during a fire in the eastbound tunnel. Under normal conditions, the maximum load will occur with peak traffic in one tunnel and normal traffic in the other. The power requirement during off-peak hours without traffic congestion is reduced due to the piston effect of vehicles moving through the tunnel.

A miscellaneous load of 100 kW has been assumed for ancillary buildings, pumping equipment and associated communications and tunnel controls.

DOYLE DRIVE ELECTRICAL POWER SUPPLY REQUIREMENTS
Tunnel Systems Connected Load (kW)

Item	Main Post Tunnels		Battery Tunnels
	Jet Fans	Semi Transverse	Jet Fans
Lighting	260		270
Ventilation	670	450	450
Fire pump **	½ of 50		½ of 50
Aux. Systems **	½ of 50		½ of 50
TOTAL	**980**	**760**	**770**

** The load is split between two tunnels to provide a comparison of total kW for different tunnels and different ventilation concepts.

6.3 EMERGENCY OPERATION

In the event that two separate power supplies are not available, it is recommended that two diverse lines from a single substation be provided. For emergency backup, essential systems (lighting, traffic signals, monitoring) will have emergency battery power for continuous operation. To operate the tunnel during longer power outages, a diesel engine generator should be provided. The generator will provide for the following emergency loads:

- Tunnel ventilation – 25%
- Nighttime intensity lighting
- Tunnel traffic signals
- CCTV
- Fire detection

SECTION 7: TUNNEL DRAINAGE

7.1 STORM WATER RUN-OFF

The vertical alignment of the proposed roadway will result in storm water run-off flowing towards the tunnel portals and a low point within the tunnel. To prevent storm water run-off from the approach roadways entering the tunnel, transverse interceptors will be placed at the tunnel portals. These will run the full width of the roadway and discharge by gravity into the roadway drainage system or into collection sumps consisting of a settling basin and suction chamber. The selection of gravity or pumped drainage will be determined by the portal location. Some rainwater will be carried into the tunnel on vehicles and drip onto the roadway. This minor volume of water will collect, via the drainage system, into the sump at the tunnel low point. The sump size will be controlled by the volume necessary to contain wastewater used during one hour of fire fighting. It should be noted that the Battery tunnels have no low point, but rather a straight downhill grade toward the Main Post tunnels. As such, no sump will be necessary within the Battery tunnels.

7.2 SPILL CONTAINMENT

Drainage is needed inside the tunnels to remove water and other liquids introduced during fire fighting, washing of tunnel interiors, flushing of pavements and water dripping from vehicles. Water will drain from the roadway into drainage inlets spaced approximately 15 m (50 feet) apart along each side of the tunnel. Inlets will be connected to longitudinal drain lines embedded in concrete below the roadway leading to a sump at the low point. Closely spaced drain inlets are preferred over continuous trench drains as they help prevent propagation of fire by burning fuel in the case of a serious accident. Drain lines will be at least 200 mm (8”) diameter with cleanouts spaced approximately every 150 m (500 feet).

7.3 SEPARATOR

The sump for the oil/waste separator will be sized for a capacity of 115 000 L (30,000 gal) based on the full containment of the water usage during one hour of fire fighting. Convenient access will be provided to the settling basin for removal of oil and solids by a tanker truck. The suction chamber will have three electrically driven, large clearance drainage pumps with alternating automatic controls to rotate the pumps in service. A high water level alarm will connect to the panel in the control room. Each pump will have a capacity of 50% of the maximum permissible flow. The maximum discharge rate will be determined during detailed design based on the allowable discharge into the local sewer system. The pumps will discharge surplus water into the public sewer system automatically to maintain the required storage capacity.

7.4 HYDROCARBON DETECTORS

The need for volatile hydrocarbon detectors will be determined during detailed design and will be based on the location of the separator sump. Typically the storage tanks and pump stations will be monitored for hydrocarbons. Also, drainage effluent will monitored and if hydrocarbons are detected, local and remote alarms will be initiated.

7.5 GROUNDWATER

The tunnel design incorporates a waterproof membrane around the tunnel surrounded by a layer of permeable material to allow the passage of groundwater around the tunnel. At one location along the tunnel alignment more rigorous methods of maintaining the existing groundwater regime are needed.

North of the National Cemetery, the tunnel passes though fractured bedrock and discrete groundwater springs exist on the north face of the bluff. A system of groundwater collection arrays, transfer pipes and diffusers has been developed to maintain the potential groundwater paths after tunnel construction is complete. A more detailed description of the existing groundwater conditions and the systems proposed to maintain the groundwater regime is provided in the Hydrological and Water Resources technical report.

SECTION 8: TUNNEL SURVEILLANCE

8.1 TRAFFIC INCIDENT DETECTION SYSTEM

Traffic sensors will be provided in the tunnel and on the approach roads to detect a traffic incident in the tunnel and on the approaches to the tunnel. Traffic data will be processed and incident alarms will be initiated by Tunnel Control System (TCS) computers based at the Tunnel Control Center (TCC - located within the Caltrans Transportation Management Center in Oakland).

There would be two levels of traffic alarms. An alarm, for a traffic incident requiring an emergency response, and a second alarm during heavy traffic conditions for traffic stopped in the tunnel. The stopped-traffic-in–the-tunnel alarm would trigger upstream CMS messages to warn of stopped traffic ahead, and is relatively easy for an incident detection system to detect during periods of heavy traffic flow.

