APPENDIX K

WATER QUALITY REPORT

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Memorandum

To	Valerie Shearer	Page	1
CC			
Subject	Yerba Buena Island Ramps Improvement Project EIR/EIS Water Quality Report Addendum Memorandum 2		
From	Susan Yogi and David Reel		
Date	July 26, 2011		

The YBI Ramps Improvement PDT, which is comprised of the lead (Caltrans and SFCTA), cooperating, and responsible agencies, held a meeting on April 12, 2011 to consider and identify the preferred alternative. The unanimous decision was that Alternative 2b would best meet the purpose and need of the YBI Ramps Improvement Project. The relocation site for Quarters 10/Building 267 was determined following the identification of the preferred alternative.

The purpose of this memorandum is to confirm that preparation of the relocation of Quarters 10/Building 267 site and relocation of the buildings would not result in new issues. After the buildings are relocated, any future use of the site will be evaluated through a separate environmental process initiated by the City and County of San Francisco and/or TIDA.

Relocation of Quarters 10/Building 267 would increase impervious area at the site. The disturbed area could total up to 1 acre from the site preparation and relocation activities. Preparation of the site could include some excavation for the building foundations. Typical construction practices require pumping of groundwater to dewater excavations below the groundwater level. If construction dewatering is required, it would take place in conformance with Caltrans General Permit and SWMP. Any discharge of groundwater to the sanitary sewer system would be required to comply with the SFPUC pretreatment standards.

The preparation of the relocation site would involve excavation, grading, and stockpiling of soil and construction materials. Runoff generated during rainfall events may result in erosion of exposed soil and stockpiled soil. Sediment transported by runoff may cause sedimentation in downstream drainages or may be transported by runoff and discharged into the Bay, resulting in water quality degradation. Other potential pollutants of concern include vehicle fluids, oil, trash, and debris. The Caltrans General Permit requires control BMPs for control of construction site runoff. The SWPPP would require approval by the SFBRWQCB and would identify potential pollutant sources that could affect the quality of runoff, and would require identification, construction, and implementation of construction site BMPs. The SWPPP would specify a monitoring program and would require that the supervisors and workers be knowledgeable about each portion of the site and maintain awareness of the importance of storm water quality protection and pollution prevention. Compliance with existing regulations, programs, and the SWPPP would adequately address potential construction-related

storm water runoff impacts. Caltrans and SFCTA would continue to incorporate minimization measures where feasible. The relocation site design would include a drainage system to collect flows and direct storm water into the drainage system. No adverse impacts to water quality and storm water runoff would occur at the relocation site.

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Memorandum

To	Ed Pang	Page	1
CC			
Subject	Yerba Buena Island Ramps Improvement Project EIR/EIS Water Quality Technical Study Addendum		
From	Yvana Khun		
Date	July 9, 2010		

The following revisions are hereby made by addendum to the Final Water Quality Report dated August 21, 2009, based on comments from Caltrans Headquarters.

The first paragraph on page 1 under "I. Purpose of Study" has been revised as follows:

> The purpose of this study is to assess the impacts on surface water and groundwater quality of the and describe measures to protect water quality during and after construction of ~~proposed project and to propose measures to mitigate any water quality impacts associated with the construction of~~ the proposed Yerba Buena Island (YBI) Ramps Improvement Project. The location of the project site is shown in **Figure 1**.

The following text has been added on page 1, following "I. Purpose of Study"":

> **Project Purpose and Need**
>
> The purpose of the proposed project is to improve:
>
> - Traffic safety for drivers using the westbound on- and off-ramps.
> - Geometric design of the westbound on- and off-ramps on the east side of YBI to and from I-80; and
> - Traffic operations levels of service (LOS) on the westbound on- and off-ramps.
>
> The proposed project is needed for the reasons listed below and explained in subsequent paragraphs:
>
> - **Geometric Design:** The existing westbound on-ramp merge lengths and off-ramp deceleration lengths on the east side of YBI do not meet current Caltrans standards. The existing westbound on-ramp on the east side of YBI has a very short merge distance of approximately 43 meters (141 feet) which calculates to a 1:11 transition rate. It has a steep entrance grade of approximately 10 percent leading to a 122-meter-long (400 feet) crest vertical curve, resulting in a 30 km/h (18.6 mph) design speed. Therefore, traffic cannot accelerate to a proper mainline speed of 80 km/h (50

mph) to merge with through traffic. The existing westbound off-ramp diverges from the left-side freeway lane. The left-side exit lane is nonstandard (Highway Design Manual Section 504.2) and is signed for 48 km/h (20 mph). The proposed ramps would meet Caltrans standards to a much greater extent than the existing ramps and is anticipated to improve the Level of Service (LOS) and safety of the ramps, as discussed below. LOS is a qualitative description of a ramp segment or intersection performance based on the criteria outlined in the Highway Capacity Manual (HCM). LOS ranges from A, which indicates free flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays. Caltrans criteria are used to establish a goal of LOS C, when possible.

- **Operations:** Projections of 2035 traffic volumes indicate ramp operations at a failing LOS F on both the on- and off-ramps in both the morning and evening peak hours. Currently, the westbound left-lane off-ramp operates at LOS D in the morning peak hour and at LOS C in the evening peak hour. The existing westbound, on-ramp operates at LOS D in both the morning and the evening peak hours. In the future (2035) no build condition, both the westbound off-ramp and on-ramp would operate at LOS F in both the morning and the evening peak hours. Under the 2035 build condition without ramp meters, the westbound off-ramp would operate at LOS F in both peak hours, and the westbound on-ramp would operate at LOS F in the morning peak hour and LOS E in the evening peak hour. In the 2035 build condition with ramp meters, the proposed westbound off-ramp would operate at LOS E in both peak hours, and the proposed westbound on-ramp would operate at LOS C in both peak hours.
- **Safety:** The accident rate for the existing on- and off-ramps is higher than the statewide rate for similar facilities. The accident rate based on data collected over a 3-year period between April 1, 2003 and March 31, 2006 at all six ramps on YBI exceeded the statewide average rate (per million vehicle miles) for total collisions (sum of fatalities, injuries, and property damage) (TASAS Selective Accident Retreival, Table B).[1] This 3-year period is the latest data available for the existing on- and off-ramps because these ramps have since been closed for the construction of the SFOBB ESSSP project. The Actual Accident Rate for the existing westbound on-ramp is 0.75 per million vehicle miles compared to a rate of 0.60 for similar facilities statewide. For the existing westbound off-ramp, the accident rate is 1.4 compared to a 1.15 rate per million vehicle miles for similar facilities statewide. Geometric improvement of the ramps would better meet Caltrans standards compared to the existing ramps and would improve the LOS and is expected to decrease the accident potential rate. Rear end collisions on the westbound on-ramp are expected to decrease under the proposed project. The existing westbound on-ramp would be replaced by a 267-meter-long (876 feet) on-ramp thereby providing more merge length for traffic to accelerate to mainline speed. The existing left-side off-ramp would be replaced by a right-side 340-meter-long (1,115 feet) off-ramp, which would provide

[1] TASAS Table B reports for accident data calculations are available for any highway or section of highway, any or all ramps, any or all intersections for any time period specified. The report shows both actual and average rates. The report also shows total accidents, fatalities, injuries, multi-vehicles, wet, dark, persons killed and injured and the significance. Table B was generated for all six ramps on YBI and included in the Draft Project Report (DPR) prepared for this project.

greater distance for deceleration. Ramp meters would better control the flow of traffic and further improve safety.

The following text has been added to the end of the third paragraph under "III. Regulatory Setting" on page 5:

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Permit, which directs that storm water discharges are point source discharges and establishes a framework for regulating municipal and industrial storm water discharges. To ensure compliance with CWA Section 402, on July 15, 1999, the SWRCB issued the NPDES Permit, Statewide Storm Water Permit for Caltrans (Order No. 99-06-DWQ, NPDES No. CAS000003) (Caltrans 2003a). The Permit regulates storm water discharges from Caltrans properties, facilities and activities during and after construction. The Caltrans General Permit allows the discharge of uncontaminated construction dewatering in conformance with storm water management plan (SWMP) procedures.

The following text has been added following the first paragraph on page 8:

Hazardous waste is regulated under Title 22, Division 4.5, of the California Code of Regulations (CCR). CCR Title 22, Division 4.5 consists of statutes and regulations intended to prevent ultimate mismanagement of hazardous waste, with the primary focus being preventing disposal at unauthorized locations. Hazardous waste is defined and categorized in Chapter 11 of Title 22. California Health and Safety Code Sections 25150 and 58012 grants the Department of Toxic Substances Control (DTSC) the authority to adopt standards and regulations dealing with the management of hazardous waste. The DTSC regulates hazardous waste in California, cleans-up existing contamination, and looks for ways to reduce the hazardous waste produced in California.

Section "IV. Project Location and Receiving Water Bodies and Groundwater" on pages 8 to 9 has been revised as follows:

IV. PROJECT LOCATION ~~AND RECEIVING WATER BODIES AND GROUNDWATER~~

YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. Land use within YBI has historically been dominated by various branches of the U.S. military. Current land uses on YBI involves operation and housing of USCG personnel. Several buildings on the island are used by Caltrans; Buildings 15 and 29 are being used as a substation/air compressor house and as a tow truck housing facility, respectively. AT&T owns two small buildings immediately south of the SFOBB East Span, where several underwater cables run onto the shore.

YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative

slope[2]. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a). The proposed project's build alternatives would occur within existing Caltrans right-of-way.

Existing Drainage

The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.

Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.

V. WATER RESOURCES

A. Storm Water

~~YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative slope[3]. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a).~~

The proposed project is located in the San Francisco Bay watershed. The hydrologic sub-area information is as follows (CSU Sacramento 2008, see **Figure 4**):

- Hydrologic unit: Bay Bridges
- Hydrologic area: Bay Waters
- Hydrologic sub-area: Undefined, Sub-area 203.10
- Watershed area: 21,461 hectares (53,031 acres)
- Average annual rainfall: 536 millimeters (21.1 inches).

[2] The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.

[3] ~~The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.~~

~~***Existing Drainage***~~

~~The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.~~

~~Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.~~

The section "Existing Contamination" on pages 13 and 14 has been revised as follows:

~~Existing~~ Soil Contamination

Along with other islands on San Francisco Bay, YBI has been used for military purposes over the years. Naval Station Treasure Island was decommissioned in 1997; however, USCG activity continues on YBI. Based on current and previous environmental investigations, several areas of known and potential contaminant sources have been identified on YBI (AECOM 2009).

The U.S. Navy occupies a significant portion of the project area on YBI. The U.S. Navy, as part of an Installation Restoration Program (IRP) for NSTI/YBI, established a Federal Facility Site Remediation Agreement among the U.S. Navy, the California Department of Toxic Substances Control (DTSC) and RWQCB. Under this agreement, the U.S. Navy agreed to undertake and report on specified tasks associated with environmental assessment and response actions at 25 Installation Restoration (IR) sites under the IRP in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The Navy transferred ownership of Installation Restoration (IR) Sites 8, 11, and 29 to Caltrans through the Federal Highway Administration (FHWA). The data review conducted as part of the Hazardous Wastes Assessment (HWA) for the SFOBB ESSSP identified the following potential contaminant sources on the YBI Ramps Improvement Project site:

- IR Site 8: Former U.S. Army Point Sludge Disposal Area,
- IR Site 11: Former Landfill,
- IR Site 29: East Side Contaminated Bridge Soils, and
- Site 270: Leaking Underground Storage Tank (LUST) site associated with Building 270.

~~At the high portion of the North east Point on YBI, elevated levels of beryllium, lead, and pesticides have been detected. Along the entire shadow area of the existing bridge and adjacent ramps, investigations indicate a potential for lead contamination in surficial soils. Petroleum hydrocarbons were also found at a former gas station and adjacent fire station,~~

~~both of which have been demolished. Petroleum hydrocarbons have also been found at an active underground storage tank (Leaking Underground Storage Tank or LUST). In addition, it has been established that there is petroleum hydrocarbon contamination in the groundwater. There is also probable Aerially Deposited Lead (ADL) contamination, primarily from tailpipe emissions, in the unpaved areas adjacent to the existing roadway.~~

The Site Management Plan for the Naval Station Treasure Island (Tetra Tech EM Inc. 2008) reflects the Navy's current strategies and schedules to achieve site closure at several sites on Naval Station Treasure Island. This plan indicates that environmental closeout schedules and site closure for Installation Restoration (IR) Sites 8, 11, and 29 as well as inactive fuel line YF3 may be impacted by construction activities related to the SFOBB and YBI Ramps Improvement Project. Site 8 is located on the northeast end of YBI and was used as an army sludge disposal area from the wastewater treatment plant for approximately 8 years between 1968 and 1976. Metals and pesticides have been identified as the contaminants of concern. Site 11 had been used as a landfill and contaminants of concern at this site include total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals. Additional sources of contamination at the landfill include five underground storage tanks (USTs) and a fuel pipeline. Site 29 is located below and parallel to the SFOBB from the northeastern portion of YBI westward to the YBI tunnel. Site 29 contains lead due to maintenance of ramps (i.e., use of lead-based paint) as well as a result of vehicle emissions. An interim remedial investigation (RI) report for Sites 8 and 29 is being finalized and the RI report for Site 11 is in the process of being prepared. The estimated year for site closeout for all three sites is 2021.

The third paragraph under "B. Groundwater" on page 14 has been revised as follows:

Due to the absence of long-term monitoring of water levels, the natural groundwater depth is uncertain. The Packer testing[4] indicated that the bedrock was nearly impermeable below the weathered zone and therefore water introduced into the boreholes and in fractures of this material is not likely to perch at shallow depths. This leads to the possibility that the measured water depths were not representative and ~~to drain away. This leaves the possibility that the measured water depths are not normal and~~ the natural groundwater table should generally be expected near adjacent Bay levels. The ongoing Project Approval and Environmental Document (PA&ED) phase will determine the natural groundwater depth.

"A. Storm Water" under Section "V. Water Quality Impacts" on pages 14 and 15 has been revised as follows:

VI. WATER QUALITY IMPACTS

A. Storm Water

Caltrans has performed many studies to monitor and characterize highway storm water runoff throughout the State. Commonly found pollutants throughout the State are Total Suspended

[4] Packer tests consist of isolating specific sections of a bedrock borehole so that water-quality samples can be collected and aquifer tests can be conducted. A series of such tests allows definition of the vertical distribution of water quality (usually contaminants) and hydraulic conductivity (pathways for water and contaminant movement) in an aquifer.

Solids (TSS), nitrate nitrogen, Total Kjeldahl Nitrogen (TKN), phosphorous, orthophosphate, copper, lead and zinc (Caltrans 2007c). Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of ~~break~~ brake pads.

The westbound lanes of the new SFOBB as it approaches YBI would transition to a stacked configuration over the eastbound lanes. The proposed YBI ramps would connect to the high point of the westbound alignment located on this bridge. The SFOBB structures would be comprised of multi-cell cast-in-place concrete box girders. The structure depth would vary from approximately 1.8 to 5.9 meters (5.5 to 18 feet) (Caltrans 2000, p. 38). The current design of the proposed YBI ramp structures incorporates piped inlets directing storm water flows down the columns and into the Bay (Caltrans 2000, p. 38). The proposed drainage system would collect concentrated flows from the elevated ramp structures using inlets, storm drain pipes, and downdrain trenches. ~~and convey the runoff to the BMPs for treatment. After treatment runoff will be conveyed to the existing west tie-in drainage system (AECOM 2009).~~ The existing ramps on YBI do not have any cross drains and the proposed YBI ramps do not include the construction of any new cross drains. Temporary (construction-related) and permanent drainage and treatment best management practices (BMPs) are currently in the conceptual design stage, as described in Section VI.

The first bullet point on page 16 has been revised as follows:

- **Alternative 2B:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of a westbound off-ramp to Macalla Road on the east side of YBI, and construction of a westbound hook on-ramp from Macalla Road on the east side of YBI. The disturbed soil area estimated for Alternative 2B is approximately 2.3 acres. The disturbed soil area is the area from the edge of the pavement to the construction limits created by the cut and fill slopes. The disturbed soil area does not include the paved ramp area. This alternative would have less water quality impacts than Alternative 4 due to less disturbed soil area and less amount of impervious area added to YBI. The amount of impervious area would increase from an existing 8.47 acres to 10.42 acres, a change of 1.95 acres (AECOM 2009; see Attachment 1). The percent of impervious area is expected to increase from 47% to 58% for the project site. Pervious area is the difference between the total area and impervious area within the project right-of-way. The surface runoff from Alternative 2B would be collected to the outfall near Macalla Road and treated in a BMP which is yet to be determined. ~~It is anticipated, however, that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 2B, the required water quality treatment flow was calculated as approximately 0.0214 cubic meter per second (m^3/s). The required water quality treatment volume was calculated to be 119 cubic meters (m^3) (AECOM 2009; see Attachment 1).~~

The second bullet point on pages 16 and 17 has been revised as follows:

- **Alternative 4:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of westbound on-ramp from Hillcrest Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 would have the most water quality impacts of the three alternatives. The disturbed soil area estimated for Alternative 4 is approximately 4.4 acres, as it has the largest soil disturbance area, the largest increase in impervious area, and construction work would be required closer

to San Francisco Bay. The amount of impervious area would increase from an existing 6.34 acres to 10.74 acres, a change of 4.40 acres (AECOM 2009; see Attachment 1). The percent of impervious area is expected to increase from 59% to 100% for the project site. Surface runoff from the northern half of this alternative would be collected at the outfall near Macalla Road. Surface runoff from the southern portion of this alternative would be collected to the outfall near South Gate Road. The location and types of Permanent Design BMPs that would be used to control this surface runoff ~~of BMPs that would be used to treat this surface runoff~~ are in the conceptual design state and would be developed in detail at a future time. ~~; however, it is anticipated that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 4, the required water quality treatment flow was calculated as approximately 0.0242 m^3/s. The required water quality treatment volume was calculated to be 267 m^3 (AECOM 2009; see Attachment 1).~~

The first full paragraph and second paragraph on page 17 has been revised as follows:

An integrated bridge and ramp drainage system would be designed and constructed within the YBI Ramps Improvement Project limits to collect all storm water runoff. An independent ramp drainage system would be designed and constructed to collect all ramp surface runoff. For all slopes, benching, rounding, and terracing would be considered to minimize concentrated flows and slope stabilization measures and retaining walls may be needed. In addition, slopes would include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system. ~~for treatment (AECOM 2009).~~ The need for slope stabilization and possible retaining walls would be determined as the project progresses. In addition, slopes would include concrete side drains to collect concentrated flows, minimize erosion, and direct storm water in the proposed drainage system and acceptable BMPs, which would eventually terminate into San Francisco Bay.

The pollutant load from the proposed YBI ramp area is negligible when compared to the overall pollutant loadings to the San Francisco Bay from the entire watershed and would not have a net impact on the overall water quality in San Francisco Bay. San Francisco Bay is listed as impaired for a number of pollutants outlined in Section IV.A above; however, only mercury (under the Caltrans general metals category) is listed on the Caltrans targeted design constituent (TDC) list. Thus, for design and stormwater permit purposes, any treatment BMPs ~~for~~ considered~~ation~~ include those used to treat general metals/general purpose pollutants. Temporary construction site BMPs, permanent design pollution BMPs, and permanent treatment BMPs, would be required to minimize or prevent impacts on water quality and pollutant loading, particularly during times of large flood flow runoff. Suggested BMPs are described below in Section VI. The total mass of storm water pollution is not expected to change as a result of the project since the total usage hours are not expected to increase and the pollutant generation rate is not expected to increase (Caltrans 2001, p. 4-68).

“B. Groundwater” on page 17 has been revised as follows:

B. Groundwater

Groundwater may be encountered during construction. At this time, excavated ~~spoils~~ soil ~~would be~~is considered potentially hazardous ~~along with any groundwater encountered~~ and

would require appropriate collection, testing, and if applicable, transport offsite for treatment and disposal.

Section "VI. Avoidance, Minimization and/or Mitigation Measures" on page 17 and 18 has been revised as follows:

VII. AVOIDANCE AND, MINIMIZATION ~~AND/OR MITIGATION~~ MEASURES

A. Section 401 of the Clean Water Act

There are potential Waters of the U.S. onsite[5]; however, verification has not yet been completed by the U.S. Army Corps of Engineers regarding if they are considered jurisdictional. If it is determined that there would be impacts to existing wetlands and Waters of the U.S. within the project limits, an Army Corps 404 permit would be required along with a 401 Water Quality Certification from Region 2.

A~~A~~voidance and minimization efforts including BMPs to avoid discharge to waters of the U.S. have been considered and described ~~in the Natural Environment Study (NES) as well as~~ in this Water Quality Report in the case that the U.S. Army Corps of Engineers makes a determination that a 401/404 permit is needed. Any i~~I~~mpacts to Water of the U.S. and appropriate mitigation measures would be described in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Yerba Buena Island Ramps Improvement Project.

B. Section 402 of the Clean Water Act

Given a projected disturbance of greater than 0.4 hectares (one acre), the project is subject to Caltrans' statewide NPDES permit and Construction General permit. A SWPPP would be developed prior to construction. This dynamic document addresses the deployment of various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.

According to the Caltrans NPDES and General Permits, Best Management Practices (BMPs) would be incorporated into the proposed project to reduce the discharge of pollutants during and after construction to the Maximum Extent Practicable (MEP). These BMPs fall into ~~three~~ four categories, temporary Construction Site BMPs, permanent Design Pollution Prevention BMPs, ~~and~~ permanent Treatment BMPs, and operational maintenance BMPs..

The last paragraph on page 19 has been deleted as follows:

~~Given a projected disturbance of greater than 0.4 hectares (one acre), a SWPPP would be developed prior to construction. This dynamic document addresses the deployment of~~

[5] Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. In the proposed YBI ramp area, there is no evidence of wetlands. Waters of the U.S. consist solely of unvegetated waters flowing in concrete or roadside swales.

~~various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.~~

Section "(3) Permanent Treatment BMPs" has been revised as follows:

(3) Permanent Treatment BMPs

The PPDG Section 4 (Caltrans 2007b) describes the process for determining the need for permanent treatment BMPs. ~~As the YBI Ramps Improvement Project will discharge water into surface waters that have TMDLs and other pollution controls, as described in Section IV, treatment BMPs are required. In addition, the project is within an urban MS4 area and would cause a change to historic drainage patterns. The project would also indirectly discharge surface runoff into the San Francisco Bay, and is considered a major reconstruction project[6] resulting in a net increase of greater than one acre of new impervious surface.~~ According to the PPDG evaluation process, this project must consider permanent treatment BMPs. The TMDL established for mercury, as described in Section IV, will affect the selection of permanent treatment BMPs.

Treatment BMPs are permanent devices and facilities that treat storm water runoff. Caltrans-approved Treatment BMPs include Biofiltration Systems (Biofiltration Strips and Swales), Infiltration Basins, Detention Basins, Traction Sand Traps, Dry Weather Flow Diversions, Media Filters, Gross Solids Removal Devices (GSRDs), Multi-Chamber Treatment Trains, and Wet Basins. Those most feasible in the Bay Area are Biofiltration Systems, Infiltration Basins, Detention Basins, Dry Weather Flow Diversions, Media Filters, and Multi-chamber Treatment Trains. ~~The selected treatment BMPs have been identified in the project's SWDR (AECOM 2009).~~<u>Bioswales are identified in the project's current SWDR as the preferred treatment BMP for consideration of incorporation into the project design (AECOM 2009).</u>

~~The SWDR identified Infiltration Devices as infeasible for the project site, as portions of the project site are known to have hazardous soil and contaminated groundwater. In addition, the impermeable soil found at the project site restricts opportunities for the use of infiltration devices (AECOM 2009). Multi-chamber Treatment Trains are also not appropriate at this~~

~~[6] As defined in the Storm Water Quality Handbook (Caltrans 2007b), new construction and major reconstruction includes new routes, route alignments, and route upgrades. New construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. New Construction and major reconstruction projects may include, but are not limited to: new highways and freeways; highway-related facilities, including new or reconstructed maintenance facilities,~~
~~safety roadside rest areas, toll plazas and inspection and weigh stations; adding one or more lanes; adding HOV lanes; construction activities conducted within highway rights-of-way in conjunction with a new facility; new or reconstructed interchanges, including on-ramps, off-ramps, and connectors; new or reconstructed bridges; tunnels; and drainage system improvements, including changes to pipes, conduits, channels, etc.~~

~~project, as this project does not fall into any of the relevant categories (vehicle service facilities, parking areas, paved storage areas, or fueling stations). In addition, since dry weather flow diversions address non-storm water flows only, Dry Weather Flow Diversions are not recommended.~~

~~Detention Devices and Media Filters were evaluated as possible types of permanent Treatment BMPs. Detention Devices are effective at removing total suspended solids (TSS), phosphorus, particulate metals, and litter by temporarily detaining storm water runoff to allow sediment and particulates to settle out before it is discharged. Media Filters, specifically the Austin Vault Sand and Delaware Sand filters, are effective at removing general purpose pollutants. Both Detention Devices and Media Filters may require an impermeable lining to avoid leaking into potentially contaminated groundwater. Right-of-way concerns as well as the cost of these two permanent treatment BMPs were also considered to be issues in the PA&ED evaluation. However, Biofiltration Systems were identified as the favored permanent treatment BMP option.~~

The following text has been added following the third paragraph on page 21:

(4) Operation/Maintenance Stormwater BMPs

As described in the Caltrans Maintenance Manual (July 2006), it is the policy of Caltrans that the Division of Maintenance will:

(A) Implement the Maintenance Storm Water Management Program described in the Statewide Storm Water Management Plan;

(B) Implement the Best Management practices defined in the Caltrans Storm Water Quality Handbook Maintenance Staff Guide;

(C) Follow all appropriate State, federal, and local laws and regulations regarding water quality including all court orders and consent decrees.

(D) Meet all requirements of the RWQCB and SWRCB permits and orders.

As described in the Caltrans Maintenance Manual Chapter C5, “Drainage Facilities, Fences, and Roadside Appurtenances,” typical maintenance BMPs that could be used for stormwater control after the proposed project is constructed include, but would not be limited to (Caltrans 2006):

- C5.10.1 - Inspections of drainage facilities by District Maintenance Supervisors
  Visual, surface level inspections of drainage facilities shall be made annually and during and after each major storm to identify obvious defects, hazards or potential problems, and also to monitor known problems.

- C5.10.2 - Inspections of drainage facilities by District Culvert Inspection Program
  Thoroughly evaluates drainage facilities condition and identifies deficiencies at early stages where corrective maintenance strategies will be effective, or prevent failure from occurring.

- C5.12 - Ditches and Gutters
  Ditches and gutters should be inspected periodically and maintained to permit free flow. Lined ditches and gutters should be sealed or repaired to maintain structural integrity.

- C5.14 - Under Drains, Horizontal Drains and Down Drains
  Under drains (including underground groundwater relief systems, horizontal drains-cut slope groundwater drains, and down drains), surface drainage conduits, and accompanying collector systems should be inspected once a year and cleaned or repaired as necessary to ensure free flow. Surface water should not be permitted to discharge into an under drain.

- C5.15 - Edge Drains
  Edge drains should be inspected early in the winter season to assure that they are functioning. Edge drains should be inspect during or shortly after a rainstorm to observe the flow. If a drain appears to be clogged, it may be checked with a "snake" and cleaned by water jet equipment if necessary. Clean outs have been installed for this purpose.

- C5.16 - Structure Drainage Systems
  Bridge drainage systems should be inspected annually prior to the rainy season, and cleaned where necessary. These systems should be observed during storms to ensure proper functioning

- C5.21 - Maintenance of Over Side Drains and Slope Ditches
  Pipe or flume down drains should be maintained intact, and in the case of metal assemblies, maintained in tight contact with shoulder surfacing, side ditch lining, and dike paving. If embankment settlement occurs, restore to grade, and re-establish down drains or spillway, side ditch and dike. Fill and seal cracks around inlets of down drains to prevent seepage of water into embankment areas. If Rock Slope Protection is provided at the end of down drains, they should also be inspected and repaired if needed.

A new Section “IX. Recommendation to Designers” has been added prior to “References” on page 22:

IX. RECOMMENDATION TO DESIGNERS

Storm water discharges from construction activities of the proposed project would require permitting under Caltrans’ Statewide Storm Water NPDES permit and discharges would also have to comply with the substantive provisions of the SWRCB’s Statewide General Construction Permit. The proposed project would also require the preparation and implementation of a SWPPP. Coordination between the San Francisco Bay RWQCB and Caltrans District 4 would be crucial to ensure that all agency requirements and environmental concerns are addressed.

If utilized, bioswales would be designed in close consultation with the Regional/District NPDES coordinators due to the site's hazardous soil conditions and would likely require the use of impermeable liners and an underdrain.

Discharge to the storm sewer system (and eventually to the Bay) or directly to the Bay would be addressed by the Caltrans General Permit, which incorporates performance requirements and other technical provisions and would be subject to the quantitative water quality objectives included in the San Francisco Bay RWQCB Basin Plan.

Section "VII. References" has been revised as follows:

~~VII~~IX. REFERENCES

AECOM. 2009. ~~Draft~~ Final Long Form - Storm Water Data Report. Prepared for Caltrans. ~~February 12~~August 17, 2009.

California Department of Transportation (Caltrans). 2007c. Revised Water Quality Report for Caldecott Tunnel Improvement Project. April 27~~, 2007~~.

California Department of Transportation (Caltrans). 2006. Maintenance Manual Volume 1. July. Chapter C5 and F.

Pages 25 and 26 have been deleted.

Water Quality Report for Yerba Buena Island Ramps Improvement Project August 21, 2009

I. PURPOSE OF STUDY

The purpose of this study is to assess the impacts on surface water and groundwater quality of the proposed project and to propose measures to mitigate any water quality impacts associated with the construction of the proposed Yerba Buena Island (YBI) Ramps Improvement Project. The location of the project site is shown in **Figure 1**.

II. PROJECT DESCRIPTION

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI. The project is located in San Francisco County and is within the San Francisco Bay Central Basin, one of seven major hydrologic units within the Region.

A large amount of the island's surface area is covered with thick vegetation consisting mostly of stands of large, mature eucalyptus trees, smaller ornamental landscape trees, shrubs and lawn areas. The south side of YBI hosts facilities of the USCG, and portions of the island are currently used to store materials related to construction and maintenance of the SFOBB. In addition, YBI has 105 housing units, which range from large single family residences originally built for military officers to two to four-unit buildings. Developed areas of the island are scattered throughout. The southern fringe of the island, where the USCG facility is located, is mostly flat and open with somewhat less vegetation cover.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Figure 1. Regional Location

Yerba Buena Island
Ramps Improvement Project

0 2.5 5 Miles

EDAW | AECOM

07/01/08

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1[1] beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.[2]

Three alternatives are currently under consideration, including:

A. No Build Alternative

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

B. Alternative 2b

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI **(see Figure 2)**.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a "T" intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow[3] lane.

- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus.

- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to

[1] Kilometer Post (KP) 12.3 and 13.2
[2] The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.
[3] A mixed-flow lane is a general purpose travel lane with no traffic restrictions.

accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.[4] Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

C. Alternative 4

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI **(see Figure 3)**.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI - This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the Bay Bridge. The length of this ramp would be approximately 2,883 feet (879 meters). HOV lane would not be provided under Alternative 4.

- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus.

- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on-and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed

[4] Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.

adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

The construction of the ramps is estimated to start in the spring of 2012 and be completed by spring of 2014. It is expected that construction would occur after construction of the connecting transition structure, which is included in the SFOBB East Span Seismic Safety Project. The YBI Ramps Improvement Project would utilize most of the construction easements as well as storage and stockpiling areas that were obtained for construction of the transition structure. However, extra construction easements would be needed on the north side of the SFOBB. Loaders and backhoes would be expected to perform the necessary earthwork during construction.

III. REGULATORY SETTING

The primary federal law regulating water quality is the Federal Clean Water Act (CWA), issued by the U.S. Environmental Protection Agency (EPA). The EPA has delegated its authority in California to the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs). Each RWQCB prepares and adopts a Water Quality Control Plan, (Basin Plan), a master policy document for managing surface and groundwater quality throughout each respective region. The SWRCB and RWQCBs issue permits, which implement the standards included in the Basin Plan as well as other requirements of the State Water Code and the CWA (Caltrans 2007c). The YBI Ramps Improvement Project is located within the jurisdiction of the San Francisco Bay RWQCB (Region 2), which is responsible for implementation of State and Federal water quality protection laws and regulations in the vicinity of the project site.

Section 401 of the CWA requires a water quality certification from the SWRCB or RWQCB when a project: 1) requires a federal license or permit (a Section 404 permit is the most common federal permit for State of California, Caltrans projects), and 2) would result in a discharge to waters of the United States.

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Permit, which directs that storm water discharges are point source discharges and establishes a framework for regulating municipal and industrial storm water discharges. To ensure compliance with CWA Section 402, on July 15, 1999, the SWRCB issued the NPDES Permit, Statewide Storm Water Permit for Caltrans (Order No. 99-06-DWQ, NPDES No. CAS000003) (Caltrans 2003a). The Permit regulates storm water discharges from Caltrans properties, facilities and activities during and after construction.

Figure 2. Alternative 2B

Yerba Buena Island
Ramps Improvement Project

Alternative 2b Proposed Ramps

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Separate Project Currently Under Construction

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Image: Nima/ USGS 2004
Data: DMJM Harris, EDAW

5/09

This map is a graphical representation and for general locating purposes only.

0 100 200 300 Feet

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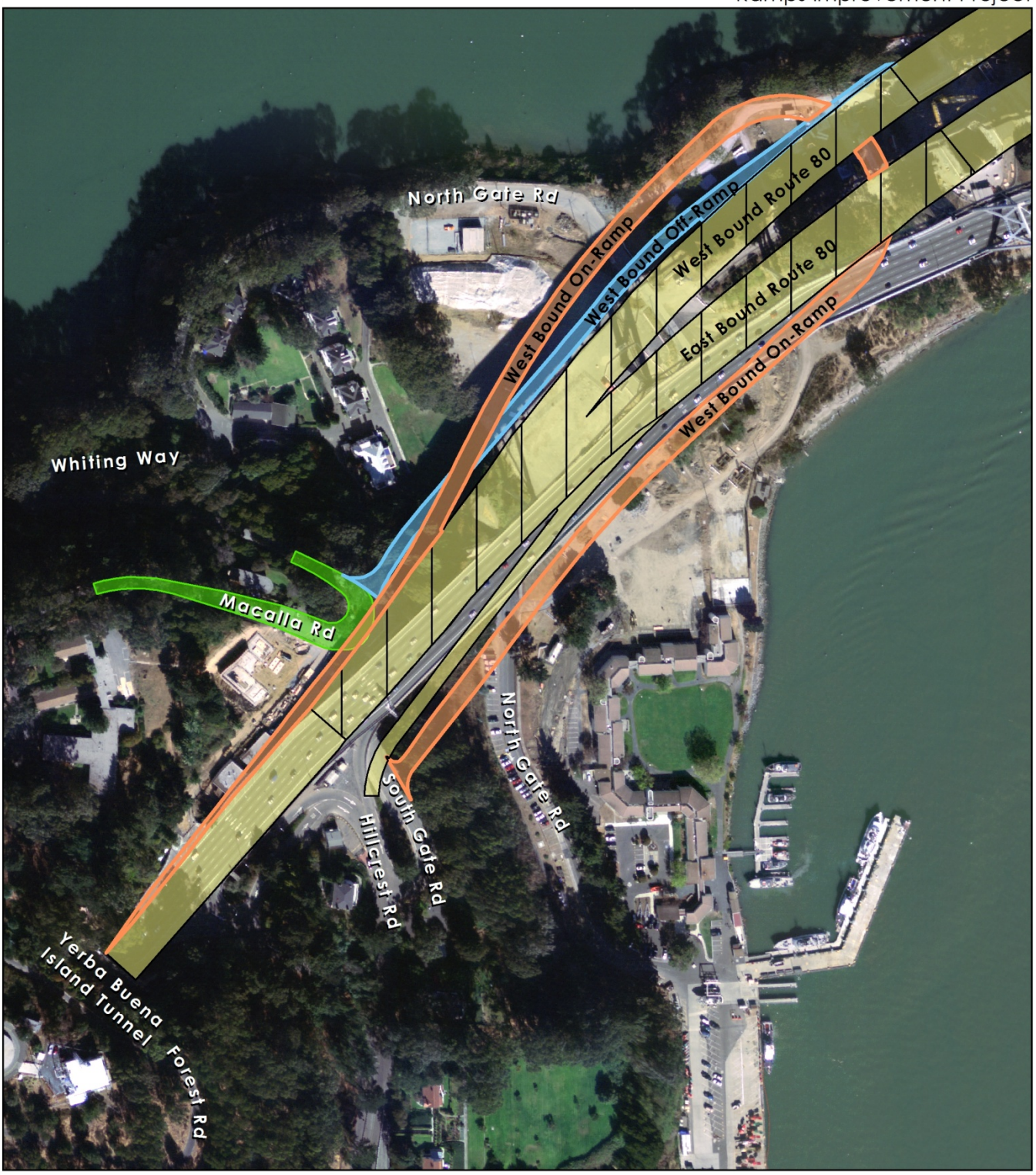
Figure 3. Alternative 4

Yerba Buena Island
Ramps Improvement Project



Alternative 4 Proposed Ramps

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Separate Project Currently Under Construction

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Image: Nima/ USGS 2004
Data: DMJM Harris, EDAW
5/09

This map is a graphical representation and for general locating purposes only.

0 100 200 300 Feet

N

The SWRCB has also issued a Statewide Construction General Permit (General Permit) for construction activities (Order No. 98-08-DWQ, CAS000002), which applies to all storm water discharges from land where clearing, grading, and excavation result in disturbances of at least 0.4 hectares (one acre) or more. The Caltrans permit (CAS000003) requires that Caltrans implement the technical provisions of the statewide general permit for construction activities. Construction activity that results in soil disturbances of less than 0.4 hectares (one acre) are subject to the General Permit if the construction activities are part of a larger Common Plan of Development totaling 0.4 hectares (one acre) or more of soil disturbing activities, or if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB (Caltrans 2007c). All projects that are subject to the General Permit require a Storm Water Pollution Prevention Plan (SWPPP). Construction projects that disturb less than 0.4 hectares (one acre) of soil are required to incorporate a Water Pollution Control Program (WPCP). The disturbed soil area estimated for YBI Ramps Improvement Project Alternatives 2B and 4 are approximately 2.3 acres and 4.4 acres, respectively. Regardless of requirement of a SWPPP or WPCP, a Storm Water Data Report (SWDR) is required, which summarizes the storm water quality issues of a project. A SWDR was prepared February 2009 (AECOM 2009) and was used to prepare this study.

The Caltrans Project Planning and Design Guide (PPDG) provides a process for determining the need for, selecting, and incorporating feasible Best Management Practices (BMPs) into projects (Caltrans 2007b). The PPDG describes the BMP selection and design process, as well as describing relevant regulations, permits, monitoring and reporting requirements.

IV. PROJECT LOCATION AND RECEIVING WATER BODIES AND GROUNDWATER

A. Storm Water

YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative slope[5]. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a).

The proposed project is located in the San Francisco Bay watershed. The hydrologic sub-area information is as follows (CSU Sacramento 2008, see **Figure 4**):

[5] The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.

- Hydrologic unit: Bay Bridges
- Hydrologic area: Bay Waters
- Hydrologic sub-area: Undefined, Sub-area 203.10
- Watershed area: 21,461 hectares (53,031 acres)
- Average annual rainfall: 536 millimeters (21.1 inches).

Existing Drainage

The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.

Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.

Surface Water Quality

The San Francisco Estuary Institute (SFEI) conducts the Regional Monitoring Program (RMP) for water quality in the San Francisco Estuary. The RMP monitors contaminant concentrations in water, sediment, and fish and shellfish tissue in San Francisco Bay and the Delta. The RMP has been conducting long-term monitoring for over 15 years. **Table 1** presents a summary of the concentrations of various pollutants in the Central San Francisco Bay, monitored in 2006 (SFEI 2009). The Yerba Buena Station (sampling site BC10) is located near the project area.

Beneficial Uses

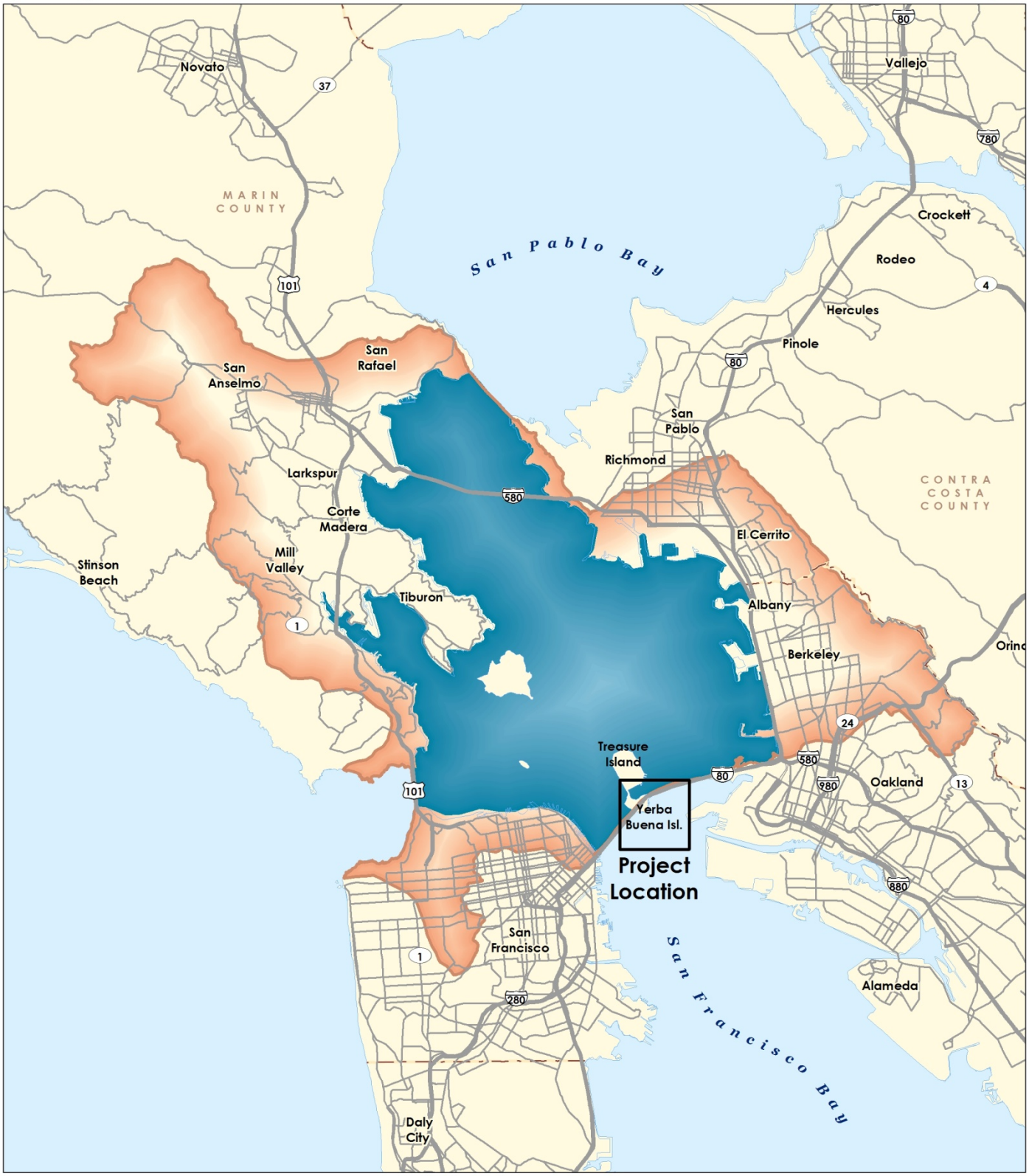
The Region 2 Basin Plan (SFBRWQCB 2007) establishes beneficial uses for waterways and water bodies within the Central Basin in San Francisco County. The existing beneficial uses for San Francisco Bay Central area include: industrial service water supply; industrial process supply; ocean, commercial, and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; noncontact water recreation; and navigation.