A traffic incident is defined as any stopped vehicle in the tunnel not due to congestion. Thus, during periods of light traffic flow, a traffic incident alarm needs would be triggered by any stopped vehicle; whereas, during periods of heavy traffic flow, a traffic incident alarm needs to be distinguished from stop and go traffic, which is expected to occur regularly in the tunnel. The right shoulder breakdown lane will allow a disabled vehicle to pull over in the tunnel without a noticeable effect during periods of lighter traffic flow. Consequently, the usual traffic incident detection algorithms, designed for freeways to look for traffic backed up behind an incident, may not detect a stopped vehicle during light traffic volumes.

The state of the art for traffic incident detection is advancing rapidly for both CCTV and vehicle profiling inductive loop systems. Radar systems, however, are not proven in tunnels, due to the microwave bouncing off the tunnel surfaces. The CCTV based system requires fixed cameras in addition to the pan-tilt-zoom cameras used for surveillance and verification of incidents. CCTV systems ideally are located high above the roadway, but in a tunnel, the relatively low ceiling height means that it is possible for a truck in the near lane to block vision of the far lane, which means in practice that cameras need to be mounted over very lane. Also in the Doyle Drive Tunnel they would have to be mounted so they can see under the jet fans, fixed signs, LUS and CMS. In contrast, loop-based system is potentially less expensive to install and maintain than a CCTV incident detection system, and can operate effectively even if the tunnel is full of smoke. Both inductive loop and CCTV systems exist that can detect a stopped vehicle during the low traffic volumes, though none, as yet, are proven to detect an incident during stop-and-go traffic conditions.

It is proposed to use the proven vehicle profiling inductive-loop vehicle counting incident detection methodology. The procedure is that if a vehicle is missing at the next count station, that a traffic incident is declared. With the loop stations (a pair of loops under each lane) about 100 m (330 feet) apart, under light or moderate traffic conditions, the incident alarm will go off in about 15 to 20 seconds. If traffic slows down due to congestion, then the alarm will take proportionally longer. The loops will also provide the usual traffic flow data of volume, speed, and occupancy. The vehicle profiling technology is also able to know if a vehicle changed lanes, which is the normal response of motorists attempting to move around a stopped vehicle. During congested period, a lane-changing algorithm based on historic lane-changing data, would distinguish an incident from stop-and-go traffic.

8.2 CLOSED CIRCUIT TELEVISION SYSTEM

The CCTV system will function as a security and safety aid for the Doyle Drive Tunnel(s). As a means to verify alarms and monitor conditions in the tunnel, complete CCTV coverage will be provided of the roadway inside the tunnels, the portal area, and approach roads included, as needed, on the first approach CMS sign bridge.

8.3 ENVIRONMENTAL MONITORING SYSTEM

The Environmental Monitoring system will provide wind speed, carbon monoxide (CO) and volatile hydrocarbon (HC) information to allow Operations personnel to react correctly in the case of an incident or emergency. See the Ventilation section for a discussion of CO monitoring requirements.

Some tunnels, such as the Posey and Webster tubes in Alameda monitor nitric oxide (an irritant and haze maker), but most likely will not be recommended for the Doyle Drive Tunnels. Analysis of pollutant levels in other tunnels has shown that the threshold standard for CO is typically reached before the threshold standard for nitric oxide is reached. In the design phase, the need to monitor nitric oxide for the Doyle Drive Tunnels will be investigated.

8.4 OTHER SENSORS

The tunnel will be equipped with other sensors. The drainage sumps will have water level sensors. The fans, pumps and other equipment will have appropriate malfunction sensors, such as heat sensors on bearings. All entry and exit doors in the tunnel will be alarmed for intrusion.

8.5 OVER HEIGHT VEHICLE DETECTORS

Over height vehicle detectors will be used to prevent an over height vehicle from entering the tunnel and damaging either the vehicle or tunnel structure and to protect the equipment (signs and signals) located under the ceiling of the tunnel. The over-height vehicle detectors will be located on the tunnel approaches sufficiently far away for the over height vehicle to be automatically stopped outside the tunnel by the CMS and traffic signals. The automatic stopping of over-height vehicles will not require operator intervention.

8.6 TUNNEL SECURITY AND ACCESS CONTROL

All related ancillary facilities that support the operation of tunnels for Doyle Drive shall be protected as required by all applicable NFPA standards and local building codes. Increased emphasis will be made on securing access to facilities that are non-occupied or subject to unauthorized access. Closed-circuit television cameras will be provided for security. Access control will be provided for critical functions by card access or special keys. Emergency egress will be visually monitored or controlled such that unauthorized personnel can be detected and action taken immediately.

It should be noted that the according to NFPA standards the length of the Battery tunnel excludes it from requiring tunnel surveillance. However, it is thought prudent here to provide more than the minimum standards.

SECTION 9: TUNNEL TRAFFIC CONTROL

Traffic will be controlled using CMS, LUS and traffic signals. These systems will be located above the vehicle clearance envelope, in between the jet fans.

CMS will be placed at the portals, spaced inside the tunnel so that one will be visible and readable by motorists at all times, and placed on the approaches to warn traffic if the tunnel is closed due to stopped traffic ahead, reduced speed or other hazard. An overhead CMS will be placed on the approaches to warn motorists of emergency conditions in the tunnel, such as the tunnel is closed.

LUS display a green down arrow, a yellow down arrow and a red 'X', to indicate whether the lane is available or prohibited. The LUS will be placed in groups with one over every lane. An LUS group will be placed at the Portals, and spaced inside the tunnel so that two LUS over any lane are visible and readable at all times.

Traffic signals will be mounted at the portals to stop traffic from entering the tunnel during emergency conditions.

A Radio Rebroadcast System will have an override capability to allow the tunnel operator to communicate with the motorists. A CMS display will alert the motorist to turn on their radio, with the emergency message delivered over all normal AM and FM frequencies. Figure 5 in Appendix A indicates the typical arrangement of the tunnel traffic control systems.

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SECTION 10: COMMUNICATIONS SYSTEM

10.1 PHONE SYSTEM

Emergency telephones will be provided in the tunnel to provide motorists, maintenance personnel, and emergency personnel with direct-line telephone communications to the local control console and with switching capabilities for the Caltrans Transportation Management Center (TMC) in Oakland.

The tunnel will have an emergency telephone no more than every 90 m (300 feet) on the right (outside shoulder) wall connecting to the TCC and not to 911. The operator at the tunnel control console would be able to simultaneously see on the CCTV system and to talk to the individual phoning from the tunnel. The operator, after verifying an incident, would then notify the appropriate authorities. There will be no emergency telephone at the portal. Rather there will be telephones visible from the tunnel CCTV located outside the portals in the widened area of the roadway. There will be telephones inside each cross passage, and at the locked fire control panel at each portal.

10.2 RADIO SYSTEM

The Radio System includes a two-way radio system and an AM/FM rebroadcast system. This work will be coordinated with Caltrans. Caltrans will be responsible for license application, modifications and renewals. The two-way radio system will be compatible with and operate with the existing Fire Mutual Aid, Caltrans, Park Police, San Francisco Police, Golden Gate Bridge emergency vehicles and CHP systems.

10.3 AM/FM REBROADCAST

The AM/FM rebroadcast system will permit motorists traveling through the tunnel to receive local radio station signals. The rebroadcast system will be capable of receiving local stations and retransmitting them with a reception level equal to that outside the tunnels without the need for adjusting vehicle volume control. The system will also provide for interruption of normal broadcast reception (AM and FM) to provide pre-recorded messages to motorists in the Doyle Drive Tunnel in the event of an emergency.

10.4 TUNNEL COMMUNICATIONS DISTRIBUTION SYSTEM

The tunnel communications system has three components, data communications, voice communications, and video communications. The data communications system is designed to provide redundancy for essential communications. The tunnel communications include separate channels for:

SCATA system that connects the Supervisor Control System (SCS) includes the Programmable Logic Controllers (PLCs) that monitor and control all the equipment in the tunnel with the exception of the CMS and the Traffic Incident Detection System.

The CMS controllers send and receive coded data via their own network. The variable message signs can by themselves control and direct traffic, and so provide a redundant system to the SCS computer PLC network.

The traffic loop detectors are monitored by field computers (out-stations). The out-stations are interconnected to keep them in synchronization. The whole system is connected to a primary incident detection computer (in-station). The in-station will send alarms via the SCS-PLC network, and will send basic traffic data via the computer-to-computer network.

An ethernet network will connect the two SCS computers, and also connect the traffic loop incident detection (In-station) computer with the SCS computers and with the data multiplexer for transmission of data to Oakland.

Each end of the tunnel will have a Fire Alarm Control Panel with all the fire alarms displayed. The two panels display identical data and are interconnected with their own data network.

10.5 TUNNEL CONTROL SYSTEM TO TMC INTERTIE

There are several communication options for the voice, data and video intertie between the Doyle Drive Tunnel Control System and the Caltrans Transportation Management Center in Oakland. The method chosen will be determined during the final design phase.

SECTION 11: TUNNEL CONTROL SYSTEM

Means will be provided for a Tunnel Control System (TCS) to control the tunnel equipment and control traffic in the tunnel and approaches.

11.1 EMERGENCY RESPONSE STRATEGY

The basic emergency response strategy will be semi-automatic. To speed the response, the TCS computer will provide the operator a pre-programmed set of appropriate responses for each emergency depending on its type and location in the tunnel. After the operator has verified the emergency and has determined that the response actions provided by the computer are appropriate, the operator can initiate the actions using the computer. The operator can select which response actions are appropriate and if needed can add other actions not initially selected by the computer. The system will track operator actions and modify suggested response actions as additional information becomes available. The TCS shall have redundancy to maintain continuous surveillance and control of the tunnel.

11.2 SUPERVISORY CONTROL SYSTEM

The Supervisory Control System (SCS) will consist of Programmable Logic Controllers (PLC), communications equipment, and conduit and cable system from the field devices to the TCC and the SCS computers, console, and associated peripherals.

The SCS will interface with, monitor, and in many cases control: the ventilation system, the primary and secondary power systems, the traffic incident detection system, the traffic signal system, the lighting system, the CMS system, the telephone system, the radio systems, the CCTV system, the environmental monitoring system, the fire and intrusion alarm systems, and the uninterruptible power supply system.