303(d) List of Water Impairments and Total Maximum Daily Loads (TMDLs)

The San Francisco Bay is listed as impaired on the CWA Section 303(d) list for Chlordane, DDT, Dieldrin, Mercury, Polychlorinated Biphenyls (PCBs), PCBs (dioxin-like), Selenium, Polycyclic Aromatic Hydrocarbons (PAHs), Dioxin compounds, Furan compounds, and Exotic species. Total Maximum Daily Loads (TMDLs) are a calculation

Figure 4. Hydrologic Area

Yerba Buena Island
Ramps Improvement Project



Central Basin

Bay Waters Hydrologic Area

Department of Water Resources, 2004

0 2.5 5 Miles

N

01/09

Table 1. Central San Francisco Bay Surface Water Concentrations from Sampling Site BC10, August 2006

Parameter	Dissolved	MDL	Units	Total	MDL	Units	Water Quality Objective
Salinity	29.543	2	psu	29.7	0.16	ppt	Controllable water quality factors shall not increase salinity of waters so as to adversely affect beneficial uses.
Ammonia	0.123257	0.001875	mg/L	NA	NA	NA	Annual Mean 0.025 mg/L, Max = 0.16 mg/L
DOC	1247.658	51.57674	µg/L	NA	NA	NA	No objective
Nitrate	0.198062		mg/L	NA	NA	NA	No objective
Nitrite	0.008425	0.000532	mg/L	NA	NA	NA	No objective
Phosphate	0.071735	0.001057	mg/L	NA	NA	NA	No objective
Arsenic (As)	1.44	0.08	µg/L	1.44	0.08	µg/L	4-day ave. 36.0 µg/L, 1-hr ave. 69.0 µg/L
Cadmium (Cd)	0.058937	0.000216	µg/L	0.06052	0.000216	µg/L	4-day ave. 9.3.0 µg/L, 1-hr ave. 42.0 µg/L
Copper (Cu)	1.035167	0.010588	µg/L	1.252406	0.010588	µg/L	4-day ave. 3.1 µg/L, 1-hr ave. 4.8 µg/L
Mercury (Hg)	0.000295	0.000127	µg/L	0.006018	0.000127	µg/L	4-day ave.0.025 µg/L, 1-hr ave. 2.1 µg/L
Nickel (Ni)	0.937488	0.01876	µg/L	1.484922	0.01876	µg/L	4-day ave. 8.2 µg/L, 1-hr ave. 74.0 µg/L
Lead (Pb)	0.006483	0.001016	µg/L	0.220943	0.001016	µg/L	4-day ave. 8.1 µg/L, 1-hr ave. 210.0 µg/L
Selenium (Se)	0.069	0.018	µg/L	0.055	0.018	µg/L	Selenium criteria were promulgated for all San Francisco Bay/Delta waters (SFBRWQCB 2007). 4-day ave. 5.0 ug/L, 1-hr ave 20 ug/l
Zinc (Zn)	0.432648	0.029593	µg/L	1.296622	0.029593	µg/L	4-day ave. 81.0 µg/L, 1-hr ave. 90.0 µg/L
Conductivity	NA	NA	NA	45670	1000	µmhos/cm	No objective
Dissolved Oxygen (DO)	NA	NA	NA	6.91	0.3	mg/L	5.0 mg/L minimum
Temperature	NA	NA	NA	18	0.1	°C	Elevated temperature waste discharges shall comply with limitations necessary to assure protection of beneficial uses. The maximum temperature of waste discharges shall not exceed the natural temperature of the receiving waters by more than 20°F. Thermal waste discharges having a maximum temperature greater than 4°F above the natural temperature of the receiving water are prohibited. (SWRCB 1998).
pH	NA	NA	NA	7.81	0.01	pH	pH shall not be depressed below 6.5 nor raised above 8.5. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

Parameter	Dissolved	MDL	Units	Total	MDL	Units	Water Quality Objective
Notes: NA = not available/not applicable; MDL = method detection limit; psu = practical salinity unit; ND = non-detect; SCT = Salinity/Conductivity/Temperature Meters; ppt = parts per trillion; mg/L = milligram per liter; µg/L = microgram per liter; ng/L = nanogram per liter; µmhos/cm = micromhos per centimeter Source: SFEI 2009; SFBRWQCB 2007; SWRCB 1998.							

of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

TMDLs for the San Francisco Bay have been established based on the 2006 303(d) list (approval date: June 28, 2007). TMDLs have only been established at this time for mercury and PCBs[6]; all of the other pollutants listed in the 2006 303(d) list have not been completed. The San Francisco Bay RWQCB has also recommended the San Francisco Bay (Central) shoreline for placement on the 303(d) list for trash impairment (SFBRWQCB 2008, p. 15).

Existing Contamination

Along with other islands on San Francisco Bay, YBI has been used for military purposes over the years. Naval Station Treasure Island was decommissioned in 1997; however, USCG activity continues on YBI. Based on current and previous environmental investigations, several areas of known and potential contaminant sources have been identified on YBI (AECOM 2009). At the high portion of the North-east Point on YBI, elevated levels of beryllium, lead, and pesticides have been detected. Along the entire shadow area of the existing bridge and adjacent ramps, investigations indicate a potential for lead contamination in surficial soils. Petroleum hydrocarbons were also found at a former gas station and adjacent fire station, both of which have been demolished. Petroleum hydrocarbons have also been found at an active underground storage tank (Leaking Underground Storage Tank or LUST). In addition, it has been established that there is petroleum hydrocarbon contamination in the groundwater. There is also probable Aerially Deposited Lead (ADL) contamination, primarily from tailpipe emissions, in the unpaved areas adjacent to the existing roadway.

The Site Management Plan for the Naval Station Treasure Island (Tetra Tech EM Inc. 2008) reflects the Navy's current strategies and schedules to achieve site closure at several sites on Naval Station Treasure Island. This plan indicates that environmental closeout schedules and site closure for Installation Restoration (IR) Sites 8, 11, and 29 as well as inactive fuel line YF3 may be impacted by construction activities related to the SFOBB and YBI Ramps Improvement Project. Site 8 is located on the northeast end of YBI and was used as an army sludge disposal area from the wastewater treatment plant for approximately 8 years between 1968 and 1976. Metals and pesticides have been identified as the contaminants of concern. Site 11 had been used as a landfill and contaminants of concern at this site include total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals. Site 29 is located below and parallel to the SFOBB from the northeastern portion of YBI westward to the YBI tunnel. Site 29 contains lead due to maintenance of ramps (i.e., use of lead-based paint) as well as a result of vehicle emissions. An interim remedial investigation (RI) report for Sites 8 and 29 is being finalized and the RI report for Site 11

[6] On February 13, 2008, the San Francisco Bay RWQCB adopted an amendment incorporating a TMDL and associated implementation plan for PCBs in San Francisco Bay into the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The amendment must still be approved by the State Water Resources Control Board, the state Office of Administrative Law, and EPA.

is in the process of being prepared. The estimated year for site closeout for all three sites is 2021.

Fuel pipelines once crossed Naval Station Treasure Island to transport gasoline, diesel, bunker C fuel, and other petroleum products. The majority of the pipeline system has been removed or abandoned in place; however, there are portions of the pipeline system where additional corrective actions are expected include the YF3 and USCG sites, which are both located on the northeast side of YBI (Tetra Tech EM Inc. 2008).

B. Groundwater

The project area is located in the Coast Range geomorphic province. The San Francisco Bay Area is underlain by various Quaternary sedimentary units, which are in turn, under lain by the Jurassic and Cretaceous age bedrock of the Franciscan Complex. YBI is composed of Franciscan Formation bedrock, which has been uplifted to the surface (AGS 2007 p. 5).

YBI does not have an existing designated groundwater basin in the Basin Plan. In general, groundwater is not likely to be encountered during the dry season, but it may be encountered during the rainy season near the interface between the soil and rock. Boring logs did not indicate if the depth to groundwater was measured in any of the borings; however, four borings were classified as "wet", which indicates that it was saturated, two borings were classified as "dry to damp" and all other borings classified the material overlying the bedrock as "moist." Relatively shallow groundwater conditions may be encountered in the project area, especially in the lower elevation areas of YBI where the westbound on- and off-ramps are proposed (AGS 2007 p.7).

Due to the absence of long-term monitoring of water levels, the natural groundwater depth is uncertain. The Packer testing[7] indicated that the bedrock was nearly impermeable below the weathered zone and therefore water introduced into the boreholes and in fractures of this material is not likely to drain away. This leaves the possibility that the measured water depths are not normal and the natural groundwater table should generally be expected near adjacent Bay levels. The ongoing Project Approval and Environmental Document (PA&ED) phase will determine the natural groundwater depth.

V. WATER QUALITY IMPACTS

A. <u>Storm Water</u>

Caltrans has performed many studies to monitor and characterize highway storm water runoff throughout the State. Commonly found pollutants throughout the State are Total Suspended Solids (TSS), nitrate nitrogen, Total Kjeldahl Nitrogen (TKN), phosphorous, orthophosphate, copper, lead and zinc (Caltrans 2007c). Some sources of these pollutants

[7] Packer tests consist of isolating specific sections of a bedrock borehole so that water-quality samples can be collected and aquifer tests can be conducted. A series of such tests allows definition of the vertical distribution of water quality (usually contaminants) and hydraulic conductivity (pathways for water and contaminant movement) in an aquifer.

are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of break pads.

The westbound lanes of the new SFOBB as it approaches YBI would transition to a stacked configuration over the eastbound lanes. The proposed YBI ramps would connect to the high point of the westbound alignment located on this bridge. The SFOBB structures would be comprised of multi-cell cast-in-place concrete box girders. The structure depth would vary from approximately 1.8 to 5.9 meters (5.5 to 18 feet) (Caltrans 2000, p. 38). The current design of the proposed YBI ramp structures incorporates piped inlets directing storm water flows down the columns and into the Bay (Caltrans 2000, p. 38). The proposed drainage system would collect concentrated flows from the elevated ramp structures using inlets, storm drain pipes, and downdrain trenches and convey the runoff to the BMPs for treatment. After treatment runoff will be conveyed to the existing west tie-in drainage system (AECOM 2009). The existing ramps on YBI do not have any cross drains and the proposed YBI ramps do not include the construction of any new cross drains. Temporary (construction-related) and permanent drainage and treatment best management practices (BMPs) are currently in the conceptual design stage, as described in Section VI.

The project would be one of the three alternatives; either the No Build or one of two proposed build-alternatives. In both Alternatives 2B and 4, the soil disturbances are limited to the construction of roadway embankments at ramp termini, structural excavations for column foundations, wall foundations, backfill for required retaining walls, and unpaved property for use as contractor lay-down area.

Alternatives for the YBI Ramps Improvement Project include the replacement of existing westbound on- and off-ramps located in two different configurations, or a no build alternative.

- **No Build:** The No Build assumes that the existing ramps would remain in place. This alternative would have water quality impacts due to continuing congestion, which may increase with the proposed Treasure Island Redevelopment Plan, which includes 6,000 units, approximately 270,000 square feet of neighborhood-serving and visitor-oriented retail, and 500 hotel rooms. At build out, there is expected to be a net increase of 1,664 vehicles during the morning peak hour and 2,909 vehicles during the afternoon peak hour (CHS Consulting Group 2009). Vehicles waiting to enter I-80 westbound would continue deposition of particulates from exhaust and heavy metals from braking. Continued traffic safety deficiencies and accident rates higher than the statewide average rates (Caltrans 2007a, p. 11) would also be anticipated to continue and contribute to water quality impacts due to oil spills and discharge or spill of other pollutants during collision. Storm water would continue to discharge untreated into the San Francisco Bay.

Both build alternatives would increase the surface area exposed to precipitation and have a corresponding increase in the quantity of pavement storm water runoff during rainfall events. The proposed project is currently in the conceptual design stage; however, storm

drain systems would be sized to handle the increase in runoff due to additional paved surface. As described above for the No Build Alternative, Alternatives 2B and 4 would have water quality impacts related to the net increase estimated future vehicle volumes (CHS Consulting Group 2009).

- **Alternative 2B:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of a westbound off-ramp to Macalla Road on the east side of YBI, and construction of a westbound hook on-ramp from Macalla Road on the east side of YBI. The disturbed soil area estimated for Alternative 2B is approximately 2.3 acres. The disturbed soil area is the area from the edge of the pavement to the construction limits created by the cut and fill slopes. The disturbed soil area does not include the paved ramp area. This alternative would have less water quality impacts than Alternative 4 due to less disturbed soil area and less amount of impervious area added to YBI. The amount of impervious area would increase from an existing 8.47 acres to 10.42 acres, a change of 1.95 acres. The percent of impervious area is expected to increase from 47% to 58% for the project site. Pervious area is the difference between the total area and impervious area within the project right-of-way. The surface runoff from Alternative 2B would be collected to the outfall near Macalla Road and treated in a BMP which is yet to be determined. It is anticipated, however, that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 2B, the required water quality treatment flow was calculated as approximately 0.0214 cubic meter per second (m^3/s). The required water quality treatment volume was calculated to be 119 cubic meters (m^3) (AECOM 2009; see Attachment 1).

- **Alternative 4:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of westbound on-ramp from Hillcrest Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 would have the most water quality impacts of the three alternatives. The disturbed soil area estimated for Alternative 4 is approximately 4.4 acres, as it has the largest soil disturbance area, the largest increase in impervious area, and construction work would be required closer to San Francisco Bay. The amount of impervious area would increase from an existing 6.34 acres to 10.74 acres, a change of 4.40 acres. The percent of impervious area is expected to increase from 59% to 100% for the project site. Surface runoff from the northern half of this alternative would be collected at the outfall near Macalla Road. Surface runoff from the southern portion of this alternative would be collected to the outfall near South Gate Road. The location and types of BMPs that would be used to treat this surface runoff are in the conceptual design state and would be developed in detail at a future time; however, it is anticipated that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 4, the required water quality treatment flow was

calculated as approximately 0.0242 m^3/s. The required water quality treatment volume was calculated to be 267 m^3 (AECOM 2009; see Attachment 1).

An integrated bridge and ramp drainage system would be designed and constructed within the YBI Ramps Improvement Project limits to collect all storm water runoff. An independent ramp drainage system would be designed and constructed to collect all ramp surface runoff. For all slopes, benching, rounding, and terracing would be considered to minimize concentrated flows and slope stabilization measures and retaining walls may be needed. In addition, slopes would include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system for treatment (AECOM 2009). The need for slope stabilization and possible retaining walls would be determined as the project progresses. In addition, slopes would include concrete side drains to collect concentrated flows, minimize erosion, and direct storm water in the proposed drainage system and acceptable BMPs, which would eventually terminate into San Francisco Bay.

The pollutant load from the proposed YBI ramp area is negligible when compared to the overall pollutant loadings to the San Francisco Bay from the entire watershed and would not have a net impact on the overall water quality in San Francisco Bay. San Francisco Bay is listed as impaired for a number of pollutants outlined in Section IV.A above; however, only mercury (under the Caltrans general metals category) is listed on the Caltrans targeted design constituent (TDC) list. Thus, treatment BMPs for consideration include those used to treat general metals/general purpose pollutants. Temporary construction site BMPs, permanent design pollution BMPs, and permanent treatment BMPs, would be required to minimize or prevent impacts on water quality and pollutant loading, particularly during times of large flood flow runoff. Suggested BMPs are described below in Section VI. The total mass of storm water pollution is not expected to change as a result of the project since the total usage hours are not expected to increase and the pollutant generation rate is not expected to increase (Caltrans 2001, p. 4-68).

B. Groundwater

Groundwater may be encountered during construction. At this time, excavated spoils would be considered hazardous along with any groundwater encountered and would require appropriate collection, testing, and if applicable, transport offsite for treatment and disposal.

VI. AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES

A. Section 401 of the Clean Water Act

There are potential Waters of the U.S. onsite; however, verification has not yet been completed by the U.S. Army Corps of Engineers regarding if they are considered jurisdictional. If it is determined that there would be impacts to existing wetlands and Waters of the U.S. within the project limits, an Army Corps 404 permit would be required along with a 401 Water Quality Certification from Region 2.

Avoidance and minimization efforts including BMPs to avoid discharge to waters of the U.S. have been considered and described in the Natural Environment Study (NES) as well as in this Water Quality Report. Impacts to Water of the U.S. and appropriate mitigation measures would be described in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Yerba Buena Island Ramps Improvement Project.

B. Section 402 of the Clean Water Act

According to the Caltrans NPDES and General Permits, Best Management Practices (BMPs) would be incorporated into the proposed project to reduce the discharge of pollutants during and after construction to the Maximum Extent Practicable (MEP). These BMPs fall into three categories, temporary Construction Site BMPs, permanent Design Pollution Prevention BMPs, and permanent Treatment BMPs.

(1) Temporary Construction Site BMPs

Construction Site BMPs are implemented during construction activities to reduce pollutants in storm water discharges throughout construction. Planning would consider scheduling and construction timing to schedule major grading operations for the non-winter season when practical and minimize the active construction area during the rainy season. Temporary concrete washouts, stabilized construction entrances/exits, silt fences, sand bag barriers, gravel bag berms, and fiber rolls may be used as temporary construction site BMPs. Additional items may be identified as the project design phase advances. Dewatering would not likely be necessary for project construction of the cast-in-drilled holes (CIDH) piles; however, if required, at this time, it is assumed that the excavated spoils from the piles would be considered hazardous. Any hazardous water and spoils would be collected appropriately, tested, and transported offsite for treatment and disposal. Proper handling and disposal methods would be determined based on the background chemical levels in groundwater and the typical chemical constituents expected from construction activities.

To minimize any additional groundwater contamination resulting from construction activities, inspection of vehicles and equipment would be conducted, spill prevention and prompt spill response would be practiced, absorbent materials would be used to contain any spills, and the proper officials would be contacted in the case of a spill. Materials associated with construction activities would also be delivered and stored using practices that prevent these materials from polluting receiving waters. Vehicle and equipment maintenance would occur off-site whenever practical, but when occurring on-site, drip plans or absorbent pads would be used and all maintenance areas would be required to have spill kits or other spill protection devices. For pile driving operations, pile driving areas and equipment would be inspected for leaks and spills on a daily basis and when not in use, store pile driving equipment away from concentrated flows or storm water (Caltrans 2003b).

Solid construction wastes would be contained, stored, and disposed of using practices that minimize contact with storm water. Adequate trash receptacles and dumpsters would be

provided to contain litter and construction waste. Solid waste will not be collected near drainage inlets or receiving waters and should be covered to avoid conveyance of waste due to wind or water. In addition, temporary sanitary facilities should not be located near drainage facilities or receiving waters, nor should they be located in areas that will collect water.

Wind erosion controls would also be implemented to minimize dust and transportation of waste. Wind erosion controls could include covering of stockpiles and waste receptacles, the use of hydroseeding, soil binders or geotextiles on stockpiles, as well as applying of water or dust palliatives to stabilize stockpiles, roadways, or work areas.

Grading of existing slopes would be required for both proposed build alternatives. The existing site condition includes varying slopes that are either vegetated or has exposed rocks. Minor clearing and grubbing would be required within the project area. Existing vegetation would be preserved to the extent possible and clearly marked to minimize erosion potential and runoff velocities. The project's environmentally sensitive areas (ESAs), including several mature trees, would be protected with bright orange "ESA" fences. The use of retaining structures, especially in excavation areas, would minimize the amount of grading required. Imported fill would be used to create the project ramps terminus and may be retained with walls, and in other cases the ramps would include side slopes of 1V:4H. Temporary silt fence, stockpile cover, installation of temporary barriers around stockpiles to prevent contact with storm water, stabilized construction entrance/exit and temporary soil stabilizers are some of the temporary erosion and water pollution control measures that would be utilized in combination to prevent and minimize soil erosion and sediment discharges during construction.

Erosion controls such as netting or soil stabilization fabrics in combination with hydroseeding would be implemented to facilitate the establishment of permanent vegetation at the end of construction. The biodegradable netting is effective in providing good initial mechanical protection while seed applied during the hydroseeding operation germinates and establishes itself.

As the new cut and fill slope areas have been established, vegetation strategies and the soil erosion control plans will be prepared. The District Landscape Architect and Maintenance Storm Water Coordinator will be consulted during the development of these plans. Vegetating hillside slopes with deep rooted plants is recommended to help stabilize the soil (AECOM 2009).

Given a projected disturbance of greater than 0.4 hectares (one acre), a SWPPP would be developed prior to construction. This dynamic document addresses the deployment of various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.

(2) Permanent Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures to improve storm water quality and include measures to stabilize disturbed soil areas and maximize vegetated surfaces, thereby reducing runoff and erosion. Erosion control measures would be provided on all disturbed areas. As earlier noted, the use of retaining wall structures would minimize the amount of open disturbed soil. Following construction, the final slopes would be vegetated with an approved Caltrans seed mix. Re-establishment of permanent vegetation cover provides erosion control. In addition, slopes will include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system for treatment (AECOM 2009).

(3) Permanent Treatment BMPs

The PPDG Section 4 (Caltrans 2007b) describes the process for determining the need for permanent treatment BMPs. As the YBI Ramps Improvement Project will discharge water into surface waters that have TMDLs and other pollution controls, as described in Section IV, treatment BMPs are required. In addition, the project is within an urban MS4 area and would cause a change to historic drainage patterns. The project would also indirectly discharge surface runoff into the San Francisco Bay, and is considered a major reconstruction project[8] resulting in a net increase of greater than one acre of new impervious surface. According to the PPDG evaluation process, this project must consider permanent treatment BMPs. The TMDL established for mercury, as described in Section IV, will affect the selection of permanent treatment BMPs.

Treatment BMPs are permanent devices and facilities that treat storm water runoff. Caltrans-approved Treatment BMPs include Biofiltration Systems (Biofiltration Strips and Swales), Infiltration Basins, Detention Basins, Traction Sand Traps, Dry Weather Flow Diversions, Media Filters, Gross Solids Removal Devices (GSRDs), Multi-Chamber Treatment Trains, and Wet Basins. Those most feasible in the Bay Area are Biofiltration Systems, Infiltration Basins, Detention Basins, Dry Weather Flow Diversions, Media Filters, and Multi-chamber Treatment Trains. The selected treatment BMPs have been identified in the project's SWDR (AECOM 2009).

[8] As defined in the Storm Water Quality Handbook (Caltrans 2007b), new construction and major reconstruction includes new routes, route alignments, and route upgrades. New construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. New Construction and major reconstruction projects may include, but are not limited to: new highways and freeways; highway-related facilities, including new or reconstructed maintenance facilities, safety roadside rest areas, toll plazas and inspection and weigh stations; adding one or more lanes; adding HOV lanes; construction activities conducted within highway rights-of-way in conjunction with a new facility; new or reconstructed interchanges, including on-ramps, off-ramps, and connectors; new or reconstructed bridges; tunnels; and drainage system improvements, including changes to pipes, conduits, channels, etc.

The SWDR identified Infiltration Devices as infeasible for the project site, as portions of the project site are known to have hazardous soil and contaminated groundwater. In addition, the impermeable soil found at the project site restricts opportunities for the use of infiltration devices (AECOM 2009). Multi-chamber Treatment Trains are also not appropriate at this project, as this project does not fall into any of the relevant categories (vehicle service facilities, parking areas, paved storage areas, or fueling stations). In addition, since dry weather flow diversions address non-storm water flows only, Dry Weather Flow Diversions are not recommended.

Detention Devices and Media Filters were evaluated as possible types of permanent Treatment BMPs. Detention Devices are effective at removing total suspended solids (TSS), phosphorus, particulate metals, and litter by temporarily detaining storm water runoff to allow sediment and particulates to settle out before it is discharged. Media Filters, specifically the Austin Vault Sand and Delaware Sand filters, are effective at removing general purpose pollutants. Both Detention Devices and Media Filters may require an impermeable lining to avoid leaking into potentially contaminated groundwater. Right-of-way concerns as well as the cost of these two permanent treatment BMPs were also considered to be issues in the PA&ED evaluation. However, Biofiltration Systems were identified as the favored permanent treatment BMP option.

Biofiltration swales are effective at removing general purpose pollutants. The site conditions and climate are favorable to allow suitable vegetation to be established. The SWDR indicates that biofiltration swales should be considered as a permanent water quality treatment BMP for the project (AECOM 2009). If biofiltration swales are included, consultation with the Regional/District NPDES coordinators would be necessary to discuss how to proceed since the site contains hazardous soil. Use of impermeable liners and an underdrain may be required to prevent contact with existing hazardous soils and contaminated groundwater. The draft drainage plan provided in the SWDR indicates that for both build alternatives, a biofiltration swale would extend north from the ramps, terminating in the bay (AECOM 2009). During the design phase, the feasibility of using biofiltration swales will be further investigated.

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Attachment 1 (AECOM 2009)

Project: I-80 On and Off Ramp Improvement Funded by SFCTA

AECOM

Alt 2B

	acre	m^2
Total Site Area	17.95	72641
Pervious Area	9.48	38360
Impervious Area	10.42	42199
Existing impervious Area	8.47	34281
Increased impervious area	1.95	7918
Total Disturbed Soil Area	2.29	9267

Total Water Tributary Area for Alt 2B

	acre	m^2
Onsite Tributary Area	3.89	15756
Offsite Tributary Area	0.00	0
Total Tributary Area	3.89	15756

Alt 4

	acre	m^2
Total Site Area	10.74	43480
Pervious Area	0.00	0
Impervious Area	10.74	43480
Existing impervious Area	6.34	2564
Increased impervious area	4.40	17816
Total Disturbed Soil Area	4.40	17816

Total Water Tributary Areas for Alt 4

	acre	m^2
On Site Tributary Area	4.40	17816
Offsite Tributary Area	0.00	0
Total Tributary Area	4.40	17816

Note: (1) surface runoff from the outside of the Right of Way (RW) to the project site is collected to the proposed Caltrans drainage system

(2) Onsite tributary area is defined as the area that the runoff collected from the roadway within the RW.

(3) Offsite tributary area is defined as the area that surface runoff is collected from the unpaved area within the RW and contributed to the treatment BMPs

APPENDIX L

AIR QUALITY ANALYSIS

AECOM
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415 788 4875 fax

Memorandum

To	Valerie Shearer	Page	1
CC			
Subject	Yerba Buena Island Ramps Improvement Project EIR/EIS Air Quality Analysis Addendum Memorandum #2		
From	George Lu		
Date	July 26, 2011		

The YBI Ramps Improvement PDT, which is comprised of the lead (Caltrans and SFCTA), cooperating, and responsible agencies, held a meeting on April 12, 2011 to consider and identify the preferred alternative. The unanimous decision was that Alternative 2b would best meet the purpose and need of the YBI Ramps Improvement Project. The relocation site for Quarters 10/Building 267 was determined following the identification of the preferred alternative.

The purpose of this memorandum is to confirm that preparation of the relocation of Quarters 10/Building 267 site and relocation of the buildings would not result in new significant impacts. After the buildings are relocated, any future use of the site will be evaluated through a separate environmental process initiated by the City and County of San Francisco and/or TIDA.

Construction activities for Quarters 10/Building 267 would include building disassembly and staging operations along with the physical relocation of the buildings. The total duration of construction activities for the relocation of Quarters 10/Building 267 would be approximately five to six weeks. During this period, construction-related criteria air pollutants and ozone precursors would be generated from heavy-duty construction equipment, on-site generators, material haul trucks, and construction worker vehicles.[1] Table 1 presents the average daily construction emissions through each phase of the proposed project.

Table 1: YBI Ramp Improvement Supplemental Construction Emissions

	Pollutants (pounds per day) [1]			
Construction Phase(s)	**ROG**	**NO_X**	**PM_{10}** [2]	**$PM_{2.5}$** [2]
Site Preparation	1.56	12.02	0.67	0.61
Building Disassembly/Staging	3.76	47.74	1.32	1.21
Building Relocation	1.97	24.18	0.67	0.62
Building Rehabilitation	1.97	24.18	0.67	0.62
Demolition	5.46	73.33	2.82	2.60

[1] The maximum daily emissions associated with relocation construction activities were modeled using URBEMIS2007 Version 9.2.4.

Average Daily Emissions [3]	2.91	34.25	1.13	1.04
BAAQMD Average Daily Thresholds of Significance	54	54	82	54
Above Threshold?	No	No	No	No

Notes: YBI = Yerba Buena Island; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter with aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 microns; BAAQMD = Bay Area Air Quality Management District.

[1] Pollutants shown for each specific construction phase represent maximum daily emissions, which is the emissions output from URBEMIS2007. However, BAAQMD's thresholds of significance are for average daily emissions. Maximum daily emissions are shown for informational purposes.

[2] BAAQMD thresholds for PM_{10} and $PM_{2.5}$ are only for exhaust emissions; therefore, all PM_{10} and $PM_{2.5}$ emissions shown in the table represent exhaust emissions.

[3] Average daily emissions also include haul truck trips for the Building Disassembly and Building Relocation phases.

Source: AECOM 2011

As shown above in Table 1, the construction activities associated with the building relocation's average daily emissions would not exceed any of the BAAQMD's construction thresholds of significance. In addition, similar to the proposed ramps, construction activities associated with the Quarters 10/Building 267, staging area, and demolition is required to comply with the requirements of the BAAQMD's Basic Construction Mitigation Measures Recommended for ALL Proposed Projects. The avoidance and minimization measures identified in the Final Air Quality Analysis (Appendix L of the Final EIR/EIS) would be implemented as applicable to the site.

By implementing these avoidance and minimization measures, air quality impacts would not be adverse and less than significant according to BAAQMD's new CEQA Guidelines (June 2010).

Yerba Buena Island Ramp Improvements
Construction Analysis (Alternative 2B)
Relocation of Quarters 10 and Building 267

SCHEDULE		
Total	3	months
Final site preparation	4	weeks
Grading		
Foundations/retain walls		
Building disassembly, staging	2-4	weeks
Building relocation/placement	2	weeks
Building rehab	4	weeks
Utility tie ins		
Drainage		
Final site work		

Week											
1	2	3	4	5	6	7	8	9	10	11	12
Final site prep											
			Building disassembly, staging								
						Bldg relocation					
								Building rehab			

Note: Assumes a minumum of 25 construction workers per day.

Demolition Dimensions

Building footprint	20,300	sf
Height	25	ft

URBEMIS inputs

Width	142.5	ft
Length	142.5	ft
Height	25	ft
Volume	507,500	cf
Max Daily	63.3	ft

San Francisco County 2011
EMFAC2007

Pollutant	Emission Factor (g/mi)	Total Miles (roundtrip)	Trips	Total Emissions (lbs)
ROG	0.494	20	10	0.22
NOX	7.386	20	10	3.26
CO	5.634	20	10	2.48
SOX	0.013	20	10	0.01
PM10	0.25	20	10	0.11
PM2.5	0.23	20	10	0.10

HDT @ 25 mph

YBI Supplemental Construction Analysis

		maximum lbs/day			
Construction Phase	**Number of Days**	**ROG**	**NOX**	**PM10**	**PM2.5**
Site Prep	15	1.56	12.02	0.67	0.61
Disassembly/Site Prep	5	5.32	59.75	1.98	1.82
Relocation	10	3.76	47.74	1.32	1.21
Bldg Rehab	10	1.97	24.18	0.67	0.62
Bldg Rehab/Demolition	5	7.43	97.52	3.5	3.21
Bldg Rehab	15	1.97	24.18	0.67	0.62
Haul Truck (Bldg Disassembly)		0.22	3.26	0.11	0.10
Haul Truck (Relocation)		0.22	3.26	0.11	0.10
Average Daily Emissions (lbs/day)		2.91	34.25	1.13	1.04

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: H:\PROJECTS\Yerba Buena\2011 Supplemental Analysis\YBI Supplemental Construction Emissions.urb924

Project Name: Yerba Buena Ramps Improvement Project - Supplemental Analysis

Project Location: San Francisco County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (lbs/day unmitigated)	7.43	97.52	38.96	0.14	107.06	3.50	110.56	22.33	3.21	25.55	18,659.04
2012 TOTALS (lbs/day mitigated)	7.43	97.52	38.96	0.14	107.06	3.50	110.56	22.33	3.21	25.55	18,659.04

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

5/9/2011 11:12:03 AM

Time Slice 1/2/2012-1/20/2012 Active Days: 15	1.56	12.02	7.23	0.00	20.01	0.67	20.67	4.18	0.61	4.79	1,490.43
Fine Grading 01/02/2012-01/27/2012	1.56	12.02	7.23	0.00	20.01	0.67	20.67	4.18	0.61	4.79	1,490.43
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18	0.00
Fine Grading Off Road Diesel	1.53	11.79	6.51	0.00	0.00	0.66	0.66	0.00	0.61	0.61	1,373.51
Fine Grading On Road Diesel	0.01	0.19	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	40.26
Fine Grading Worker Trips	0.02	0.04	0.66	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.66
Time Slice 1/23/2012-1/27/2012 Active Days: 5	5.32	59.75	25.83	0.01	20.04	1.98	22.02	4.19	1.82	6.01	8,177.71
Building 01/23/2012-02/10/2012	3.76	47.74	18.59	0.01	0.03	1.32	1.35	0.01	1.21	1.22	6,687.28
Building Off Road Diesel	3.58	47.10	13.46	0.00	0.00	1.29	1.29	0.00	1.19	1.19	6,026.54
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89
Fine Grading 01/02/2012-01/27/2012	1.56	12.02	7.23	0.00	20.01	0.67	20.67	4.18	0.61	4.79	1,490.43
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18	0.00
Fine Grading Off Road Diesel	1.53	11.79	6.51	0.00	0.00	0.66	0.66	0.00	0.61	0.61	1,373.51
Fine Grading On Road Diesel	0.01	0.19	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	40.26
Fine Grading Worker Trips	0.02	0.04	0.66	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.66
Time Slice 1/30/2012-2/10/2012 Active Days: 10	3.76	47.74	18.59	0.01	0.03	1.32	1.35	0.01	1.21	1.22	6,687.28
Building 01/23/2012-02/10/2012	3.76	47.74	18.59	0.01	0.03	1.32	1.35	0.01	1.21	1.22	6,687.28
Building Off Road Diesel	3.58	47.10	13.46	0.00	0.00	1.29	1.29	0.00	1.19	1.19	6,026.54
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89

Time Slice 2/13/2012-2/24/2012 Active Days: 10	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
Building 02/13/2012-02/24/2012	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
Building Off Road Diesel	1.79	23.55	6.73	0.00	0.00	0.64	0.64	0.00	0.59	0.59	3,013.27
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89
Time Slice 2/27/2012-3/2/2012 Active Days: 5	7.43	97.52	38.96	**0.14**	**107.06**	3.50	110.56	**22.33**	3.21	25.55	18,659.04
Building 02/27/2012-03/23/2012	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
Building Off Road Diesel	1.79	23.55	6.73	0.00	0.00	0.64	0.64	0.00	0.59	0.59	3,013.27
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89
Demolition 02/27/2012-03/02/2012	5.46	73.33	27.09	0.13	107.03	2.82	109.85	22.32	2.60	24.92	14,985.04
Fugitive Dust	0.00	0.00	0.00	0.00	106.53	0.00	106.53	22.16	0.00	22.16	0.00
Demo Off Road Diesel	0.98	6.77	4.49	0.00	0.00	0.49	0.49	0.00	0.45	0.45	700.30
Demo On Road Diesel	4.45	66.52	21.72	0.13	0.50	2.33	2.82	0.16	2.14	2.30	14,182.52
Demo Worker Trips	0.03	0.05	0.88	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.22
Time Slice 3/5/2012-3/23/2012 Active Days: 15	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
Building 02/27/2012-03/23/2012	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
Building Off Road Diesel	1.79	23.55	6.73	0.00	0.00	0.64	0.64	0.00	0.59	0.59	3,013.27
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89

Phase Assumptions

Phase: Demolition 2/27/2012 - 3/2/2012 - Demolish Building 240

5/9/2011 11:12:03 AM

Building Volume Total (cubic feet): 507300

Building Volume Daily (cubic feet): 253636.1

On Road Truck Travel (VMT): 3522.72

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 1/2/2012 - 1/27/2012 - Final Site Prep

Total Acres Disturbed: 2

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Default

10 lbs per acre-day

On Road Truck Travel (VMT): 10

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 1/23/2012 - 2/10/2012 - Building disassembly, staging

Off-Road Equipment:

2 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

Phase: Building Construction 2/13/2012 - 2/24/2012 - Building relocation

Off-Road Equipment:

1 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

Phase: Building Construction 2/27/2012 - 3/23/2012 - Building rehab

Off-Road Equipment:

1 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

5/9/2011 11:12:03 AM

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/2/2012-1/20/2012 Active Days: 15	1.56	12.02	7.23	0.00	9.47	0.67	10.13	1.98	0.61	2.59	1,490.43
Fine Grading 01/02/2012-01/27/2012	1.56	12.02	7.23	0.00	9.47	0.67	10.13	1.98	0.61	2.59	1,490.43
Fine Grading Dust	0.00	0.00	0.00	0.00	9.46	0.00	9.46	1.98	0.00	1.98	0.00
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Fine Grading Off Road Diesel	1.53	11.79	6.51	0.00	0.00	0.66	0.66	0.00	0.61	0.61	1,373.51
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Building Off Road Diesel	1.79	23.55	6.73	0.00	0.00	0.64	0.64	0.00	0.59	0.59	3,013.27
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89
Demolition 02/27/2012-03/02/2012	5.46	73.33	27.09	0.13	107.03	2.82	109.85	22.32	2.60	24.92	14,985.04
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Demo Off Road Diesel	0.98	6.77	4.49	0.00	0.00	0.49	0.49	0.00	0.45	0.45	700.30
Demo On Road Diesel	4.45	66.52	21.72	0.13	0.50	2.33	2.82	0.16	2.14	2.30	14,182.52
Demo Worker Trips	0.03	0.05	0.88	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.22

Time Slice 3/5/2012-3/23/2012 Active Days: 15	1.97	24.18	11.86	0.01	0.03	0.67	0.70	0.01	0.62	0.63	3,674.01
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Building Off Road Diesel	1.79	23.55	6.73	0.00	0.00	0.64	0.64	0.00	0.59	0.59	3,013.27
Building Vendor Trips	0.03	0.37	0.35	0.00	0.00	0.01	0.02	0.00	0.01	0.01	106.85
Building Worker Trips	0.15	0.26	4.79	0.01	0.03	0.01	0.04	0.01	0.01	0.02	553.89

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/2/2012 - 1/27/2012 - Final Site Prep

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

U.S. Department of Transportation
Federal Highway Administration

California Division

650 Capitol Mall, Suite 4-100
Sacramento, CA 95814
(916) 498-5001

June 10, 2011

In Reply Refer To:
HDA-CA
EA 3A6400

Bijan Sartipi, District Director
California Department of Transportation
111 Grand Avenue
P.O. Box 23360
Oakland, CA 94612

Attention: Allen Baradar, Office Chief, Chief of Environmental Engineering

Dear Mr. Baradar:

SUBJECT: FHWA Project Level Conformity Determination for the Yerba Buena Island Ramps Improvement Project, San Francisco County

On May 24, 2011, the California Department of Transportation (Caltrans) submitted to the Federal Highway Administration (FHWA) a request for a project level conformity determination for the Yerba Buena Island Ramps Improvement Project in San Francisco County. The project is in an area that is designated Nonattainment for Ozone and $PM_{2.5}$ and Maintenance for Carbon Monoxide (CO).

The project level conformity analysis submitted by Caltrans indicates that the transportation conformity requirements of 40 C.F.R. Part 93 have been met. The project is included in the Metropolitan Transportation Commission's (MTC) currently conforming *Transportation 2035 Plan (RTP)* and the *2011 Regional Transportation Improvement Program (FTIP).* The current conformity determinations for the RTP and FTIP were approved by FHWA and the Federal Transit Administration (FTA) on December 14, 2010. The design concept and scope of the preferred alternative have not changed significantly from those assumed in the regional emissions analysis.

As required by 40 C.F.R. 93.116 and 93.123, the localized CO and $PM_{2.5}$ analyses are included in the documentation. The CO hotspot analysis was conducted using the *Transportation Project-Level Carbon Monoxide Protocol.* The analyses demonstrate that the project will not create any new violation of the standards or increase the severity or number of existing violations.

Based on the information provided, FHWA finds that the Conformity Determination for the Yerba Buena Island Ramps Improvement Project in San Francisco County conforms to the State Implementation Plan (SIP) in accordance with 40 C.F.R. Part 93.

If you have any questions pertaining to this conformity finding, please contact Stew Sonnenberg, FHWA Air Quality Specialist, at (916) 498-5889 or by email at Stew.Sonnenberg@dot.gov.

Sincerely,

For
Robert F. Tally Jr.
Acting Division Administrator

cc: (email)
M. Brady, Caltrans HQ
G. Kinoshita, D-4
J. Hannon, FHWA

SSonnenberg/km

FINAL
AIR QUALITY ANALYSIS

YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT

SF-80 PM 7.6/8.1
EA 04-3A640K

Prepared for:

San Francisco County Transportation Authority
100 Van Ness Avenue, 26th Floor
San Francisco, California 94102

and

California Department of Transportation, District 4
111 Grand Avenue
Oakland, California 94612

As agent for FHWA as Federal Lead Agency
pursuant to the National Environmental Policy Act of 1969

Prepared by:

AECOM Design and Planning
150 Chestnut Street
San Francisco, California 94111
(415) 955-2800

December 2009

TABLE OF CONTENTS

LIST OF EXHIBITS

LIST OF TABLES

Tables **Page**

ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
µg/m^3	micrograms per cubic meter
AADT	annual average daily trips
ACM	asbestos containing material
ADT	Average daily trips
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CCAA	California Clean Air Act of 1988
CDC	California Department of Conservation
CFR	Code of Federal Regulations
CO	carbon monoxide
diesel PM	diesel-fueled engines
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessments
FHWA	Federal Highway Administration
FHWA Interim Guidance	Federal Highway Administration's *Interim Guidance on Air Toxic Analysis for NEPA Documents*
ft.	feet
FTA	Federal Transit Administration
HAP	hazardous air pollutant
HEI	Health Effects Institute
HOV	high occupancy vehicle
I-80	Interstate 80
IRIS	Integrated Risk Information System
LOS	Level of Service
MEI	maximally exposed individual
MSAT	Mobile Source Air Toxic
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Protection Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants

NLEV	national low emission vehicle
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOAA	National Oceanic and Atmospheric Administration
NO_X	oxides of nitrogen
OEHAA	Office of Environmental Health Hazard Assessment
ozone	photochemical smog
PAH	polycyclic aromatic hydrocarbons
PM	particulate matter
PM_{10}	particulate matter with aerodynamic diameter less than 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 microns
POAQC	projects of air quality concern
ppm	parts per million
proposed project	Yerba Buena Island Ramp Improvement Project
Protocol	*Transportation Project-Level Carbon Monoxide Protocol*
RFG	reformulated gasoline
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SFBAAB	San Francisco Bay Area Air Basin
SFCTA	San Francisco County Transportation Authority
SFOBB	San Francisco-Oakland Bay Bridge
SIP	State Implementation Plan
SO_2	sulfur dioxide
TAC	toxic air contaminant
TI	Treasure Island
TIP	Transportation Improvement Program
UCD ITS	University of California, Davis Institute of Transportation Studies
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic gases
YBI	Yerba Buena Island

CHAPTER 1.0 – INTRODUCTION

1.1 INTRODUCTION

The San Francisco County Transportation Authority (SFCTA) proposes to replace the existing westbound on- and off-ramps located east of the Yerba Buena Island (YBI) tunnel with new westbound on- and off-ramps. The project, referred to as the Yerba Buena Island Ramp Improvement Project (proposed project), is located in San Francisco County (the County), approximately halfway between the City of San Francisco and the City of Oakland along the San Francisco-Oakland Bay Bridge (SFOBB). Exhibit 1 shows the location of the project on a regional map, and Exhibit 2 provides a vicinity map for the project site.

The primary purpose of the proposed project is to improve the safety of the existing westbound on- and off-ramps. The existing ramps do not meet current California Department of Transportation (Caltrans) design standards. The new ramps would address the current geometric deficiencies of the existing ramps, provide standard deceleration distance for the off-ramp, and improve acceleration/merging distance for the on-ramp. Overall, implementation of the proposed project would improve traffic operations to and from YBI.

This analysis also provides a description of the regulatory framework for air quality management on federal, state, and regional levels. In addition, this analysis will evaluate the types (e.g., criteria air pollutants, toxic air contaminants [TACs]) and relative quantities of air pollutant emissions that would be generated during short-term construction activities associated with the ramp improvements and the change in long-term operational emissions following completion of the proposed project. The following analysis of air quality impacts is based on air quality regulations administered by the U.S. Environmental Protection Agency (USEPA), Federal Highway Administration (FHWA), Caltrans, the California Air Resources Board (ARB), and the Bay Area Air Quality Management District (BAAQMD).

Source: Prepared by EDAW 2009

Exhibit 1. Regional Map

Source: Prepared by EDAW 2009

Exhibit 2. Project Vicinity Map

1.2 SUMMARY

The proposed project is included in the Transportation 2035 Plan (2035 RTP [Regional Transportation Plan]) as Reference Number 230555 (Reconstruct ramps on east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island Tunnel) (MTC 2008a). The FHWA and Federal Transit Administration (FTA) adopted the air quality conformity finding for the 2035 RTP on May 29, 2009. The project is also included in Metropolitan Transportation Commission (MTC) financially constrained 2009 Transportation Improvement Program (2009 TIP) on page 38 as TIP ID SF-070027 – Yerba Buena Island Ramp Improvements (MTC 2008b). The design concept and scope of the proposed project are consistent with the project description in the 2035 RTP, the 2009 TIP, and the assumptions in MTC's regional emissions analysis. Therefore, the project would satisfy the regional conformity requirements and is assumed to conform to the State Implementation Plan (SIP). Thus, no adverse regional air quality impact would occur as a result of the project.

This is a new project in an area designated as nonattainment/maintenance for transportation-related criteria air pollutants and therefore, a new project-level conformity determination is required. Analysis of local carbon monoxide (CO) and particulate matter (PM) impacts is required to demonstrate conformity at a project level. The San Francisco Bay Area Air Basin (SFBAAB) is currently a CO maintenance area and therefore federal projects located within the SFBAAB require a local CO impact analysis. Analysis of CO impacts in accordance with the *Transportation Project-Level Carbon Monoxide Protocol* (Protocol) (UCD ITS 1997) shows that the project is satisfactory with respect to local CO impacts and would not cause a violation of the state or federal CO ambient air quality standards. The SFBAAB is designated as an attainment area for particulate matter with aerodynamic diameter less than 10 microns (PM_{10}). In December 2008, the SFBAAB was designated as a nonattainment area for the new 35 micrograms per cubic meter ($\mu g/m^3$) 24-hour particulate matter with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) standard, which replaced the previous 65 $\mu g/m^3$ 24-hour standard in September 2006. Prior to the December 2008 designation, the SFBAAB was designated as a $PM_{2.5}$ attainment area for the 65 $\mu g/m^3$ 24-hour $PM_{2.5}$ standard. On October 9, 2009, USEPA published a final ruling that designated the SFBAAB as nonattainment for the 2006 24-hour $PM_{2.5}$ standard. In accordance with the new nonattainment status, an analysis of the proposed project's localized PM impacts was also conducted. According to USEPA's *Transportation Conformity Guidance for Qualitative Hot Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (PM Guidance), PM impacts from transportation projects are of concern only for projects defined as "projects of air quality concern" (POAQC) (FHWA 2006a). Analysis of proposed project pursuant to the PM Guidance determined that the project is not a POAQC.