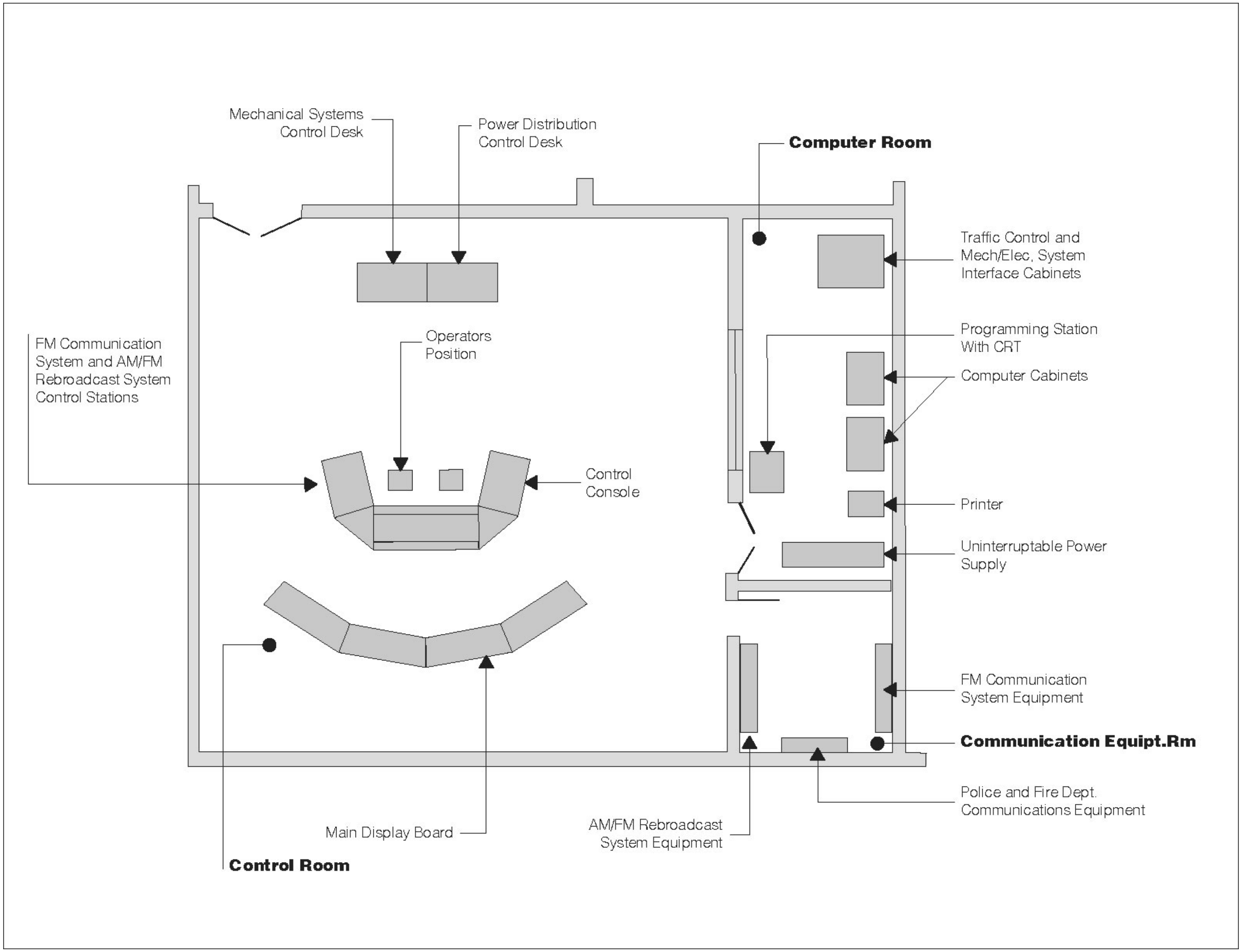
The SCS is designed so that the tunnel can be operated locally out of the tunnels themselves or from the TMC in Oakland. Each location will have two computers with identical SCS software. The two computers side by side provide backup, and also allow two tunnel operators to work simultaneously during maintenance or emergency operations. .

11.3 TUNNEL CONTROL CENTER

The tunnel control would be located in the TCC to be located within the Tunnel Management Center. The focal point for the SCS will be the Control Console that will contain the following devices (see Figure 11.1).

- Supervisor Control System Computers & Monitors
- Telephone console will be installed at the TCC Tunnel Operator’s console
- Two-way radio console will be installed at the TCC Tunnel Operator’s console and will provide for Two-Way Radio Communications with Caltrans radios and other cooperating agencies.
- AM/FM Rebroadcast console will be installed at the TCC Tunnel Operator’s console and will provide for interruption of all normal broadcast reception (AM and FM) to provide pre-recorded messages to motorists in the Doyle Drive Tunnels in the event of an emergency.

FIGURE 11-1
TUNNEL CONTROL PLAN



CCTV monitors and a single CCTV Control console will be installed at the TCC Tunnel Operator's console and will provide for: reception of video signals transmitted from field located cameras; distribution of the video signals by means of remote controlled switching to selected monitors installed in the TCC; recording of selected video scenes on a cassette recorder with the camera identification, time, and date information included; and transmission of camera control for Pan, Tilt, and Zoom to field located cameras.

11.4 CALTRANS TRANSPORTATION MANAGEMENT CENTER EQUIPMENT

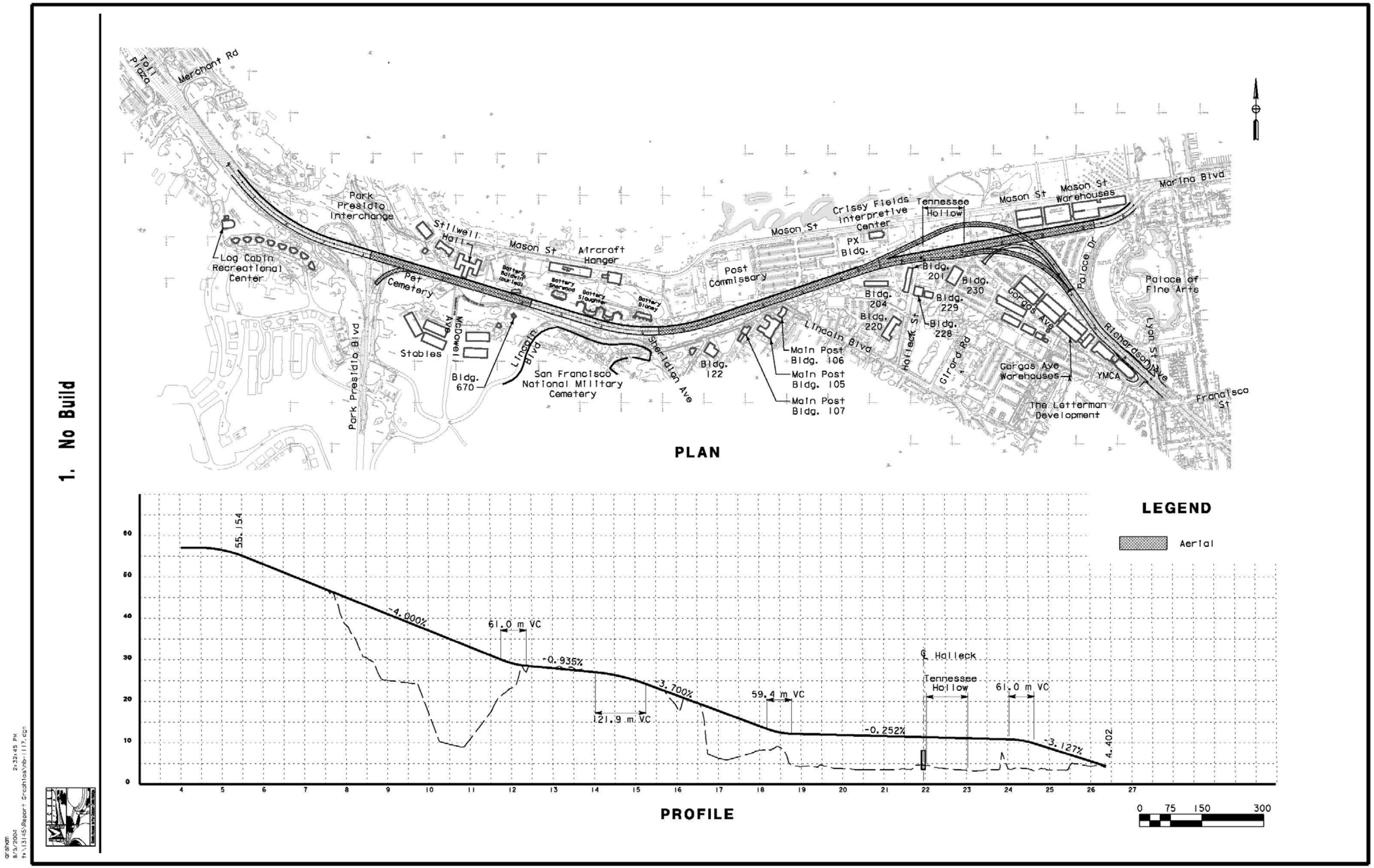
The TMC-Tunnel Operator equipment will be installed at the Caltrans Transportation Management Center control room in Oakland.

- TMC Doyle's Drive Tunnel SCS Computer. A personal computer system will be installed at the TMC control room on one of the Traffic Operations Consoles. The two computers (one primary and one backup) will have the minimum attributes similar to the TCC-Tunnel Control computers.
- Two-way radio link via phone lines to the Caltrans maintenance radio at the tunnel.
- AM/FM Rebroadcast Console. A single AM/FM Rebroadcast console will be installed at the TMC control room and will provide for interruption of all normal broadcast reception (AM and FM) to provide pre-recorded messages to motorists in the Doyle's Drive Tunnels in the event of an emergency.
- CCTV Monitoring Console. A single CCTV Control console will be installed at the TMC control room and will provide for the following functions: Distribution of the video signals by means of remote controlled switching to selected monitors of the existing TMC system; and transmission of camera control for Pan, Tilt, and Zoom to field located cameras.