The proposed project was evaluated for potential Mobile Source Air Toxics (MSATs) air quality impacts in accordance with the FHWA's *Interim Guidance on Air Toxic Analysis for NEPA Documents* (FHWA Interim Guidance) (FHWA 2006b) and *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (MSAT Interim Guidance Update) (FHWA 2009a) and was found to not result in any adverse MSAT impacts.

In addition, a discussion of construction emissions, potential impacts, and measures to avoid or minimize the impacts is included in this analysis. These emissions would be temporary and would cease at the completion of construction activities.

1.3 PROJECT DESCRIPTION

The proposed project is located in the County along the SFOBB. YBI is only accessible to vehicular traffic via the SFOBB stretch of Interstate 80 (I-80). The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island (TI), located immediately north of YBI.

The current ramps do not meet current Caltrans design standards. The proposed project would remove the existing ramps and construct new ramps that maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improving safety. The new ramps would also provide standard deceleration distance for the off-ramp and improved acceleration/merging distance for the on-ramp. The proposed project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The proposed project is located between post-mile 7.6 and 8.1 beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between post mile 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension span.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. The three following alternatives are currently under consideration:

- **No Build Alternative**

  This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

- **Alternative 2b**

  Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

  This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

  - Westbound on-ramp on the east side of YBI — This ramp would begin at the "T" intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the SFOBB. The length of this ramp would be approximately 876 feet. This ramp would have two traffic lanes merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow lane.

  - Westbound off-ramp on the on the east side of YBI — This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at the "T" intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet. A stop sign is proposed at the ramp terminus.

  - Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

  - Under Alternative 2b, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located. Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

- **Alternative 4**

  Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of the YBI, construction of a westbound on-ramp from South Gate Road, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

  This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

  - Westbound on-ramp on the east side of YBI — This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the SFOBB. The length of this ramp would be approximately 2,883 feet. A HOV lane would not be provided under Alternative 4.

  - Westbound off-ramp on the east side of YBI — This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at the "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168. A stop sign is proposed at the ramp terminus.

  - Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

  - Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

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CHAPTER 2.0 – REGULATORY SETTING

The Clean Air Act (CAA) as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988 (CCAA). These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS have been established for six criteria air pollutants that have been linked to potential health concerns; the criteria air pollutants are CO, nitrogen dioxide (NO_2), ozone, PM (which PM_{10} and $PM_{2.5}$ are a subset of), lead, and sulfur dioxide (SO_2).

Under the 1990 CAA Amendments, the U.S. Department of Transportation (USDOT) cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the SIP for achieving the goals of the CAA requirements. The specific requirements for determining conformity for transportation projects are included in the USEPA's Transportation Conformity Rule. Transportation conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity within California is focused on the standards set for CO, NO_2, ozone, and PM, as California is in attainment for the other criteria air pollutants. At the regional level, RTPs are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, air quality modeling is conducted to determine whether the implementation of those projects would conform to emission budgets or other tests showing that the projects in the RTP would not obstruct or conflict with the SIP regarding the timely attainment of the NAAQS. If conformity with the SIP is demonstrated, the regional planning organization, such as MTC for the SFBAAB and the appropriate federal agencies, such as the USDOT, make determinations that the RTP is in conformity with the SIP for achieving the goals of the CAA. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as those described in the RTP, then the proposed project is deemed to meet regional conformity requirements.

Conformity at the project-level requires a "hot spot" (i.e., exceedance of NAAQS or California Ambient Air Quality Standard [CAAQS]) analysis if an area is a "nonattainment" or "maintenance" area for CO and/or PM. A region is a "nonattainment" area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas, but have recently met the standard are called "maintenance" areas. A "hot spot" analysis is essentially the same, for technical purposes, as a CO or PM analysis performed for National Environmental Protection Act (NEPA) purposes. Conformity

does include some specific standards for projects that require a "hot spot" analysis. In general, projects must not cause the CO standard to be violated, and in "nonattainment" areas the project must not cause any increase in the number and severity of violations. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well. The SFBAAB is a CO "maintenance" area; therefore, the proposed project is subject to a CO "hot spot" analysis. As discussed above, the SFBAAB was previously designated as attainment for the $PM_{2.5}$ standard; however, in December 2008, it was designated as nonattainment for the new $PM_{2.5}$ 24-hour standard (i.e., 35 $\mu g/m^3$). On October 9, 2009, USEPA published a final ruling that designated the SFBAAB as nonattainment for the 2006 24-hour $PM_{2.5}$ standard. The ruling will become effective 30 days after publication in the Federal Register; however, in anticipation of the new nonattainment status, a PM "hot spot" analysis was performed for the proposed project.

2.1 REGIONAL SETTING

Management of air quality in the basin is the responsibility of the BAAQMD. The BAAQMD is responsible for bringing and/or maintaining air quality in the basin within federal and state air quality standards. Specifically, the BAAQMD has responsibility for monitoring ambient air pollutant levels throughout the basin and developing and implementing attainment strategies to ensure that future emissions will be within federal and state standards. The following plans have been developed by the BAAQMD to achieve attainment of the federal and state ozone standards. The Clean Air Plan (CAP) and Ozone Strategy fulfill the planning requirements of the CCAA, while the Ozone Attainment Plan fulfills the federal CAA requirements. In addition, in December of 1999, the BAAQMD released a revision to the previously adopted CEQA guidelines document. The BAAQMD is currently in the process of updating its CEQA guidelines and recommended significance thresholds. The new guidelines would involve developing quantitative CEQA significance thresholds for construction-related emissions of criteria air pollutants, precursors, TACs, and GHG (BAAQMD 2009). The BAAQMD expects to adopt these new thresholds of significance in late 2009.

Bay Area Air Quality Management District Rules and Regulations

The BAAQMD is primarily responsible for limiting the amount of emissions that can be generated throughout the basin by stationary sources. Specific rules and regulations have been adopted that limit emissions that can be generated by various uses and/or activities and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules regulate not only the emissions of the state and federal criteria air pollutants, but also the emissions of TACs. The rules are also subject to ongoing refinement by the BAAQMD. The following rules and regulations would apply to the proposed project:

- Regulation 7: Odorous Substances;
- Regulation 8, Rule 3: Architectural Coatings; and
- Regulation 8, Rule 15: Emulsified Asphalt.

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CHAPTER 3.0 – AFFECTED ENVIRONMENT

The proposed project is located along the SFOBB, approximately 2.3 miles northeast of the City of San Francisco. The project site is located in the County, which is part of the SFBAAB. The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties as well as the southern half of Sonoma County and the southwestern portion of Solano County. Air quality within the SFBAAB is regulated by USEPA, ARB, and BAAQMD. The following analysis describes the existing air quality conditions on a regional and local level that influence air quality.

3.1 TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. Air quality within the SFBAAB is influenced by two main mountain ranges. The Diablo Range forms the eastern and southern border while the Coast Range forms the western border. The gaps and directional orientation of these mountain ranges affect the location of where air flow enters and exits the SFBAAB. In the northern portion of the SFBAAB, the Coast Range splits, resulting in the western (Golden Gate) coast gap and the eastern (Carquinez Strait) coast gap. These gaps allow air to flow in and out of the SFBAAB. The Golden Gate coast gap allows marine air during afternoons and evenings to flow into the SFBAAB, which disperses and transports air pollution to neighboring counties and air basins. Winds coming from the Pacific Ocean through the Golden Gate coast gap have typical speeds of 20–30 miles per hour (NOAA 1995). Air flows into Solano County through the Carquinez Strait, moving across the Sacramento–San Joaquin River Delta, and transporting pollution from the Bay Area. In the areas south of the Carquinez Strait, the Coast Range, which has an average elevation of 3,000 feet, impedes pollutants from dispersing to the east.

Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present in the northeast areas of the SFBAAB. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between volatile organic gases (VOC) and oxides of nitrogen (NO_X), which result in ozone formation.

Local meteorology of the project area is represented by measurements recorded at the San Francisco Bay Area station. The region receives an average of 21.5 inches of precipitation per year, which primarily occurs from the months of October through April (NOAA 1995). Off-

season rains (May through September) account for approximately 5 percent of the annual average rainfall. Maximum summer temperatures range from 60 to 70 degrees Fahrenheit (°F). Minimum wintertime temperatures range from 45 to 50°F (NOAA 1995).

Climate within the SFBAAB is largely controlled by the presence of the Pacific High Pressure Cell, which is located in the northern Pacific Ocean off the coast of California. During the summertime, the High Pressure Cell deflects incoming storms from traveling inland. As a result, the SFBAAB receives little precipitation during these months, as described above. Beginning in the fall and continuing through the winter, the High Pressure Cell weakens and resides off the coast of Southern California. The absence of the High Pressure Cell allows storms to travel inland and reach many portions of the SFBAAB. Temperature, winds, and rainfall become more variable during the winter months with the frequent presence of dense fog. Winter weather patterns include periods of stormy weather with rain and gusty winds.

3.2 EXISTING SENSITIVE RECEPTORS

Sensitive land uses are facilities that generally house people that may experience adverse effects from unhealthful concentrations of air pollutants (i.e., sensitive receptors). Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics. Sensitive receptors in the project area include three residential units south of the project site (approximately 650 feet). Commercial buildings are situated to the west and southeast of the project site; however, these uses are not considered sensitive receptors.

3.3 EXISTING AIR QUALITY — CRITERIA AIR POLLUTANTS

Criteria air pollutants can cause health risks to the public when their concentrations reach certain levels. As discussed above, the meteorology, topography, and climate of a region can influence the concentration and dispersion of air pollutants in the atmosphere. A brief description of each criteria air pollutant including source types, health effects, and future trends is provided below along with the current attainment area designations and monitoring data for the project study area.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of VOC and NO_X in the presence of sunlight. VOC emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for 1 or 2 hours has been found to significantly alter lung function by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system's ability to defend against infection (Godish 2004).

Emissions of ozone precursors VOC and NO_X have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SFBAAB have declined overall by about 18 percent during the last 20 years. Peak 1-hour and 8-hour ozone concentrations in the SFBAAB have declined approximately 17 percent and 18 percent, respectively, in the past 20 years (1988 to 2007) (ARB 2009a). However, it is not clear if this reduction represents a significant change in the overall trend due to the variability caused by meteorological conditions in the SFBAAB (ARB 2009a).

Carbon Monoxide

CO is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85–95 percent of all CO emissions may come

from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air (USEPA 2009a).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (USEPA 2009a).

The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile, and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (USEPA 2009a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions (USEPA 2009a).

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at five ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations, fires, and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and VOC (USEPA 2009a). $PM_{2.5}$ is another classification of particulate matter that has been evaluated as a pollutant due to the increased health risks associated with these smaller particulates that can reach deeper into the lungs (ARB 2009a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter (which is referred to as the "piggybacking effect"), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (USEPA 2009a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of both PM_{10} and $PM_{2.5}$ increased slightly in the SFBAAB between 1975 and 2005 and are projected to increase through 2020. These emissions are dominated by areawide sources, primarily because of development. Direct emissions of PM from mobile and stationary sources have remained relatively steady (ARB 2009a).

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result

of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, USEPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. USEPA banned the use of leaded gasoline in highway vehicles in December 1995 (USEPA 2009a).

As a result of USEPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78-percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (USEPA 2009a).

Lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (USEPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB has identified lead as a TAC.

Monitoring Station Data

To identify ambient concentrations of criteria air pollutants, the BAAQMD and ARB operate more than 30 air quality monitoring stations throughout the SFBAAB. The nearest monitoring station to the project site is located at 10 Arkansas Street in San Francisco, approximately four miles southwest of the project site. This monitoring station measures ozone, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. In general, the ambient air-quality measurements from this station are representative of the air quality in the project area. Table 1 summarizes the air quality data from the most recent 3 years (2006–2008).

Table 1 lists the concentrations registered and the exceedances of CAAQS and the NAAQS that have occurred at this monitoring station from 2006 through 2008. During this period, the station

did not register any days above the state 1-hour or 8-hour ozone standards. The state CO and NO_2 standards were also not exceeded at the monitoring station in the last 3 years. The 24-hour PM_{10} CAAQS was exceeded on multiple days in 2006 and 2007, but not in 2008. The 24-hour $PM_{2.5}$ NAAQS was also exceeded during 2006 and 2007, but not in 2008.

Table 1. Summary of Annual Ambient Air Quality Data [1]

	2006	2007	2008
OZONE			
Maximum concentration (1-hour/8-hour, ppm)	0.053/0.046	0.060/0.053	0.082/0.066
Number of days state standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
Number of days national standard exceeded (8-hour) [2]	0	0	0
Carbon Monoxide (CO)			
Maximum concentration (1-hour/8-hour, ppm)	2.7/2.09	2.5/1.60	2.1/2.29
Number of days state standard exceeded (8-hour)	0	0	0
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hour, ppm)	0.107	0.069	0.062
Number of days state standard exceeded	0	0	0
Annual average (ppm)	0.016	0.016	0.016
Sulfur Dioxide (SO_2)			
Maximum concentration (24-hour, ppm)	0.007	0.006	0.004
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (µg/m^3) (National/California [3])	54.3/54.3	45.2/45.2	29.4/39.2
Number of days national standard exceeded (measured/estimated [4]) [5]	3/3.1	5/5.1	0/—
Annual average (µg/m^3) (National/California)	9.7/9.7	8.7/8.9	—/11.7
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m^3) (National/California [3])	58.0/61.4	65.7/69.8	41.2/41.3
Number of days state standard exceeded (measured/estimated [4])	3/17.3	2/12.0	0/0.0
Number of days national standard exceeded (measured/estimated [4])	0/0.0	0/0.0	0/0.0
Annual average (µg/m^3) (National/California)	22.9	21.9	2.00

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million; — = data not available

1 Measurements were recorded at the Arkansas Street monitoring station.

2 The 8-hour national ozone standard was revised to 0.075 ppm in March 2008. Statistics shown are based on the previous 0.08 ppm standard.

3 State and national statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. State statistics are based on local conditions while national statistics are based on standard conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

4 Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Estimated days mathematically estimate the number of days concentrations would have been greater than the level of the standard had each day been monitored. The number of days above the standard is not necessarily the number of violations of the standard for the year.

5 The national $PM_{2.5}$ 24-hour standard was revised from 65 µg/m^3 to 35µg/m^3 in September 2006. Statistics shown are based on the 65 µg/m^3 standard.

Sources: ARB 2009b; USEPA 2009b

3.4 ATTAINMENT STATUS

Both ARB and USEPA use monitoring data (Table 1) to designate an area's attainment status for criteria air pollutants. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, ARB designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The most recent attainment designations with respect to the SFBAAB are shown in Table 2 for each criteria air pollutant.

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to national and state standards. Health-based air quality standards have been established by ARB, at the state level, and USEPA, at the national level for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. These standards were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of the monitored pollutants are presented in Table 3. The current attainment designations for the County portion of the SFBAAB are summarized in Table 2 below.

Federal Attainment Status

The NAAQS (other than for ozone, PM_{10}, $PM_{2.5}$ and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. The NAAQS for ozone, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The SFBAAB is currently designated as a marginal nonattainment area with respect to the national ozone standard, a maintenance area with respect to the national CO standards, and a nonattainment area with respect to the $PM_{2.5}$ 24-hour standard. The SFBAAB is designated as attainment or unclassified for all other pollutants. Additional details regarding the national attainment status are provided in Table 2 above. The NAAQS along with health effects, atmospheric effects, and common source types are shown in Table 3.

Table 2. San Francisco Bay Area Air Basin California and Federal Attainment Status

Pollutant	Averaging Time	California Attainment Status	Federal Attainment Status
Ozone	1-hour	N	—
	8-hour	N	N
Carbon Monoxide (CO)	1-hour	A	A/M
	8-hour	A	A/M
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	—	U/A
	1-hour	A	—
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	—
	24-hour	A	A
	3-hour	—	—
	1-hour	A	—
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	N	—
	24-hour	N	U
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	N	A
	24-hour	—	N [1]
Lead	30-day Average	A	—
	Calendar Quarter	—	A

Notes: N = nonattainment; A = attainment; M = maintenance; U/A = unclassified/attainment; U = unclassified; — = no standard
[1] On October 9, 2009, USEPA published a final ruling in the Federal Register designating the SFBAAB as nonattainment for the 2006 24-hour $PM_{2.5}$ standard. The rule will become effective 30 days after publication in the Federal Register.
Sources: ARB 2009c; USEPA 2009c

California Attainment Status

Air quality of a region is considered to be in attainment of the CAAQS if the measured ambient air pollutant levels for ozone, CO, SO_2 (1- and 24-hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility-reducing particles are not exceeded, and all other standards are not equaled or exceeded at any time in any consecutive 3-year period. The SFBAAB is currently designated as a nonattainment area with respect to the state standards for ozone, PM_{10}, and $PM_{2.5}$ and is designated as attainment or unclassified for all other pollutants. Additional details regarding the state attainment status are provided in Table 2 above. The CAAQS along with health effects, atmospheric effects, and common source types are shown in Table 3.

Table 3. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	Federal Standard	Health and Atmospheric Effects	Typical Sources
Ozone[a]	1 hour 8 hours	0.09 ppm 0.070 ppm	–[b] 0.075 ppm	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.	Low-altitude ozone is almost entirely formed from VOC and NO_X in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes. Biologically-produced VOC may also contribute.
Carbon Monoxide (CO)	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm[c] 6 ppm	35 ppm 9 ppm –	Asphyxiant. CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Respirable Particulate Matter (PM_{10})[a]	24 hours Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 –	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray).
Fine Particulate Matter ($PM_{2.5}$)[a]	24 hours Annual	– 12 µg/m^3	35 µg/m^3 15 µg/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the $PM_{2.5}$ size range. Many aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including NO_X, SO_X, ammonia, and VOC.
Nitrogen Dioxide (NO_2)	1 hour Annual	0.18 ppm 0.030 ppm	– 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain.	Motor vehicles and other mobile sources; refineries; industrial operations.
Sulfur Dioxide (SO_2)	1 hour 3 hours 24 hours Annual	0.25 ppm – 0.04 ppm –	– 0.5 ppm 0.14 ppm 0.030 ppm	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing.
Lead [d]	Monthly Quarterly	1.5 µg/m^3 –	– 1.5 µg/m^3	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also considered a toxic air contaminant.	Primary: lead-based industrial process like batter production and smelters. Past: lead paint, leaded gasoline. Moderate to high levels of aerially deposited lead from gasoline may still be present in soils along major roads, and can be a problem if large amounts of soil are disturbed.

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter; VOC = volatile organic gases; NO_X = oxides of nitrogen; SO_X = sulfur oxides

[a] Annual PM_{10} NAAQS revoked October 2006; was 50 µg/m^3. 24-hr. $PM_{2.5}$ NAAQS tightened October 2006; was 65 µg/m^3.

[b] The Federal 1-hour ozone standard was revoked in 2005.

[c] Rounding to an integer value is not allowed for the State 8-hour CO standard. A violation occurs at or above 9.05 ppm.

[d] The ARB has identified lead, vinyl chloride, and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both the ARB and USEPA have identified various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There is no threshold level of exposure for adverse health effect determined for toxic air contaminants, and control measures may apply at ambient concentrations below any criteria levels specified for these pollutants or the general categories of pollutants to which they belong.

Sources: California Air Resources Board Ambient Air Quality Standards chart,11/17/2008 (http://www.arb.ca.gov/aqs/aaqs2.pdf)
Sonoma-Marin Area Rail Transit Draft Air Pollutant Standards and Effects table, November 2005, page 3-52.
USEPA and California Air Resources Board air toxics websites, 05/17/2006

Existing Emission Sources

Criteria air pollutant emission sources in the County include stationary, area, and mobile sources. According to the 2008 emissions inventory for the County, the majority of VOC and NO_X emissions are attributable to mobile sources, while areawide sources are the greatest contributor of particulate matter emissions (ARB 2009d).

Major stationary sources of air pollutant emissions within the County include industrial processes, fuel combustion from electric utilities and other processes, waste disposal, surface coating and cleaning, petroleum production, and other sources. Local air districts issue permits to various types of stationary sources, which must demonstrate implementation of best available control technologies (BACT).

Areawide sources of emissions include consumer products, application of architectural coatings, residential fuel combustion, farming operations, construction and demolition, road dust, fugitive dust, landscaping, fires, and other miscellaneous sources. Paved road dust is the largest contributor to particulate matter emissions within the County.

On-road and other mobile sources are the largest contributors of ozone precursor emissions within the County. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources comprise heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment. Major roadways in the County include I-80 and I-280. Major United States routes include U.S. Highway 101 and major state routes include State Route 1.

3.5 EXISTING AIR QUALITY — TOXIC AIR CONTAMINANTS

Concentrations of TACs, or in federal parlance, hazardous air pollutants (HAPs), are also used as indicators of ambient-air-quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the *California Almanac of Emissions and Air Quality* (ARB 2009a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among TACs in California. Based on receptor modeling techniques, ARB estimated its health risk to be 480 excess cancer cases per million people in the SFBAAB during 2000. Since 1990, the health risk associated with diesel PM has been reduced by 36 percent in the SFBAAB. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2009a).

Mobile Source Air Toxics

The CAA identified 188 compounds as HAPs. USEPA has assessed this expansive list of toxics and identified a group of 21 as MSATs. The MSATs are compounds emitted from highway vehicles and non-road equipment (e.g., off-road construction equipment). Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. USEPA also extracted a subset of this list of 21 compounds that it now labels as the six priority MSATs. These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene (FHWA 2006b). However, in September 2009, FHWA released its MSAT Interim Guidance Update that identified seven compounds "with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers" (FHWA 2009a). These seven compounds are now considered the priority MSATs: acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While these MSATs are considered the priority transportation toxics, USEPA stresses that the lists are subject to change and may be adjusted in future rules (FHWA 2006b, FHWA 2009a).

USEPA has issued a number of regulations that will dramatically decrease MSATs through cleaner fuels and cleaner engines. According to an FHWA analysis, even if the number of vehicle miles traveled (VMT) increases by 64 percent, reductions of 57–87 percent in MSATs are projected from 2000 to 2020 (FHWA 2006b). Project MSAT impacts are discussed in Chapter 4.0, "Environmental Consequences," of this analysis.

Asbestos

The CAA requires USEPA to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with CAA Section 112, USEPA established National Emissions Standards for Hazardous Air Pollutants (NESHAP) to protect the public. Asbestos was one of the first HAPs regulated under this section. On March 31, 1971, USEPA identified asbestos as a HAP, and on April 6, 1973, first promulgated the asbestos NESHAP in 40 Code of Federal Regulations (CFR) 61. In 1990, a revised NESHAP regulation was promulgated by USEPA.

The asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of asbestos-containing material. Accordingly, the asbestos NESHAP specifies work practices to be followed during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require the project applicant to notify applicable state and local agencies and/or USEPA regional offices before all demolitions or before construction that contains a certain threshold amount of asbestos.

Naturally Occurring Asbestos

Serpentine is a mineral commonly found in seismically active regions of California, usually in association with ultramafic rocks and along associated faults. Certain types of serpentine occur naturally in a fibrous form known generically as asbestos. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. ARB has regulated the amount of asbestos in crushed serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about health hazards from activities that disturb asbestos-bearing rocks and soil. In response, ARB revised their asbestos limit for crushed serpentines and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent and adopted a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos (NOA) (CDC 2000).

According to A General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos (CDC 2000), the project site is not located in an area that is likely to contain NOA. Thus, hazardous exposure to asbestos-containing serpentine materials would not be a concern with the proposed project.

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CHAPTER 4.0 – ENVIRONMENTAL CONSEQUENCES

4.1 PROJECT IMPACT ANALYSIS

Operational Impacts

As determined in the traffic study, traffic operations resulting from implementation of Alternative 2b and 4 would be the same. Therefore, the following operational impacts analysis refers to the proposed project as the build alternatives (Alternative 2b and Alternative 4).

Regional Air Quality Conformity

For federal or joint projects, the air quality analysis and technical report must comply with the federal CAA and the environmental document must contain a regional and a project-level air conformity statement, unless the project is exempt (see 40 CFR 93, 126-128). The proposed project must match the design, concept, and scope of the project as described in the most recent RTP and Regional Transportation Improvement Plan (RTIP).

The proposed project is included in the 2035 RTP (latest RTP update) which was found to conform by MTC on April 22, 2009. The FHWA and FTA adopted the air quality conformity finding for the 2035 RTP on May 29, 2009. MTC used the latest planning assumptions for the purpose of preparing the conformity analysis. Current and future population and employment assumptions were obtained from ABAG's latest socio-economic/land use forecast series, *Projections 2007*. MTC's latest travel demand forecast model, BAYCAST 2000, was used to estimate future vehicle activity while taking into consideration the ARB's most recent vehicle emissions inventory model, EMFAC 2007. EMAC 2007 takes into consideration the most recent available vehicle registration data. The proposed project is included in the 2035 RTP as Reference Number 230555 – Reconstruct ramps on east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island Tunnel. The project is also included in MTC financially constrained 2009 TIP on page 38 as TIP ID SF-070027 – Yerba Buena Island Ramp Improvements. The original MTC 2009 TIP, which includes the proposed project, was found to conform by FHWA and FTA on November 17, 2008. Revisions to the MTC 2009 TIP following FHWA and FTA's decision did not affect the proposed project. The year the project is expected to open to traffic is consistent with the project's TIP listing. The design concept and scope of the proposed project is consistent with the project description in the 2035 RTP, the 2009 TIP and the assumptions in the MTC regional emissions analysis.

Project-Level Conformity

The Transportation Conformity Rule requires a determination that federal projects not cause or contribute to any new localized CO, PM_{10}, and/or $PM_{2.5}$ violations or increase the frequency or severity of any existing CO, PM_{10}, and/or $PM_{2.5}$ violations in CO, PM_{10}, and $PM_{2.5}$ nonattainment and maintenance areas.

A project-level conformity analysis must be completed to determine the potential for a CO and PM "hot spot." The SFBAAB is currently designated as a maintenance area for the CO NAAQS and therefore a CO "hot spot" analysis is required under the USEPA Transportation Conformity Rule. An analysis of the potential for a CO "hot spot" was performed below consistent with the Protocol. For PM_{10}, the SFBAAB is unclassified with respect to the NAAQS. For $PM_{2.5}$, the SFBAAB was previously designated as attainment for the 65 $\mu g/m^3$ standard; however, on October 9, 2009, USEPA published a final ruling in the Federal Register designating the SFBAAB as nonattainment for the 2006 35 $\mu g/m^3$ 24-hour standard. The ruling will become effective 30 days after October 9, 2009. As a result of the new designation, a PM "hot spot" analysis was performed for the proposed project in accordance to the PM Guidance. This analysis was performed consistent with the USEPA and FHWA's PM Guidance (FHWA 2006a).

Carbon Monoxide

The Protocol provides procedures and guidelines for use by agencies to evaluate the potential localized CO impacts of a transportation project (UCD ITS 1997). The Protocol provides decision flow charts designed to assist the lead agency in evaluating requirements that specifically apply to a proposed project. An examination of each flow chart inquiry as it pertains to the proposed project is provided below. The Protocol states that the determination of project-level CO impacts should be carried out in accordance with the Local CO Analysis flow charts shown as Figure 3 of the Protocol.

The procedures of Section 4 in Figure 3 of the Protocol are provided for the proposed project to identify level of effort required.

Section 4, Local CO Analysis

Level 1

Is the project in a CO nonattainment area?

> No, the SFBAAB has attained the federal CO standard, but is currently a maintenance area for the CO standard, as shown in Table 2 of this analysis. Go to next question.

Was the area redesignated as "attainment" after the 1990 Clean Air Act?

Yes, the SFBAAB was redesignated as attainment in 1998.

Has "continued attainment" been verified with the local Air District (if appropriate)?

Yes. ARB's "2004 Revision to the California State Implementation Plan for Carbon Monoxide" demonstrates continued attainment of the CO standard in 10 areas including the SFBAAB. Go to Level 7.

Level 7

4.7.1: Does the project worsen air quality?

The guidance for this question states: "Only those projects that are likely to worsen air quality necessitate further analysis." To determine whether a project is likely to worsen air quality for the area substantially affected by the project, the guidance asks the following questions:

Would "the project significantly increase the percentage of vehicles operating in cold start mode"? An increase of as little as 2 percent should be considered significant.

No. The proposed project does not involve development of housing, employment centers, or other attractions and, thus, would not generate traffic. Rather, the proposed project would maintain the functional role of the YBI on- and off-ramps while satisfying the seismic requirements and highway design standards and improving traffic operations and safety. The proposed on- and off-ramps are not anticipated to increase the percentage or total number of vehicles operating in cold start mode.

Would "the project significantly increase traffic volumes?" Increases in traffic volumes in excess of 5 percent or more should be considered potentially significant. Additionally, an increase of less than 5 percent may still be potentially significant, if there is also a reduction in average speeds.

No. The proposed project would not develop any land uses that would generate vehicle trips and increase traffic volumes on the on- and off-ramps. The proposed ramps would add additional capacity to the westbound on-ramp for the SFOBB; however, because the ramps would be metered, the proposed project would not increase traffic volumes entering the SFOBB. Therefore, according to the criterion described above, the proposed project would not adversely affect on traffic volumes.

Would "the project worsen traffic flow"? A reduction in average speeds of 3 to 50 [miles per hour] mph or an increase in average delay at an intersection should be regarded as worsening traffic flow.

Yes. The proposed project would not worsen traffic flow on or off of the SFOBB because only the same number of vehicles exiting the SFOBB would be allowed to enter. In other words, the metering system for the proposed on-ramp would only allow a vehicle to enter the SFOBB if another vehicle exited the SFOBB. Therefore, with implementation of proper ramp metering, the proposed project is not anticipated to adversely affect the traffic operations of the SFOBB. However, the proposed metering system could worsen traffic flow on the on-ramp due to vehicles idling prior to entering the SFOBB. Vehicles attempting to enter the SFOBB would have to idle at the proposed meter until another vehicle exits off of the SFOBB. Therefore, although the proposed metering system would not be anticipated to worsen traffic flow on the SFOBB due to a one-to-one ratio of vehicles entering and exiting at the Yerba Buena exit, the metering system would worsen traffic flow on the on-ramp. Thus, the proposed project could worsen traffic flow.

According to the criteria discussed above, implementation of the proposed project could potentially worsen air quality. Proceed to Question 4.7.2.

4.7.2 Would the project result in higher CO concentrations than those existing in the region at the time of attainment demonstration?

The guidance for this question states: "Projects potentially creating CO concentrations higher than those existing within the region at the time of attainment demonstration should proceed to Section 4.7.3; other projects should be deemed satisfactory and no further analysis is needed." In order to answer the question, the Protocol recommends that the features of the proposed project are compared with an existing project in region. If the project features of the "build" scenario would be less likely to cause a CO "hot spot" than the existing worst-case project, then there is no reason to expect higher concentrations of CO at the proposed project location. Table 4 presents the conditions and parameters of the proposed on- and off-ramps and the U.S. Route 101 southbound on- and off-ramps at Blossom Hill Road for comparison purposes.

Table 4. Comparison of Ramp Conditions

	Parameters	Yerba Buena Island Build Alternatives	U.S. Route 101 – Blossom Hill Road Southbound Ramps
A	Receptor Distance	650 ft.	250 ft.
B	Roadway Geometry	2 lanes on-ramp 1 lane off-ramp	1 lanes on-ramp 3 lanes off-ramp
C	Worst-Case Meteorology	Coastal Valley	Coastal Valley
D	AADT Volumes	3,040 (2008) [1] 16,730 (2035) [1]	26,400 (2007) [2]
E	Hot/Cold Starts Percentage	75/25 on-ramp 85/15 off-ramp	75/25 on-ramp 85/15 off-ramp
F	Percent Heavy Duty Gasoline Trucks	0.76%	1.8% [3]
G	8-Hour Background CO	2.3 ppm (2006–2008)	2.9 ppm (2006–2008) [4]

Notes: ft = feet; AADT = annual average daily trips; ppm = parts per million; CO = carbon monoxide

1 Average daily trips (ADT) were calculated by multiplying the PM peak hour traffic using the westbound on- and off-ramps and a k factor of 10. ADT is anticipated to be comparable to AADT. However, the adjustment made to calculate AADT would not be expected to cause the proposed project's AADT to exceed the comparison project's AADT.

2 Traffic volumes from Caltrans were provided in ADT, which is expected to be comparable to AADT. Any adjustment made to calculate AADT would not be expected to cause the AADT to be below the proposed project's AADT. The ramp volume shown only represents the southbound on- and off-ramps at U.S. Route 101 and Blossom Hill Road.

3 Percent of heavy-duty gasoline trucks for the comparison project was determined using the CO Protocol methodology and truck volumes and distributions from the San Jose, Junction Route 85, Bernal Road Interchange from Caltrans 2007 Truck Traffic data, which is the closest data point to the comparison project.

4 Background 8-hour CO concentration was obtained from the Jackson Street monitoring station in San Jose, California, which is the closest monitoring station to the Blossom Hill Road southbound ramps.

Sources: Caltrans 2009a; Caltrans 2009b; UCD ITS 1997; ARB 2009b

As shown above, all conditions in items A through G for Question 4.7.2 have been satisfied; therefore, there is no reason to expect higher CO concentrations at the project location than at the U.S. Route 101 on- and off-ramps at Blossom Hill Road. Thus, the proposed project would not cause an exceedance of the state or federal CO standards.

4.7.3: Would the project involve signalized intersections at Level of Service (LOS) E, or F?

No, the proposed project would not impact any signalized intersections. Although metering is proposed for the on-ramp, the on-ramp would be considered a roadway segment for which the Protocol does not apply. Proceed to Question 4.7.4.

4.7.4: Would the project result in worsening of signalized intersections LOS to E, or F?

No, the proposed project would not impact any signalized intersections. Although metering is proposed for the on-ramp, the on-ramp would be considered a roadway segment for which the Protocol does not apply. Proceed to Question 4.7.5.

4.7.5: Would there be any other reasons the project could cause adverse air quality impacts?

The guidance for this question states: "Under certain special conditions, there still may be cause for concern about the air quality impacts of the project even if no further analysis

was required according to Sections 4.7.3 and 4.7.4." As discussed above, the proposed project would not generate vehicle trips or create any special conditions (e.g., urban street canyon, increase number of heavy-duty trucks, and proximity to large stationary sources of CO) that would increase CO concentrations at local signalized intersections. Therefore, it is determined there are no other reasons that the proposed project would cause adverse air quality impacts with respect CO concentrations.

According to the traffic study, the proposed project would not reduce the LOS of any signalized intersection to LOS E or F. In addition, no special conditions would contribute to the proposed project causing an adverse air quality impact with respect to CO. Therefore, the proposed build alternatives would not cause violations of the federal or state CO standards and further analysis of localized CO impacts is not necessary.

Particulate Matter

On March 10, 2006, USEPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. Based on that rule, USEPA and FHWA published the PM Guidance (FHWA 2006a). In December 2008, USEPA designated the SFBAAB as nonattainment for the new 35 $\mu g/m^3$ $PM_{2.5}$ standard. On October 9, 2009, USEPA published the final ruling in the Federal Register, which officially designated the SFBAAB as nonattainment for the 2006 $PM_{2.5}$ standard. It should be noted that a "hot spot' analysis for particulate matter is not currently required for project conformity until December 2010 to allow a one-year conformity grace period; however, in anticipation of the nonattainment designation, a "hot spots" analysis was performed for the proposed project in accordance to the PM Guidance. In accordance with the nonattainment designation and pursuant to the transportation conformity requirements, the local PM impacts of the proposed project are analyzed in accordance with the PM Guidance.

A "hot spot" analysis is defined in 40 CFR 93.101 as an estimation of likely future localized $PM_{2.5}$ or PM_{10} pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A "hot spot" analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals. Such an analysis demonstrates that a transportation project meets CAA conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts. When a "hot spot" analysis is required, it is included within the project-level conformity determination that is made by FHWA and FTA.

The PM Guidance document describes qualitative "hot spot" analyses. Quantitative $PM_{2.5}$ and PM_{10} "hot spot" analyses will be required when appropriate methods and modeling guidance are available. Qualitative "hot spot" analyses involve more streamlined reviews of local factors such as local monitoring data near a proposed project location.

Since issuing the March 2006 guidance, a lawsuit was filed challenging a project's conformity determination, including the project's $PM_{2.5}$ "hot spot" analysis that relied on Method A (comparison to another location with similar characteristics). Method A is described in question 4.1 of the March 2006 guidance. As part of a settlement agreement on that lawsuit (Environmental Defense, et al. v. USDOT, et al., No. 08-1107 (4th Cir., dismissed Nov. 17. 2008)), FHWA agreed to issue a clarification on a specific schedule, in coordination with USEPA, related to the March 2006 guidance. This clarification does not supersede the March 2006 guidance or the March 10, 2006 Final Transportation Conformity Rule; it only further explains how to implement the existing guidance and the "hot spot" analysis requirements in the final rule. The clarification also does not create any new requirements and does not serve as guidance for $PM_{2.5}$ and PM_{10} quantitative "hot spot" analyses (FHWA 2009b).

Projects of Air Quality Concern

To meet statutory requirements, the March 10, 2006, final rule requires $PM_{2.5}$ and PM_{10} "hot spot" analyses to be performed for POAQC. Qualitative "hot spot" analyses would be done for these projects. Projects not identified as POAQCs are considered to have met statutory requirements without any further "hot spot" analyses.

The PM Guidance defines POAQCs as projects within a federally designated $PM_{2.5}$ or PM_{10} nonattainment or maintenance area that are funded or approved by FHWA or FTA, and are one of the following types of projects:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- Projects affecting intersections that are LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F, because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals, and transfer points, that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals, and transfer points, that significantly increase the number of diesel vehicles congregating at a single location; and

- Projects in, or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Appendix A of the PM Guidance contains examples of POAQCs and examples of projects that are not an air quality concern. Under the example of POAQC, a significant volume for a new highway or expressway is defined as facilities with an annual average daily traffic (AADT) volume of 125,000 or more, and a significant number of diesel vehicles is defined as 8 percent or more of the total AADT is diesel truck traffic.

The proposed project is not a land use project that is anticipated to generate vehicle trips. The traffic study analyzed the future (year 2035) traffic volumes that would use the proposed ramps to access YBI and TI. The total number of vehicles accessing YBI and TI via the proposed ramps during the p.m. peak hour in 2035 would be 3,835 vehicles, which would translate to approximately 38,350 average daily trips (ADT) (AECOM Transportation 2009). It should be noted that this analysis uses ADT rather than AADT, which is used to define traffic volumes for a POAQC. The ADT associated with the project is anticipated to be comparable to the AADT. Nevertheless, the ADT associated with the proposed project is approximately 25 percent of the AADT threshold; therefore, any adjustments made to the ADT to calculate AADT would still not be expected to result in an AADT that exceeds 125,000 AADT. Therefore, the proposed project would not exceed the first threshold for a POAQC. However, it is acknowledged that traffic volumes on the SFOBB during the p.m. peak hour would increase from 16,351 vehicles in 2008 to 19,350 vehicles in 2035, which would translate into 193,500 ADT. Although the SFOBB traffic volumes would exceed the 125,000-AADT threshold, those traffic volumes have been analyzed in a previous environmental analysis. As discussed above, the metering system proposed for the on-ramps would limit the amount of vehicles entering the SFOBB to the amount of vehicles exiting the SFOBB and therefore would not add a substantial traffic volume to the SFOBB that would cause a PM "hot spot."

In addition, the vehicle trips along the proposed ramps would not be anticipated to cause an increase in the number of diesel vehicles. The proposed project is not a land use project that would generate an increased number of diesel trucks traveling on the ramps. As discussed in the traffic study, future traffic volumes would increase on the SFOBB and the proposed ramps, which would also increase the number of diesel trucks traveling along the SFOBB and the proposed ramps. However, the percentage of diesel trucks of the total traffic volume is anticipated to remain the same. It should be noted that the TI and YBI Redevelopment Plan would develop land uses on YBI and TI that could potentially increase the number of heavy-duty diesel trucks traveling on the proposed ramps to deliver goods. Therefore, although implementing the proposed project would not directly increase diesel vehicle traffic, future

development on TI and YBI could increase the number and percent of diesel vehicle traffic. Because implementing the proposed project would not significantly increase AADT or diesel truck traffic along the proposed on- and off-ramps, the proposed project does not meet the criteria of a POAQC as defined in the PM Guidance and would not significantly increase the potential for a PM "hot spot." In addition, the proposed project would not involve developing a land use that would alter the vehicle mix traveling along the ramps.

Mobile Source Air Toxics

In addition to CO, MSAT emissions are of local concern. MSATs are compounds emitted from highway vehicles and non-road equipment. In February 2006, FHWA issued the FHWA Interim Guidance to advise when and how to analyze MSAT in the NEPA process for highways. However, USEPA currently recommends following the March 2007 report entitled "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process." FHWA and USEPA are currently undergoing mediation on the FHWA Interim Guidance. In September 2009, FHWA released an update to the FHWA Interim Guidance (i.e., Interim Guidance Update). The Interim Guidance Update did not change any project analysis thresholds, recommendations, or guidelines; however, an updated set of seven priority MSATs were identified as having significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers.

Evaluating the environmental and health impacts from MSATs on a proposed highway project may involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure.

The following is an excerpt from Appendix C of the FHWA Interim Guidance (FHWA 2006b):

<u>Introduction to MSAT</u>

> In addition to the criteria air pollutants for which there are NAAQS, USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).
>
> MSATs are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete

combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

USEPA is the lead Federal Agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. USEPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, USEPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64-percent increase in VMT, these programs would reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57–65 percent, and would reduce on-highway diesel PM emissions by 87 percent.

As a result, USEPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous

effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for

forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs. healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion,

accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of USEPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The USEPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The USEPA IRIS is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from USEPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures, unless noted otherwise.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.

- **Diesel PM exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

- **Naphthalene** is classified in Group C, a possible human carcinogen. This is based on the inadequate data of carcinogenicity in humans exposed to naphthalene via the oral and inhalation routes, and the limited evidence of carcinogenicity in animals via the inhalation route.

- Epidemiological studies have shown an increase in lung cancer cases for individuals exposed to **polycyclic organic matter** sources such as coke oven emissions, roof tar emissions, and cigarette smoke. Seven polycyclic organic matter compounds have been classified as Group B2, probable human carcinogens (USEPA 2009d).

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a nonprofit organization funded by USEPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT "hot spots," the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes — particularly respiratory problems (South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein).

Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria air and other pollutants.

This document provides a qualitative assessment of MSAT emissions relative to the various alternatives and has acknowledged that all the project alternatives may result in increased exposure to MSAT emissions in certain locations.

It is possible to qualitatively assess the levels of future MSAT emissions under the project. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2009c), found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

Evaluation of Project MSAT Potential

The FHWA has developed a tiered approach (FHWA Interim Guidance and Interim Guidance Update) for analyzing MSATs in NEPA documents. This tiered approach has not been altered in the Interim Guidance Update. Depending on the specific project circumstances, FHWA has identified three levels of analysis:

- Category 1: No analysis for projects with no potential for meaningful MSAT effects,
- Category 2: Qualitative analysis for projects with low potential MSAT effects, or
- Category 3: Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Category 1 is limited to projects that qualify as a categorical exclusion under 23 CFR 771.117(c); are exempt under the CAA conformity rule under 40 CFR 93.126; or have no meaningful impacts on traffic volumes or vehicle mix. The proposed project does not meet any of the Category 1 requirements.

For a project to be of the magnitude to have a higher potential for MSAT effects, Category 3, a project must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- be proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

The proposed project would not alter a major intermodal freight facility or add significant capacity to urban highways where AADT is projected to be above 140,000. Therefore, by default, the proposed project would be classified as a Category 2 project with low potential MSAT effects. A Category 2 MSAT analysis is recommended for projects that would improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions. A qualitative MSAT analysis should be performed for Category 2 projects discussing the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic. The analysis should also qualitatively evaluate the change in MSAT emissions based on the expected effect of the project on VMT, vehicle mix, and vehicle speeds.

Project-Specific MSAT Impact Analysis

The amount of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. In addition, the FHWA's *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* study concluded that the most important factors affecting MSAT emissions are VMT and levels of traffic congestion (FHWA 2009c). A higher level of traffic congestion and reduced vehicle speeds were found to increase emission factors of all seven priority MSATs except for diesel particulate matter. The emission rate for diesel particulate matter is not as dependent on speeds as the other MSATs. Based on a review of the traffic study, year 2035 (i.e., buildout year) traffic volumes and associated VMT estimated for the two Build Alternatives and the No Build Alternative would be similar. The reason being, although the project would add additional capacity, the project itself would not generate trips or attract new trips as a result of its completion. In addition, the proposed project would not develop a land use that would alter the vehicle mix traveling along the ramps. Therefore, MSAT emissions associated with each alternative would vary as a function of vehicle congestion along the on- and off-ramps. The traffic study determined that compared with the No Build Alternative, the average operating speed on the on-ramp would be lower for the Build condition due to proposed metering system (i.e., one-to-one ratio of vehicles exiting and entering the SFOBB). Under the No Build Alternative (i.e., no metering), the average vehicle speed on the on-ramp would be slightly higher due to the lack of metering. However, it should be noted that the free flowing and unmetered on-ramp under the No Build Alternative could cause congestion and reduced speeds on the SFOBB. The operating speeds on the SFOBB were not analyzed in the traffic study. With respect to the operation of the on-ramp, the two build alternatives would result in more delays and queuing as a result of the proposed metering for the on-ramp, and therefore a lower average operating speed. According the *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* study, it is anticipated that the build alternatives would result in higher emissions of MSATs than the No Build Alternative.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce MSAT emissions by 57–87 percent between 2000 and 2020 (FHWA 2006b). This reduction in MSAT emissions is projected to occur even with a 64-percent increase in VMT. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Construction Impacts

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities. Emissions from construction equipment also are anticipated and would include CO, NO_X, VOCs, directly emitted PM_{10} and $PM_{2.5}$, and TACs such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO_X and VOCs in the presence of sunlight. To minimize air quality impacts from construction activities, control measure will be implemented as specified in Caltrans Standard Specifications, Section 14-9.01, "Air Pollution Control," and Section 14-9.02, "Dust Control."