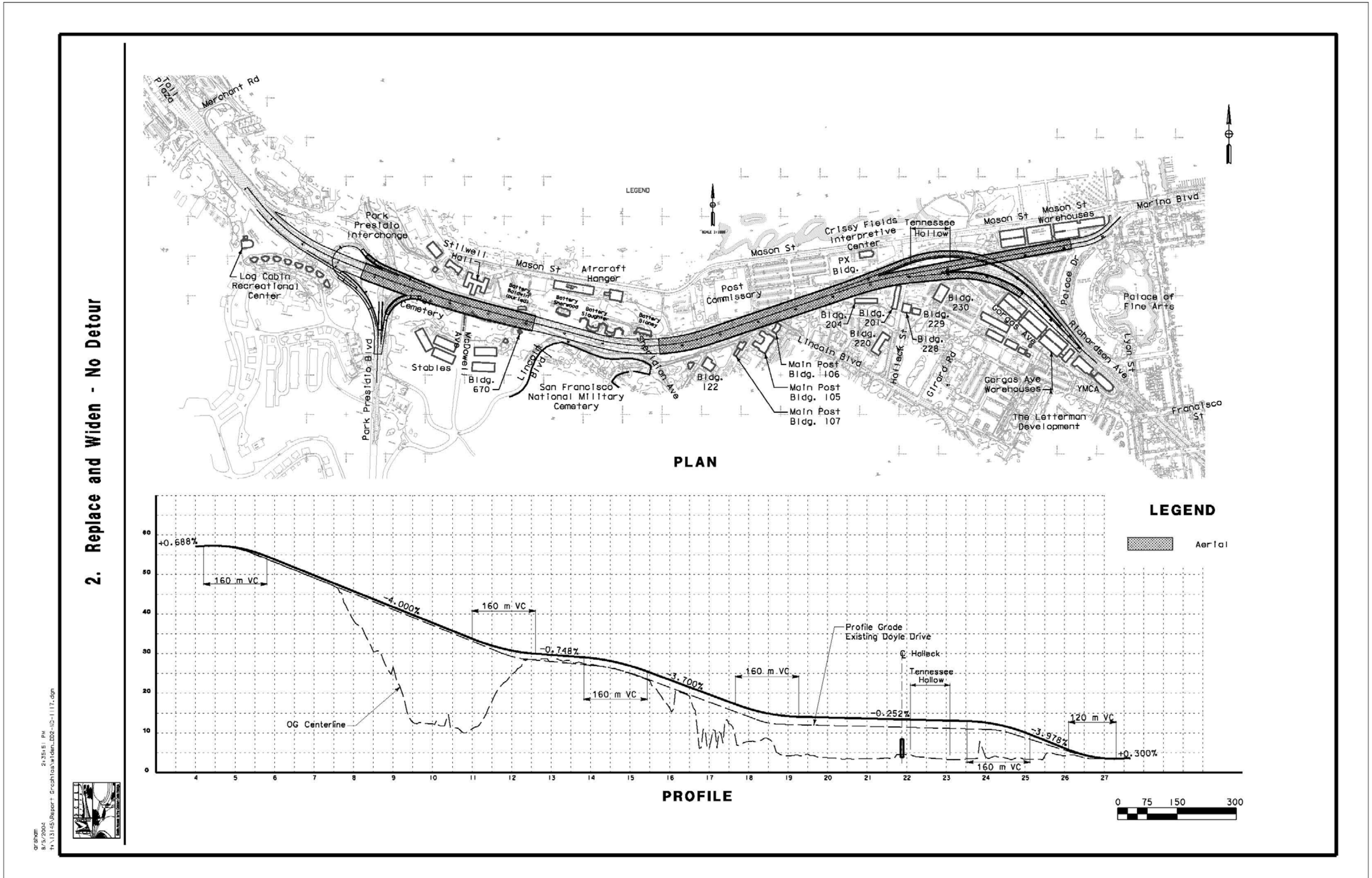
11.5 UPS

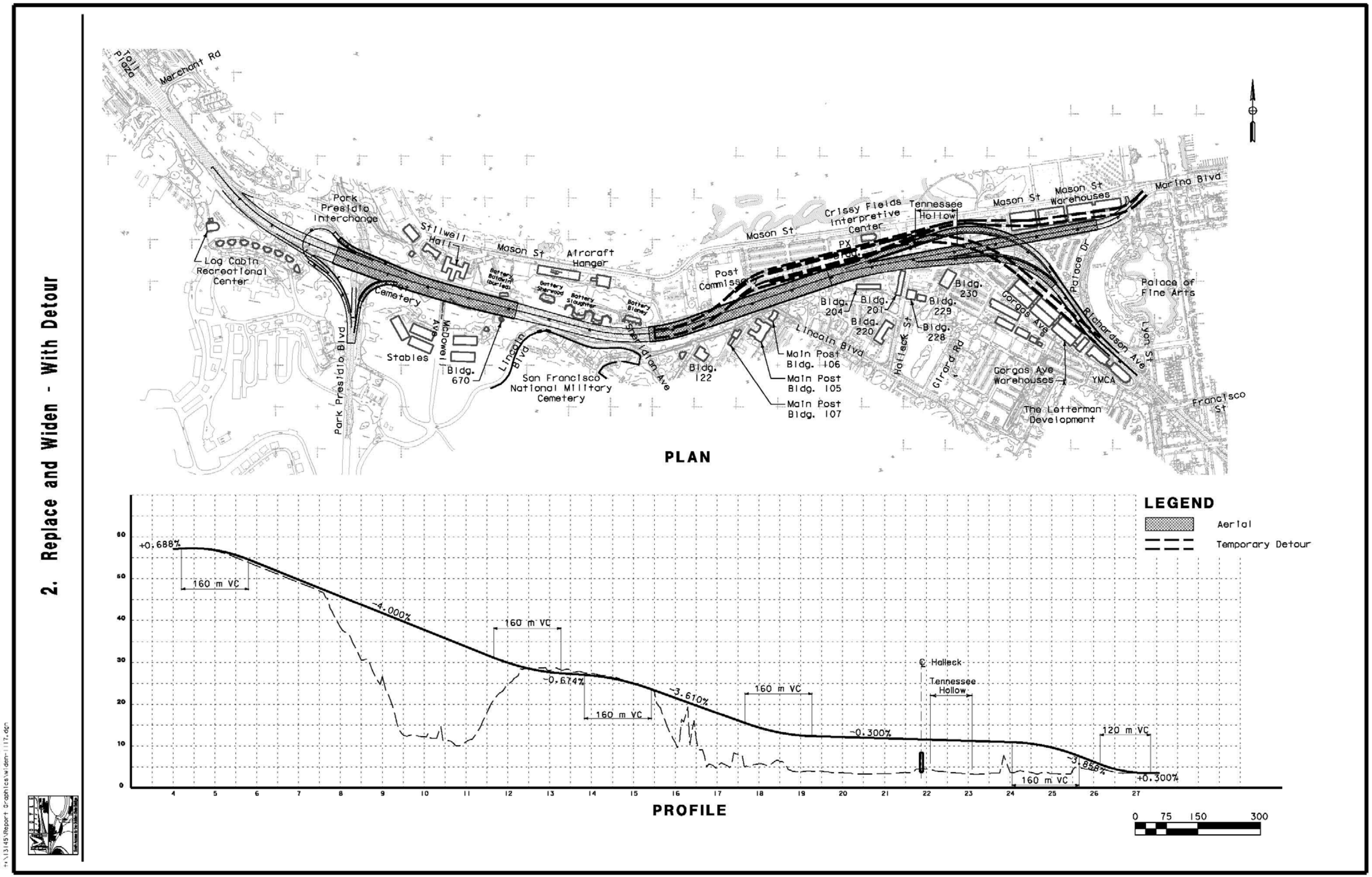
The computers, the communication system, the traffic surveillance system, the fire detection system and other vital functions will have an Uninterrupted Power Supply (UPS). The other vital functions requiring UPS are as a minimum: minimal lighting, exit signs, lighting for cross passages or refuge areas, ventilation for refuge areas, CMS's at the portals, and the traffic signal system. All the other systems including ventilation, full lighting and the other CMS's will be supported by the standby generator that will be operating at full power within 60 seconds of a failure.