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine and fugitive emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and small amounts of CO, SO_2, NO_X, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the USEPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent. Caltrans' Standard Specifications (Section 14) pertaining to dust minimization requirements requires use

of water or dust palliative compounds and would reduce potential fugitive dust emissions during construction.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_X, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. These emissions would be temporary and limited to the immediate area surrounding the construction site. If construction activities were to last longer than 2 years and/or substantially affect traffic due to detours, road closures, and/or temporary terminations, the potential for a CO and PM "hot spot" should be analyzed. Construction of the proposed project is scheduled to last approximately 2 years and would not require substantial detours, road closures, and/or temporary terminations due to the proposed ramps being located in different areas than the existing ramp. In other words, the existing ramps could operate under current conditions while the new ramps are constructed to avoid substantial alternations to traffic flow. Therefore, construction activities were not considered in the CO or PM "hot spot" analyses.

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 ppm of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and ARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO_2-related issues due to diesel exhaust would be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving site(s). Such odors would be quickly dispersed below detectable thresholds as distance from the site(s) increases.

Local Emissions

According to 40 CFR, Part 51, Section 93.123 (5), CO, PM_{10}, and $PM_{2.5}$ "hot spot" analyses are not required for construction-related activities, which create a temporary increase in air emissions. A temporary increase in air emissions is defined as an increase that would only occur during a construction phase and would last for 5 years or less at any individual site. As discussed above, construction-related activities would result in short-term emissions of PM_{10} and $PM_{2.5}$ from soil excavation and grading operations, and VOC, NO_X, and CO emissions from the exhaust of off-road heavy-duty diesel equipment used for site preparation (e.g., excavation, grading, and clearing); paving; and other construction activities. Construction activities leading to the generation of ozone precursors and criteria air pollutant emissions would be temporary and short term in duration and would not last longer than 5 years (i.e., approximately 2 years). Thus, project-generated emissions of criteria air pollutants and precursors would not expose sensitive receptors to substantial pollutant concentrations. It is concluded that local ambient air quality impacts from construction would not be adverse.

Toxic Air Contaminants — Diesel Particulate Matter Exhaust Emissions

Construction-related activities would result in short-term project-generated emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment for site preparation (e.g., excavation, grading, and clearing); paving; materials transport and handling; and other miscellaneous activities. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential noncancer health impacts (OEHHA 2003).

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TACs to be compared to applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual (MEI). Thus, the risks estimated for an MEI are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHAA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed project (Salinas 2004). The project construction period would be much less than the 70-year period used for risk determination. Because the use of off-road heavy-duty diesel equipment would be temporary in combination with the highly dispersive properties of diesel PM (Zhu et al. 2002) and further reductions in exhaust emissions, and project-generated and construction-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Nonetheless, a measure to reduce the potential short-term exposure of sensitive receptors to diesel PM is identified in Chapter 6.

Naturally Occurring Asbestos and Structural Asbestos

As discussed above in Naturally Occurring Asbestos, the project site is not located in an area that is likely to contain naturally occurring asbestos. However, certain building structures on YBI and the on- and off-ramp structures could potentially include structural asbestos that would be disturbed and emitted into the atmosphere during construction of the proposed project. As discussed in the Hazardous Waste/Materials section, the 2008 Site Management Plan has abated all known asbestos containing material (ACM) on the YBI and TI areas, including Quarters 10 and Building 267, which would be relocated as part of Alternative 2b. Therefore, the proposed project would not expose any receptors or workers to naturally occurring or structural asbestos.

4.2 COMPARISON OF AIR QUALITY IMPACTS BETWEEN ALTERNATIVES

The proposed project includes three possible alternatives: No Build Alternative, Alternative 2b, and Alternative 4. The No Build Alternative would not alter the existing YBI on- and off-ramps.

The two build alternatives would include the removal of the existing on- and off-ramps and construction of new ramps that meet geometric and highway design standards and seismic requirements. The traffic study determined that VMT along the ramp junctions would be similar for all three alternatives. Therefore, operational air quality impacts associated with each alternative would vary as a result of their affect on traffic flow along the ramp junctions. The following section discussed the differences in air quality impacts between alternatives. Please see the Project Description for a detailed description of each project alternative.

Carbon Monoxide "Hot Spot"

As discussed above, the proposed project would not affect any signalized intersections. Therefore, the selection of one alternative over another would not adversely affect the LOS of project intersections or the potential for a CO "hot spot."

Particulate Matter "Hot Spot"

Under the No Build Alternative, the YBI on-ramp would have insufficient capacity for future (2035) traffic volumes. However, the traffic volumes entering the SFOBB under the No Build Alternative would be slightly higher than the two build scenarios due to the unrestricted access (i.e., without metering) on the on-ramp. The two build alternatives would cause vehicles to remain on the on-ramp for longer due to the proposed metering system, which would cause more congestion and idling on the on-ramp than the No Build Alternative. Therefore, implementation of the two build alternatives is expected to be more likely to result in a $PM_{2.5}$ or PM_{10} "hot spot."

Mobile Source Air Toxics

Under the No Build Alternative, the on-ramp volumes entering the SFOBB are slightly higher than the two build alternatives due to the unrestricted access (i.e., without metering). It is anticipated that the lack of metering under the No Build Alternative would allow for vehicles to travel at a higher average speed along the on-ramp to reach the SFOBB than under the metered build alternatives. As cited in the FHWA study, *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, MSAT emission factors tend to be higher with increased traffic congestion. Therefore, it is anticipated that the No Build Alternative would result in a lower amount of MSAT emissions compared with the build alternatives.

Under the two build alternatives (2b and 4), the YBI on-ramp would be metered with a one-to-one ratio (i.e., one vehicle is allowed to enter the SFOBB if one vehicle exits the SFOBB). As cited in the traffic study, the average operating speed along the ramp junction would decrease with implementation of the two build alternatives as a result of the metering system. It should be

noted that the amount of congestion on the SFOBB would be reduced with the build alternatives because only the same number of vehicles exiting the SFOBB, would be allowed to enter. Nevertheless, the two build alternatives would result in higher levels of delays and queuing and subsequent MSAT emissions than the No Build Alternative.

Construction Impacts

Under the No Build Alternative, the existing ramps would remain intact and no construction emissions would be generated. Both build alternatives would involve the removal of the existing ramps and construction of new on- and off-ramps on the east side of the island.

Alternative 2b and Alternative 4 would construct the proposed westbound on-ramp at different locations, which would affect the total length of the on-ramp. Alternative 4 would require an on-ramp approximately three times longer (2,883 feet) than that of Alternative 2b (876 feet). Accordingly, Alternative 4 may require increased construction effort to complete the longer on-ramp. However, Alternative 2b would include the relocation of Quarters 10 and Building 267, which is not included in Alternative 4. In terms of air pollutant emissions, it is anticipated that construction of Alternative 2b and Alternative 4 would be comparable on an annual basis. In addition, construction of either alternative is expected to last less than 2 years, which is considered a temporary increase in air pollutant emissions.

Naturally Occurring Asbestos and Structural Asbestos

As discussed above, the project site is not an area likely to contain naturally occurring asbestos. In addition, any asbestos containing material in Quarters 10 and Building 267, which would be relocated as part of Alternative 2b, has been abated in the 2008 Site Management Plan. Therefore, none of the alternatives are anticipated to cause adverse air quality impacts associated with naturally occurring or structural asbestos.

4.3 CUMULATIVE IMPACTS

The analysis of project impacts to regional air quality, as performed by MTC as part of the RTP and RTIP conformity process, is a cumulative analysis. The proposed project would conform to the assumptions in the conformity analyses for the 2035 RTP and 2009 RTIP, which are long-range planning documents that include roadway projects throughout the region. These plans, among others, are used in the SIP to determine if the region would achieve attainment or maintain attainment of ambient air quality standards. Therefore, the proposed project would not result in a cumulative impact to air quality.

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CHAPTER 5.0 – POLLUTION ABATEMENT MEASURES

Most of the construction impacts to air quality are short term in duration and, therefore, would not result in adverse or long-term conditions. Implementation of the following measures would reduce any air quality impacts resulting from construction activities:

- The construction contractor shall comply with Caltrans' Standard Specifications Section 14-9.01, "Air Pollution Control," and Section 14-9.02, "Dust Control," of Caltrans' Standard Specifications (1999).

    - Section 14-9.01, "Air Pollution Control," addresses the contractor's responsibility on many air quality concerns such as complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules, regulations, ordinances and statutes provided in the Government Code Section 11017 (Public Contract Code Section 10231). In addition, it is specified that material to be disposed of shall not be burned.

    - Section 14-9.02, "Dust Control," addresses the contractor's responsibility to minimize fugitive dust emissions during construction. The contractor shall prevent and alleviate dust by applying water, a dust palliative, or both under Section 14-9-01 (above); applying water under Section 17, "Watering"; applying a dust palliative under Section 18, "Dust Palliative"; and, if ordered, applying water, a dust palliative, or both to control dust caused by public traffic. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

- Water or dust palliative will be applied to the site and equipment as frequently as necessary to control fugitive dust emissions.

- Soil binder will be spread on any unpaved roads used for construction purposes, and all project construction parking areas.

- Trucks will be washed off as they leave the right of way as necessary to control fugitive dust emissions.

- Construction equipment and vehicles shall be properly tuned and maintained. Low-sulfur fuel shall be used in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.

- Develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.

- Locate equipment and materials storage sites as far away from residential and park uses as practical. Keep construction areas clean and orderly.

- To the extent feasible, establish environmental site assessments (ESA) for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited.

- Use track-out reduction measures such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic.

- Cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM_{10} and deposition of particulate during transportation.

- Remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.

- To the extent feasible, route and schedule construction traffic to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.

- Install mulch or plant vegetation on disturbed areas as soon as practical after grading to reduce windblown particulate in the area.

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A Guide to the

2009 Transportation Improvement Program (TIP)

For the Nine-County San Francisco Bay Area

May 28, 2008 MTC Resolution No. 3875

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Transportation 2035 Plan for the San Francisco Bay Area

FINAL

April 2009

CHANGE IN MOTION

TRANSPORTATION 2035

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Transportation 2035 Plan for the San Francisco Bay Area

FINAL

April 2009

CHANGE IN MOTION

TRANSPORTATION 2035

Financially Significant Projects in the 2009 TIP

(Total Project Cost Greater than $200 Million)

TIP ID	County	Orig TIP	Sponsor	Project Name	Total Project Cost	Project Cost within the TIP Period
SF-070027	San Francisco	2007	SFCTA	Yerba Buena Island Ramp Improvements	$215,450,000	$36,500,000
ALA050017	Alameda	2005	AC Transit	Enhanced Bus – Telegraph/Int	$203,770,193	$43,004,300
Total					$17,184,351,797	$6,033,187,398

Financially Significant Grouped Listings in the 2009 TIP

(Total Project Cost Greater than $200 Million)

TIP ID	County	Orig TIP	Sponsor	Project Name	Total Project Cost	Project Cost within the TIP Period
VAR991005	Various	1999	Caltrans	Grouped Listing SHOPP - Bridge Preservation	$1,977,415,000	$370,797,000
MTC050011	Various	2005	Caltrans	Grouped Listing SHOPP - Collision Reduction	$638,298,000	$380,003,000
VAR991007	Various	1999	Caltrans	Grouped Listing Local - Highway Bridge Program	$511,412,000	$186,017,000
REG070001	Various	2007	Caltrans	Grouped Listing for SHOPP – Emergency Response	$231,544,000	$92,816,000
MTC050006	Various	2005	Caltrans	Group Listing SHOPP – Mobility	$214,236,000	$60,539,000
VAR991004	Various	1999	Caltrans	Grouped Listing SHOPP - Emergency Response (ER)	$202,250,000	$3,850,000
Total					$5,020,451,000	$1,475,299,000

Financially Significant Projects in the 2009 TIP

Metropolitan Transportation Commission

Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area

Transportation Improvement Program (TIP) Mapping Project

Geographic Information Systems Unit

Project List:

1. San Francisco-Oakland Bay Bridge
   Alameda County
   $5.7 Billion
2. BART Seismic Retrofit Program
   Multiple Counties
   $1.2 Billion
3. BART - Warm Springs to San Jose Extension
   Santa Clara
   $1.1 Billion
4. Transbay Terminal/ Caltrain Downtown Extension Phase 1
   San Francisco
   $988.2 Million
5. US 101 Doyle Drive Replacement
   San Francisco
   $987.3 Million
6. Muni Third St Light Rail Phase 2 - New Central Subway
   San Francisco
   $966.4 Million
7. BART - Warm Springs Extension
   Alameda County
   $889.8 Million
8. Caltrain Electrification
   Multiple Counties
   $629.3 Million
9. eBART - East Contra Costa Rail Extension
   Contra Costa County
   $487.3 Million
10. BART Oakland Airport Connector
    Alameda County
    $469.9 Million
11. SR 4 East Widening from Somersville to SR 160
    Contra Costa County
    $464.5 Million
12. SR 24 - Caldecott Tunnel 4th Bore
    Contra Costa County
    $420.5 Million
13. US 101 HOV Lanes: Marin-Sonoma Narrows
    Marin County
    $390.9 Million
14. Dumbarton Rail Service
    San Mateo County
    $335.1 Million
15. Capitol Expressway Light Rail Extension: Downtown to East Valley
    Alameda County
    $334.3 Million
16. BART Transbay Tube Seismic Retrofit
    San Francisco
    $325.4 Million
17. SR 1 Devils Slide Bypass
    San Mateo County
    $322.9 Million
18. I-680/Hwy 4 Interchange Reconstruction
    Contra Costa
    $297.6 Million
19. Golden Gate Bridge Seismic Retrofit Phase: 1 thru 3A
    Marin County
    $272.1 Million
20. I-80/I-680/Hwy 12 Interchange
    Solano County
    $263 Million
21. Yerba Buena Island Ramp Improvements
    San Francisco
    $215.5 Million
22. AC Transit Enhanced Bus -- Telegraph/International
    Alameda
    $203.8 Million

The following projects are programmatic, and therefore are not shown on the map:

AC Transit Preventative Maintenance
Alameda County
$250.2 Million

VTA Preventative Maintenance
Santa Clara County
$313.2 Million

Note: All costs are total project costs.

San Francisco County

(In millions of year-of-expenditure dollars)

Reference Number	Project/Program	Total Project Cost	Committed Funds[1]	Discretionary Funds[2]	Project Notes
22512	Provide capital improvements to support ferry service between Treasure Island and San Francisco	$ 57.1	$ 45.0	$ 12.1	Resolution 3434 Regional Transit Expansion Program
22982	Enhance transit programs in San Francisco that promote system connectivity and accessibility, close service gaps and expand transit service	$ 196.1	$ 191.1	$ 5.0	2003 Proposition K sales tax project
22984	Construct new/reconstruct existing wheelchair curb ramps	$ 41.1	$ 36.1	$ 5.0	2003 Proposition K sales tax project
94632	Extend Third Street Light Rail from Fourth and King streets to Bayshore Caltrain Station	$ 649.0	$ 649.0	$ 0.0	2003 Proposition K sales tax and Regional Measure 2 Toll Bridge Program project
98593	Fund the Integrated Transportation Management System (SFgo)	$ 138.4	$ 133.4	$ 5.0	2003 Proposition K sales tax project
230161	Implement a Bus Rapid Transit (BRT) project on Van Ness Avenue (includes dedicated transit lanes, signal priority and pedestrian and urban design upgrades)	$ 87.6	$ 87.6	$ 0.0	Resolution 3434 Regional Transit Expansion Program
230164	Implement a Bus Rapid Transit (BRT) project on Geary Boulevard (includes dedicated transit lanes, signal priority and pedestrian and urban design upgrades)	$ 219.8	$ 127.3	$ 92.5	
230168	Improve the Great Highway between Lincoln Way and 48th Avenue (includes resurfacing roadway, installing drainage systems and constructing medians)	$ 19.4	$ 1.5	$ 17.9	
230207	Implement a Bus Rapid Transit (BRT) project on the Geneva Avenue/Harney Way corridor (includes new infrastructure and rolling stock)	$ 265.0	$ 225.0	$ 40.0	
230211	Extend trolley coach infrastructure into Mission Bay along 16th Street and Third Street, and implement transit signal priority along 16th Street and Fillmore Street	$ 13.9	$ 4.1	$ 9.8	
230215	Extend existing trolley coach lines throughout San Francisco	$ 5.6	$ 1.3	$ 4.3	2003 Proposition K sales tax project
230364	Improve water access to San Francisco parks	$ 4.0	$ 4.0	$ 0.0	
230490	Reconstruct and widen Harney Way to 8 lanes (6 mixed flow, 2 bus-only for Bus Rapid Transit service) and improve bicycle lanes and sidewalks	$ 54.3	$ 51.3	$ 3.0	
230517	Improve transit and roadway connectivity between San Francisco and San Mateo counties	$ 280.0	$ 275.0	$ 5.0	
230555	Reconstruct ramps on the east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island tunnel	$ 183.0	$ 183.0	$ 0.0	

1 Committed Funds have been reserved by law for specific uses, or allocated by MTC action prior to the development of the Transportation 2035 Plan.

2 Discretionary Funds are flexible funds available to MTC (and not already programmed in Committed Funds) for assignment to projects via the Transportation 2035 Plan planning process.

APPENDIX M

NOISE STUDY

AECOM
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San Francisco, CA 94111
www.aecom.com

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Memorandum

To	Valerie Shearer	Page	1
CC			
Subject	Yerba Buena Island Ramps Improvement Project EIR/EIS Noise Study Report Addendum Memorandum		
From	Bill Maddux		
Date	July 26, 2011		

The YBI Ramps Improvement PDT, which is comprised of the lead (Caltrans and SFCTA), cooperating, and responsible agencies, held a meeting on April 12, 2011 to consider and identify the preferred alternative. The unanimous decision was that Alternative 2b would best meet the purpose and need of the YBI Ramps Improvement Project. The relocation site for Quarters 10/Building 267 was determined following the identification of the preferred alternative.

The purpose of this memorandum is to confirm that preparation of the relocation of Quarters 10/Building 267 site and relocation of the buildings would not result in new issues. After the buildings are relocated, any future use of the site will be evaluated through a separate environmental process initiated by the City and County of San Francisco and/or TIDA.

During construction activities, noise would be generated from heavy-duty construction equipment, generators, haul trucks, and construction worker vehicles. Thus, construction noise would primarily occur at the existing building location during building disassembly and at the Quarters 10/Building 267 relocation site. The movement of the structures and worker trips would also generate noise on local roadways during construction; however, these noise level increases would be short term and would not result in a perceptible change in the existing noise environment.

Table 1 below lists the construction equipment that could be used for the preparation of the relocation site with reference noise levels at a distance of 15.24 meters (50 feet) from the equipment and usage factors. The loudest construction activity at the relocation site would be associated with site clearing. Assuming a reasonable maximum activity scenario with a dozer, excavator, a pickup truck, and a dump truck and after determining the usage factor of individual pieces of equipment; construction activities at a relocation site would be expected to result in an equivalent hourly average noise levels of 86 dBA L_{eq}, at a distance of 15.24 meters (50 feet) from the center of the construction site. Maximum noise levels generated by construction activities are not predicted to exceed 85 dBA L_{max} at 15.24 meters (50 feet) beyond the edge of active construction sites.

Table 1: Quarters 10 and Building 267 Relocation Site Construction Equipment

Equipment Type	Typical Noise Level at 15.24 meters (50 feet), dBA	Usage Factor
Pickup Truck	55	0.4
Backhoe	80	0.4
Dozer	85	0.4
Excavator	85	0.4
Dump Truck	84	0.4
Generator	82	0.5
Concrete Mixer Truck	85	0.4

Notes: dB = A-weighted decibels;

*All equipment fitted with properly maintained and operational noise control device, per manufacturer specifications.

Source: Data Compiled by AECOM 2011; FHWA 2006, FTA 2006.

The nearest noise-sensitive receptor to the Quarters 10/Building 267 relocation site is a multiple family residence approximately 83.8 meters (275 feet) from the nearest point of construction to the south at the northwest corner of Nimitz Drive and Macalla Road. The distance from the center of construction activity to this receptor is approximately 143.3 meters (470 feet). Noise from localized sources, such as construction activities, decreases at a rate of 6 to 7.5 dBA with each doubling of distance from source. Conservatively assuming an attenuation rate of 6 dBA per doubling of distance, construction activities during peak activity are predicted to generate hourly noise levels of approximately 67 dBA Leq at 143.3 meters (470 feet) at the closest source. Therefore, construction noise associated with the relocation of Quarters 10/Building 267 would not exceed the maximum allowable noise level of 80 dBA at 30.5 meters (100 feet) per Section 2907(a) of City of San Francisco Municipal Code. The avoidance and minimization measures for construction noise abatement identified in Section 3.15.4.2 of the Final EIR/EIS would be implemented as applicable to the site. Noise impacts would not be adverse.

FHWA issued new protocol for noise reports, effective July 13, 2011. However, because the YBI Ramps Improvement Project's Noise Study Report was approved by Caltrans staff before July 13, 2011, the report has been grandfathered in and is not required to be revised per the new protocol.

Attachment 1: Project-Generated Construction Source Noise Prediction Model

Project-Generated Construction Source Noise Prediction Model

AECOM

Yerba Buena Island Ramps Improvement Project

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	179	75.0
	50	86.1
	100	80.0
	150	76.5
	200	74.0
	250	72.1
	300	70.5
	360	68.9
	400	68.0
	450	67.0
	500	66.1
	1600	56.0
	1750	55.2

Assumptions:	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Dozer	85	0.4
Excavator	85	0.4
Flat Bed Truck	84	0.4
Crane	85	0.16
Ground Type	hard	
Ground Factor	0.00	

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Dozer	81.0
Excavator	81.0
Flat Bed Truck	80.0
Crane	77.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
86.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006.

[2] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L.+10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Yerba Buena Island Ramps Improvement Project ***NSR***

Final

Noise Study Report

Yerba Buena Island Ramps Improvement Project

San Francisco, California

District 4-San Francisco-Interstate 80-PM 7.6 to 8.1

EA 04-3A640K

January 2011

Caltrans

FINAL

NOISE STUDY REPORT

Yerba Buena Island Ramps Improvement Project

San Francisco, California

District 4-San Francisco-Interstate 80-PM 7.6 to 8.1

EA 04-3A640K

January 2011

SUMMARY

The purpose of this Noise Study Report (NSR) is to describe the existing noise environment in the project area and identify potential future traffic noise impacts associated with implementation of the Yerba Buena Island (YBI) Ramps Improvement Project (proposed project). Where traffic noise impacts would occur, this NSR states whether noise abatement would be feasible under the requirements of the California Department of Transportation (Caltrans) *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol). Specifically, for each receiver in the project area, this NSR describes existing and future predicted traffic noise levels for the build alternatives and the No-Build Alternative. This NSR also addresses potential construction noise impacts associated with the proposed project.

This NSR assesses potential noise impacts related to the proposed replacement of the existing on- and off-ramps for westbound Interstate 80 (I-80) on the San Francisco-Oakland Bay Bridge, located on the east side of YBI, between post miles 7.6 and 8.1. The project area elevation ranges from approximately 1.5 to 200 feet above mean sea level. In general, the topography in the project area slopes moderately downward from the interior of the island to the outer perimeter of the island.

The primary goals of the proposed project are to improve the safety of the on- and off-ramps to the extent physically and economically feasible, improve traffic operations to and from YBI, and comply with current Caltrans design standards. Under the proposed project, the standard deceleration length for the off-ramp would be provided, and the acceleration/merging length for the on-ramp would be improved. In addition, implementing the proposed project would improve traffic operations to and from YBI.

A limited range of alternatives has been identified for the proposed project. The alternatives present minor variations in cost, impact footprint, and operational characteristics (i.e., lane configurations, bike lane accommodations, and width). The alternatives considered in this NSR are Alternative 2B, Alternative 4, and the No-Build Alternative. Under the No-Build Alternative, the existing on- and off-ramps would remain in place, and no improvements would be made. Alternative 2B would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing a loop on-ramp from Macalla Road, and constructing an off-ramp to Macalla Road. Alternative 4 would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing an on-ramp from South Gate Road, and constructing an off-ramp to Macalla Road.

Adjacent land uses include residential and a limited amount of commercial development and a U.S. Coast Guard station, intermixed with undeveloped hillsides. The U.S. Coast Guard station includes a separate area with varying land uses, including residential, commercial, office, and

industrial development. Commercial development is scattered to the north of the project area. Additional residential, commercial, and industrial development is located west of YBI on Treasure Island.

Potential noise impacts were assessed by investigating the existing traffic noise conditions in the project area, identifying noise-sensitive locations, and predicting future traffic noise levels with and without the alternatives. The noise receivers analyzed in the project area are located throughout YBI. Most of the category B receivers in the project area are residential, single-family, and multiple-family units. Seventeen receiver points, representing three single-family residential units, 20 multiple-family residential units, 12 commercial/governmental units, one recreational area, and one driveway, were used.

Noise levels were measured at select receivers in the project area to identify existing background noise levels and validate the noise model. Loudest hour noise levels were modeled and indicate that the existing traffic noise levels approach or exceed the noise abatement criteria (NAC) at one category B receiver (R-3). The category B receiver represents 12 multiple-family residential units. Additionally, two category C receivers representing seven commercial/ governmental units (R-2, R-4, and R-16) are exposed to existing noise levels that approach or exceed the NAC. 4

Under the No-Build Alternative, predicted changes in traffic noise levels over existing conditions would range from -4 to 2 A-weighted decibels (dBA) equivalent sound level (L_{eq}). Noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers would range from 41 to 65 dBA $L_{eq.}$ Noise levels also would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers would range from 61 to 69 dBA L_{eq}.

Under Alternative 2B, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under this build alternative would range from 41 to 65 dBA $L_{eq.}$ Noise levels also would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA L_{eq}.

Under Alternative 4, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under either build alternative would range from 41 to 65 dBA L_{eq}. Noise levels also

would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA $L_{eq.}$

Although a traffic noise impact has been identified at one category B receiver, no area of frequent human use is associated with this receiver; therefore, noise abatement was not considered feasible, and no soundwalls are required.

Construction noise related to implementing the proposed project is anticipated to be typical of that for road construction. Some pavement breaking would be required; however, these activities would be temporary. Construction equipment noise may be audible at local receivers above the normal traffic noise. Night work would be required to maintain roadway operation for activities that would cross travel lanes. Nighttime construction noise would result in noise levels approximately 2 dBA above the lowest measured ambient hourly noise level; however, these noise level increases would be temporary and would not represent a substantial increase in noise levels at local receivers. To minimize construction-related noise to the extent practical, Caltrans would implement noise control measures as part of standard contract requirements.

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APPENDICES

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LIST OF ABBREVIATED TERMS

Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	community noise equivalent level
dB	decibel(s)
dBA	A-weighted decibel(s)
FHWA	Federal Highway Administration
HOV	high-occupancy vehicle
Hz	hertz
I-80	Interstate 80
L_{dn}	day-night level
LD820	Larson Davis Laboratories Model 820
LD824	Larson-Davis Laboratories Model 824
L_{eq}	equivalent sound level
$L_{eq(h)}$	equivalent sound level over 1 hour
L_{max}	maximum sound level
LOS	level of service
LT	long term
L_{xx}	percentile-exceeded sound level
mPa	micro-Pascal(s)
mph	miles per hour
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NSR	Noise Study Report
PM	post mile
Protocol	Caltrans's 2006 Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
R-	Receiver-
SFOBB	San Francisco-Oakland Bay Bridge
SLM	sound level meter
SN	serial number
SPL	sound pressure level
ST	short term
TeNS	Caltrans's 1998 Technical Noise Supplement
TNM 2.5	FHWA Traffic Noise Model, version 2.5
USCG	U.S. Coast Guard
YBI	Yerba Buena Island

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CHAPTER 1 INTRODUCTION

1.1 Purpose of the Noise Study Report

The purpose of this Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772), 'Procedures for Abatement of Highway Traffic Noise.' 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

The Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects (Protocol) (Caltrans 2006) provides the California Department of Transportation (Caltrans) policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing NSRs. Noise impacts associated with this project under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) are evaluated in the Yerba Buena Island (YBI) Ramps Improvement Project Environmental Assessment/Environmental Impact Report.

1.2 Project Purpose and Need

The proposed project is needed to increase and improve safety of the on- and off-ramps, improve mobility, and meet current Caltrans design standards along the YBI San Francisco-Oakland Bay Bridge (SFOBB) stretch of westbound Interstate 80 (I-80). The SFOBB stretch of I-80 is a primary transportation corridor between the city of San Francisco and the city of Oakland. The SFOBB is considered a lifeline structure and is a critical link between San Francisco and the East Bay. It also provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island. West and east of YBI, the SFOBB has five general-purpose lanes in each direction traveling to San Francisco and Oakland.

The current configuration of on- and off-ramps for the SFOBB on YBI does not comply with Caltrans guidelines for vehicle safety and seismic stability. Currently, the YBI SFOBB stretch of westbound I-80 does not meet the minimum design standards established by the Highway Design Manual, dated September 2006, for deceleration length for the off-ramp and acceleration/merging length for the on-ramp. Thus, the primary purpose of the proposed project is to improve the safety of the on- and off-ramps to the extent physically and economically feasible and to reconstruct the on- and off-ramps to comply with current Caltrans design standards by providing standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp, while minimizing environmental and community

impacts for the planning design year of 2014. The completion of the proposed project would accomplish the following objectives:

- improve traffic safety for drivers using the westbound on- and off-ramps,
- improve geometric design of the westbound on- and off-ramps on the east side of YBI to and from I-80, and
- improve traffic operations levels of service on the westbound on- and off-ramps.

CHAPTER 2 PROJECT DESCRIPTION

The proposed project is located on YBI, in the San Francisco Bay, approximately halfway between Oakland and San Francisco (Figures 1 and 2). The project site is located between post mile (PM) 7.6 and 8.1, beginning at the eastern mouth of the YBI tunnel and ending at the east side of the transition structure portion of the new SFOBB. The transition structure is located between PM 7.9 and 8.1, between the YBI tunnel and the SFOBB self-anchored suspension span. The project area elevation ranges from approximately 1 to 203 feet above mean sea level. In general, the topography in the project area slopes moderately downward from the interior of the island to the outer perimeter of the island.

The eastern mouth of the YBI tunnel (the western boundary of the project site) can be found at approximately 37°48'36' North and 122°21'54' West in the Oakland West and San Francisco North U.S. Geological Survey 7.5-minute quadrangle maps. Adjacent land uses include residential and a limited amount of commercial development and a USCG station, intermixed with undeveloped hillsides. The USCG station includes a separate area with varying land uses, including residential, commercial, office, and industrial development. Commercial development is scattered to the north of the project area. Additional residential, commercial, and industrial development is located west of YBI on Treasure Island.

2.1 Project Alternatives

A limited range of alternatives has been identified for the proposed project. The alternatives present minor variations in cost, impact footprint, and operational characteristics (i.e., lane configurations, bike lane accommodations, and width). The alternatives considered in this NSR are Alternative 2B, Alternative 4, and the No-Build Alternative. These alternatives are described in the following sections.

2.1.1 Alternative 2B

Alternative 2b would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing a loop on-ramp from Macalla Road, and constructing an off-ramp to Macalla Road (Figure 3). Under this alternative, two of the existing six on- and off-ramps at the I-80/YBI interchange would be reconstructed. The proposed on- and off-ramps would provide a single traffic lane with standard shoulder widths and would have the following features:

- The on-ramp on the east side of YBI would begin at a T intersection at Macalla Road, loop right with a tight radius, and connect with the north side of the SFOBB. The length of the ramp would be approximately 876 feet. The ramp would have two traffic lanes that merge into one as it connects to the SFOBB. One lane would be a high-occupancy vehicle (HOV) lane and the other a mixed-flow lane.

Not To Scale

Figure 1
Regional Map

Not To Scale

Figure 2
Vicinity Map

Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09

Not To Scale

Figure 3
Alternative 2B Site Plan

- The off-ramp on the east side of YBI would diverge from the new SFOBB transition structure between bents W3 and W4 curving around the Nimitz House and terminate at a T intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet. A stop sign is proposed at the ramp terminus.

- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the on- and off-ramps. The existing roadway is approximately 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes in the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

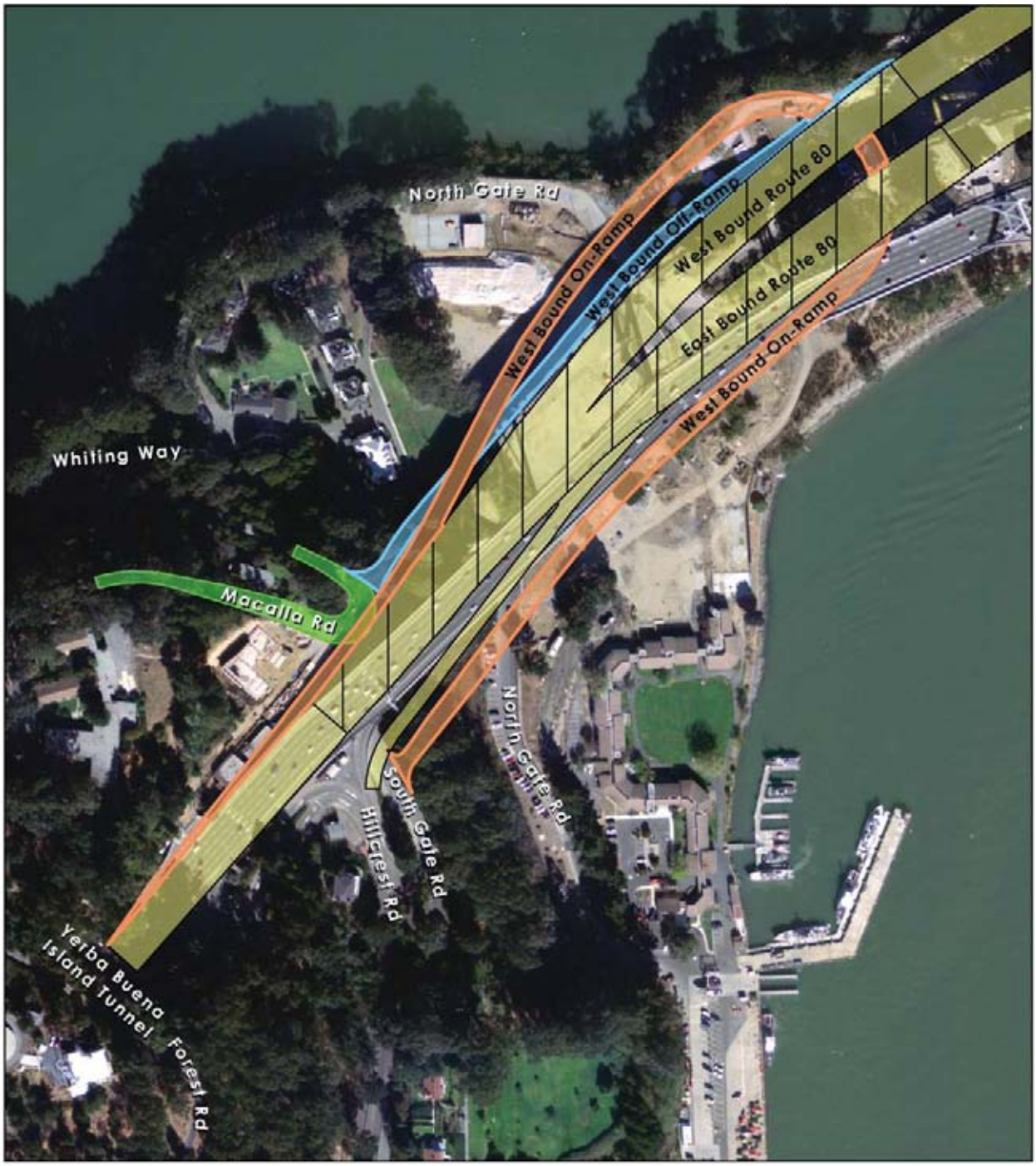
- The on- and off-ramps would terminate at Macalla Road where Quarters 10 is currently located. Quarters 10 would be relocated before construction of the ramps. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

2.1.2 Alternative 4

Alternative 4 would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing an on-ramp from South Gate Road, and constructing an off-ramp to Macalla Road (Figure 4). Under this alternative, two of the existing six on- and off-ramps at the I-80/YBI interchange would be reconstructed. The proposed on- and off-ramps would provide a single traffic lane with standard shoulder widths and would have the following features:

- The on-ramp on the east side of YBI would begin at South Gate Road; proceed east, paralleling the eastbound on-ramp; loop under the new SFOBB transition structure near its eastern end to provide adequate merging distances; and cross over the off-ramp along the north side of the SFOBB. The length of this ramp would be approximately 2,883 feet. An HOV lane would not be provided.

- The off-ramp on the east side of YBI would diverge from the new SFOBB transition structure between bents W2 and W3, parallel the transition structure, cross under the on-ramp, and terminate at a T intersection at North Gate Road. The length of this ramp would be approximately 1,168 feet. A stop sign is proposed at the ramp terminus.



Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09

Not To Scale

Figure 4
Alternative 4 Site Plan

- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the on- and off-ramps. The existing roadway is approximately 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes in the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

- No buildings would be relocated under Alternative 4.

2.1.3 No-Build Alternative

Environmental review must consider the effects of not implementing the proposed project. The No-Build Alternative is a base point from which to evaluate the impacts of the proposed build alternatives. It would not provide solutions to the existing roadway deficiencies. With the exception of the on- and off-ramps for eastbound I-80, which are part of the SFOBB East Span Seismic Safety Project, the No-Build Alternative assumes that the existing on- and off- ramps for westbound I-80 would remain in place and that no improvements would be made.

CHAPTER 3 FUNDAMENTALS OF TRAFFIC NOISE

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to Caltrans' Technical Noise Supplement (TeNS) (Caltrans 1998), a technical supplement to the Protocol, that is available on the Caltrans Web site (http://www.dot.ca.gov/hq/env/noise/pub/ tens_complete.pdf).

3.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

3.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

3.3 Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB–rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5 A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an ‘A-weighted’ sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Table 1 describes typical A-weighted noise levels for various noise sources.

Table 1. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 1998

3.6 Human Response to Changes in Noise Levels

As discussed above, the doubling of sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency (‘pure-tone’) signals in the midfrequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a

5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

3.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others fluctuate slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

Equivalent Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq[h])}$ is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

Percentile-Exceeded Sound Level (L_{xx}): L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

Community Noise Equivalent Level (CNEL): Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

3.8 Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

3.8.1 Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dBA for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dBA for each doubling of distance from a line source.

3.8.2 Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance.

3.8.3 Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

3.8.4 Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

CHAPTER 4 FEDERAL REGULATIONS AND STATE POLICIES

This NSR focuses on the requirements of 23 CFR 772, as discussed below.

4.1 Federal Regulations

4.1.1 23 CFR 772

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I or Type II projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or as the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.

Type I projects include those that create a completely new noise source, as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway or the widening of an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor ‘consider’ noise abatement before adoption of the final NEPA document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project and identification of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a ‘substantial’ noise increase). 23 CFR 772 does not specifically define the terms ‘substantial increase’ or ‘approach’; these criteria are defined in the Protocol, as described below.

Table 2 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

Table 2. Activity Categories and Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA-L_{eq}[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, hospitals, and auditoriums
Source: 23 CFR 772		

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (category E) is used as the basis for determining a noise impact.

4.2 State Regulations and Policies

4.2.1 Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23 CFR 772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA. The Protocol also states that a sound level is considered to approach an NAC level when the sound level is within 1 dB of the NAC identified in 23 CFR 772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA, but 65 dBA is not) (Caltrans 2006).

The TeNS to the Protocol provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance (Caltrans 1998).

4.2.2 Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this

code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA-$L_{eq(h)}$ in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the 'approach or exceed' NAC criterion for FHWA Activity Category E for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23 CFR 772.

If implementing a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA-$L_{eq(h)}$. If the noise levels generated from freeway and nonfreeway sources exceed 52 dBA-$L_{eq(h)}$ prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

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CHAPTER 5 STUDY METHODS AND PROCEDURES

5.1 Selection of Receivers and Measurement Sites

Preliminary selection of receivers for modeling and measurement was made based on the distance to the project limits, aerial photographs of the project area, and an initial field visit. Receiver locations were then refined based on the results of a field visit, maps, and photographic data. Modeled receiver placement focused on areas of frequent human use associated with residential or recreational units. Measurement points, identified as short-term (ST) 1 through ST-5 (Figure 5), were used to calibrate the FHWA Traffic Noise Model, version 2.5 (TNM 2.5) relative to the distribution of traffic noise. With the exception of ST-4, all measurement points are also represent areas of frequent human use. ST-4 does not represent an area of frequent human use; thus, traffic noise impacts are not assessed at this location. ST-1 is modeled as R-1, ST-2 is modeled as R-10, ST-3 is modeled as R-4, ST-4 is represented by R-12, and ST-5 is modeled as R-13.

Category B receivers assessed in this NSR include single-family and multiple-family residential units, which were chosen primarily because of their proximity to the YBI SFOBB stretch and their potential to be affected by the proposed project. Single-family residential units potentially affected by implementing the proposed project are associated with the USCG facility located southeast. Multiple-family residential units assessed in this NSR include the USCG housing southeast of the SFOBB along Healy Avenue, a vacant barrack building located northwest of the SFOBB south of Macalla Road, and six duplex units located northwest of SFOBB along Forest Road. Category C receivers assessed in this NSR are located northwest and southeast of SFOBB adjacent to North Gate Road and are associated with the former Officers Quarters 1–7 and the USCG station. These category C receivers are generally commercial and governmental development located adjacent to the project area.

Single-family residential units are represented by receivers (R)-11, R-14, and R-15. R-3 and R-6 though R-9 represent 20 multiple-family residential units. R-13 represents a garden area between quarters A and B and is considered a recreational land use.

Single-family residential units are represented by the following individual receiver points:

- R-11 represents a single-family residential unit (Building 9) located east of Hillcrest Drive, at the lower portion of the recreational area associated with the USCG Officers Quarters. R-12 represents a measurement taken in the driveway of the residential unit, whereas R-11 represents the rear yard, which is assumed to be the area of frequent human use. This residence is partially shielded from the SFOBB and the locations

proposed for new ramps by topography. The receiver elevation is approximately 30 feet below the I-80 SFOBB road surface.

- R-14 and R-15 represent two single-family residential units (Quarters A and B) located east of Hillcrest Drive. R-14 and R-15 represent patios, which are assumed to be the areas of frequent human use. The receivers are approximately 20 feet below the I-80 SFOBB road surface. Additionally, these residential units are shielded from the SFOBB and the proposed ramps by topography.

The multiple-family residential units evaluated for impacts are located along Macalla Court and Healy Avenue. These units are represented by receivers R-3 and R-6 through R-9. R-3 represents a vacant barracks building. R-6 through R-9 represent the USCG enlisted quarters. No exterior use area was associated with USCG enlisted quarters; thus, R-6 through R-9 are placed at the building façade to estimate the interior noise levels. The existing USCG quarters are assumed to provide 20-dBA attenuation from exterior noise sources. R-3 and R-6 through R-9 have direct lines of sight to the SFOBB access ramps. Category C receivers evaluated for impact assessment are primarily commercial/governmental development represented by R-1, R-2, R-4, R-5, R-10, R-16, and R-17 (Figure 5). R-1 and R-2 represent event rental facilities known as Quarters 1–7, which include the Nimitz House. R-4 and R-10 represent offices at the USCG station. R-5 represents the USCG station parade grounds, which showed no signs of recreational use. R-17 represents another event rental facility. R-16 represents a noncommercial land use: the USCG Vessel Traffic Service complex. R-1, R-2, R-4, and R-5 have direct lines of sight to the proposed ramp improvement project location and SFOBB.

5.2 Field Measurement Procedures

Long-term (LT) (24-hour) noise measurements were taken on March 30, April 1, and April 6, 2009, to determine the loudest hour or period. The LT noise measurements were captured in 1-hour intervals to determine the loudest hour or hours. During the LT measurements, the sound level meter (SLM) was unattended, and no traffic data were collected. The LT measurement locations are shown in Figure 5.

ST (10- to 20-minute) noise measurements were also taken on these days, to measure existing noise levels and record general traffic characteristics at selected receiver points. Because of the constant traffic flow on I-80, these measurement intervals were sufficient to characterize hourly traffic noise levels. ST noise level measurements taken outside the loudest period were adjusted up to normalize the data to the loudest period as defined by the 24-hour

Source: GoogleEarth 2009

Figure 5
Noise Measurement and Receiver Locations

measurements. Detailed measurement data, including noise levels, observations, weather conditions, and field measurement logs, are included in Appendix A. The results of the measurements are discussed in Section 6.2. SLM setup and instrumentation are discussed below.

5.2.1 Instrumentation and Setup

Two SLMs were used to measure existing noise in the project vicinity. A Larson-Davis Laboratories Model 820 (LD820) Type 1 SLM (serial number [SN]: 820A1176) was used, with the following parameters:

Filter:	A-weighted
Response:	Fast
Time History Period:	1 minute

A Larson-Davis Laboratories Model 824 (LD824) Type 1 SLM (SN: 824 A2624) was also used, with the following parameters:

Filter:	A-weighted
Response:	Slow
Time History Period:	1 minute

SLM calibration was checked with Larson-Davis CAL200 (SN: 4637 and SN: 4214) calibrators before and after use. Premeasurement and postmeasurement calibration results were within 0.1 dBA, and no corrections were made to results. The two SLMs were also tested with side-by-side measurements to determine differences in instrument sensitivity. The LD820 measurement was 0.3 dBA lower than the LD824 measurement. For all noise measurements, the SLMs were placed 5 feet above the existing ground level.

5.2.2 Meteorology

Wind and temperature measurements were made at the time of existing noise measurements because atmospheric conditions can cause noise levels to fluctuate by 10 dBA or more at locations distant from the freeway. The fluctuations are generally less at closer distances. Wind and vertical temperature differentials cause the greatest meteorological effects on noise levels and propagation. A vertical gradient of temperature or wind velocity can produce a vertical gradient of sound velocity, which can cause sound waves to refract or bend. Wind speeds averaged less than 3 miles per hour (mph) during all measurements. The results of meteorological measurements are discussed further in Section 6.3.

5.2.3 Data Reduction

Noise-level data were captured in the SLMs and then electronically transferred to a desktop computer using the Larson-Davis UTIL and the Larson-Davis 824 Utility programs. Average

noise levels for each measurement were calculated summing the time-energy products for each interval of measurement and converting them to the L_{eq} metric.

5.3 Traffic Noise Prediction

TNM 2.5 was used to predict existing and future traffic noise levels at specific receiver locations. Inputs to TNM 2.5 include the three-dimensional coordinates of:

- roadways, noise receivers, and topographic or planned barriers that would affect noise propagation;
- vehicle volumes and speeds, by type of vehicle;
- absorption (drop-off) factors; and
- adjustment factors.

The model outputs are noise levels at the selected receiver points. Receivers at exterior locations and ground-floor windows are modeled 5 feet above the ground elevation.

5.4 Traffic Parameters

Existing and future traffic volumes on all project area roadways were taken from the project traffic report (AECOM 2009a). Existing speeds were developed from site visits and time spent driving the alignment. Vehicle mixes for I-80 were taken from the *2007 Annual Average Daily Truck Traffic on the California State Highway System* (Caltrans 2008). Field counts taken in conjunction with ST noise measurements on April 1 and April 3, 2009, were used to develop the vehicle mix for local roadways.

Future traffic speeds and vehicle mixes on all study roadways were assumed to be the same as those used in the existing conditions. Future (2035) traffic volumes for the No-Build Alternative were obtained from the project traffic report (AECOM 2009a). The project traffic report did not include an evaluation of traffic volumes on local roadway; therefore, for purposes of this NSR, level of service (LOS) C segment volumes were used on local roadways to determine traffic noise levels. Based on information provided by the project traffic engineer, LOS C volumes on Yerba Buena Road, Healy Avenue, and Macalla Road would be approximately 700 vehicles per hour per lane (AECOM 2009b). Table 3 identifies the traffic volume mix used in the model. Traffic volumes used in the noise modeling for each scenario are presented in Appendix B.

Table 3. Traffic Volume Mix Used in TNM 2.5

Roadway Segment	Automobiles (percent)	Medium Trucks (percent)	Heavy Trucks (percent)
I-80 and access ramps	97.1	1.3	1.6
Local roadways (Yerba Buena Road, Healy Avenue, and Macalla Road)	97	2	1
Sources: Caltrans 2008, data provided by EDAW in 2009 based on field observations			

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CHAPTER 6 EXISTING NOISE ENVIRONMENT

6.1 Project Area

YBI is surrounded by San Francisco Bay waters; the San Francisco mainland is approximately 2 miles to the west, and Oakland is about 2 miles to the east. YBI is a natural island that has been used by private parties and the U.S. Army and Navy since the 1840s. It is steeply sloped and highly vegetated. The USCG occupies approximately 35 acres on the southeast side of YBI, and Caltrans occupies about 20 acres of YBI with portions of the SFOBB and tunnel.

YBI is a portion of the former Naval Station Treasure Island, which was owned by the Navy and encompasses approximately 489 acres of land. Approximately 10 buildings previously used by the military primarily for storage, communications, fire safety, and administrative purposes are located on YBI. In addition, there are 105 residential units, 10 of which are large single-family residences originally built for officers; the remainder consists of two-, three-, and four-unit residences, generally single story. Of these 105 residential units, about 95 units, located on the western and central parts of YBI, are occupied as market-rate civilian housing.

Land uses on the eastern side of YBI in the vicinity of the project site include Quarters 1–7. Built in the early 1900s as officers' quarters, they are now designated as a historic district. Quarters 1–7 have been renovated and are leased out by the city and county of San Francisco as locations for events and meetings. Two other buildings are located on the eastern side of YBI.

The Navy closed Naval Station Treasure Island military operations in 1997 and transferred interim control of most of its property to the Treasure Island Development Authority via a cooperative agreement. It intends to transfer all the property to the Treasure Island Development Authority.

An active, approximately 41-acre USCG station is located on the southeast side of YBI. The station includes Coast Guard Group San Francisco facilities, which include housing, administrative, open storage and docks, and buoy maintenance facilities. It also includes a lighthouse built by the U.S. Army in 1872. Additionally, Navigation Light No. 6, which is located at the tip of the breakwater on the northern end of Treasure Island, is a USCG facility.

6.2 Noise Receivers

The noise receivers analyzed in the project area are located along both the east and west sides of I-80 on the SFOBB and at the proposed locations for the ramp improvements, as shown in Figures 6 and 7. Most of the category B receivers in the project area are single-family and multiple-family residential units. For this NSR, 17 receivers were used to represent three single-family residential units, 20 multiple-family residential units, 12 commercial/governmental units, one recreational area, and one driveway.

The single-family residential units for which noise levels were assessed are located east of the YBI SFOBB stretch, along Hillcrest Road. Single-family residential units located in the USCG station and serving as the officers quarters are represented by R-11 and R-14 and R-15, which are located along the eastern side of Hillcrest Road. R-11, R-14, and R-15 are known as Building 9 and Quarters A and B, respectively. R-12, located in the driveway nearest the project site, was used as a model calibration point. R-13 is located between Quarters A and B and represents a recreational area.

R-3 and R-6 through R-9 represent 20 multiple-family residential units in the project area (Figure 5). R-3 represents an abandoned barrack. R-6 through R-9 represent USCG quarters.

Category C receivers evaluated in the impact assessment are commercial/governmental development and are represented by R-1, R-2, R-4, R-5, R-10, R-16, and R-17 (Figure 5). R-1, R-2, and R-17 represent event rental facilities. R-4, R-5, and R-10 represent non-residential uses, offices and parade grounds, at the USCG station. R-16 represents the USCG Vessel Traffic Service complex. R-1, R-2, R-4, R-5, and R-10 have direct lines of sight to the proposed ramp improvement project location and the YBI SFOBB stretch.

6.3 Existing Noise Level Measurements

Site visits and noise measurements were conducted on March 30 and on April 1 and 6, 2009 (see Appendix A for details). For each measurement location, the SLM was placed 5 feet above the existing ground elevation. A summary of the 24-hour measurements is provided in Tables 4 through 8.

Measurement data for LT-1 indicate that the loudest period of the day is the 6:00 a.m. hour (Table 4). Noise levels for LT-1 are consistent for most of the day, fluctuating by no more than 1 dBA between 4:00 a.m. and 10:00 p.m.

Measurement data for LT-2 indicate that the loudest period of the day is the 7:00 a.m. hour (Table 5). Daytime noise levels for LT-2 are relatively consistent, fluctuating by no more than 2 dBA between 6:00 a.m. and 8:00 p.m.

**Table 4. Summary of LT-1,
March 30, 2009**

Time	L_{eq}	Time	L_{eq}
12:00 a.m.	65.3	12:00 p.m.	71.1
1:00 a.m.	60.9	1:00 p.m.	71.2
2:00 a.m.	61.5	2:00 p.m.	70.4
3:00 a.m.	65.2	3:00 p.m.	70.0
4:00 a.m.	70.3	4:00 p.m.	69.7
5:00 a.m.	71.3	5:00 p.m.	69.6
6:00 a.m.	**71.4**	6:00 p.m.	71.0
7:00 a.m.	71.1	7:00 p.m.	71.2
8:00 a.m.	70.3	8:00 p.m.	71.0
9:00 a.m.	71.3	9:00 p.m.	70.4
10:00 a.m.	71.2	10:00 p.m.	68.8
11:00 a.m.	70.9	11:00 p.m.	67.3

Note: Bolded numbers indicate the loudest hour.
Source: Data compiled by EDAW in 2009.

**Table 5. Summary of LT-2,
March 30, 2009**

Time	L_{eq}	Time	L_{eq}
12:00 a.m.	61.0	12:00 p.m.	66.1
1:00 a.m.	60.3	1:00 p.m.	66.7
2:00 a.m.	60.2	2:00 p.m.	66.8
3:00 a.m.	60.5	3:00 p.m.	66.5
4:00 a.m.	63.6	4:00 p.m.	66.5
5:00 a.m.	65.7	5:00 p.m.	66.7
6:00 a.m.	66.9	6:00 p.m.	66.8
7:00 a.m.	**67.4**	7:00 p.m.	66.1
8:00 a.m.	67.2	8:00 p.m.	65.8
9:00 a.m.	66.8	9:00 p.m.	64.9
10:00 a.m.	66.5	10:00 p.m.	64.0
11:00 a.m.	66.0	11:00 p.m.	62.8

Note: Bolded numbers indicate the loudest hour.
Source: Data compiled by EDAW in 2009.

Measurement data for LT-3 indicate that the loudest period of the day is the 7:00 a.m. hour (Table 6). Noise levels for LT-3 are consistent between 6:00 a.m. and 6:00 p.m., fluctuating by no more than 1 dBA during this period.

**Table 6. Summary of LT-3,
March 30, 2009**

Time	L_{eq}	Time	L_{eq}
12:00 a.m.	62.6	12:00 p.m.	69.3
1:00 a.m.	61.7	1:00 p.m.	69.7
2:00 a.m.	61.6	2:00 p.m.	69.4
3:00 a.m.	63.1	3:00 p.m.	69.0
4:00 a.m.	66.5	4:00 p.m.	68.8
5:00 a.m.	68.2	5:00 p.m.	69.0
6:00 a.m.	69.6	6:00 p.m.	69.0
7:00 a.m.	**70.4**	7:00 p.m.	68.2
8:00 a.m.	69.5	8:00 p.m.	68.1
9:00 a.m.	69.4	9:00 p.m.	67.1
10:00 a.m.	69.1	10:00 p.m.	66.3
11:00 a.m.	69.0	1:00 p.m.	65.0

Note: Bolded numbers indicate the loudest hour.
Source: Data compiled by EDAW in 2009.

Measurement data for LT-4 indicate that the loudest period of the day is the 6:00 a.m. hour (Table 7). Noise levels for LT-4 do not fluctuate by more than 2 dBA between 5:00 a.m. and 4:00 p.m., but there is a marked drop in noise levels after 2:00 p.m. that continues until 6:00 a.m.

**Table 7. Summary of LT-4,
April 2, 2009**

Time	L_{eq}	Time	L_{eq}
12:00 a.m.	56.8	12:00 p.m.	63.0
1:00 a.m.	55.5	1:00 p.m.	64.0
2:00 a.m.	54.9	2:00 p.m.	62.0
3:00 a.m.	56.5	3:00 p.m.	62.3
4:00 a.m.	59.9	4:00 p.m.	61.1
5:00 a.m.	63.6	5:00 p.m.	61.3
6:00 a.m.	**64.5**	6:00 p.m.	62.6
7:00 a.m.	64.3	7:00 p.m.	61.4
8:00 a.m.	64.1	8:00 p.m.	61.7
9:00 a.m.	63.8	9:00 p.m.	61.4
10:00 a.m.	63.6	10:00 p.m.	61.3
11:00 a.m.	62.9	11:00 p.m.	60.3

Note: Bolded numbers indicate the loudest hour.
Source: Data compiled by EDAW in 2009.

Measurement data for LT-5 indicate that the loudest period of the day is the 4:00 a.m. hour (Table 8). Noise levels for LT-5 fluctuate by approximately 2 dBA between 4:00 a.m. and 3:00 p.m., but there is a marked drop in noise levels after 3:00 p.m. that continues until 3:00 a.m.

Table 8. Summary of LT-5, April 6, 2009

Time	L_{eq}	Time	L_{eq}
12:00 a.m.	63.0	12:00 p.m.	71.7
1:00 a.m.	62.6	1:00 p.m.	71.6
2:00 a.m.	64.5	2:00 p.m.	71.4
3:00 a.m.	68.1	3:00 p.m.	71.0
4:00 a.m.	71.9	4:00 p.m.	62.6
5:00 a.m.	**73.1**	5:00 p.m.	68.2
6:00 a.m.	72.4	6:00 p.m.	70.4
7:00 a.m.	71.8	7:00 p.m.	69.3
8:00 a.m.	72.1	8:00 p.m.	69.1
9:00 a.m.	71.7	9:00 p.m.	68.6
10:00 a.m.	71.6	10:00 p.m.	66.5
11:00 a.m.	71.2	11:00 p.m.	64.3

Note: Bolded numbers indicate the loudest hour.
Source: Data compiled by EDAW in 2009.

Noise measurement data presented in Tables 4 through 8 is generally consistent with the project traffic report, which indicates that a.m. peak-hour traffic volumes for I-80 are higher than p.m. peak-hour traffic volumes.

ST noise levels were measured between the hours of 11:00 a.m. and 3:30 p.m. at selected receivers and at other points of interest in the project area (Figure 5). Weather conditions were clear and warm, 67 degrees Fahrenheit (°F) to 90°F, with a slight breeze, less than 3 mph each day. All ST noise measurements were taken outside the loudest hour and were normalized (i.e., adjusted) to reflect the loudest hour based on the results of the 24-hour measurements (see Table 4 though 8 and Appendix C).

Since I-80 is a continuous noise source, background noise (i.e., noise without the traffic noise from I-80 or other local roadways) is not easily measured. However, based on a review of the detailed noise measurement data provided in Appendix A, the background noise level may be estimated at less than 60 dBA L_{eq}, based on the L_{90} measurement (which represents the noise level exceeded 90 percent of the time during the measurement) at ST measurement sites 4

and 5. The ST noise measurements and the adjusted loudest hour for each location are summarized in Table 9.

Table 9. Short-Term Noise Measurement Summary

Site I.D. [1]	Location or Address	Type of Development	Measured Noise Level ($L_{eq(h)}$, dBA)	Adjusted Worst-Hour Noise Level ($L_{eq(h)}$, dBA)
ST-1	1 Whiting Way, historical village	Commercial	70.4	71.4
ST-2	North Gate Road, USCG station, north offices	Governmental	64.9	65.9
ST-3	North Gate Road, USCG station, south parking lot	Governmental	70.4	71.4
ST-4	Hill Crest Road, USCG, Officers Quarters	Single-family residential	60.5	63.5
ST-5	Hill Crest Road, USCG, Officers Quarters	Single-family residential	57.9	59.9

[1] See Figure 5.
Source: Data compiled by EDAW in 2009.

The dominant noise source in the project area—traffic on major local roadways, such as Yerba Buena Road and Macalla Road—represented additional secondary noise sources with a noticeable but negligible effect on the ambient noise levels as compared to I-80. Smaller local roadways, including Forest Road, Healy Avenue, and Hillcrest Crest Road, had limited traffic volumes and low speeds, which had a minor effect on ambient noise levels in the project area.

6.4 Predicted Existing Noise Levels and Calibration

The purpose of model calibration is to 'fine-tune' the prediction model to actual site conditions that are not adequately accounted for by the model. Calibration is performed by algebraically adding a constant, or K-factor, to the noise level calculated in TNM 2.5. The magnitude of K-factors is initially determined by the difference between measured and modeled noise levels at specific points. Calibration factors may be positive or negative. Additional factors may be applied based on the experience and judgment of the noise engineer performing the analysis.

Section N-5400 of the TeNS, 'Calibrating the Prediction Model,' provides guidance on the application of calibrations. Subsection N-5420 states, 'highway reconstruction projects which significantly alter alignments and profiles of an existing highway are also poor candidates for model calibration.' Additionally, FHWA's policy for TNM 2.5 states, '[n]o adjustments should be made for differences of less than 3 dBA' (FHWA 2004).

Noise levels were predicted at all receivers, including at ST measurement locations, using TNM 2.5 and various input parameters, as previously discussed, to compare them with adjusted measured traffic noise levels at common points. Differences between measured loudest hour

noise levels and the predicted loudest hour noise levels were less than 3 dBA at all receivers except ST-1 (R-2) and ST-3 (R-4). ST-1 (R-2) and ST-3 (R-4) modeled 4 dBA and 6 dBA below the measured noise level at the same location. The differences at ST-1 and ST-3 are likely due to reflective noise from the double decked structure. K-factors were applied to R-2 and R-4 for the existing condition model run. No K-factors were applied to the future model runs. Because the alignment of the proposed SFOBB would be substantially different from the current alignment of I-80, the proposed project is a poor candidate for calibration under future conditions. Existing measured and predicted noise levels at specific receiver points are compared and shown in Table 10. The existing condition noise model run input and output data are included in Appendix D.

Table 10. Loudest Hour Noise Level Model Comparison

Measurement ID[1]	Measured Noise Level L_{eq} (dBA)	Loudest Hour Noise Level Adjustment	Adjusted Loudest Hour Noise Level L_{eq} (dBA)	Predicted Loudest Hour Noise Level L_{eq} (dBA)	Difference (K-Factor)
ST-1	70	1	71	67	4 (4.2)
ST-2	65	1	66	66	0
ST-3	70	1	71	65	6 (5.7)
ST-4	61	3	64	66	-2
ST-5	58	2	60	58	2

[1] See Figure 5.
Source: Data compiled by EDAW in 2009.

Based on the existing noise levels, one category B receiver (R-3) is affected by existing noise levels that approach or exceed the NAC. The category B receiver represents one 12 multiple-family residential units. Additionally, three category C receivers (R-2, R-4, and R-16) representing seven commercial/governmental units are exposed to existing noise levels that approach or exceed the NAC. Predicted existing noise levels are shown in Chapter 7.

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CHAPTER 7 FUTURE NOISE ENVIRONMENT, IMPACTS, AND CONSIDERED ABATEMENT

7.1 Predicted Noise Levels – Site Geometry and Traffic

Traffic noise levels were predicted for three future (2035) alternatives: the No-Build Alternative, Alternative 2B (Figure 6), and Alterative 4 (Figure 7). Existing and future traffic volumes on all project area roadways were taken from the project traffic report (AECOM 2009a). Speeds were developed from posted speed limits and time spent driving the existing alignment. Vehicle mixes for I-80 were taken from the 2007 Annual Average Daily Truck Traffic on the California State Highway System report (Caltrans 2008). The traffic mix used for all local streets was 97 percent automobile, 2 percent medium trucks, and 1 percent heavy trucks.

Future traffic speeds and vehicle mixes on all project area roadways were assumed to be the same as those used under existing conditions. The traffic parameters used for the modeling are discussed in detail in Section 5.4, and peak-hour traffic volumes developed from the project traffic report are included in Appendix B.

Receiver and building locations and elevations were taken from topographic survey data provided by the project engineer. Existing and future roadway geometric data were developed from project design drawings provided by the project engineer (AECOM 2009c). Appendix D includes the model input and output sheets for both the No-Build Alternative and both build alternatives.

7.2 Traffic Noise Impacts

Predicted noise levels for the three future conditions are shown in Table 11. The changes in traffic noise levels from the existing condition to the 2035 no-build condition would range from -4 to 2 dBA L_{eq}. Under the No-Build Alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under the No-Build Alternative would range from 41 to 65 dBA L_{eq}. Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers would range from 61 to 69 dBA L_{eq}. The increases in noise levels associated with the No-Build Alternative would be caused by forecasted increases in traffic volumes and by the construction and operation of the new SFOBB (AECOM 2009a).

Under Alternative 2B, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3)

representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under this build alternative would range from 41 to 65 dBA L_{eq}. Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA L_{eq}.

Under Alternative 4, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under either build alternative would range from 41 to 65 dBA L_{eq}. Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA L_{eq}.

As with the No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike with the No-Build Alternative, some noise level changes would be a result of the proposed ramps under each build alternative. As shown in Table 11, the maximum increase associated with either build alternative would be 2 dBA L_{eq}, which is below the Caltrans threshold for a substantial increase. Thus, implementing the proposed project would not result in a substantial increase.

7.3 Noise Abatement

Noise abatement must be considered where traffic noise impacts are identified. According to FHWA-Caltrans criteria, noise abatement must be considered at affected receivers where there is an exposed area of frequent human use (such as a yard, patio, or deck) and a lowered noise level would be of benefit. Frequent human use is defined as any activity that would result in frequent human exposure to traffic noise over the course of a year in a specific location. In practice, for an area to be considered it must be continuously occupied for at least one hour per day.

Impacts have been identified at two receivers under both of the build alternatives. R-16 represents a governmental unit. Although this receiver represents an area of human use, it is associated with a parking lot that has only transitory use (i.e. less than an hour) and would not result in a cumulative amount of time on a daily, weekly, or yearly level that would be considered frequent or have detrimental effects on the activities of humans at the receiver location. Thus, a lowered noise level at this location would not be a benefit and abatement is not considered further for R-16. Future plans would relocate personnel associated with this site to a lower portion of USCG Sector San Francisco. R-3 represents a residential use; however, there is no current occupation, and the building is anticipated to be demolished and future plans for development are uncertain at this time (AECOM 2011). Thus, as with R-16, R-3 does not have

an area of frequent human use and there would not be a benefited receiver; abatement is not considered further for R-3.

A Noise Abatement Decision Report (NADR) is typically prepared when a NSR identifies receiver locations that are exposed to noise levels the approach or exceed NAC and those receivers are areas of frequent human use and abatement would be beneficial. As stated above, both R-3 and R-16 are in areas where NAC is approached or exceeded, however neither receiver is in a location of frequent human use or abatement would benefit a receiver. Therefore, a NADR would not be required.

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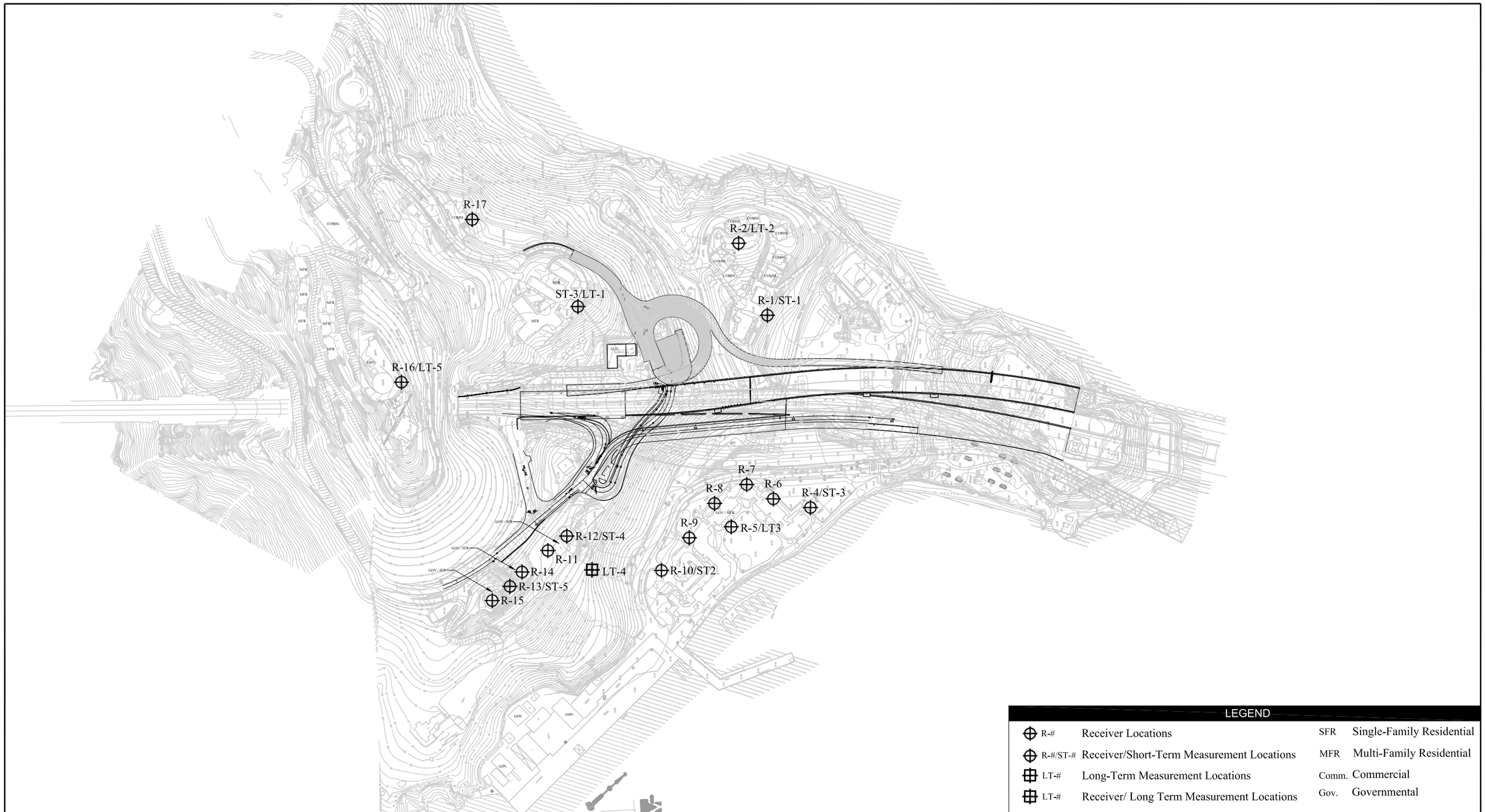

Source: TBD
July 29, 2009

0 100 200 Feet
Scale: 1" = 100'

Figure 6
Noise Measurement and Receiver Locations

Yerba Buena Island Interchange Project
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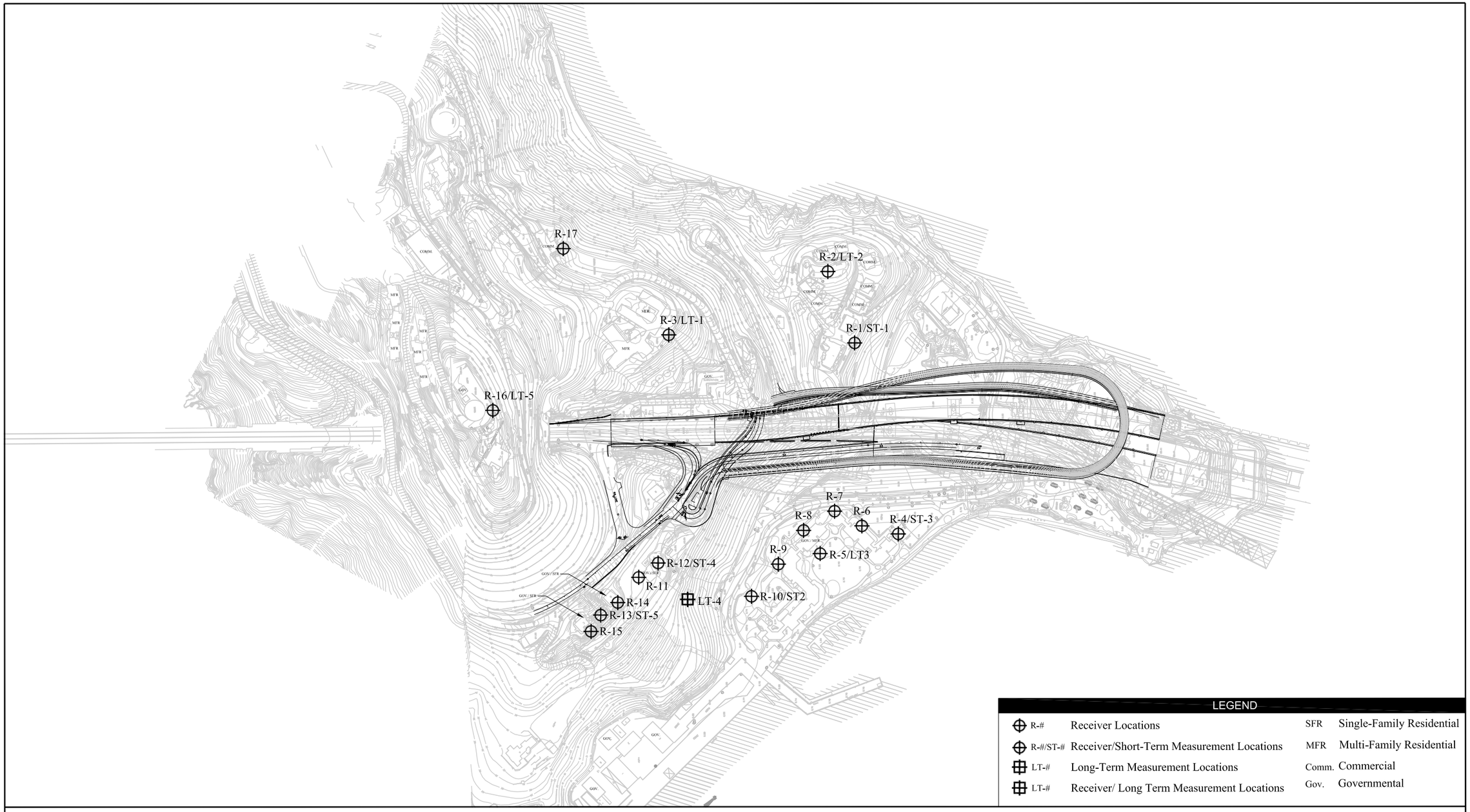

Source: TBD
July 29, 2009

0 100 200 Feet
Scale: 1" = 100'

Figure 7

Noise Measurement and Receiver Locations

Yerba Buena Island Interchange Project

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Table 11. Predicted Noise Levels

Receiver I.D.	Location or Address	Type of Development	Number of Units Represented	NAC	Existing	No-Build Alternative			Alternative 2B			Alternative 4		
					Predicted Noise Level (dBA L_{eq})	Predicted Noise Level (dBA L_{eq})	Increase Less Existing (dBA L_{eq})	Impact Type	Predicted Noise Level (dBA L_{eq})	Increase, Build Less Existing (dBA L_{eq})	Impact Type	Predicted Noise Level (dBA L_{eq})	Increase, Build Less Existing (dBA L_{eq})	Impact Type
R-1	7 Whiting Way, event rental	Commercial	2	C (72)	68	67	-1	None	67	-1	None	67	-1	None
R-2	1 Whiting Way, historical village	Commercial	5	C (72)	**71**	69	-2	None	69	-2	None	69	-2	None
R-3	240 Macalla Road, U.S. Coast Guard, Abandon Barrack	Multi-family residential	12	B (67)	**74**	**73**	-1	**A/E**	**73**	-1	**A/E**	**73**	-1	**A/E**
R-4	North Gate Road, U.S. Coast Guard station, north offices	Governmental	1	C (72)	**71**	67	-4	None	67	-4	None	67	-4	None
R-5	North Gate Road, U.S. Coast Guard station, parade ground	Governmental	1	C (72)	70	67	-3	None	67	-3	None	67	-3	None
R-6	U.S. Coast Guard, quarters[1]	Multi-family residential	2	E (52)	47	47	0	None	47	0	None	47	0	None
R-7	U.S. Coast Guard, quarters[1]	Multi-family residential	2	E (52)	47	47	0	None	47	0	None	47	0	None
R-8	U.S. Coast Guard, quarters[1]	Multi-family residential	2	E (52)	44	44	0	None	44	0	None	44	0	None
R-9	U.S. Coast Guard, quarters[1]	Multi-family residential	2	E (52)	43	43	0	None	43	0	None	43	0	None
R-10	North Gate Road, U.S. Coast Guard station, south parking lot	Governmental	1	C (72)	66	65	-1	None	65	-1	None	65	-1	None
R-11	Hill Crest Road, U.S. Coast Guard, Officers Quarters (Building 9)	Single-family residential	1	B (67)	55	54	-1	None	54	-1	None	54	-1	None
R-12	Hill Crest Road, U.S. Coast Guard, Officers Quarters	Driveway	0	--	66	66	0	NA	66	0	NA	66	0	NA
R-13	Hill Crest Road, U.S. Coast Guard, Officers Quarters	Recreational area	1	B (67)	57	58	1	None	58	1	None	58	1	None
R-14	Hill Crest Road, U.S. Coast Guard, Officers Quarters (A)	Single-family residential	1	B (67)	65	65	0	None	65	0	None	65	0	None
R-15	Hill Crest Road, U.S. Coast Guard, Officers Quarters (B)	Single-family residential	1	B (67)	62	64	2	None	64	2	None	64	2	None
R-16	Signal Road, U.S. Coast Guard, Vessel Traffic Service complex	Governmental	1	C (72)	**71**	**73**	2	**A/E**	**73**	2	**A/E**	**73**	2	**A/E**
R-17	62 Macalla Road, event rental	Commercial	1	C (72)	60	61	1	None	61	1	None	61	1	None

Note: A/E = approach or exceed, NA = not applicable. NAC = Noise Abatement Criterion. **Bold** = traffic noise impact
[1] Noise levels reported for these receivers are reduced by 20 dBA to represent interior noise levels.
Source: Data compiled by EDAW in 2009.

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7.4 Feasibility of Noise Abatement

Noise abatement is not being considered; thus, a feasibility analysis is not required and has not been conducted.

7.5 Reasonable Noise Abatement

Noise abatement is not being considered; thus, a reasonable allowance analysis is not required.

7.6 Areas Where Abatement Is Not Feasible

Noise abatement is not being considered; thus, none have been found feasible.

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CHAPTER 8 CONSTRUCTION NOISE

8.1 Applicable Standards

8.1.1 California Department of Transportation

The Protocol requires that a noise assessment of potential adverse construction noise impacts on local receivers and activities be performed using a reasonable analysis method (Caltrans 2006).

As part of the specifications for construction contracts, the Caltrans requirements relative to the allowable noise emission of equipment must be used on the proposed project. Sound control must conform to the provisions in Section 14-8.02, 'Noise Control,' of the Standard Specifications and the following special provisions:

1) The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

2) Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

Caltrans's Standard Specification Section 14-8.02, 'Noise Control,' states the following:

> The noise level from operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 feet.
>
> Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

8.2 Impacts

8.2.1 Construction Activities

CONSTRUCTION STAGING

The staging areas for both Alternative 2B and Alternative 4 would be the same. Both alternatives would use the staging areas used for the SFOBB East Span Seismic Safety Project. The primary staging area is located east of the Officers Quarters Historic District and north of the SFOBB. Each alternative would use a secondary staging area south of the SFOBB and north of the USCG facilities. Storage of equipment and materials on-site would be limited to the

staging and construction areas to minimize ground disturbance. Access for construction vehicles and equipment would be via Macalla Road, South Gate Road, and North Gate Road.

CONSTRUCTION METHODS

Both build alternatives would involve standard construction techniques and require large-scale construction equipment and labor-intensive activities. General activities would include:

- excavation and grading,
- removal of vegetation,
- erection of temporary falsework,
- roadway and ramp construction,
- landscaping, and
- demobilization.

Equipment would include drill rigs, backhoes, cranes, concrete trucks, and delivery trucks. The construction period is estimated to be 2 years for either of the build alternatives.

CONSTRUCTION TIMING

Construction staging for the build alternatives assumes that a typical construction schedule would be used for the proposed project. Some activities could occur during hours of low traffic volumes. Scheduling construction activities during these hours would ensure that roadways in the construction area are open during the peak traffic times to minimize disruption. The types of construction activities that may occur in the hours of low traffic volumes are:

- erection of falsework to permit construction of ramps,
- construction of Macalla Road and retaining wall, and
- relocation of substation stairway.

Construction noise would be generated by diesel engine–driven construction equipment used for site preparation and grading, removal of existing pavement, loading, unloading, and placing materials and paving. Diesel engine–driven trucks also would bring materials to the site and remove the spoils from excavation. No pile driving or blasting would be required as part of the proposed project.

Under load conditions, diesel engine noise levels may be 85–90 dBA at a distance of 50 feet from the equipment (FHWA 2006). Construction equipment noise is considered a point source and is attenuated over distance at a rate of 6 dBA for each doubling of distance. Thus, a noise level of 85 dBA at 50 feet would be 79 dBA at 100 feet and 73 dBA at 200 feet from the source.

During excavating, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for nonequipment tasks, such as measurement. Although maximum noise levels may be 85–90 dBA at a distance

of 50 feet during most construction activities, hourly average noise levels near the edge of the project site at locations where the excavation, grading, and paving occur would be anticipated to be 65–75 dBA L_{eq}. Maximum noise levels during pavement breaking would be approximately 90 dBA L_{max}.

The nearest occupied residential units (R-6 through R-9 and R-11 through R-15) are located approximately 330 feet from the nearest point of construction activities. R-3 is closer but is unoccupied with no known plans for occupation. Hourly construction noise levels at this distance would attenuate to approximately 59 dBA L_{eq}, with a maximum noise level of 73 dBA L_{max}. Based on the existing modeling and measurements, these noise levels would barely be noticeable over existing noise levels. Therefore, construction-related noise impacts would not occur from diesel engine noise associated with development of the proposed project.

Some construction activities associated with the proposed improvements (specifically, paving and striping for detour lanes) must take place during nighttime hours to avoid greater daytime traffic. As described previously, noise levels from these activities would be on the order of 75 dBA L_{eq} at 50 feet from construction activity. Residential units would be located approximately 330 feet from these activities, so nighttime construction activities are not expected to generate noise levels sufficient to disturb local residents. Based on the 24-hour measurement (LT-4), noise levels even during the quiet hour are on the order of 63 dBA L_{eq}; therefore, the nighttime construction activity would result in less than a 2-dBA increase at nearby residential units. However, even if noise associated with construction were audible at these residences, these activities would be temporary in nature and would not be considered an adverse impact.

To summarize, construction noise may be heard at nearby sensitive receivers and may cause occasional speech disruption, principally during times of pavement breaking or use of impact equipment. Thus, construction-related noise would not be considered adverse. Measures to minimize construction noise impacts are discussed below.

8.3 Construction Noise Abatement

The following measures are recommended to avoid or minimize construction noise impacts:

- As required by Caltrans's Standard Specification 14-08.02, each internal combustion engine shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project site without said muffler.

- Staging areas shall be located at least 500 feet from occupied residential units. Work in staging areas that generates loud noises, such as equipment maintenance, shall not occur during the hours prohibited for construction work.

- If traffic control and construction signs that require power for lighting or flashing are located near residential units, the source of power will be batteries, solar cells, or another quiet source. Gas- or diesel-fueled internal combustion engines will not be used.

CHAPTER 9 REFERENCES

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———. 2008. 2007 Annual Average Daily Truck Traffic on the California State Highway System. September.

Code of Federal Regulations (CFR). 1982. Title 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise.

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———. 2006. Road Construction Noise Model, Version 1, February 2.

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CHAPTER 10 LIST OF PREPARERS

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APPENDIX A

NOISE MEASUREMENTS

This appendix includes the Field Measurements Summary Log. Field notes, and marked drawings, are available upon request.