APPENDIX A
FIGURES

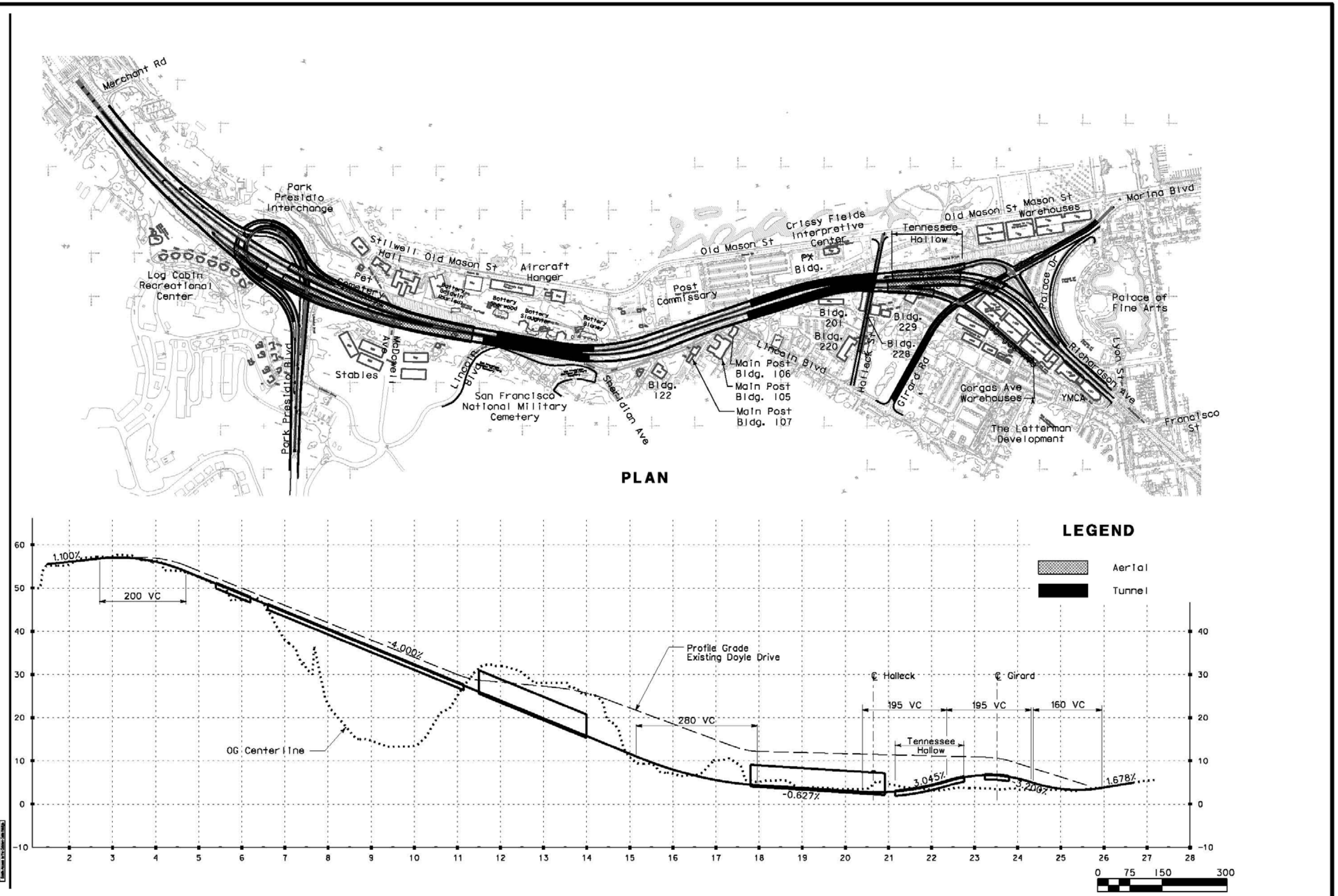


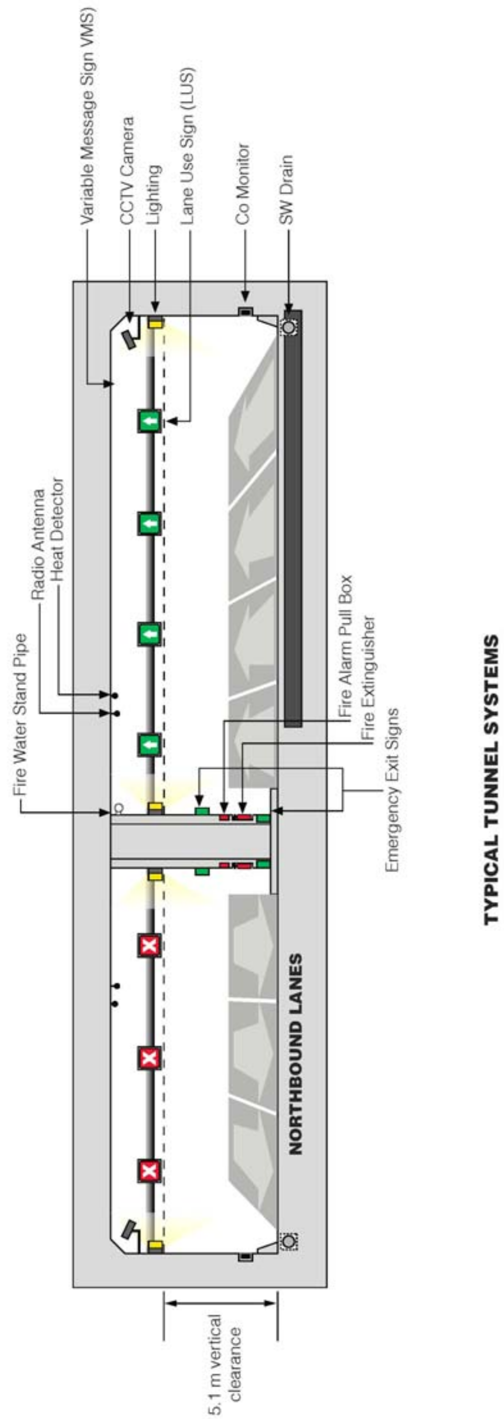
1. No Build
PLAN
Toll Plaza
Merchant Rd
Park Presidio Interchange
Stillwell Hall
Mason St
Aircraft Hanger
Log Cabin Recreational Center
Pet Cemetery
Stables
McDowell Ave
Lincoln Blvd
Bldg. 670
San Francisco National Military Cemetery
Sheridan Ave
Bldg. 122
Post Commissary
Crissy Fields Interpretive Center
PX Bldg.
Tennessee Hollow
Mason St Warehouses
Marina Blvd
Palace Dr
Palace of Fine Arts
Bldg. 201
Bldg. 230
Bldg. 204
Bldg. 229
Bldg. 220
Bldg. 228
Halleck St
Girard Rd
Gorgas Ave
Gorgas Ave Warehouses
Richardson Ave
Lyon St
YMCA
The Letterman Development
Francisco St
Main Post Bldg. 106
Main Post Bldg. 105
Main Post Bldg. 107
Park Presidio Blvd
LEGEND
Aerial
55.154
-4.000%
61.0 m VC
-0.935%
-3.700%
121.9 m VC
59.4 m VC
-0.252%
℄ Halleck
Tennessee Hollow
61.0 m VC
-3.127%
4.402
PROFILE
0 75 150 300


2. Replace and Widen - No Detour
PLAN
PROFILE
LEGEND
Aerial
Toll Plaza
Merchant Rd
Park Presidio Interchange
Log Cabin Recreational Center
Stilwell Hall
Mason St
Aircraft Hanger
Post Commissary
Crissy Fields Interpretive Center
Tennessee Hollow
PX Bldg.
Mason St Warehouses
Marina Blvd
Palace of Fine Arts
Lyon St
Francisco St
YMCA
The Letterman Development
Gorgas Ave Warehouses
Richardson Ave
Lincoln Blvd
Main Post Bldg. 106
Main Post Bldg. 105
Main Post Bldg. 107
Bldg. 122
San Francisco National Military Cemetery
Stables
Bldg. 670
Park Presidio Blvd
McDowell Ave
+0.688%
160 m VC
-4.000%
-0.748%
-3.700%
-0.252%
-3.978%