SSA Intervals
Translated: 14-Jul-09 16:05:22
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Firmware F 4.283
Software V 3.12
Name: EDAW
Descr1: 2022 J St
Descr2: Sacramento, CA
Setup: SLM&RTA_.ssa
Setup Desc SLM & Real-Time Analyzer
Location: **ST-1**
Note 1:
Note 2:

Weighting: A
Peak Weigl Flat
Detector: Slow
RTA Detect Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L5.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	10:10:05	15:00.0	70.4	100	65.8	72.7	98.6	86	72.691	71.933	70.457	68.566	67.863	66.379

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Firmware R 4.283
Software V 3.12
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Descr2: Sacramento, CA
Setup: SLM&RTA_.ssa
Setup Desc SLM & Real-Time Analyzer
Location: **ST-2**
Note 1:
Note 2:

Weighting: A
Peak Weigh Flat
Detector: Slow
RTA Detect Fast

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1	1-Apr-09	11:16:57	15:00.0	64.9	94.5	62.3	74.5	94.9	88	70.824	66.847	64.379	63.215	63.058	62.316

SSA Intervals

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Serial Number:	A2624
Firmware Rev:	4.283
Software Version:	3.12
Name:	EDAW
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Descr2:	Sacramento, CA
Setup:	SLM&RTA_.ssa
Setup Descr:	SLM & Real-Time Analyzer
Location:	**ST-3 and ST-4**
Note 1:	Record 1 is ST-3
Note 2:	Record 2 is ST-4

Weighting:	A
Peak Weighting:	Flat
Detector:	Slow
RTA Detector:	Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L10.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	11:42:33	15:00.0	70.4	99.9	66.7	75	96.3	91.7	72.777	71.597	70.324	68.871	68.277	67.332
2	1-Apr-09	14:16:31	15:00.0	60.5	90	58.5	64.6	93.2	80.2	62.879	61.511	60.386	59.269	59.09	58.535

SSA Intervals
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Serial Num A2624
Firmware R 4.283
Software V 3.12
Name: EDAW
Descr1: 2022 J St
Descr2: Sacramento, CA
Setup: SLM&RTA_.ssa
Setup Desc SLM & Real-Time Analyzer
Location: **ST-5**
Note 1:
Note 2:

Weighting: A
Peak Weigh Flat
Detector: Slow
RTA Detect Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L10.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	14:41:29	15:00.0	57.9	87.5	56.2	65.3	94.1	94.1	62.465	58.824	57.613	57.011	56.55	56.199

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Software: SlmUtility v2.01
EDAW
2022 J Street
Sacramento, CA 95616

LT-1

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63	30-Mar-09	0:00:00	00:00.0	65.3	70.82	64.85	60.38
64	30-Mar-09	1:00:00	00:00.0	60.9	73.17	60.29	57.27
65	30-Mar-09	2:00:00	00:00.0	61.55	70.22	61.15	58.22
66	30-Mar-09	3:00:00	00:00.0	65.22	73.4	63.73	60.16
67	30-Mar-09	4:00:00	00:00.0	70.35	76.52	70.36	68.11
68	30-Mar-09	5:00:00	00:00.0	71.39	75.63	71.34	70.04
69	**30-Mar-09**	**6:00:00**	**00:00.0**	**71.4**	**79.94**	**71.51**	**68.8**
70	30-Mar-09	7:00:00	00:00.0	71.16	75.37	71.4	67.9
71	30-Mar-09	8:00:00	00:00.0	70.3	75.71	70.55	66.67
72	30-Mar-09	9:00:00	00:00.0	71.3	81.4	71.19	69.97
73	30-Mar-09	10:00:00	00:00.0	71.23	80.66	71.15	69.74
74	30-Mar-09	11:00:00	00:00.0	70.97	76.17	70.9	69.33
75	30-Mar-09	12:00:00	00:00.0	71.14	78.33	71.08	69.53
76	30-Mar-09	13:00:00	00:00.0	71.28	77.42	71.24	70.05
77	30-Mar-09	14:00:00	00:00.0	70.47	77.18	70.38	69.01
78	30-Mar-09	15:00:00	00:00.0	70	75.78	70.19	66.88
79	30-Mar-09	16:00:00	00:00.0	69.76	76.23	69.97	66.72
80	30-Mar-09	17:00:00	00:00.0	69.65	74.8	69.37	65.4
81	30-Mar-09	18:00:00	00:00.0	71	77.45	71.08	67.8
82	30-Mar-09	19:00:00	00:00.0	71.27	77.4	71.21	69.71
83	30-Mar-09	20:00:00	00:00.0	71.06	78.05	70.98	69.11
84	30-Mar-09	21:00:00	00:00.0	70.41	74.45	70.3	67.69
85	30-Mar-09	22:00:00	00:00.0	68.88	75.68	68.65	66.19
86	30-Mar-09	23:00:00	00:00.0	67.39	77.27	67.01	63.83

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EDAW
2022 J Street
Sacramento, CA 95811
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62	30-Mar-10	0:00:00	00:00.0	61.1	67.0	60.7	57.5
63	30-Mar-10	1:00:00	00:00.0	60.3	75.8	59.5	56.5
64	30-Mar-10	2:00:00	00:00.0	60.2	72.2	59.7	57.0
65	30-Mar-10	3:00:00	00:00.0	60.6	68.8	60.1	57.2
66	30-Mar-10	4:00:00	00:00.0	63.7	75.9	63.1	60.5
67	30-Mar-10	5:00:00	00:00.0	65.7	70.2	65.5	63.3
68	30-Mar-10	6:00:00	00:00.0	67.0	75.5	66.8	65.1
69	**30-Mar-10**	**7:00:00**	**00:00.0**	**67.4**	**72.4**	**67.4**	**66.1**
70	30-Mar-10	8:00:00	00:00.0	67.3	74.1	67.2	65.6
71	30-Mar-10	9:00:00	00:00.0	66.8	76.6	66.7	65.0
72	30-Mar-10	10:00:00	00:00.0	66.5	76.3	66.3	64.4
73	30-Mar-10	11:00:00	00:00.0	66.1	71.4	65.9	64.1
74	30-Mar-10	12:00:00	00:00.0	66.2	70.3	66.1	64.4
75	30-Mar-10	13:00:00	00:00.0	66.7	74.7	66.6	65.3
76	30-Mar-10	14:00:00	00:00.0	66.8	74.9	66.7	65.4
77	30-Mar-10	15:00:00	00:00.0	66.6	75.7	66.5	64.8
78	30-Mar-10	16:00:00	00:00.0	66.5	72.1	66.4	65.3
79	30-Mar-10	17:00:00	00:00.0	66.7	71.5	66.6	65.4
80	30-Mar-10	18:00:00	00:00.0	66.8	77.0	66.6	65.1
81	30-Mar-10	19:00:00	00:00.0	66.1	70.7	66.0	64.3
82	30-Mar-10	20:00:00	00:00.0	65.9	71.4	65.8	63.8
83	30-Mar-10	21:00:00	00:00.0	64.9	69.7	64.9	61.4
84	30-Mar-10	22:00:00	00:00.0	64.1	70.3	63.9	61.1
85	30-Mar-10	23:00:00	00:00.0	62.9	71.2	62.4	58.5

LT-4

135	2-Apr-10	0:00:00	00:00.0	56.8	66.9	56.5	54.4
136	2-Apr-10	1:00:00	00:00.0	55.5	65.9	55.2	52.9
137	2-Apr-10	2:00:00	00:00.0	55.0	69.2	54.0	51.7
138	2-Apr-10	3:00:00	00:00.0	56.5	62.0	56.3	54.0
139	2-Apr-10	4:00:00	00:00.0	60.0	65.4	59.9	57.5
140	2-Apr-10	5:00:00	00:00.0	63.7	68.9	63.5	61.8
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144	2-Apr-10	9:00:00	00:00.0	63.8	78.1	63.4	62.2
145	2-Apr-10	10:00:00	00:00.0	63.7	75.8	62.7	61.3
146	2-Apr-10	11:00:00	00:00.0	63.0	71.4	62.6	61.4
147	2-Apr-10	12:00:00	00:00.0	63.0	69.6	62.7	61.6
148	2-Apr-10	13:00:00	00:00.0	64.0	69.4	62.9	61.5
149	2-Apr-10	14:00:00	00:00.0	62.0	73.6	61.7	61.0
150	2-Apr-10	15:00:00	00:00.0	62.3	73.3	62.0	61.1
151	2-Apr-10	16:00:00	00:00.0	61.2	67.3	61.0	60.1
152	2-Apr-10	17:00:00	00:00.0	61.3	71.2	61.1	60.1
153	2-Apr-10	18:00:00	00:00.0	62.7	79.0	62.2	61.2
154	2-Apr-10	19:00:00	00:00.0	61.5	76.9	61.3	60.2
155	2-Apr-10	20:00:00	00:00.0	61.7	69.3	61.6	60.4
156	2-Apr-10	21:00:00	00:00.0	61.5	69.7	61.3	60.1
157	2-Apr-10	22:00:00	00:00.0	61.4	72.7	61.1	59.9
158	2-Apr-10	23:00:00	00:00.0	60.3	64.9	60.3	58.9

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EDAW
2022 J Street
Sacramento, CA 95811

LT-3

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58	30-Mar-10	0:00:00	00:00.0	62.61	68.08	62.36	59.81
59	30-Mar-10	1:00:00	00:00.0	61.72	70.32	61.3	58.62
60	30-Mar-10	2:00:00	00:00.0	61.68	73.32	61.15	59.03
61	30-Mar-10	3:00:00	00:00.0	63.13	67.93	62.92	60.41
62	30-Mar-10	4:00:00	00:00.0	66.51	74.8	66.36	64.42
63	30-Mar-10	5:00:00	00:00.0	68.22	71.03	68.17	66.58
64	30-Mar-10	6:00:00	00:00.0	69.62	75.4	69.56	68.38
65	**30-Mar-10**	**7:00:00**	**00:00.0**	**70.4**	**79.91**	**70.33**	**69.24**
66	30-Mar-10	8:00:00	00:00.0	69.55	73.72	69.46	68.29
67	30-Mar-10	9:00:00	00:00.0	69.48	78.51	69.31	68.08
68	30-Mar-10	10:00:00	00:00.0	69.13	77.1	68.97	67.87
69	30-Mar-10	11:00:00	00:00.0	69.06	77.9	68.79	67.57
70	30-Mar-10	12:00:00	00:00.0	69.32	73.91	69.29	68.04
71	30-Mar-10	13:00:00	00:00.0	69.71	74.9	69.61	68.74
72	30-Mar-10	14:00:00	00:00.0	69.45	77.37	69.4	68.36
73	30-Mar-10	15:00:00	00:00.0	69.01	76.89	69.18	67.23
74	30-Mar-10	16:00:00	00:00.0	68.81	83.5	68.63	67.92
75	30-Mar-10	17:00:00	00:00.0	69.08	72.83	69.01	68.11
76	30-Mar-10	18:00:00	00:00.0	69.01	74.2	68.94	67.75
77	30-Mar-10	19:00:00	00:00.0	68.25	74.13	68.23	67.01
78	30-Mar-10	20:00:00	00:00.0	68.17	73.86	68.02	66.5
79	30-Mar-10	21:00:00	00:00.0	67.1	70.44	67.15	64.51
80	30-Mar-10	22:00:00	00:00.0	66.32	70.65	66.28	64.18
81	30-Mar-10	23:00:00	00:00.0	65.06	71.63	64.88	61.95

LT-5

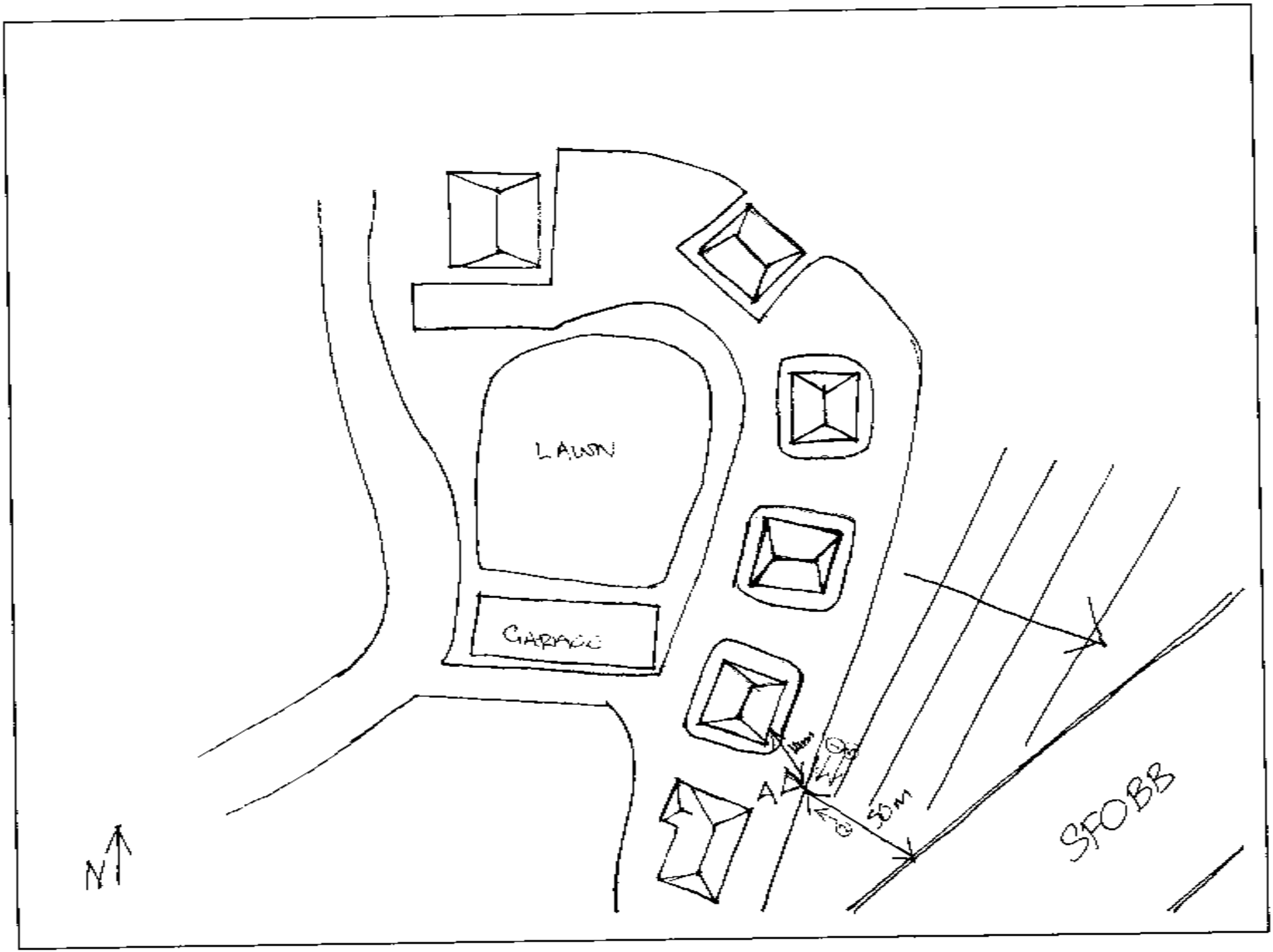
228	6-Apr-10	0:00:00	00:00.0	63.04	71.04	61.84	56.57
229	6-Apr-10	1:00:00	00:00.0	62.59	71.51	61.58	56.54
230	6-Apr-10	2:00:00	00:00.0	64.54	71.74	63.63	58.72
231	6-Apr-10	3:00:00	00:00.0	68.13	74.71	67.61	63.21
232	6-Apr-10	4:00:00	00:00.0	71.97	76.44	71.94	68.76
233	6-Apr-10	5:00:00	00:00.0	73.1	76.42	73.04	71.4
234	6-Apr-10	6:00:00	00:00.0	72.38	76.05	72.27	70.42
235	6-Apr-10	7:00:00	00:00.0	71.87	76.1	71.77	70.03
236	6-Apr-10	8:00:00	00:00.0	72.05	78.36	71.95	70.04
237	6-Apr-10	9:00:00	00:00.0	71.78	75.3	71.71	70.01
238	6-Apr-10	10:00:00	00:00.0	71.58	76.75	71.45	69.43
239	6-Apr-10	11:00:00	00:00.0	71.24	75.1	71.17	68.97
240	6-Apr-10	12:00:00	00:00.0	71.74	78.27	71.61	69.33
241	6-Apr-10	13:00:00	00:00.0	71.66	76.42	71.55	69.27
242	6-Apr-10	14:00:00	00:00.0	71.43	75.51	71.37	68.99
243	6-Apr-10	15:00:00	00:00.0	71.01	75.76	71.26	64.09
244	6-Apr-10	16:00:00	00:00.0	62.64	74.36	61.84	59.11
245	6-Apr-10	17:00:00	00:00.0	68.24	75.68	64.76	60.65
246	6-Apr-10	18:00:00	00:00.0	70.47	75.25	70.32	67.54
247	6-Apr-10	19:00:00	00:00.0	69.34	77.15	69.11	66.17
248	6-Apr-10	20:00:00	00:00.0	69.15	74.35	68.83	65.58
249	6-Apr-10	21:00:00	00:00.0	68.64	74.22	68.26	64.68
250	6-Apr-10	22:00:00	00:00.0	66.57	78.56	66.02	61.15
251	6-Apr-10	23:00:00	00:00.0	64.31	73.65	63.17	57.6

Short Term Noise Level Measurement Datasheet

Project: 08080090.11 Date: _____ Analyst: MJP SLM: 824 Cal #: _____

Offset A: -46.43 Offset B: -46.44 Temp: 60°F Hum: 83% Wind: 10mph

Site	Location	Time	Leq	Lmax	L10	L50	L90	Notes:
ST-1 2	A	11:10	70.4	72.7	—	70.5	68.6	Traffic noise from Bay Bridge dominant. construction yard nearby but few movements of equipment & vehicles

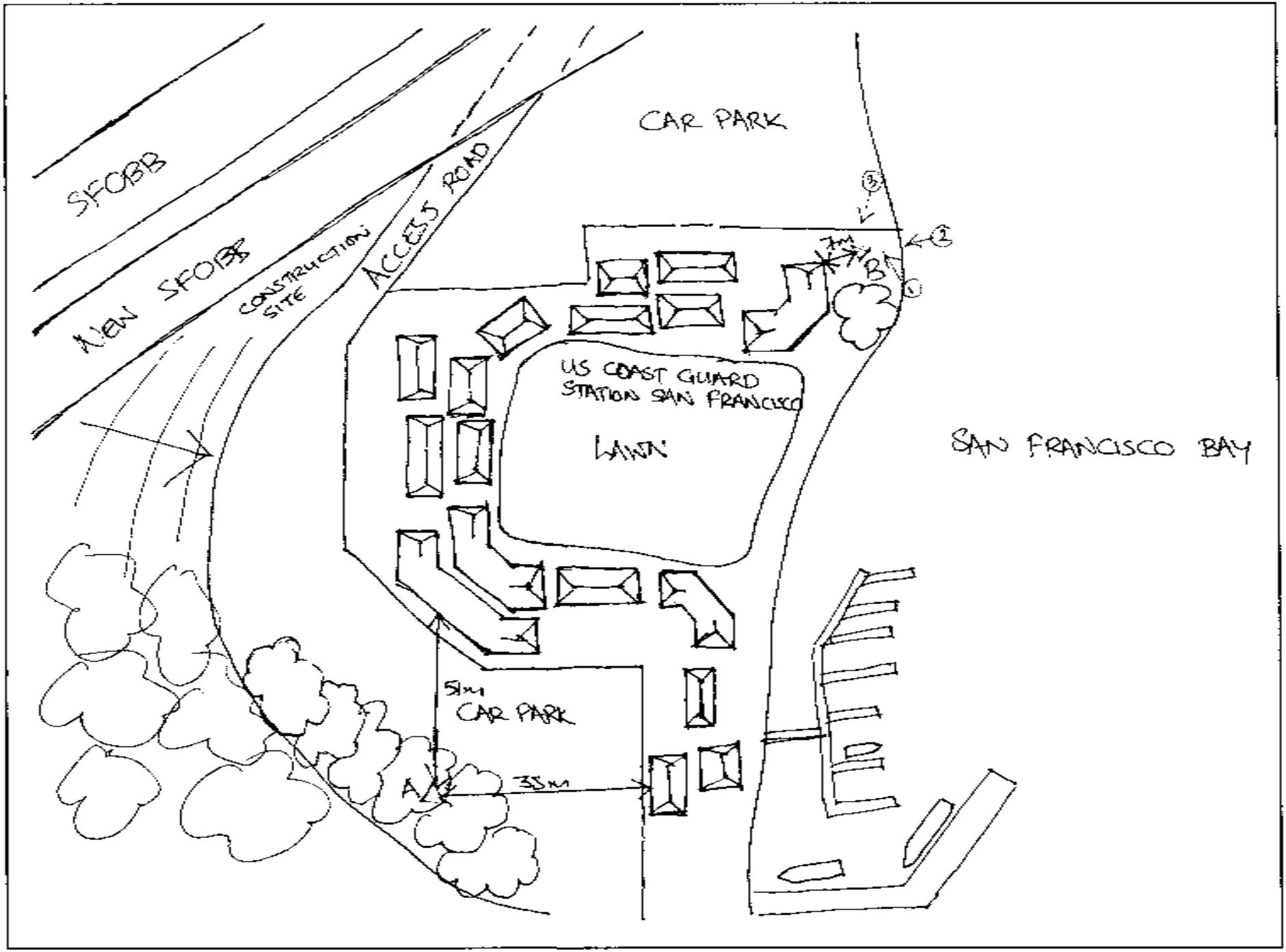

LAWN
GARAGE
A
A
50m
SFOBB
N

Short Term Noise Level Measurement Datasheet

Project: 080800090.11 Date: 4/1/09 Analyst: MSP SLM: 824 Cal #:

Offset A: -46.53 Offset B: -46.53 Temp: 63°F Hum: 86% Wind: 14 mph

Site	Location	Time	Leq	Lmax	L10	L50	L90	Notes:
ST-2 3	A	12:16	64.9	74.5	—	64.3	63.0	file no. 5 : Bay Bridge traffic dominant w helicopter flyover; commercial jet flyovers audible; building HVAC plant nearby but not operating; power tools on base audible.
ST-3	B	12:42	70.4	75	71.6	70.3	68.9	Bridge traffic dominant; construction audible but irregular - hand tools, no major equipment movements. file no 6-1

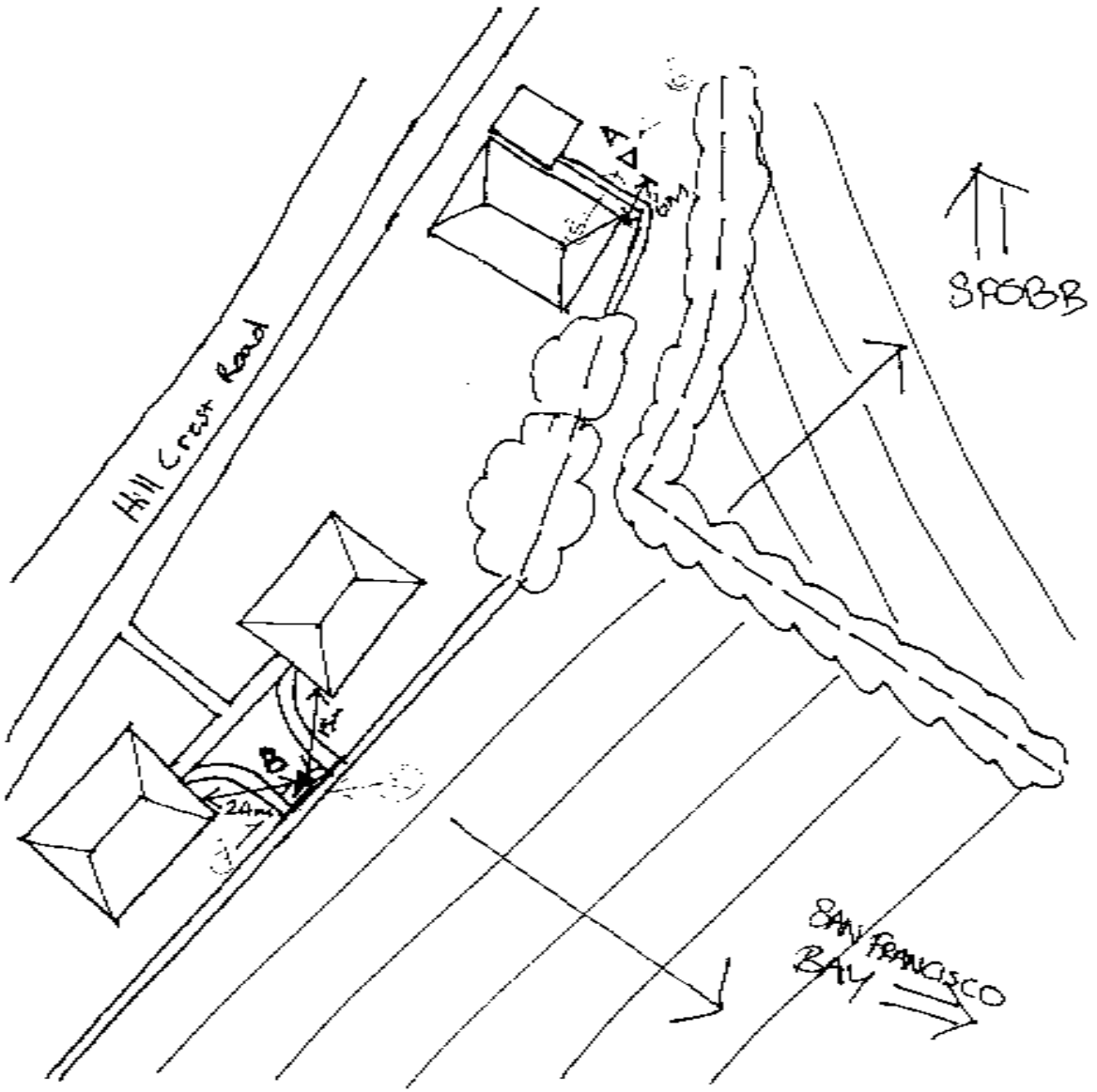

SFOBB
NEW SFOBB
CONSTRUCTION SITE
ACCESS ROAD
CAR PARK
7m
B
US COAST GUARD STATION SAN FRANCISCO
LAWN
SAN FRANCISCO BAY
51m
CAR PARK
A
35m

Short Term Noise Level Measurement Datasheet

Project: 0808090.11 Date: 4/1/09 Analyst: MJP SLM: 824 Cal #:

Offset A: -46.43 Offset B: -46.44 Temp: 63°F Hum: 86% Wind: 19 mph

Site	Location	Time	Leq	Lmax	L10	L50	L90	Notes:
ST-4 5	A	15:16 to 15:31	60.5	64.6	61.5	60.3	59.0	File 62: Bay Bridge traffic noise dominated. Construction noise audible; Bird song
ST-5	B	15:41 to 15:56	57.9	65.3	58.8	57.6	57.0	File 7: Bay Bridge traffic noise dominated; 4x Aircraft overflights, ships horns audible.


Hill Crest Road
A
A'
6m
B
B'
24m
SFOBB
SAN FRANCISCO BAY
N

Continuous Noise Measurement Datasheet

Project: 08080090.11 Date: 03/27/09 Analyst: MJC SLM: 1 -

Cal #: 1 - Offset A: 8.6 Offset B: 8.5 Temp: 69.1 Hum: 40.7% Wind: 0-3 mph Sky: Clear -

Roadway Name: SFOBB - I-80 Location On Site:

Site: Lg-1

Start Time: 11:18 A

Stop Time:

Mic Elev - Source: +20'

Ground Type: Soft

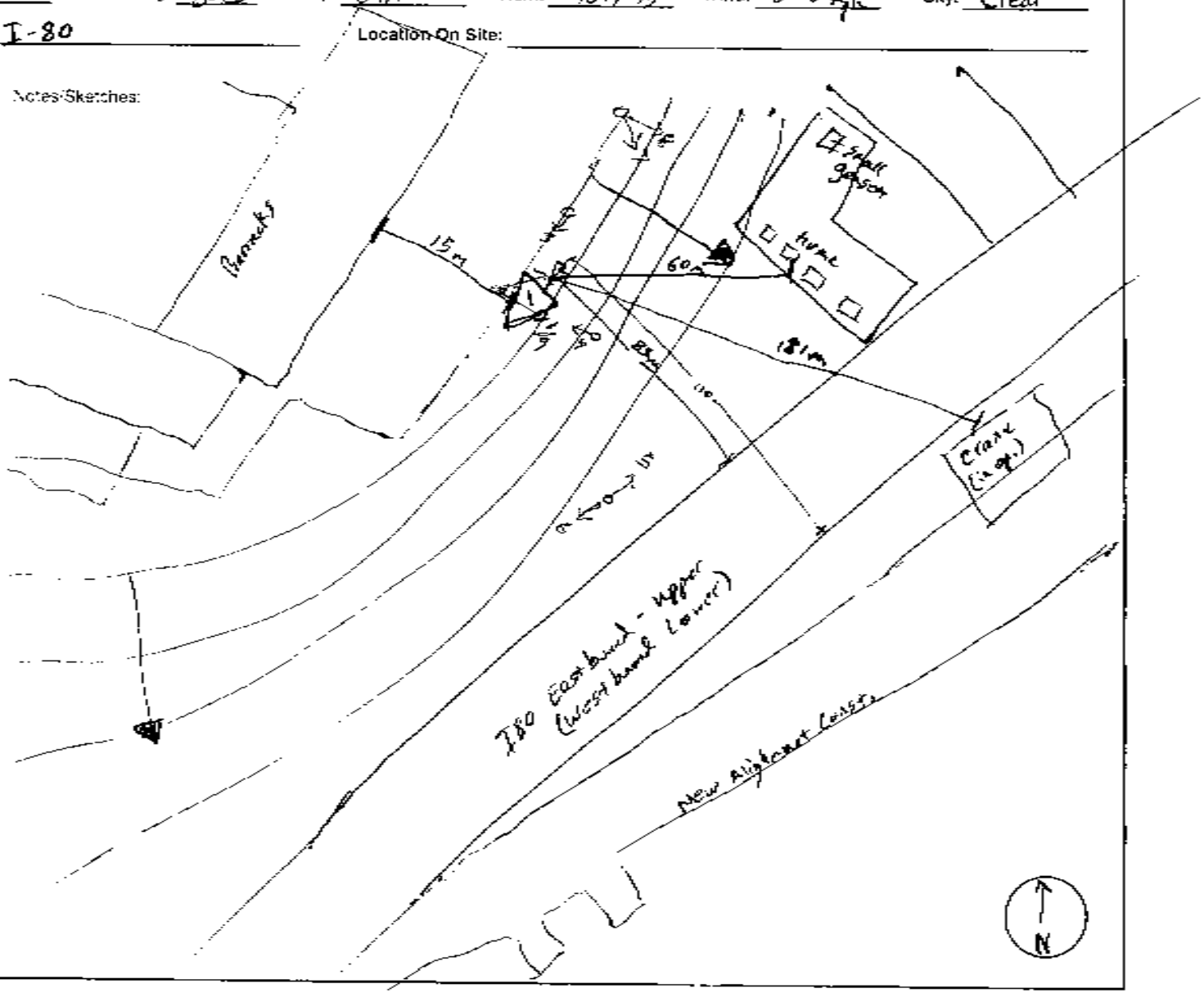
Site Topography: Sloped toward Road.

Noise Source(s) w/ Distance:

1) I-80 upper: 83m-110m
I-80 Lower: 85m-112m
Construction: 181m
Substation HVAC: 60m

Notes: 1) freeway dominate.
2) pressure release valve for crane operation
3) Aircraft flyover

Notes/Sketches:



Continuous Noise Measurement Datasheet

Project: 05050090.11 Date: 03/27/09 Analyst: MJC SLM: 2-

Cal #: 2- Offset A: 5.7 Offset B: 5-7 Temp: 75.8F Hum: 38.7% Wind: 2-3 Sky: CLR

Roadway Name: I-80 SF Bay Br Location On Site:

Site: LT-2

Start Time: 12:20pm

Stop Time: 11:00am

Mic Elev - Source:

Ground Type: Soft/Heal

Site Topography: Sloped to

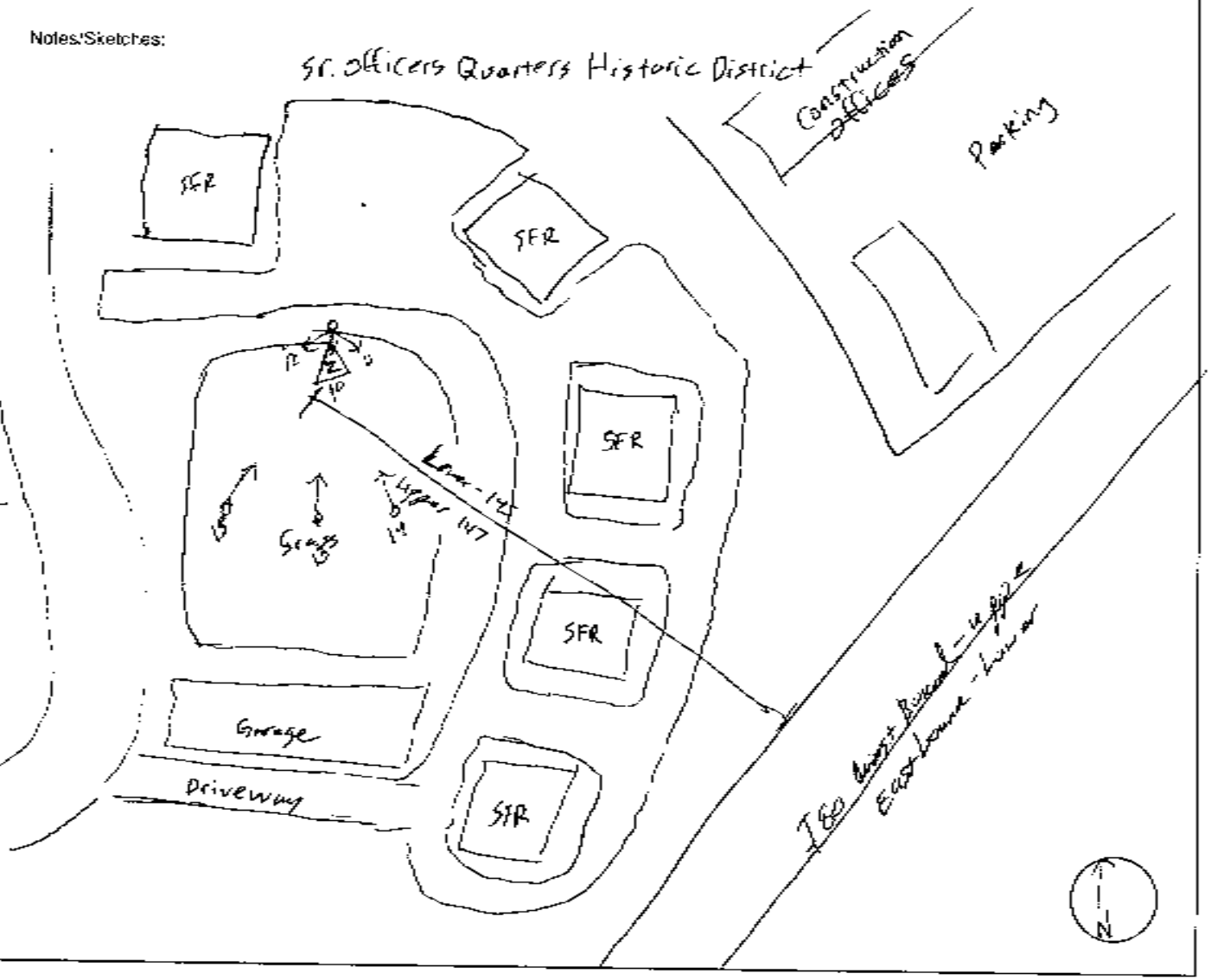
Support Structure

Noise Source(s) w/ Distance:

1) Traffic on Bay Bridge
- Grounds maintenance on wed 4/1/09
- mower
- Sprinkler
- Vehicles

Notes: -Birdsong

Notes/Sketches:



Continuous

~~FHWA Traffic Noise Model Calibration~~ Datasheet

Project: 0838090.11 Date: 03/27/09 Analyst: MJL SLM: 4-

Cal #: 4- Offset A: 6.7 Offset B: 6.7 Temp: 78.2F Hum: 35% Wind: 0-3 mph Sky: CLR

Roadway Name: I80 SFOBB Location On Site: Site #3

Site: LT-3

~~Cal #:~~

Start Time: 3:40

~~Duration:~~

~~Auto:~~

~~Med:~~

~~Hvy:~~

~~Leq:~~

Lmax:

Distance to CL: 170m

Mic Elev - Road: ~flat'

Number of Lanes: 5-6

Posted Speed: 55

~~Observed Speed:~~

~~Road Type:~~

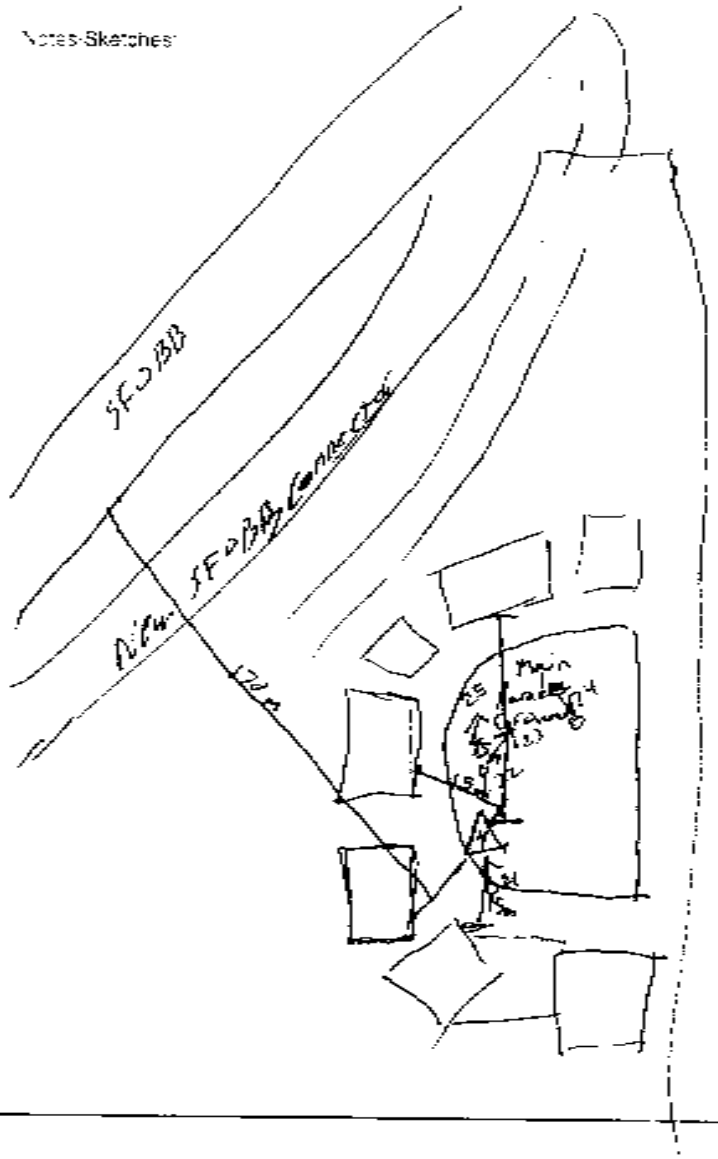
~~Road Grade:~~

~~Road Condition:~~

Intv. Ground Type: Soft

Site Topography: flat

Notes/Sketches:



Continuous Noise Measurement Datasheet

Project: 0808090.11 Date: 4/1/09 Analyst: MJP SLM: #2

Cal #: 2 Offset A: 5.7 Offset B: 5.8 Temp: 62°F Hum: 83% Wind: 19mph Sky: cle

Roadway Name: I-80 SFOBB Location On Site: on fenceline

Site: LT-4

Start Time: 1400

Stop Time: 16:00

Mic Elev - Source: ~-10 m

Ground Type: short grass

Site Topography: Hilly

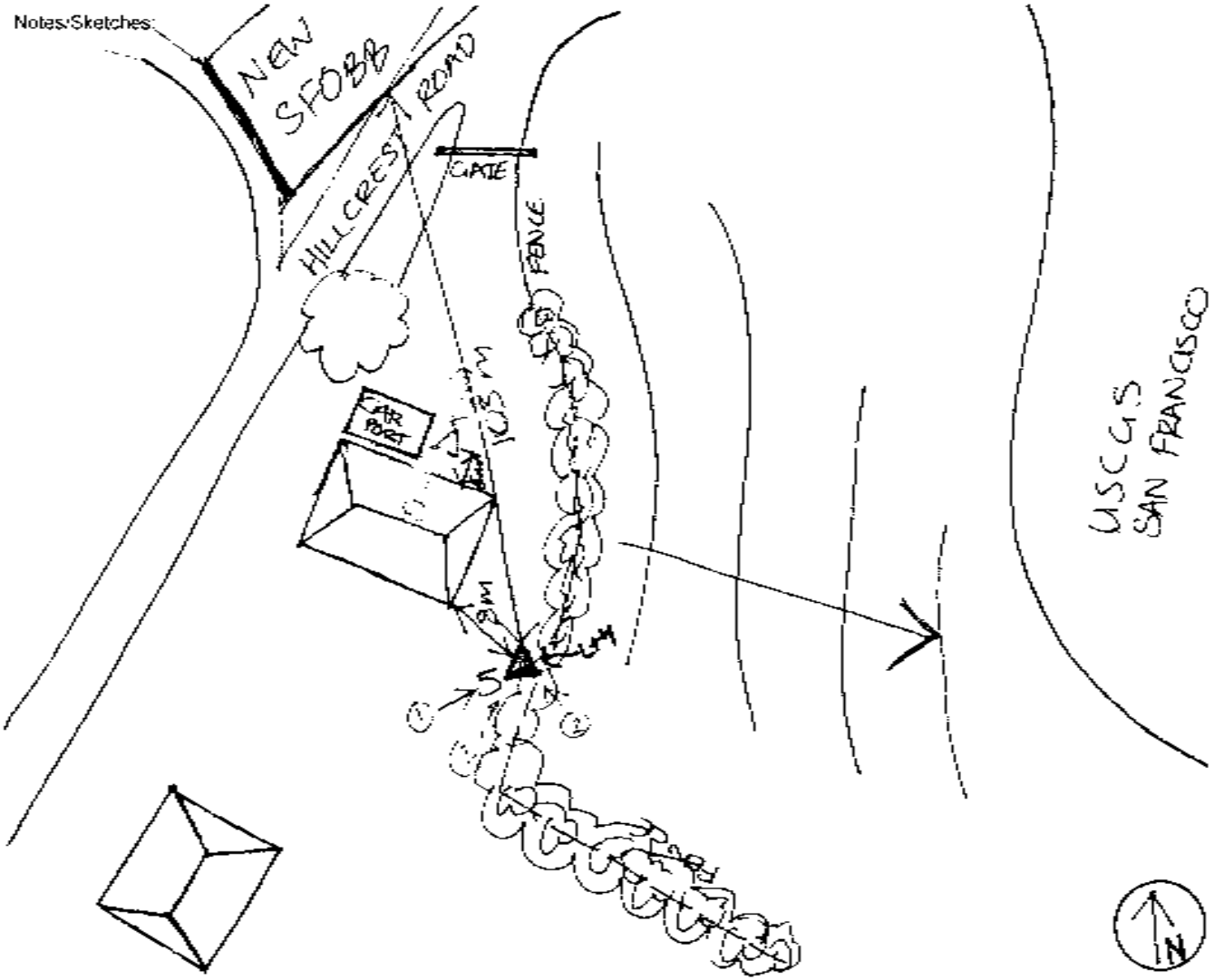
Noise Source(s) w/ Distance:

1) Bay Bridge traffic dominates.

2) Construction noise from SFOBB upgrade project audible - reversing beepers.

Notes: 3) Birdsong minor contributor.

Notes/Sketches:



Continuous Noise Measurement Datasheet

Project: 0808090.11 Date: 4/3/09 Analyst: 4/3/09 SLM: [illegible]

Cal #: 4 Offset A: 6.7 Offset B: 6.6 Temp: 63°F Hum: 72% Wind: 7 mph Sky: [illegible]

Roadway Name: I80 SFOBB Location On Site: On top of flat roof.

Site: LT-5

Start Time: 14:00

Stop Time: 14:00

Mic Elev - Source: 55m

Ground Type: Soil vs. Vegetation

Site Topography: Hilly

Noise Source(s) w/ Distance:

1) Traffic noise from eastern SFOBB dominates.

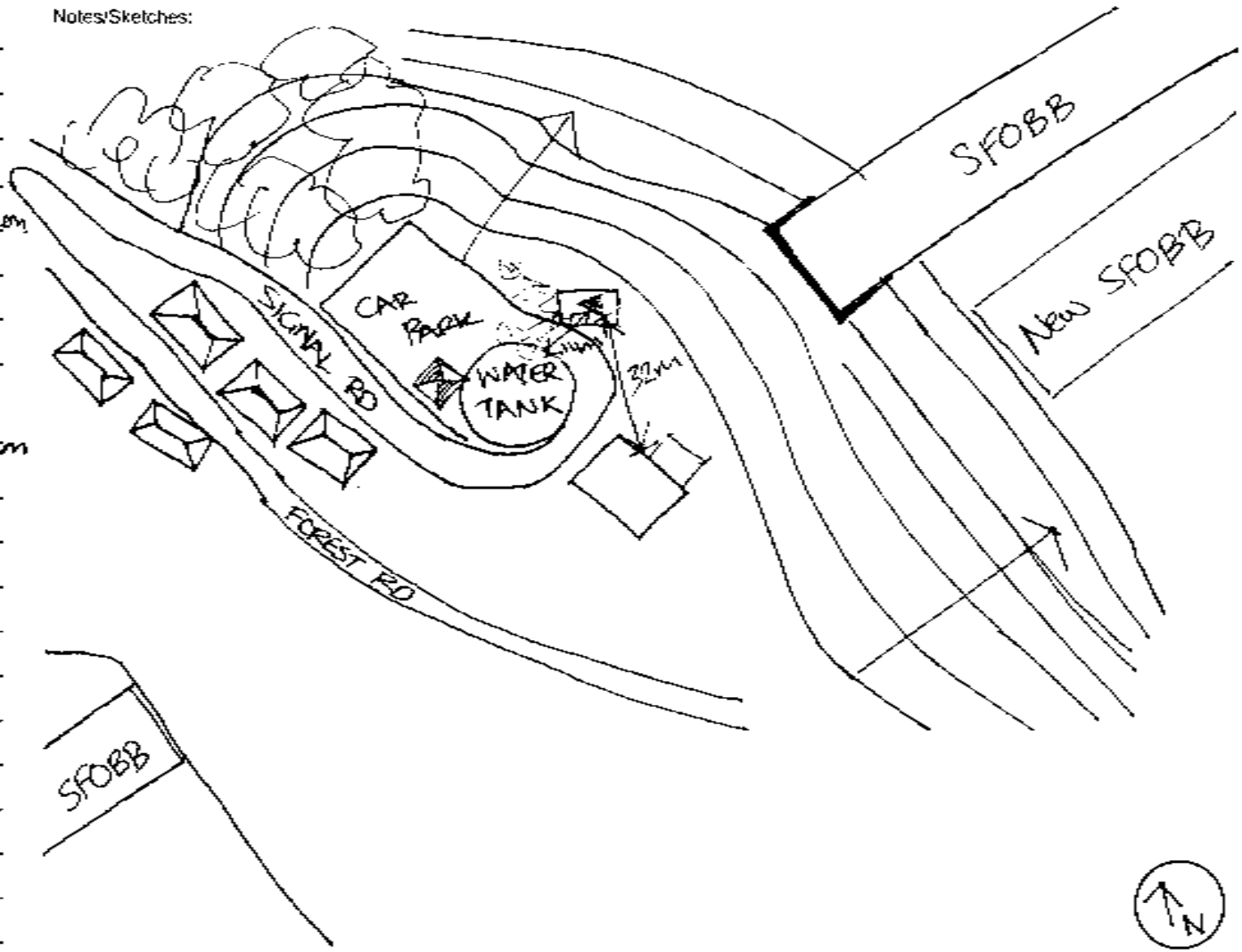
2) Occasional traffic on Signal Rd access to car park.

3) Aircraft overflights

Notes: 4) Birdsong

5) Cars on local roads.

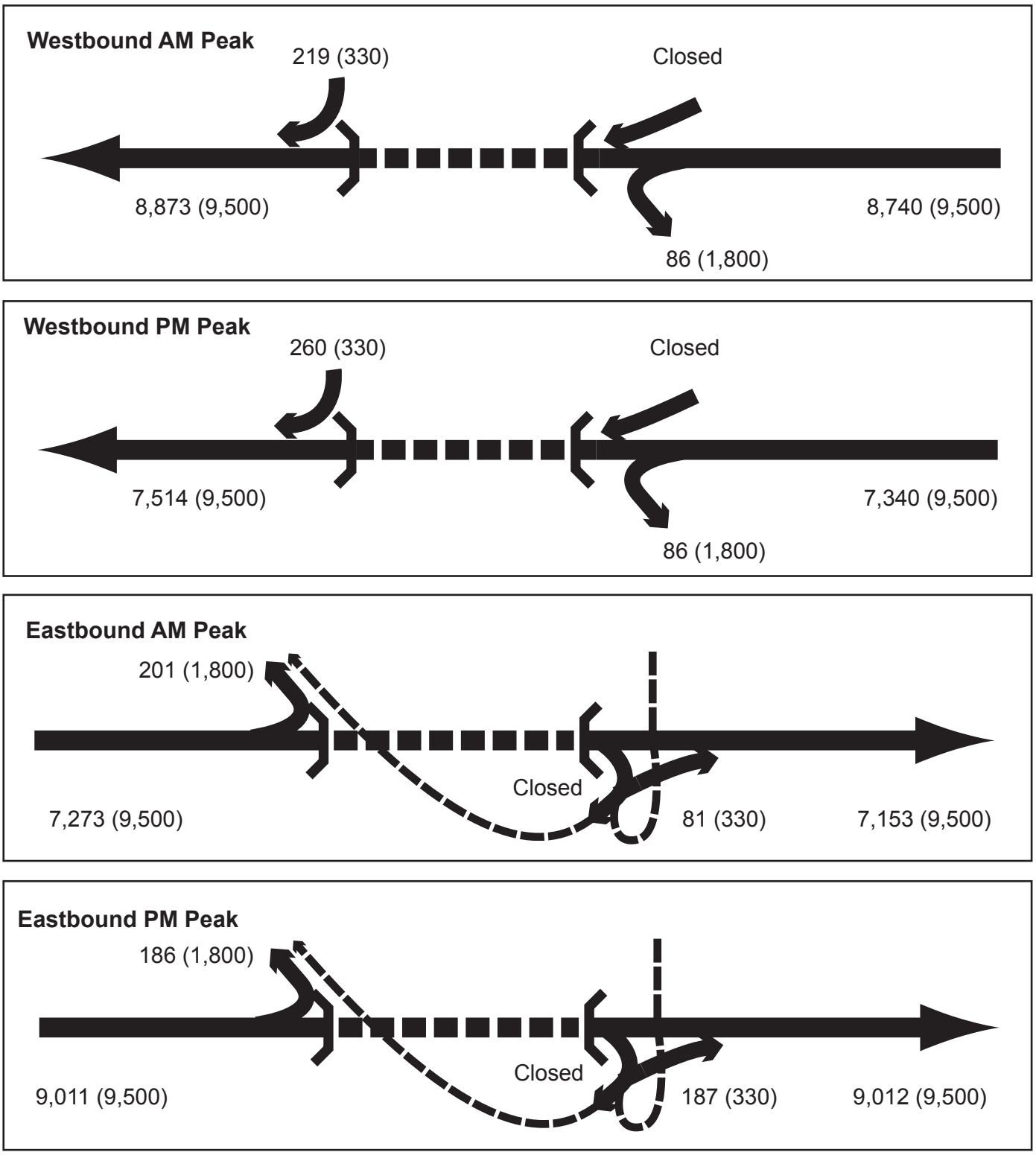
Notes/Sketches:



APPENDIX B

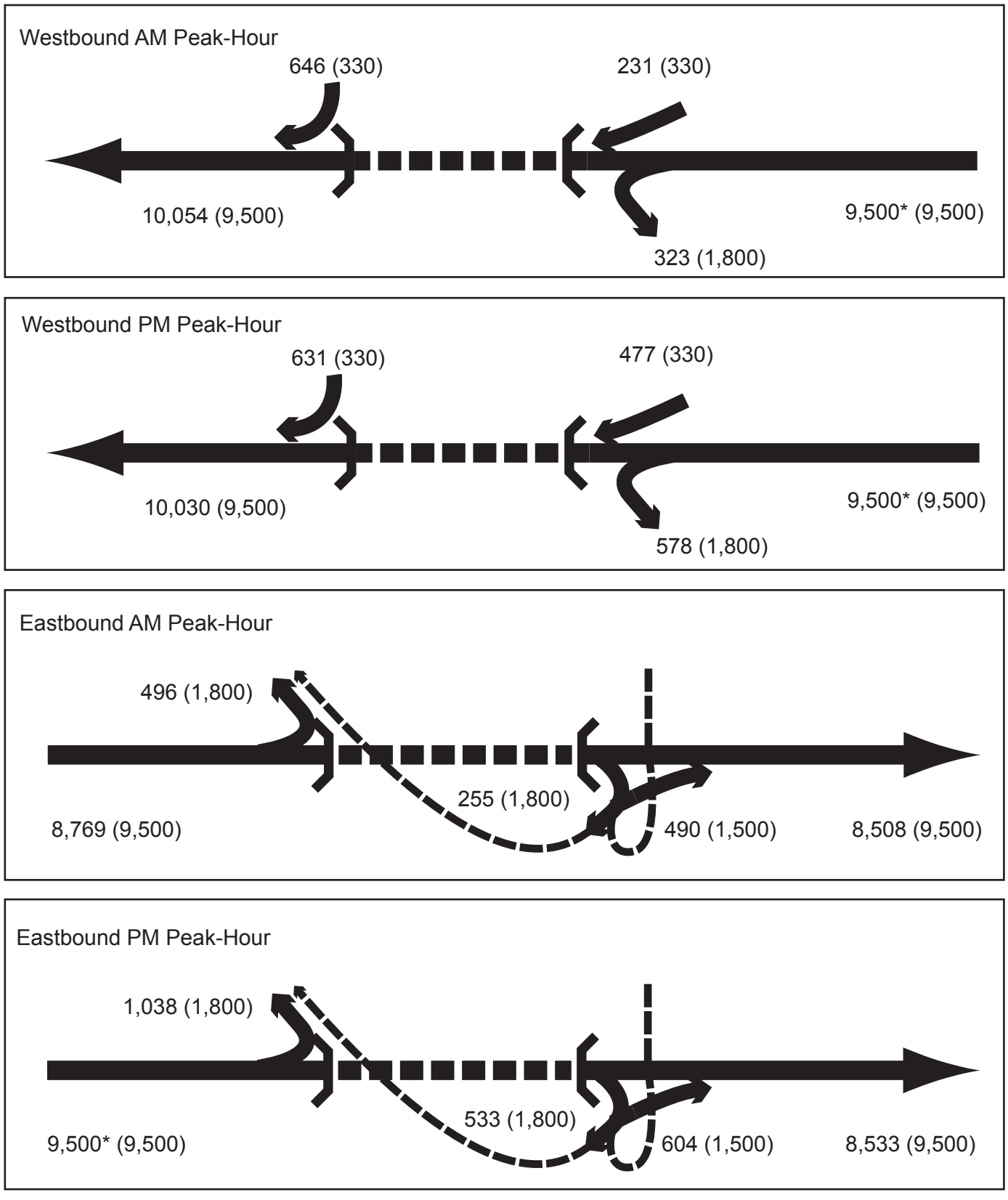
TRAFFIC DATA USED IN NOISE MODELING

Existing (2008) Peak-Hour Volume



1. The volume and capacity are shown as xx (yy).
2. Bay Bridge westbound traffic volumes are controlled by metering lights during both the AM and PM peak periods, and Caltrans sets a limit of 9,600 vehicles per hour onto the Bay Bridge.
3. Bay Bridge eastbound capacity is constrained by the ramps and mainline configuration near First Street. The highest volume counted between 2005 and 2007 was approximately 9,500 vehicles per hour.

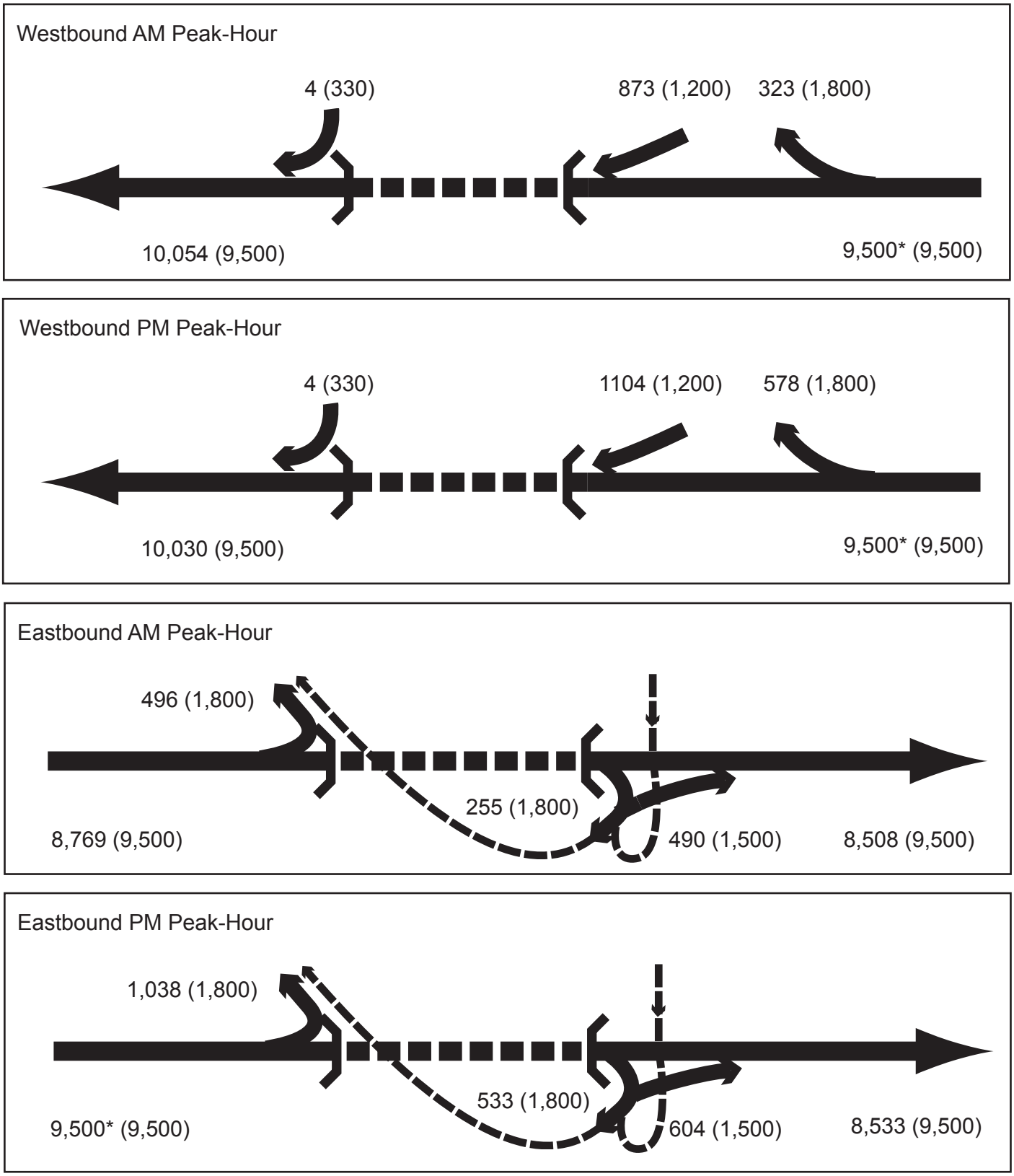
Future (2035) No Build



1. The demand volume and capacity are shown as xx (yy).
2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

* Constrained Volumes

Future (2035) Build



1. The demand volume and capacity are shown as xx (yy).
2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

* Constrained Volumes

APPENDIX C

NOISE LEVEL ADJUSTMENTS AND K-FACTORS

Noise Measurement and TNM Validation/Adjustment Summary

Location	Leq	Adjustment	Adj Leq	Modeled	Delta (K-Factor)
ST-1	70.4	1	71.4	67.2	4.2
ST-2	64.9	1	65.9	65.7	0.2
ST-3	70.4	1	71.4	65.7	5.7
ST-4	60.5	3	63.5	65.5	-2
ST-5	57.9	2	59.9	60.9	-1

APPENDIX D

FHWA TNM 2.5 INPUT AND OUTPUT DATA

EDAW/AECOM 13 August 2009
Mike Carr SN 65282 TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Existing

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	%		
SFOBB WB - 1	7.3	point25	1	1,418.5	918.6	67.50				Average	Y
		point23	2	1,298.8	872.7	66.00				Average	Y
		point22	3	1,253.8	854.8	65.60				Average	Y
		point21	4	1,220.1	839.4	65.20				Average	Y
		point20	5	1,186.6	821.1	64.70				Average	Y
		point507	6	1,162.5	806.5	64.20				Average	Y
		point19	7	1,129.8	783.9	63.70				Average	Y
		point18	8	1,110.3	767.6	63.20				Average	Y
		point17	9	1,087.8	745.9	62.50				Average	Y
		point16	10	1,068.4	725.3	62.00				Average	Y
		point14	11	1,052.7	707.3	61.50				Average	Y
		point13	12	1,032.1	684.1	61.00				Average	Y
		point12	13	1,014.4	664.1	60.00				Average	Y
		point11	14	996.8	644.3	60.00				Average	Y
		point10	15	978.1	623.3	59.50				Average	Y
		point9	16	960.1	603.1	59.00				Average	Y
		point8	17	940.8	581.0	58.50				Average	Y
		point7	18	921.0	558.4	58.00				Average	Y
		point6	19	901.9	537.0	57.50				Average	Y
		point5	20	883.1	515.8	57.00				Average	Y
		point4	21	865.0	495.4	56.50				Average	Y
		point3	22	853.9	482.7	56.20				Average	Y
		point2	23	845.8	473.6	56.00					
SFOBB WB - 2	7.3	point48	24	1,419.0	912.6	67.50				Average	Y
		point47	25	1,300.7	867.3	66.00				Average	Y

		point46	26	1,257.6	850.7	65.60				Average	Y
		point45	27	1,223.3	836.1	65.20				Average	Y
		point44	28	1,189.8	818.8	64.70				Average	Y
		point43	29	1,165.7	803.9	64.20				Average	Y
		point42	30	1,133.5	780.4	63.70				Average	Y
		point41	31	1,114.9	764.7	63.20				Average	Y
		point40	32	1,092.1	742.8	62.50				Average	Y
		point39	33	1,073.3	722.6	62.00				Average	Y
		point38	34	1,057.6	704.6	61.50				Average	Y
		point37	35	1,036.9	681.2	61.00				Average	Y
		point36	36	1,018.8	660.8	60.00				Average	Y
		point35	37	1,001.0	640.7	60.00				Average	Y
		point34	38	983.1	620.5	59.50				Average	Y
		point33	39	964.5	599.6	59.00				Average	Y
		point32	40	945.8	578.4	58.50				Average	Y
		point31	41	925.9	555.9	58.00				Average	Y
		point30	42	906.8	534.3	57.50				Average	Y
		point29	43	888.7	514.0	57.00				Average	Y
		point28	44	869.5	492.8	56.50				Average	Y
		point27	45	858.6	479.9	56.20				Average	Y
		point26	46	849.5	469.7	56.00					
SFOBB WB - 3	7.3	point71	47	1,422.4	908.8	67.50				Average	Y
		point70	48	1,304.2	863.5	66.00				Average	Y
		point69	49	1,261.0	846.9	65.60				Average	Y
		point68	50	1,226.7	832.3	65.20				Average	Y
		point67	51	1,193.2	814.9	64.70				Average	Y
		point66	52	1,168.1	799.3	64.20				Average	Y
		point65	53	1,137.0	776.5	63.70				Average	Y
		point64	54	1,118.3	760.8	63.20				Average	Y
		point63	55	1,095.5	739.0	62.50				Average	Y
		point62	56	1,076.7	718.8	62.00				Average	Y
		point61	57	1,061.0	700.8	61.50				Average	Y
		point60	58	1,040.3	677.4	61.00				Average	Y
		point59	59	1,022.2	657.0	60.00				Average	Y
		point58	60	1,004.5	636.9	60.00				Average	Y
		point57	61	986.5	616.7	59.50				Average	Y
		point56	62	968.0	595.7	59.00				Average	Y
		point55	63	949.2	574.6	58.50				Average	Y
		point54	64	929.3	552.1	58.00				Average	Y

		point53	65	910.3	530.5	57.50				Average	Y
		point52	66	892.2	510.2	57.00				Average	Y
		point51	67	873.0	488.9	56.50				Average	Y
		point50	68	862.0	476.1	56.20				Average	Y
		point49	69	853.0	465.9	56.00					
SFOBB WB OFF SE	3.7	point82	70	970.0	595.0	58.00				Average	
		point81	71	894.5	509.8	57.00				Average	
		point80	72	884.6	498.2	57.00				Average	
		point79	73	884.0	493.9	57.00				Average	
		point78	74	885.1	490.1	57.00				Average	
		point77	75	887.5	487.3	57.00				Average	
		point76	76	899.1	483.8	57.00				Average	
		point75	77	914.4	479.1	57.00				Average	
		point74	78	929.8	473.0	56.50				Average	
		point73	79	943.5	465.6	56.00					
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00				Average	
		point95	81	919.4	524.9	51.20				Average	
		point94	82	925.7	530.1	51.30				Average	
		point93	83	946.1	550.2	51.50				Average	
		point92	84	949.8	552.6	51.50				Average	
		point91	85	952.0	553.6	51.50				Average	
		point90	86	958.8	555.0	51.50				Average	
		point89	87	963.5	554.4	51.20				Average	
		point88	88	966.9	553.3	51.00				Average	
		point87	89	970.1	551.7	50.80				Average	
		point86	90	977.5	545.3	50.50				Average	
		point85	91	979.9	542.2	50.00				Average	
		point84	92	982.5	534.0	49.50				Average	
		point83	93	986.4	520.0	48.00					
SFOBB WB ON NE	3.7	point106	94	954.5	634.9	47.50	Onramp	72.00	100	Average	
		point105	95	883.6	554.9	56.50				Average	
		point104	96	880.6	550.8	56.80				Average	
		point103	97	879.5	546.3	57.00				Average	
		point102	98	877.6	528.5	57.00				Average	
		point101	99	875.6	521.9	57.00				Average	
		point100	100	873.2	516.6	57.00				Average	
		point99	101	862.9	501.7	56.70				Average	
		point98	102	848.8	481.8	56.50				Average	
		point97	103	843.6	475.0	56.00					

SFOBB WB OFF NE	3.7	point123	104	1,030.7	686.0	52.00				Average	
		point122	105	1,013.1	666.1	52.00				Average	
		point121	106	995.7	646.5	52.00				Average	
		point120	107	958.4	607.9	51.80				Average	
		point119	108	919.5	564.6	51.50				Average	
		point118	109	900.4	542.3	51.30				Average	
		point117	110	893.2	535.8	51.10				Average	
		point116	111	889.0	534.8	51.00				Average	
		point115	112	885.7	535.6	51.50				Average	
		point114	113	883.1	538.5	52.00				Average	
		point113	114	882.2	543.8	53.00				Average	
		point112	115	883.3	548.8	54.00				Average	
		point111	116	886.3	554.1	55.00				Average	
		point107	117	956.5	633.8	47.50					
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	100	Average	
		point136	119	984.2	536.2	49.50				Average	
		point135	120	980.5	547.6	50.50				Average	
		point134	121	976.7	558.8	51.00				Average	
		point133	122	974.1	567.2	51.50				Average	
		point132	123	973.6	572.5	51.50				Average	
		point131	124	974.0	578.1	51.40				Average	
		point130	125	974.6	580.7	51.40				Average	
		point129	126	975.7	584.7	51.30				Average	
		point128	127	981.1	597.1	51.40				Average	
		point127	128	987.9	608.4	51.50				Average	
		point126	129	995.6	619.1	51.70				Average	
		point125	130	1,008.7	635.6	51.90				Average	
		point124	131	1,018.4	646.7	52.00					
Forest Rd - 1	3.7	point370	132	623.6	468.2	92.00				Average	
		point369	133	624.3	463.0	92.50				Average	
		point368	134	629.2	458.1	92.00				Average	
		point367	135	639.7	452.1	91.00				Average	
		point366	136	653.3	443.1	90.50				Average	
		point365	137	657.8	439.3	90.00				Average	
		point364	138	673.3	420.0	90.00				Average	
		point363	139	678.0	415.8	90.00				Average	
		point362	140	693.7	404.9	90.00				Average	
		point361	141	712.9	394.2	91.00				Average	
		point360	142	731.8	386.5	90.00					

Forest Rd - 2	3.7	point371	143	732.6	388.4	90.00				Average	
		point372	144	713.7	396.1	91.00				Average	
		point373	145	694.7	406.6	90.00				Average	
		point374	146	679.3	417.4	90.00				Average	
		point375	147	674.7	421.4	90.00				Average	
		point376	148	659.2	440.7	90.00				Average	
		point377	149	654.5	444.7	90.50				Average	
		point378	150	640.8	453.8	90.00				Average	
		point379	151	630.4	459.7	92.00				Average	
		point380	152	626.2	463.9	92.50				Average	
		point381	153	625.6	468.5	92.00					
Signal Rd - 1	3.7	point394	154	628.6	466.7	92.00				Average	
		point393	155	641.6	461.7	91.50				Average	
		point392	156	668.2	456.6	94.50				Average	
		point391	157	674.0	454.2	94.80				Average	
		point390	158	708.1	430.4	98.00				Average	
		point389	159	752.6	412.0	99.50				Average	
		point388	160	762.9	408.4	100.20				Average	
		point387	161	777.7	407.1	101.50				Average	
		point386	162	789.1	412.5	102.50				Average	
		point385	163	792.9	422.4	103.00				Average	
		point384	164	789.3	432.7	103.20				Average	
		point383	165	781.8	439.0	103.50				Average	
		point382	166	764.6	441.0	103.80					
Signal Rd - 2	3.7	point406	167	764.6	438.7	103.80				Average	
		point405	168	781.7	436.9	103.50				Average	
		point404	169	787.9	431.6	103.20				Average	
		point403	170	790.4	422.7	103.00				Average	
		point402	171	786.8	414.4	102.50				Average	
		point401	172	777.5	410.1	101.50				Average	
		point400	173	762.9	411.2	100.20				Average	
		point399	174	708.5	432.8	98.00				Average	
		point398	175	675.4	456.1	94.80				Average	
		point397	176	668.9	458.7	94.50				Average	
		point396	177	641.9	463.8	91.50				Average	
		point395	178	629.9	468.6	92.00					
SFOBB EB - 1	7.3	point513	179	845.8	473.6	50.00				Average	Y
		point514	180	853.9	482.7	50.20				Average	Y
		point515	181	865.0	495.4	50.50				Average	Y

		point516	182	883.1	515.8	51.00				Average	Y
		point517	183	901.9	537.0	51.50				Average	Y
		point518	184	921.0	558.4	52.00				Average	Y
		point519	185	940.8	581.0	52.50				Average	Y
		point520	186	960.1	603.1	53.00				Average	Y
		point521	187	978.1	623.3	53.50				Average	Y
		point522	188	996.8	644.3	54.00				Average	Y
		point523	189	1,014.4	664.1	54.00				Average	Y
		point524	190	1,032.1	684.1	55.00				Average	Y
		point525	191	1,052.7	707.3	55.50				Average	Y
		point526	192	1,068.4	725.3	56.00				Average	Y
		point527	193	1,087.8	745.9	56.50				Average	Y
		point528	194	1,110.3	767.6	57.20				Average	Y
		point529	195	1,129.8	783.9	57.70				Average	Y
		point530	196	1,162.5	806.5	58.20				Average	Y
		point531	197	1,186.6	821.1	58.70				Average	Y
		point532	198	1,220.1	839.4	59.20				Average	Y
		point533	199	1,253.8	854.8	59.60				Average	Y
		point534	200	1,298.8	872.7	60.00				Average	Y
		point536	201	1,418.5	918.6	61.50					
SFOBB EB - 2	7.3	point537	202	849.5	469.7	50.00				Average	Y
		point538	203	858.6	479.9	50.20				Average	Y
		point539	204	869.5	492.8	50.50				Average	Y
		point540	205	888.7	514.0	51.00				Average	Y
		point541	206	906.8	534.3	51.50				Average	Y
		point542	207	925.9	555.9	52.00				Average	Y
		point543	208	945.8	578.4	52.50				Average	Y
		point544	209	964.5	599.6	53.00				Average	Y
		point545	210	983.1	620.5	53.50				Average	Y
		point546	211	1,001.0	640.7	54.00				Average	Y
		point547	212	1,018.8	660.8	54.00				Average	Y
		point548	213	1,036.9	681.2	55.00				Average	Y
		point549	214	1,057.6	704.6	55.50				Average	Y
		point550	215	1,073.3	722.6	56.00				Average	Y
		point551	216	1,092.1	742.8	56.50				Average	Y
		point552	217	1,114.9	764.7	57.20				Average	Y
		point553	218	1,133.5	780.4	57.70				Average	Y
		point554	219	1,165.7	803.9	58.20				Average	Y
		point555	220	1,189.8	818.8	58.70				Average	Y

		point556	221	1,223.3	836.1	59.20				Average	Y
		point557	222	1,257.6	850.7	59.60				Average	Y
		point558	223	1,300.7	867.3	60.00				Average	Y
		point559	224	1,419.0	912.6	61.50					
SFOBB EB - 3	7.3	point560	225	853.0	465.9	50.00				Average	Y
		point561	226	862.0	476.1	50.20				Average	Y
		point562	227	873.0	488.9	50.50				Average	Y
		point563	228	892.2	510.2	51.00				Average	Y
		point564	229	910.3	530.5	51.50				Average	Y
		point565	230	929.3	552.1	52.00				Average	Y
		point566	231	949.2	574.6	52.50				Average	Y
		point567	232	968.0	595.7	53.00				Average	Y
		point568	233	986.5	616.7	53.50				Average	Y
		point569	234	1,004.5	636.9	54.00				Average	Y
		point570	235	1,022.2	657.0	54.00				Average	Y
		point571	236	1,040.3	677.4	55.00				Average	Y
		point572	237	1,061.0	700.8	55.50				Average	Y
		point573	238	1,076.7	718.8	56.00				Average	Y
		point574	239	1,095.5	739.0	56.50				Average	Y
		point575	240	1,118.3	760.8	57.20				Average	Y
		point576	241	1,137.0	776.5	57.70				Average	Y
		point577	242	1,168.1	799.3	58.20				Average	Y
		point578	243	1,193.2	814.9	58.70				Average	Y
		point579	244	1,226.7	832.3	59.20				Average	Y
		point580	245	1,261.0	846.9	59.60				Average	Y
		point581	246	1,304.2	863.5	60.00				Average	Y
		point582	247	1,422.4	908.8	61.50					
North Gate Rd - 1	3.7	point359	248	1,124.1	467.5	3.50				Average	
		point358	249	1,111.4	473.9	4.00				Average	
		point357	250	1,098.7	489.2	4.50				Average	
		point356	251	1,089.0	516.7	5.00				Average	
		point355	252	1,081.7	537.9	5.40				Average	
		point354	253	1,073.4	555.5	5.60				Average	
		point353	254	1,070.6	565.0	5.80				Average	
		point352	255	1,070.8	576.7	5.70				Average	
		point351	256	1,074.8	593.1	5.50				Average	
		point350	257	1,085.1	615.7	4.00				Average	
		point349	258	1,095.2	630.9	3.50				Average	
		point348	259	1,107.1	644.5	3.50				Average	

		point347	260	1,111.6	649.3	3.50				Average	
		point346	261	1,128.6	669.7	3.50				Average	
		point345	262	1,137.6	681.0	3.50				Average	
		point344	263	1,163.4	712.1	3.50				Average	
		point343	264	1,182.9	735.2	4.00				Average	
		point342	265	1,190.3	745.6	4.20				Average	
		point341	266	1,195.2	752.6	4.50				Average	
		point340	267	1,198.5	763.6	5.00				Average	
		point339	268	1,197.7	770.3	5.50				Average	
		point338	269	1,195.7	776.6	6.00				Average	
		point337	270	1,188.6	784.5	6.50				Average	
		point335	271	1,172.5	792.6	7.00				Average	
		point334	272	1,142.9	805.1	8.60				Average	
		point333	273	1,134.1	812.4	8.70				Average	
		point332	274	1,120.5	831.3	8.80				Average	
		point331	275	1,110.0	846.8	9.00				Average	
		point330	276	1,100.5	860.4	9.10				Average	
		point329	277	1,094.9	866.9	9.30				Average	
		point328	278	1,089.0	870.5	9.30				Average	
		point327	279	1,074.9	873.3	9.50				Average	
		point326	280	1,058.3	874.8	10.00				Average	
		point325	281	1,043.2	875.2	10.20				Average	
		point324	282	1,028.0	874.8	10.50				Average	
		point323	283	1,000.9	872.0	12.50				Average	
		point322	284	965.5	867.9	15.00				Average	
		point321	285	930.5	860.9	16.50				Average	
		point320	286	910.8	850.2	18.00				Average	
		point319	287	885.7	829.5	20.00				Average	
		point318	288	876.1	814.3	21.50				Average	
		point317	289	871.2	791.0	23.50				Average	
		point316	290	873.5	776.2	25.50				Average	
		point315	291	885.0	756.1	26.00				Average	
		point314	292	894.1	744.9	26.50				Average	
		point313	293	897.0	736.5	26.70				Average	
		point312	294	890.0	728.2	28.00				Average	
		point311	295	869.1	729.3	28.20				Average	
		point310	296	838.6	726.6	30.20				Average	
		point309	297	808.0	727.5	31.50				Average	
		point308	298	797.1	724.0	32.30				Average	

		point307	299	795.4	713.2	32.50				Average	
		point306	300	801.7	704.8	32.80				Average	
		point305	301	808.3	703.5	33.00				Average	
		point304	302	837.9	709.9	34.50				Average	
		point303	303	856.4	708.7	35.50				Average	
		point302	304	875.3	703.6	36.50				Average	
		point301	305	946.4	678.3	40.50				Average	
		point300	306	967.0	665.8	42.50				Average	
		point299	307	975.1	657.4	43.50				Average	
		point298	308	975.4	649.8	44.80					
North Gate Rd - 2	3.7	point609	309	980.6	648.5	44.80				Average	
		point241	310	978.9	658.9	43.50				Average	
		point240	311	974.3	664.4	43.00				Average	
		point239	312	968.3	668.3	42.00				Average	
		point238	313	946.7	679.7	40.50				Average	
		point237	314	920.0	690.1	38.50				Average	
		point236	315	903.8	696.0	38.00				Average	
		point235	316	874.7	706.7	36.50				Average	
		point234	317	856.7	711.6	35.50				Average	
		point233	318	837.9	712.7	34.50				Average	
		point232	319	808.2	706.6	33.00				Average	
		point231	320	802.6	707.5	32.80				Average	
		point230	321	798.2	714.0	32.50				Average	
		point229	322	799.2	722.3	32.80				Average	
		point228	323	808.3	725.7	31.50				Average	
		point227	324	838.9	724.6	30.20				Average	
		point226	325	869.2	727.4	28.20				Average	
		point225	326	891.3	726.1	28.00				Average	
		point224	327	899.9	736.4	26.70				Average	
		point223	328	896.7	745.8	26.50				Average	
		point222	329	887.6	757.5	26.00				Average	
		point221	330	875.8	776.9	25.50				Average	
		point220	331	873.5	791.2	23.50				Average	
		point219	332	878.3	813.9	21.50				Average	
		point218	333	887.7	828.1	20.00				Average	
		point217	334	912.6	848.7	18.00				Average	
		point216	335	931.5	858.7	16.50				Average	
		point215	336	966.3	865.7	15.00				Average	
		point214	337	1,029.0	871.4	10.50				Average	

		point213	338	1,059.1	870.7	10.00				Average	
		point212	339	1,075.1	869.6	9.50				Average	
		point211	340	1,088.1	866.9	9.30				Average	
		point210	341	1,092.6	863.7	9.30				Average	
		point209	342	1,105.7	847.3	9.00				Average	
		point208	343	1,132.0	810.7	8.70				Average	
		point207	344	1,140.5	802.3	8.60				Average	
		point206	345	1,171.5	789.1	7.00				Average	
		point205	346	1,185.8	782.0	6.50				Average	
		point204	347	1,191.4	775.4	6.00				Average	
		point203	348	1,192.7	771.5	5.50				Average	
		point202	349	1,193.2	765.2	5.00				Average	
		point201	350	1,191.2	756.4	4.50				Average	
		point200	351	1,177.4	740.0	4.00				Average	
		point199	352	1,167.8	727.2	3.60				Average	
		point198	353	1,158.1	712.1	3.50				Average	
		point197	354	1,092.8	633.7	3.50				Average	
		point196	355	1,080.9	616.6	4.00				Average	
		point195	356	1,070.5	593.7	5.50				Average	
		point194	357	1,067.2	577.5	5.70				Average	
		point193	358	1,066.7	564.7	5.80				Average	
		point192	359	1,070.5	554.0	5.60				Average	
		point191	360	1,079.2	537.3	5.40				Average	
		point190	361	1,096.3	488.5	4.50				Average	
		point189	362	1,109.6	471.9	4.00				Average	
		point188	363	1,122.5	464.6	3.50					
Macalla Rd - 1	3.7	point608	364	975.4	649.8	44.80				Average	
		point297	365	970.6	644.2	45.50				Average	
		point296	366	963.7	642.0	46.00				Average	
		point295	367	954.1	643.0	47.50				Average	
		point294	368	909.2	655.7	52.00				Average	
		point293	369	863.1	668.1	56.50				Average	
		point292	370	851.7	668.3	57.50				Average	
		point291	371	838.7	666.6	58.50				Average	
		point290	372	822.7	661.3	59.50				Average	
		point289	373	790.9	647.9	65.00				Average	
		point288	374	781.7	638.5	66.00				Average	
		point287	375	776.7	627.2	66.20				Average	
		point286	376	775.1	615.1	66.50				Average	

		point285	377	763.7	595.8	67.50				Average	
		point284	378	749.0	584.6	68.50				Average	
		point283	379	730.6	577.1	69.50				Average	
		point282	380	711.5	575.6	70.00				Average	
		point281	381	688.8	580.4	70.50				Average	
		point280	382	671.1	587.3	71.00				Average	
		point279	383	658.3	586.9	70.60				Average	
		point278	384	635.8	585.6	70.30				Average	
		point277	385	618.9	584.9	70.00				Average	
		point276	386	610.5	587.9	68.50				Average	
		point275	387	590.6	604.4	67.50					
Treasure Is Rd - 1	3.7	point164	388	985.1	519.1	48.00				Average	
		point163	389	986.0	503.2	48.00				Average	
		point162	390	984.4	452.2	53.50				Average	
		point161	391	979.4	378.0	60.50				Average	
		point160	392	975.4	356.4	61.50				Average	
		point159	393	961.6	319.8	63.00				Average	
		point158	394	950.8	306.7	63.50				Average	
		point157	395	935.5	296.0	64.00				Average	
		point156	396	921.7	290.2	64.00				Average	
		point155	397	904.0	289.3	60.50				Average	
		point154	398	896.6	291.0	60.80				Average	
		point153	399	798.8	311.0	62.50				Average	
		point152	400	776.7	316.4	62.20				Average	
		point151	401	769.7	319.5	62.00				Average	
		point150	402	728.3	352.1	71.50				Average	
		point149	403	707.3	362.0	72.80				Average	
		point148	404	694.4	363.4	74.00				Average	
		point147	405	683.5	362.8	73.00				Average	
		point146	406	671.9	360.6	72.50				Average	
		point145	407	660.7	356.8	71.50				Average	
		point144	408	654.9	355.4	70.00				Average	
		point143	409	602.5	340.2	63.00				Average	
		point142	410	591.8	337.9	62.00				Average	
		point141	411	582.9	336.9	61.00				Average	
		point140	412	571.6	337.4	60.00				Average	
		point139	413	557.7	340.8	57.50					
Treasure Is Rd - 2-2	3.7	point663	414	556.4	336.6	57.50				Average	
		point185	415	571.0	332.7	60.00				Average	

		point184	416	583.3	332.3	61.00				Average	
		point183	417	594.8	332.7	62.00				Average	
		point182	418	664.7	354.5	71.00				Average	
		point181	419	676.6	357.9	72.50				Average	
		point180	420	686.6	359.0	73.00				Average	
		point179	421	694.3	359.5	74.00				Average	
		point178	422	706.9	358.4	72.80				Average	
		point177	423	726.5	348.7	71.50				Average	
		point176	424	767.9	316.6	62.00				Average	
		point175	425	776.8	312.8	62.20				Average	
		point174	426	904.5	285.9	60.00				Average	
		point173	427	924.4	287.5	64.00				Average	
		point172	428	940.3	294.3	64.00				Average	
		point171	429	956.4	306.2	63.50				Average	
		point170	430	966.8	319.1	63.00				Average	
		point169	431	975.3	338.1	61.00				Average	
		point168	432	980.9	359.6	61.50				Average	
		point167	433	983.1	378.2	60.50				Average	
		point166	434	990.1	506.3	48.50				Average	
		point165	435	988.9	518.9	48.00					
Macalla Rd - 2	3.7	point664	436	589.2	601.8	67.50				Average	
		point262	437	608.9	584.9	68.50				Average	
		point261	438	619.0	581.8	70.00				Average	
		point260	439	649.0	583.5	71.00				Average	
		point259	440	671.1	584.4	71.00				Average	
		point258	441	687.7	577.3	70.50				Average	
		point257	442	711.7	572.7	70.00				Average	
		point256	443	731.9	574.3	69.50				Average	
		point255	444	750.7	582.4	68.50				Average	
		point254	445	765.5	593.8	67.50				Average	
		point253	446	778.2	614.7	66.50				Average	
		point252	447	780.7	627.7	66.20				Average	
		point251	448	784.5	637.3	66.00				Average	
		point250	449	792.7	645.2	65.00				Average	
		point249	450	824.3	658.8	58.50				Average	
		point248	451	840.9	664.0	58.50				Average	
		point247	452	852.9	665.3	57.50				Average	
		point246	453	862.9	665.1	56.50				Average	
		point245	454	953.4	637.5	47.50				Average	

		point244	455	965.0	636.8	46.50				Average	
		point243	456	974.6	640.0	45.50				Average	
		point242	457	980.6	648.5	44.80					

EDAW/AECOM **13 August 2009**
Mike Carr SN 65282 **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Existing

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
SFOBB WB - 1	point25	1	2829	105	37	105	45	88	0	0	0	0
	point23	2	2829	105	37	105	45	88	0	0	0	0
	point22	3	2829	105	37	105	45	88	0	0	0	0
	point21	4	2829	105	37	105	45	88	0	0	0	0
	point20	5	2829	105	37	105	45	88	0	0	0	0
	point507	6	2829	105	37	105	45	88	0	0	0	0
	point19	7	2829	105	37	105	45	88	0	0	0	0
	point18	8	2829	105	37	105	45	88	0	0	0	0
	point17	9	2829	105	37	105	45	88	0	0	0	0
	point16	10	2829	105	37	105	45	88	0	0	0	0
	point14	11	2829	105	37	105	45	88	0	0	0	0
	point13	12	2829	105	37	105	45	88	0	0	0	0
	point12	13	2829	105	37	105	45	88	0	0	0	0
	point11	14	2829	105	37	105	45	88	0	0	0	0
	point10	15	2829	105	37	105	45	88	0	0	0	0
	point9	16	2829	105	37	105	45	88	0	0	0	0
	point8	17	2829	105	37	105	45	88	0	0	0	0
	point7	18	2829	105	37	105	45	88	0	0	0	0
	point6	19	2829	105	37	105	45	88	0	0	0	0
	point5	20	2829	105	37	105	45	88	0	0	0	0
	point4	21	2829	105	37	105	45	88	0	0	0	0
	point3	22	2829	105	37	105	45	88	0	0	0	0
	point2	23										

SFOBB WB - 2	point48	24	2829	105	37	105	45	88	0	0	0	0
	point47	25	2829	105	37	105	45	88	0	0	0	0
	point46	26	2829	105	37	105	45	88	0	0	0	0
	point45	27	2829	105	37	105	45	88	0	0	0	0
	point44	28	2829	105	37	105	45	88	0	0	0	0
	point43	29	2829	105	37	105	45	88	0	0	0	0
	point42	30	2829	105	37	105	45	88	0	0	0	0
	point41	31	2829	105	37	105	45	88	0	0	0	0
	point40	32	2829	105	37	105	45	88	0	0	0	0
	point39	33	2829	105	37	105	45	88	0	0	0	0
	point38	34	2829	105	37	105	45	88	0	0	0	0
	point37	35	2829	105	37	105	45	88	0	0	0	0
	point36	36	2829	105	37	105	45	88	0	0	0	0
	point35	37	2829	105	37	105	45	88	0	0	0	0
	point34	38	2829	105	37	105	45	88	0	0	0	0
	point33	39	2829	105	37	105	45	88	0	0	0	0
	point32	40	2829	105	37	105	45	88	0	0	0	0
	point31	41	2829	105	37	105	45	88	0	0	0	0
	point30	42	2829	105	37	105	45	88	0	0	0	0
	point29	43	2829	105	37	105	45	88	0	0	0	0
	point28	44	2829	105	37	105	45	88	0	0	0	0
	point27	45	2829	105	37	105	45	88	0	0	0	0
	point26	46										
SFOBB WB - 3	point71	47	2829	105	37	105	45	88	0	0	0	0
	point70	48	2829	105	37	105	45	88	0	0	0	0
	point69	49	2829	105	37	105	45	88	0	0	0	0
	point68	50	2829	105	37	105	45	88	0	0	0	0
	point67	51	2829	105	37	105	45	88	0	0	0	0
	point66	52	2829	105	37	105	45	88	0	0	0	0
	point65	53	2829	105	37	105	45	88	0	0	0	0
	point64	54	2829	105	37	105	45	88	0	0	0	0
	point63	55	2829	105	37	105	45	88	0	0	0	0
	point62	56	2829	105	37	105	45	88	0	0	0	0
	point61	57	2829	105	37	105	45	88	0	0	0	0
	point60	58	2829	105	37	105	45	88	0	0	0	0
	point59	59	2829	105	37	105	45	88	0	0	0	0

	point58	60	2829	105	37	105	45	88	0	0	0	0
	point57	61	2829	105	37	105	45	88	0	0	0	0
	point56	62	2829	105	37	105	45	88	0	0	0	0
	point55	63	2829	105	37	105	45	88	0	0	0	0
	point54	64	2829	105	37	105	45	88	0	0	0	0
	point53	65	2829	105	37	105	45	88	0	0	0	0
	point52	66	2829	105	37	105	45	88	0	0	0	0
	point51	67	2829	105	37	105	45	88	0	0	0	0
	point50	68	2829	105	37	105	45	88	0	0	0	0
	point49	69										
SFOBB WB OFF SE	point82	70	84	88	1	88	1	88	0	0	0	0
	point81	71	84	88	1	88	1	88	0	0	0	0
	point80	72	84	88	1	88	1	88	0	0	0	0
	point79	73	84	88	1	88	1	88	0	0	0	0
	point78	74	84	88	1	88	1	88	0	0	0	0
	point77	75	84	88	1	88	1	88	0	0	0	0
	point76	76	84	88	1	88	1	88	0	0	0	0
	point75	77	84	88	1	88	1	88	0	0	0	0
	point74	78	84	88	1	88	1	88	0	0	0	0
	point73	79										
SFOBB EB OFF SE	point96	80	84	88	1	88	1	88	0	0	0	0
	point95	81	84	88	1	88	1	88	0	0	0	0
	point94	82	84	88	1	88	1	88	0	0	0	0
	point93	83	84	88	1	88	1	88	0	0	0	0
	point92	84	84	88	1	88	1	88	0	0	0	0
	point91	85	84	88	1	88	1	88	0	0	0	0
	point90	86	84	88	1	88	1	88	0	0	0	0
	point89	87	84	88	1	88	1	88	0	0	0	0
	point88	88	84	88	1	88	1	88	0	0	0	0
	point87	89	84	88	1	88	1	88	0	0	0	0
	point86	90	84	88	1	88	1	88	0	0	0	0
	point85	91	84	88	1	88	1	88	0	0	0	0
	point84	92	84	88	1	88	1	88	0	0	0	0
	point83	93										
SFOBB WB ON NE	point106	94	126	88	2	88	2	88	0	0	0	0
	point105	95	126	88	2	88	2	88	0	0	0	0

	point104	96	126	88	2	88	2	88	0	0	0	0
	point103	97	126	88	2	88	2	88	0	0	0	0
	point102	98	126	88	2	88	2	88	0	0	0	0
	point101	99	126	88	2	88	2	88	0	0	0	0
	point100	100	126	88	2	88	2	88	0	0	0	0
	point99	101	126	88	2	88	2	88	0	0	0	0
	point98	102	126	88	2	88	2	88	0	0	0	0
	point97	103										
SFOBB WB OFF NE	point123	104	126	65	2	65	2	65	0	0	0	0
	point122	105	126	65	2	65	2	65	0	0	0	0
	point121	106	126	65	2	65	2	65	0	0	0	0
	point120	107	126	65	2	65	2	65	0	0	0	0
	point119	108	126	65	2	65	2	65	0	0	0	0
	point118	109	126	65	2	65	2	65	0	0	0	0
	point117	110	126	65	2	65	2	65	0	0	0	0
	point116	111	126	65	2	65	2	65	0	0	0	0
	point115	112	126	65	2	65	2	65	0	0	0	0
	point114	113	126	65	2	65	2	65	0	0	0	0
	point113	114	126	65	2	65	2	65	0	0	0	0
	point112	115	126	65	2	65	2	65	0	0	0	0
	point111	116	126	65	2	65	2	65	0	0	0	0
	point107	117										
SFOBB EB ON SE	point137	118	79	88	1	88	1	88	0	0	0	0
	point136	119	79	88	1	88	1	88	0	0	0	0
	point135	120	79	88	1	88	1	88	0	0	0	0
	point134	121	79	88	1	88	1	88	0	0	0	0
	point133	122	79	88	1	88	1	88	0	0	0	0
	point132	123	79	88	1	88	1	88	0	0	0	0
	point131	124	79	88	1	88	1	88	0	0	0	0
	point130	125	79	88	1	88	1	88	0	0	0	0
	point129	126	79	88	1	88	1	88	0	0	0	0
	point128	127	79	88	1	88	1	88	0	0	0	0
	point127	128	79	88	1	88	1	88	0	0	0	0
	point126	129	79	88	1	88	1	88	0	0	0	0
	point125	130	79	88	1	88	1	88	0	0	0	0
	point124	131										