+0.300%
120 m VC
Profile Grade Existing Doyle Drive
℄ Halleck
OG Centerline
0 75 150 300


2. Replace and Widen - With Detour
PLAN
Toll Plaza
Merchant Rd
Park Presidio Interchange
Log Cabin Recreational Center
Stilwell Hall
Mason St
Aircraft Hanger
Cemetery
Stables
McDowell Ave
Bldg. 670
Lincoln Blvd
San Francisco National Military Cemetery
Sheridan Ave
Park Presidio Blvd
Post Commissary
Crissy Fields Interpretive Center
PX
Tennessee Hollow
Mason St Warehouses
Marina Blvd
Bldg. 122
Bldg. 204
Bldg. 201
Bldg. 220
Bldg. 229
Bldg. 228
Bldg. 230
Main Post Bldg. 106
Main Post Bldg. 105
Main Post Bldg. 107
Halleck St
Girard Rd
Gorgas Ave
Gorgas Ave Warehouses
YMCA
The Letterman Development
Palace Dr
Palace of Fine Arts
Richardson Ave
Lyon St
Francisco St
LEGEND
Aerial
Temporary Detour
PROFILE
+0.688%
160 m VC
-4.000%
-0.674%
-3.610%
-0.300%
-3.858%
+0.300%
120 m VC
℄ Halleck
Tennessee Hollow
0 75 150 300

5. Presidio Parkway





Schematic Tunnel Systems — *Figure 5*

APPENDIX B

CONSTRUCTION COST SUMMARY – TUNNEL SYSTEMS

Doyle Drive Environmental & Design Study

Preliminary Tunnel Systems Report

Construction Cost Summary of Tunnel Systems

System	Battery Tunnels		Main Post Tunnels	
	Length (m)[1]	Amount ($)	Length (m)[1]	Amount ($)
Ventilation	470	846,000	595	1,071,000
Lighting	470	1,739,000	595	2,201,500
Fire Suppression	470	329,000	595	416,500
Power	470	1,527,500	595	1,933,750
Systems	470	2,514,500	595	3,183,250
Total		**$ 6,956,000.00**		**$ 8,806,000.00**

1. Total length of single tunnel bore

04mg0730 Tunnel Cost.xls

Rev 2