Forest Rd - 1	point370	132	12	25	0	0	0	0	0	0	0	0
	point369	133	12	25	0	0	0	0	0	0	0	0
	point368	134	12	25	0	0	0	0	0	0	0	0
	point367	135	12	25	0	0	0	0	0	0	0	0
	point366	136	12	25	0	0	0	0	0	0	0	0
	point365	137	12	25	0	0	0	0	0	0	0	1
	point364	138	12	25	0	0	0	0	0	0	0	0
	point363	139	12	25	0	0	0	0	0	0	0	0
	point362	140	12	25	0	0	0	0	0	0	0	0
	point361	141	12	25	0	0	0	0	0	0	0	0
	point360	142										
Forest Rd - 2	point371	143	12	25	0	0	0	0	0	0	0	0
	point372	144	12	25	0	0	0	0	0	0	0	0
	point373	145	12	25	0	0	0	0	0	0	0	0
	point374	146	12	25	0	0	0	0	0	0	0	0
	point375	147	12	25	0	0	0	0	0	0	0	0
	point376	148	12	25	0	0	0	0	0	0	0	0
	point377	149	12	25	0	0	0	0	0	0	0	0
	point378	150	12	25	0	0	0	0	0	0	0	0
	point379	151	12	25	0	0	0	0	0	0	0	0
	point380	152	12	25	0	0	0	0	0	0	0	0
	point381	153										
Signal Rd - 1	point394	154	10	40	0	0	0	0	0	0	0	0
	point393	155	10	40	0	0	0	0	0	0	0	0
	point392	156	10	40	0	0	0	0	0	0	0	0
	point391	157	10	40	0	0	0	0	0	0	0	0
	point390	158	10	40	0	0	0	0	0	0	0	0
	point389	159	10	40	0	0	0	0	0	0	0	0
	point388	160	10	40	0	0	0	0	0	0	0	0
	point387	161	10	40	0	0	0	0	0	0	0	0
	point386	162	10	40	0	0	0	0	0	0	0	0
	point385	163	10	40	0	0	0	0	0	0	0	0
	point384	164	10	40	0	0	0	0	0	0	0	0
	point383	165	10	40	0	0	0	0	0	0	0	0
	point382	166										
Signal Rd - 2	point406	167	10	40	0	0	0	0	0	0	0	0

	point405	168	10	40	0	0	0	0	0	0	0	0
	point404	169	10	40	0	0	0	0	0	0	0	0
	point403	170	10	40	0	0	0	0	0	0	0	0
	point402	171	10	40	0	0	0	0	0	0	0	0
	point401	172	10	40	0	0	0	0	0	0	0	0
	point400	173	10	40	0	0	0	0	0	0	0	0
	point399	174	10	40	0	0	0	0	0	0	0	0
	point398	175	10	40	0	0	0	0	0	0	0	0
	point397	176	10	40	0	0	0	0	0	0	0	0
	point396	177	10	40	0	0	0	0	0	0	0	0
	point395	178										
SFOBB EB - 1	point513	179	2315	105	31	105	38	88	0	0	0	0
	point514	180	2315	105	31	105	38	88	0	0	0	0
	point515	181	2315	105	31	105	38	88	0	0	0	0
	point516	182	2315	105	31	105	38	88	0	0	0	0
	point517	183	2315	105	31	105	38	88	0	0	0	0
	point518	184	2315	105	31	105	38	88	0	0	0	0
	point519	185	2315	105	31	105	38	88	0	0	0	0
	point520	186	2315	105	31	105	38	88	0	0	0	0
	point521	187	2315	105	31	105	38	88	0	0	0	0
	point522	188	2315	105	31	105	38	88	0	0	0	0
	point523	189	2315	105	31	105	38	88	0	0	0	0
	point524	190	2315	105	31	105	38	88	0	0	0	0
	point525	191	2315	105	31	105	38	88	0	0	0	0
	point526	192	2315	105	31	105	38	88	0	0	0	0
	point527	193	2315	105	31	105	38	88	0	0	0	0
	point528	194	2315	105	31	105	38	88	0	0	0	0
	point529	195	2315	105	31	105	38	88	0	0	0	0
	point530	196	2315	105	31	105	38	88	0	0	0	0
	point531	197	2315	105	31	105	38	88	0	0	0	0
	point532	198	2315	105	31	105	38	88	0	0	0	0
	point533	199	2315	105	31	105	38	88	0	0	0	0
	point534	200	2315	105	31	105	38	88	0	0	0	0
	point536	201										
SFOBB EB - 2	point537	202	2315	105	31	105	38	88	0	0	0	0
	point538	203	2315	105	31	105	38	88	0	0	0	0

	point539	204	2315	105	31	105	38	88	0	0	0	0
	point540	205	2315	105	31	105	38	88	0	0	0	0
	point541	206	2315	105	31	105	38	88	0	0	0	0
	point542	207	2315	105	31	105	38	88	0	0	0	0
	point543	208	2315	105	31	105	38	88	0	0	0	0
	point544	209	2315	105	31	105	38	88	0	0	0	0
	point545	210	2315	105	31	105	38	88	0	0	0	0
	point546	211	2315	105	31	105	38	88	0	0	0	0
	point547	212	2315	105	31	105	38	88	0	0	0	0
	point548	213	2315	105	31	105	38	88	0	0	0	0
	point549	214	2315	105	31	105	38	88	0	0	0	0
	point550	215	2315	105	31	105	38	88	0	0	0	0
	point551	216	2315	105	31	105	38	88	0	0	0	0
	point552	217	2315	105	31	105	38	88	0	0	0	0
	point553	218	2315	105	31	105	38	88	0	0	0	0
	point554	219	2315	105	31	105	38	88	0	0	0	0
	point555	220	2315	105	31	105	38	88	0	0	0	0
	point556	221	2315	105	31	105	38	88	0	0	0	0
	point557	222	2315	105	31	105	38	88	0	0	0	0
	point558	223	2315	105	31	105	38	88	0	0	0	0
	point559	224										
SFOBB EB - 3	point560	225	2315	105	31	105	38	88	0	0	0	0
	point561	226	2315	105	31	105	38	88	0	0	0	0
	point562	227	2315	105	31	105	38	88	0	0	0	0
	point563	228	2315	105	31	105	38	88	0	0	0	0
	point564	229	2315	105	31	105	38	88	0	0	0	0
	point565	230	2315	105	31	105	38	88	0	0	0	0
	point566	231	2315	105	31	105	38	88	0	0	0	0
	point567	232	2315	105	31	105	38	88	0	0	0	0
	point568	233	2315	105	31	105	38	88	0	0	0	0
	point569	234	2315	105	31	105	38	88	0	0	0	0
	point570	235	2315	105	31	105	38	88	0	0	0	0
	point571	236	2315	105	31	105	38	88	0	0	0	0
	point572	237	2315	105	31	105	38	88	0	0	0	0
	point573	238	2315	105	31	105	38	88	0	0	0	0
	point574	239	2315	105	31	105	38	88	0	0	0	0

	point575	240	2315	105	31	105	38	88	0	0	0	0
	point576	241	2315	105	31	105	38	88	0	0	0	0
	point577	242	2315	105	31	105	38	88	0	0	0	0
	point578	243	2315	105	31	105	38	88	0	0	0	0
	point579	244	2315	105	31	105	38	88	0	0	0	0
	point580	245	2315	105	31	105	38	88	0	0	0	0
	point581	246	2315	105	31	105	38	88	0	0	0	0
	point582	247										
North Gate Rd - 1	point359	248	340	40	7	40	3	40	0	0	0	0
	point358	249	340	40	7	40	3	40	0	0	0	0
	point357	250	340	40	7	40	3	40	0	0	0	0
	point356	251	340	40	7	40	3	40	0	0	0	0
	point355	252	340	40	7	40	3	40	0	0	0	0
	point354	253	340	40	7	40	3	40	0	0	0	0
	point353	254	340	40	7	40	3	40	0	0	0	0
	point352	255	340	40	7	40	3	40	0	0	0	0
	point351	256	340	40	7	40	3	40	0	0	0	0
	point350	257	340	40	7	40	3	40	0	0	0	0
	point349	258	340	40	7	40	3	40	0	0	0	0
	point348	259	340	40	7	40	3	40	0	0	0	0
	point347	260	340	40	7	40	3	40	0	0	0	0
	point346	261	340	40	7	40	3	40	0	0	0	0
	point345	262	340	40	7	40	3	40	0	0	0	0
	point344	263	340	40	7	40	3	40	0	0	0	0
	point343	264	340	40	7	40	3	40	0	0	0	0
	point342	265	340	40	7	40	3	40	0	0	0	0
	point341	266	340	40	7	40	3	40	0	0	0	0
	point340	267	340	40	7	40	3	40	0	0	0	0
	point339	268	340	40	7	40	3	40	0	0	0	0
	point338	269	340	40	7	40	3	40	0	0	0	0
	point337	270	340	40	7	40	3	40	0	0	0	0
	point335	271	340	40	7	40	3	40	0	0	0	0
	point334	272	340	40	7	40	3	40	0	0	0	0
	point333	273	340	40	7	40	3	40	0	0	0	0
	point332	274	340	40	7	40	3	40	0	0	0	0
	point331	275	340	40	7	40	3	40	0	0	0	0

	point330	276	340	40	7	40	3	40	0	0	0	0
	point329	277	340	40	7	40	3	40	0	0	0	0
	point328	278	340	40	7	40	3	40	0	0	0	0
	point327	279	340	40	7	40	3	40	0	0	0	0
	point326	280	340	40	7	40	3	40	0	0	0	0
	point325	281	340	40	7	40	3	40	0	0	0	0
	point324	282	340	40	7	40	3	40	0	0	0	0
	point323	283	340	40	7	40	3	40	0	0	0	0
	point322	284	340	40	7	40	3	40	0	0	0	0
	point321	285	340	40	7	40	3	40	0	0	0	0
	point320	286	340	40	7	40	3	40	0	0	0	0
	point319	287	340	40	7	40	3	40	0	0	0	0
	point318	288	340	40	7	40	3	40	0	0	0	0
	point317	289	340	40	7	40	3	40	0	0	0	0
	point316	290	340	40	7	40	3	40	0	0	0	0
	point315	291	340	40	7	40	3	40	0	0	0	0
	point314	292	340	40	7	40	3	40	0	0	0	0
	point313	293	340	40	7	40	3	40	0	0	0	0
	point312	294	340	40	7	40	3	40	0	0	0	0
	point311	295	340	40	7	40	3	40	0	0	0	0
	point310	296	340	40	7	40	3	40	0	0	0	0
	point309	297	340	40	7	40	3	40	0	0	0	0
	point308	298	340	40	7	40	3	40	0	0	0	0
	point307	299	340	40	7	40	3	40	0	0	0	0
	point306	300	340	40	7	40	3	40	0	0	0	0
	point305	301	340	40	7	40	3	40	0	0	0	0
	point304	302	340	40	7	40	3	40	0	0	0	0
	point303	303	340	40	7	40	3	40	0	0	0	0
	point302	304	340	40	7	40	3	40	0	0	0	0
	point301	305	340	40	7	40	3	40	0	0	0	0
	point300	306	340	40	7	40	3	40	0	0	0	0
	point299	307	340	40	7	40	3	40	0	0	0	0
	point298	308										
North Gate Rd - 2	point609	309	340	40	7	40	3	40	0	0	0	0
	point241	310	340	40	7	40	3	40	0	0	0	0
	point240	311	340	40	7	40	3	40	0	0	0	0

	point239	312	340	40	7	40	3	40	0	0	0	0
	point238	313	340	40	7	40	3	40	0	0	0	0
	point237	314	340	40	7	40	3	40	0	0	0	0
	point236	315	340	40	7	40	3	40	0	0	0	0
	point235	316	340	40	7	40	3	40	0	0	0	0
	point234	317	340	40	7	40	3	40	0	0	0	0
	point233	318	340	40	7	40	3	40	0	0	0	0
	point232	319	340	40	7	40	3	40	0	0	0	0
	point231	320	340	40	7	40	3	40	0	0	0	0
	point230	321	340	40	7	40	3	40	0	0	0	0
	point229	322	340	40	7	40	3	40	0	0	0	0
	point228	323	340	40	7	40	3	40	0	0	0	0
	point227	324	340	40	7	40	3	40	0	0	0	0
	point226	325	340	40	7	40	3	40	0	0	0	0
	point225	326	340	40	7	40	3	40	0	0	0	0
	point224	327	340	40	7	40	3	40	0	0	0	0
	point223	328	340	40	7	40	3	40	0	0	0	0
	point222	329	340	40	7	40	3	40	0	0	0	0
	point221	330	340	40	7	40	3	40	0	0	0	0
	point220	331	340	40	7	40	3	40	0	0	0	0
	point219	332	340	40	7	40	3	40	0	0	0	0
	point218	333	340	40	7	40	3	40	0	0	0	0
	point217	334	340	40	7	40	3	40	0	0	0	0
	point216	335	340	40	7	0	3	40	0	0	0	0
	point215	336	340	40	7	40	3	40	0	0	0	0
	point214	337	340	40	7	40	3	40	0	0	0	0
	point213	338	340	40	7	40	3	40	0	0	0	0
	point212	339	340	40	7	40	3	40	0	0	0	0
	point211	340	340	40	7	40	3	40	0	0	0	0
	point210	341	340	40	7	40	3	40	0	0	0	0
	point209	342	340	40	7	40	3	40	0	0	0	0
	point208	343	340	40	7	40	3	40	0	0	0	0
	point207	344	340	40	7	40	3	40	0	0	0	0
	point206	345	340	40	7	40	3	40	0	0	0	0
	point205	346	340	40	7	40	3	40	0	0	0	0
	point204	347	340	40	7	40	3	40	0	0	0	0

	point203	348	340	40	7	40	3	40	0	0	0	0
	point202	349	340	40	7	40	3	40	0	0	0	0
	point201	350	340	40	7	40	3	40	0	0	0	0
	point200	351	340	40	7	40	3	40	0	0	0	0
	point199	352	340	40	7	40	3	40	0	0	0	0
	point198	353	340	40	7	40	3	40	0	0	0	0
	point197	354	340	40	7	40	3	40	0	0	0	0
	point196	355	340	40	7	40	3	40	0	0	0	0
	point195	356	340	40	7	40	3	40	0	0	0	0
	point194	357	340	40	7	40	3	40	0	0	0	0
	point193	358	340	40	7	40	3	40	0	0	0	0
	point192	359	340	40	7	40	3	40	0	0	0	0
	point191	360	340	40	7	40	3	40	0	0	0	0
	point190	361	340	40	7	40	3	40	0	0	0	0
	point189	362	340	40	7	40	3	40	0	0	0	0
	point188	363										
Macalla Rd - 1	point608	364	340	40	7	40	3	40	0	0	0	0
	point297	365	340	40	7	40	3	40	0	0	0	0
	point296	366	340	40	7	40	3	40	0	0	0	0
	point295	367	340	40	7	40	3	40	0	0	0	0
	point294	368	340	40	7	40	3	40	0	0	0	0
	point293	369	340	40	7	40	3	40	0	0	0	0
	point292	370	340	40	7	40	3	40	0	0	0	0
	point291	371	340	40	7	40	3	40	0	0	0	0
	point290	372	340	40	7	40	3	40	0	0	0	0
	point289	373	340	40	7	40	3	40	0	0	0	0
	point288	374	340	40	7	40	3	40	0	0	0	0
	point287	375	340	40	7	40	3	40	0	0	0	0
	point286	376	340	40	7	40	3	40	0	0	0	0
	point285	377	340	40	7	40	3	40	0	0	0	0
	point284	378	340	40	7	40	3	40	0	0	0	0
	point283	379	340	40	7	40	3	40	0	0	0	0
	point282	380	340	40	7	40	3	40	0	0	0	0
	point281	381	340	40	7	40	3	40	0	0	0	0
	point280	382	340	40	7	40	3	40	0	0	0	0
	point279	383	340	40	7	40	3	40	0	0	0	0

	point278	384	340	40	7	40	3	40	0	0	0	0
	point277	385	340	40	7	40	3	40	0	0	0	0
	point276	386	340	40	7	40	3	40	0	0	0	0
	point275	387										
Treasure Is Rd - 1	point164	388	340	65	7	65	3	65	0	0	0	0
	point163	389	340	65	7	65	3	65	0	0	0	0
	point162	390	340	65	7	65	3	65	0	0	0	0
	point161	391	340	65	7	65	3	65	0	0	0	0
	point160	392	340	65	7	65	3	65	0	0	0	0
	point159	393	340	65	7	65	3	65	0	0	0	0
	point158	394	340	65	7	65	3	65	0	0	0	0
	point157	395	340	65	7	65	3	65	0	0	0	0
	point156	396	340	65	7	65	3	65	0	0	0	0
	point155	397	340	65	7	65	3	65	0	0	0	0
	point154	398	340	65	7	65	3	65	0	0	0	0
	point153	399	340	65	7	65	3	65	0	0	0	0
	point152	400	340	65	7	65	3	65	0	0	0	0
	point151	401	340	65	7	65	3	65	0	0	0	0
	point150	402	340	65	7	65	3	65	0	0	0	0
	point149	403	340	65	7	65	3	65	0	0	0	0
	point148	404	340	65	7	65	3	65	0	0	0	0
	point147	405	340	65	7	65	3	65	0	0	0	0
	point146	406	340	65	7	65	3	65	0	0	0	0
	point145	407	340	65	7	65	3	65	0	0	0	0
	point144	408	340	65	7	65	3	65	0	0	0	0
	point143	409	340	65	7	65	3	65	0	0	0	0
	point142	410	340	65	7	65	3	65	0	0	0	0
	point141	411	340	65	7	65	3	65	0	0	0	0
	point140	412	340	65	7	65	3	65	0	0	0	0
	point139	413										
Treasure Is Rd - 2-2	point663	414	340	65	7	65	3	65	0	0	0	0
	point185	415	340	65	7	65	3	65	0	0	0	0
	point184	416	340	65	7	65	3	65	0	0	0	0
	point183	417	340	65	7	65	3	65	0	0	0	0
	point182	418	340	65	7	65	3	65	0	0	0	0
	point181	419	340	65	7	65	3	65	0	0	0	0

	point180	420	340	65	7	65	3	65	0	0	0	0
	point179	421	340	65	7	65	3	65	0	0	0	0
	point178	422	340	65	7	65	3	65	0	0	0	0
	point177	423	340	65	7	65	3	65	0	0	0	0
	point176	424	340	65	7	65	3	65	0	0	0	0
	point175	425	340	65	7	65	3	65	0	0	0	0
	point174	426	340	65	7	65	3	65	0	0	0	0
	point173	427	340	65	7	65	3	65	0	0	0	0
	point172	428	340	65	7	65	3	65	0	0	0	0
	point171	429	340	65	7	65	3	65	0	0	0	0
	point170	430	340	65	7	65	3	65	0	0	0	0
	point169	431	340	65	7	65	3	65	0	0	0	0
	point168	432	340	65	7	65	3	65	0	0	0	0
	point167	433	340	65	7	65	3	65	0	0	0	0
	point166	434	340	65	7	65	3	65	0	0	0	0
	point165	435										
Macalla Rd - 2	point664	436	340	40	7	40	3	40	0	0	0	0
	point262	437	340	40	7	40	3	40	0	0	0	0
	point261	438	340	40	7	40	3	40	0	0	0	0
	point260	439	340	40	7	40	3	40	0	0	0	0
	point259	440	340	40	7	40	3	40	0	0	0	0
	point258	441	340	40	7	40	3	40	0	0	0	0
	point257	442	340	40	7	40	3	40	0	0	0	0
	point256	443	340	40	7	40	3	40	0	0	0	0
	point255	444	340	40	7	40	3	40	0	0	0	0
	point254	445	340	40	7	40	3	40	0	0	0	0
	point253	446	340	40	7	40	3	40	0	0	0	0
	point252	447	340	40	7	40	3	40	0	0	0	0
	point251	448	340	40	7	40	3	40	0	0	0	0
	point250	449	340	40	7	40	3	40	0	0	0	0
	point249	450	340	40	7	40	3	40	0	0	0	0
	point248	451	340	40	7	40	3	40	0	0	0	0
	point247	452	340	40	7	40	3	40	0	0	0	0
	point246	453	340	40	7	40	3	40	0	0	0	0
	point245	454	340	40	7	40	3	40	0	0	0	0
	point244	455	340	40	7	40	3	40	0	0	0	0

	point243	456	340	40	7	40	3	40	0	0	0	0
	point242	457										

EDAW/AECOM						**20 October 2009**					
Mike Carr SN 65282						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**										
RUN:	**Existing**										
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	
R-1	9	1	916.0	782.7	28.00	1.50	67.40	71	12.0	5.0	
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	71.40	71	12.0	5.0	Y
R-3	17	1	855.5	618.7	64.00	1.50	71.40	66	12.0	5.0	Y
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	71.40	71	12.0	5.0	Y
R-5	19	1	1,125.6	585.5	2.80	1.50	70.40	71	12.0	5.0	Y
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0	
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0	
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0	
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0	
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	65.90	66	12.0	5.0	
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0	
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	63.50	66	12.0	5.0	
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	60.90	71	12.0	5.0	
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	
R-16	43	1	794.8	434.3	101.50	1.50	73.10	71	12.0	5.0	
R-17	59	1	719.3	596.8	66.70	1.50	0.00	66	12.0	5.0	
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											

R-6 0											
R-7 0											
R-8 0											
R-9 0											
R-10 (ST-2) 0											
R-11 1											
R-12 (ST-4) 0											
R-13 (ST-5) 0											
R-14 0											
R-15 0											
R-16 0											

EDAW/AECOM 13 August 2009
Mike Carr SN 65282 TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Existing

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Barrier1	W	0.00	30.48	0.00				0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0		
									point2	2	820.7	399.2	100.50	4.50	0.00	0	0		
									point3	3	817.8	398.3	100.50	4.50	0.00	0	0		
									point4	4	819.5	393.0	100.50	4.50	0.00	0	0		
									point5	5	828.7	396.0	100.50	4.50	0.00	0	0		
									point6	6	827.9	398.5	100.50	4.50	0.00	0	0		
									point7	7	834.2	400.4	100.50	4.50	0.00	0	0		
									point8	8	834.4	399.5	100.50	4.50	0.00	0	0		
									point9	9	838.3	400.8	100.50	4.50	0.00	0	0		
									point10	10	837.2	404.2	100.50	4.50	0.00	0	0		
									point11	11	839.7	405.0	100.50	4.50	0.00	0	0		
									point12	12	834.5	421.0	100.50	4.50	0.00	0	0		
									point13	13	823.0	417.3	100.50	4.50	0.00	0	0		
									point14	14	821.9	420.4	100.50	4.50	0.00	0	0		
									point15	15	814.3	417.7	100.50	4.50					
Barrier2	W	0.00	30.48	0.00				0.00	point16	16	723.3	398.9	92.00	6.00	0.00	0	0		
									point17	17	717.0	401.9	92.00	6.00	0.00	0	0		
									point18	18	717.7	403.4	92.00	6.00	0.00	0	0		
									point19	19	708.9	407.5	92.00	6.00	0.00	0	0		
									point20	20	708.3	406.0	92.00	6.00	0.00	0	0		
									point21	21	701.9	409.0	92.00	6.00	0.00	0	0		
									point22	22	705.7	417.0	92.00	6.00	0.00	0	0		
									point23	23	707.2	416.2	92.00	6.00	0.00	0	0		
									point24	24	708.0	418.0	92.00	6.00	0.00	0	0		
									point25	25	726.3	409.4	92.00	6.00	0.00	0	0		
									point26	26	725.5	407.6	92.00	6.00	0.00	0	0		
									point27	27	727.0	406.9	92.00	6.00	0.00	0	0		
									point28	28	723.3	398.9	92.00	6.00					
Barrier3	W	0.00	30.48	0.00				0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0		
									point30	30	685.8	419.6	92.00	6.00	0.00	0	0		
									point31	31	686.7	420.8	92.00	6.00	0.00	0	0		
									point32	32	694.7	415.3	92.00	6.00	0.00	0	0		
									point33	33	693.9	414.1	92.00	6.00	0.00	0	0		
									point34	34	699.6	410.5	92.00	6.00	0.00	0	0		
									point35	35	704.4	417.4	92.00	6.00	0.00	0	0		

									point36	36	703.0	418.2	92.00	6.00	0.00	0	0		
									point37	37	704.2	419.9	92.00	6.00	0.00	0	0		
									point38	38	687.4	431.4	92.00	6.00	0.00	0	0		
									point39	39	686.3	429.8	92.00	6.00	0.00	0	0		
									point40	40	685.0	430.7	92.00	6.00	0.00	0	0		
									point41	41	680.1	423.5	92.00	6.00					
Barrier4	W	0.00	30.48	0.00				0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0		
									point43	43	666.2	440.5	92.00	6.00	0.00	0	0		
									point44	44	667.5	441.4	92.00	6.00	0.00	0	0		
									point45	45	673.2	433.5	92.00	6.00	0.00	0	0		
									point46	46	672.0	432.6	92.00	6.00	0.00	0	0		
									point47	47	676.1	427.3	92.00	6.00	0.00	0	0		
									point48	48	683.0	432.2	92.00	6.00	0.00	0	0		
									point49	49	682.0	433.4	92.00	6.00	0.00	0	0		
									point50	50	683.6	434.6	92.00	6.00	0.00	0	0		
									point51	51	671.7	451.1	92.00	6.00	0.00	0	0		
									point52	52	670.2	449.9	92.00	6.00	0.00	0	0		
									point53	53	669.3	451.2	92.00	6.00	0.00	0	0		
									point54	54	662.2	446.1	92.00	6.00					
Barrier5	W	0.00	30.48	0.00				0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0		
									point56	56	629.0	439.2	86.00	6.00	0.00	0	0		
									point57	57	628.4	438.0	86.00	6.00	0.00	0	0		
									point58	58	632.9	435.5	86.00	6.00	0.00	0	0		
									point59	59	633.8	437.2	86.00	6.00	0.00	0	0		
									point60	60	641.4	433.0	86.00	6.00	0.00	0	0		
									point61	61	644.4	438.4	86.00	6.00	0.00	0	0		
									point62	62	642.8	439.3	86.00	6.00	0.00	0	0		
									point63	63	644.5	442.4	86.00	6.00	0.00	0	0		
									point64	64	639.2	445.2	86.00	6.00	0.00	0	0		
									point65	65	639.7	446.1	86.00	6.00	0.00	0	0		
									point66	66	633.5	449.5	86.00	6.00	0.00	0	0		
									point67	67	632.8	448.2	86.00	6.00	0.00	0	0		
									point68	68	627.3	451.2	86.00	6.00	0.00	0	0		
									point69	69	625.5	448.0	86.00	6.00	0.00	0	0		
									point70	70	624.1	448.7	86.00	6.00	0.00	0	0		
									point71	71	621.3	443.4	86.00	6.00					
Barrier6	W	0.00	30.48	0.00				0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0		
									point73	73	650.5	424.6	86.00	6.00	0.00	0	0		
									point74	74	649.2	423.6	86.00	6.00	0.00	0	0		
									point75	75	652.4	419.6	86.00	6.00	0.00	0	0		
									point76	76	653.6	420.6	86.00	6.00	0.00	0	0		
									point77	77	659.0	413.7	86.00	6.00	0.00	0	0		
									point78	78	663.7	417.4	86.00	6.00	0.00	0	0		
									point79	79	662.8	418.6	86.00	6.00	0.00	0	0		
									point80	80	665.5	420.8	86.00	6.00	0.00	0	0		
									point81	81	661.8	425.5	86.00	6.00	0.00	0	0		
									point82	82	663.0	426.4	86.00	6.00	0.00	0	0		
									point83	83	658.5	432.1	86.00	6.00	0.00	0	0		
									point84	84	658.0	431.7	86.00	6.00	0.00	0	0		

									point85	85	654.2	436.5	86.00	6.00	0.00	0	0		
									point86	86	651.1	433.9	86.00	6.00	0.00	0	0		
									point87	87	650.0	435.3	86.00	6.00	0.00	0	0		
									point88	88	645.1	431.4	86.00	6.00					
Barrier7	W	0.00	30.48	0.00				0.00	point89	89	662.9	409.7	88.00	6.00	0.00	0	0		
									point90	90	669.4	404.1	88.00	6.00	0.00	0	0		
									point91	91	668.3	402.8	88.00	6.00	0.00	0	0		
									point92	92	672.3	399.4	88.00	6.00	0.00	0	0		
									point93	93	673.3	400.6	88.00	6.00	0.00	0	0		
									point94	94	680.0	394.9	88.00	6.00	0.00	0	0		
									point95	95	684.0	399.6	88.00	6.00	0.00	0	0		
									point96	96	682.6	400.7	88.00	6.00	0.00	0	0		
									point97	97	684.8	403.2	88.00	6.00	0.00	0	0		
									point98	98	680.3	407.1	88.00	6.00	0.00	0	0		
									point99	99	681.2	408.2	88.00	6.00	0.00	0	0		
									point100	100	675.7	412.9	88.00	6.00	0.00	0	0		
									point101	101	674.9	411.8	88.00	6.00	0.00	0	0		
									point102	102	670.3	415.8	88.00	6.00	0.00	0	0		
									point103	103	668.1	413.2	88.00	6.00	0.00	0	0		
									point104	104	666.8	414.3	88.00	6.00	0.00	0	0		
									point105	105	662.9	409.7	88.00	6.00					
Barrier11	W	0.00	30.48	0.00				0.00	point165	106	687.1	600.9	67.50	4.50	0.00	0	0		
									point166	107	702.2	597.3	67.50	4.50	0.00	0	0		
									point167	108	703.4	601.6	67.50	4.50	0.00	0	0		
									point168	109	709.8	600.1	67.50	4.50	0.00	0	0		
									point169	110	709.4	598.5	67.50	4.50	0.00	0	0		
									point170	111	713.0	597.5	67.50	4.50	0.00	0	0		
									point171	112	710.8	588.7	67.50	4.50	0.00	0	0		
									point172	113	711.9	588.5	67.50	4.50	0.00	0	0		
									point173	114	723.7	588.6	67.50	4.50	0.00	0	0		
									point174	115	723.8	580.6	67.50	4.50	0.00	0	0		
									point175	116	716.3	580.6	67.50	4.50	0.00	0	0		
									point176	117	716.4	582.8	67.50	4.50	0.00	0	0		
									point177	118	709.9	584.3	67.50	4.50	0.00	0	0		
									point178	119	709.7	584.0	67.50	4.50	0.00	0	0		
									point179	120	697.7	586.9	67.50	4.50	0.00	0	0		
									point180	121	698.3	589.6	67.50	4.50	0.00	0	0		
									point181	122	691.1	591.2	67.50	4.50	0.00	0	0		
									point182	123	690.4	589.0	67.50	4.50	0.00	0	0		
									point183	124	684.2	590.4	67.50	4.50	0.00	0	0		
									point184	125	687.1	600.9	67.50	4.50					
Barrier12	W	0.00	30.48	0.00				0.00	point185	126	832.9	601.5	66.50	4.50	0.00	0	0		
									point186	127	831.2	585.8	66.50	4.50	0.00	0	0		
									point187	128	806.7	587.4	66.50	4.50	0.00	0	0		
									point188	129	805.9	573.9	66.50	4.50	0.00	0	0		
									point189	130	830.2	572.4	66.50	4.50	0.00	0	0		
									point190	131	829.5	558.0	66.50	4.50	0.00	0	0		
									point191	132	842.8	557.1	66.50	4.50	0.00	0	0		
									point192	133	844.9	587.0	66.50	4.50	0.00	0	0		

									point193	134	853.8	586.7	66.50	4.50	0.00	0	0		
									point194	135	854.9	600.3	66.50	4.50	0.00	0	0		
									point197	136	832.9	601.5	66.50	4.50					
Barrier13	W	0.00	30.48	0.00				0.00	point198	137	802.3	633.6	66.50	4.50	0.00	0	0		
									point199	138	805.0	625.0	66.50	4.50	0.00	0	0		
									point200	139	828.8	631.6	66.50	4.50	0.00	0	0		
									point201	140	832.6	618.0	66.50	4.50	0.00	0	0		
									point202	141	797.9	608.3	66.50	4.50	0.00	0	0		
									point203	142	800.3	599.2	66.50	4.50	0.00	0	0		
									point206	143	844.6	611.7	66.50	4.50	0.00	0	0		
									point207	144	839.4	630.6	66.50	4.50	0.00	0	0		
									point208	145	833.6	629.0	66.50	4.50	0.00	0	0		
									point209	146	830.1	641.6	66.50	4.50	0.00	0	0		
									point210	147	826.8	640.7	66.50	4.50	0.00	0	0		
									point211	148	826.7	641.1	66.50	4.50	0.00	0	0		
									point212	149	802.3	633.6	66.50	4.50					
Barrier14	W	0.00	30.48	0.00				0.00	point213	150	919.3	602.1	49.50	5.00	0.00	0	0		
									point214	151	901.4	618.0	49.50	5.00	0.00	0	0		
									point215	152	920.2	639.5	49.50	5.00	0.00	0	0		
									point216	153	929.2	631.7	49.50	5.00	0.00	0	0		
									point217	154	916.7	617.4	49.50	5.00	0.00	0	0		
									point218	155	925.8	609.3	49.50	5.00	0.00	0	0		
									point219	156	919.3	602.1	49.50	5.00					
Barrier15	W	0.00	30.48	0.00				0.00	point220	157	980.4	298.2	56.50	4.00	0.00	0	0		
									point221	158	990.4	296.2	56.50	4.00	0.00	0	0		
									point222	159	991.8	303.3	56.50	4.00	0.00	0	0		
									point223	160	981.8	305.3	56.50	4.00	0.00	0	0		
									point224	161	980.4	298.2	56.50	4.00					
Barrier16	W	0.00	30.48	0.00				0.00	point226	162	1,006.8	351.3	52.50	4.50	0.00	0	0		
									point227	163	1,017.7	351.4	52.50	4.50	0.00	0	0		
									point228	164	1,017.7	352.4	52.50	4.50	0.00	0	0		
									point229	165	1,018.7	352.4	52.50	4.50	0.00	0	0		
									point230	166	1,018.6	355.2	52.50	4.50	0.00	0	0		
									point231	167	1,017.5	355.2	52.50	4.50	0.00	0	0		
									point232	168	1,017.5	356.0	52.50	4.50	0.00	0	0		
									point233	169	1,015.4	356.0	52.50	4.50	0.00	0	0		
									point234	170	1,015.4	356.3	52.50	4.50	0.00	0	0		
									point235	171	1,015.2	357.0	52.50	4.50	0.00	0	0		
									point236	172	1,017.3	357.0	52.50	4.50	0.00	0	0		
									point237	173	1,017.2	367.3	52.50	4.50	0.00	0	0		
									point238	174	1,011.5	367.4	52.50	4.50	0.00	0	0		
									point239	175	1,011.4	365.4	52.50	4.50	0.00	0	0		
									point240	176	1,007.0	365.5	52.50	4.50	0.00	0	0		
									point241	177	1,006.9	364.2	52.50	4.50	0.00	0	0		
									point242	178	1,006.8	364.2	52.50	4.50	0.00	0	0		
									point243	179	1,006.8	351.3	52.50	4.50					
Barrier17	W	0.00	30.48	0.00				0.00	point244	180	1,006.5	403.5	51.75	4.50	0.00	0	0		
									point245	181	1,006.8	391.4	51.75	4.50	0.00	0	0		
									point246	182	1,017.4	391.7	51.75	4.50	0.00	0	0		

									point247	183	1,017.3	396.3	51.75	4.50	0.00	0	0		
									point248	184	1,015.3	396.2	51.75	4.50	0.00	0	0		
									point249	185	1,015.2	403.5	51.75	4.50	0.00	0	0		
									point250	186	1,006.5	403.5	51.75	4.50					
Barrier18	W	0.00	30.48	0.00				0.00	point251	187	1,013.7	450.3	45.50	4.50	0.00	0	0		
									point252	188	1,014.0	444.2	45.50	4.50	0.00	0	0		
									point253	189	1,015.3	444.1	45.50	4.50	0.00	0	0		
									point254	190	1,015.5	437.1	45.50	4.50	0.00	0	0		
									point255	191	1,027.5	437.3	45.50	4.50	0.00	0	0		
									point256	192	1,027.6	446.7	45.50	4.50	0.00	0	0		
									point257	193	1,025.9	446.9	45.50	4.50	0.00	0	0		
									point258	194	1,025.7	450.9	45.50	4.50	0.00	0	0		
									point259	195	1,013.7	450.3	45.50	4.50					
Barrier19	W	0.00	30.48	0.00				0.00	point260	196	1,162.1	649.0	2.60	5.00	0.00	0	0		
									point261	197	1,162.1	649.0	2.60	5.00	0.00	0	0		
									point262	198	1,162.0	649.6	2.60	5.00	0.00	0	0		
									point263	199	1,162.0	650.2	2.60	5.00	0.00	0	0		
									point264	200	1,161.5	650.8	2.60	5.00	0.00	0	0		
									point265	201	1,161.0	651.2	2.60	5.00	0.00	0	0		
									point266	202	1,160.3	651.2	2.60	5.00	0.00	0	0		
									point267	203	1,159.6	650.8	2.60	5.00	0.00	0	0		
									point268	204	1,159.1	650.2	2.60	5.00	0.00	0	0		
									point269	205	1,158.9	649.4	2.60	5.00	0.00	0	0		
									point270	206	1,159.3	648.8	2.60	5.00	0.00	0	0		
									point271	207	1,160.1	648.2	2.60	5.00	0.00	0	0		
									point272	208	1,160.7	648.1	2.60	5.00	0.00	0	0		
									point273	209	1,162.0	648.4	2.60	5.00	0.00	0	0		
									point274	210	1,162.0	648.3	2.60	5.00	0.00	0	0		
									point275	211	1,162.2	646.1	2.60	5.00	0.00	0	0		
									point276	212	1,158.0	645.7	2.60	5.00	0.00	0	0		
									point277	213	1,158.3	635.9	2.60	5.00	0.00	0	0		
									point278	214	1,161.3	636.1	2.60	5.00	0.00	0	0		
									point279	215	1,161.4	634.5	2.60	5.00	0.00	0	0		
									point280	216	1,160.2	634.5	2.60	5.00	0.00	0	0		
									point281	217	1,160.6	628.5	2.60	5.00	0.00	0	0		
									point282	218	1,160.1	628.5	2.60	5.00	0.00	0	0		
									point283	219	1,159.7	632.1	2.60	5.00	0.00	0	0		
									point284	220	1,156.3	632.1	2.60	5.00	0.00	0	0		
									point285	221	1,156.3	630.2	2.60	5.00	0.00	0	0		
									point286	222	1,151.5	629.8	2.60	5.00	0.00	0	0		
									point287	223	1,151.3	635.5	2.60	5.00	0.00	0	0		
									point288	224	1,133.4	634.8	2.60	5.00	0.00	0	0		
									point289	225	1,133.6	630.3	2.60	5.00	0.00	0	0		
									point290	226	1,132.3	630.2	2.60	5.00	0.00	0	0		
									point291	227	1,132.0	632.8	2.60	5.00	0.00	0	0		
									point292	228	1,123.9	632.8	2.60	5.00	0.00	0	0		
									point293	229	1,124.3	627.1	2.60	5.00	0.00	0	0		
									point294	230	1,123.5	626.9	2.60	5.00	0.00	0	0		
									point295	231	1,123.4	629.7	2.60	5.00	0.00	0	0		

									point296	232	1,120.9	629.7	2.60	5.00	0.00	0	0		
									point297	233	1,120.9	627.1	2.60	5.00	0.00	0	0		
									point298	234	1,115.5	626.9	2.60	5.00	0.00	0	0		
									point299	235	1,115.2	628.6	2.60	5.00	0.00	0	0		
									point300	236	1,108.0	628.2	2.60	5.00	0.00	0	0		
									point301	237	1,100.1	619.6	2.80	5.00	0.00	0	0		
									point302	238	1,102.4	613.9	2.80	5.00	0.00	0	0		
									point303	239	1,103.2	607.7	2.80	5.00	0.00	0	0		
									point304	240	1,099.9	603.6	2.80	5.00	0.00	0	0		
									point305	241	1,097.1	603.3	2.80	5.00	0.00	0	0		
									point306	242	1,097.7	589.6	2.80	5.00	0.00	0	0		
									point307	243	1,102.6	589.9	2.80	5.00	0.00	0	0		
									point308	244	1,102.6	588.5	2.80	5.00	0.00	0	0		
									point309	245	1,099.2	588.3	2.80	5.00	0.00	0	0		
									point310	246	1,099.9	572.5	2.80	5.00	0.00	0	0		
									point311	247	1,104.7	572.8	2.80	5.00	0.00	0	0		
									point312	248	1,104.8	569.0	2.80	5.00	0.00	0	0		
									point313	249	1,098.6	568.8	2.80	5.00	0.00	0	0		
									point314	250	1,098.7	563.4	2.80	5.00	0.00	0	0		
									point315	251	1,100.3	562.0	2.80	5.00	0.00	0	0		
									point316	252	1,100.6	554.8	2.80	5.00	0.00	0	0		
									point317	253	1,112.7	543.6	2.80	5.00	0.00	0	0		
									point318	254	1,123.7	544.2	2.80	5.00	0.00	0	0		
									point319	255	1,123.8	546.2	2.80	5.00	0.00	0	0		
									point320	256	1,124.8	546.2	2.80	5.00	0.00	0	0		
									point321	257	1,124.8	544.4	2.80	5.00	0.00	0	0		
									point322	258	1,127.8	544.4	2.80	5.00	0.00	0	0		
									point323	259	1,127.9	547.3	2.80	5.00	0.00	0	0		
									point324	260	1,142.8	548.1	2.80	5.00	0.00	0	0		
									point325	261	1,146.7	544.4	2.80	5.00	0.00	0	0		
									point326	262	1,148.7	544.5	2.80	5.00	0.00	0	0		
									point327	263	1,148.8	543.2	2.80	5.00	0.00	0	0		
									point328	264	1,146.9	543.2	2.80	5.00	0.00	0	0		
									point329	265	1,147.5	521.6	2.80	5.00	0.00	0	0		
									point330	266	1,149.7	521.6	2.80	5.00	0.00	0	0		
									point331	267	1,149.8	520.0	2.80	5.00	0.00	0	0		
									point332	268	1,146.6	520.0	2.80	5.00	0.00	0	0		
									point333	269	1,146.9	509.3	2.80	5.00	0.00	0	0		
									point334	270	1,153.2	509.3	2.80	5.00	0.00	0	0		
									point335	271	1,153.2	499.4	2.80	5.00	0.00	0	0		
									point336	272	1,149.4	495.2	2.80	5.00	0.00	0	0		
									point337	273	1,142.6	495.0	2.80	5.00	0.00	0	0		
									point338	274	1,142.6	496.3	2.80	5.00	0.00	0	0		
									point339	275	1,131.7	496.3	2.80	5.00	0.00	0	0		
									point340	276	1,131.9	490.0	2.80	5.00	0.00	0	0		
									point341	277	1,143.3	490.0	2.80	5.00	0.00	0	0		
									point342	278	1,143.3	491.5	2.80	5.00	0.00	0	0		
									point343	279	1,146.9	491.7	2.80	5.00	0.00	0	0		
									point344	280	1,146.9	487.6	2.80	5.00	0.00	0	0		

									point345	281	1,153.0	487.6	2.80	5.00	0.00	0	0		
									point346	282	1,161.1	496.4	2.80	5.00	0.00	0	0		
									point347	283	1,160.9	502.8	2.80	5.00	0.00	0	0		
									point348	284	1,156.6	502.8	2.80	5.00	0.00	0	0		
									point349	285	1,156.0	511.0	2.80	5.00	0.00	0	0		
									point350	286	1,162.1	511.2	2.80	5.00	0.00	0	0		
									point351	287	1,161.9	522.1	2.80	5.00	0.00	0	0		
									point352	288	1,158.1	521.9	2.80	5.00	0.00	0	0		
									point353	289	1,157.3	541.4	2.80	5.00	0.00	0	0		
									point354	290	1,155.0	541.4	2.80	5.00	0.00	0	0		
									point355	291	1,155.0	545.1	2.80	5.00	0.00	0	0		
									point356	292	1,158.8	545.1	2.80	5.00	0.00	0	0		
									point357	293	1,158.6	551.6	2.80	5.00	0.00	0	0		
									point358	294	1,149.1	560.3	2.80	5.00	0.00	0	0		
									point359	295	1,142.5	560.0	2.80	5.00	0.00	0	0		
									point360	296	1,142.5	558.1	2.80	5.00	0.00	0	0		
									point361	297	1,138.5	558.1	2.80	5.00	0.00	0	0		
									point362	298	1,131.4	558.1	2.80	5.00	0.00	0	0		
									point363	299	1,127.7	557.9	2.80	5.00	0.00	0	0		
									point364	300	1,118.2	557.6	2.80	5.00	0.00	0	0		
									point365	301	1,113.9	561.4	2.80	5.00	0.00	0	0		
									point366	302	1,113.6	567.7	2.80	5.00	0.00	0	0		
									point367	303	1,107.8	567.4	2.80	5.00	0.00	0	0		
									point368	304	1,107.3	575.9	2.80	5.00	0.00	0	0		
									point369	305	1,107.3	577.1	2.80	5.00	0.00	0	0		
									point370	306	1,113.2	577.1	2.80	5.00	0.00	0	0		
									point371	307	1,112.5	594.5	2.80	5.00	0.00	0	0		
									point372	308	1,108.0	594.4	2.80	5.00	0.00	0	0		
									point373	309	1,107.9	595.7	2.80	5.00	0.00	0	0		
									point374	310	1,110.9	595.9	2.80	5.00	0.00	0	0		
									point375	311	1,110.2	607.7	2.80	5.00	0.00	0	0		
									point376	312	1,106.4	607.7	2.80	5.00	0.00	0	0		
									point377	313	1,106.0	613.2	2.80	5.00	0.00	0	0		
									point378	314	1,109.9	613.1	2.80	5.00	0.00	0	0		
									point379	315	1,115.5	619.0	2.60	5.00	0.00	0	0		
									point380	316	1,115.5	623.0	2.60	5.00	0.00	0	0		
									point381	317	1,120.6	623.3	2.60	5.00	0.00	0	0		
									point382	318	1,120.8	619.4	2.60	5.00	0.00	0	0		
									point383	319	1,138.4	620.0	2.60	5.00	0.00	0	0		
									point384	320	1,138.4	624.7	2.60	5.00	0.00	0	0		
									point385	321	1,139.6	624.7	2.60	5.00	0.00	0	0		
									point386	322	1,139.8	621.7	2.60	5.00	0.00	0	0		
									point387	323	1,151.8	622.1	2.60	5.00	0.00	0	0		
									point388	324	1,151.6	626.3	2.60	5.00	0.00	0	0		
									point389	325	1,157.1	626.5	2.60	5.00	0.00	0	0		
									point390	326	1,157.1	618.9	2.60	5.00	0.00	0	0		
									point391	327	1,169.0	619.4	2.60	5.00	0.00	0	0		
									point392	328	1,173.9	625.1	2.60	5.00	0.00	0	0		
									point393	329	1,173.3	636.9	2.60	5.00	0.00	0	0		

									point394	330	1,167.0	636.9	2.60	5.00	0.00	0	0		
									point395	331	1,167.0	638.0	2.60	5.00	0.00	0	0		
									point396	332	1,169.9	638.0	2.60	5.00	0.00	0	0		
									point397	333	1,169.5	650.0	2.60	5.00	0.00	0	0		
									point398	334	1,162.1	649.0	2.60	5.00					
Barrier20	W	0.00	30.48	0.00				0.00	point399	335	906.6	754.5	25.00	6.00	0.00	0	0		
									point400	336	907.3	762.7	25.00	6.00	0.00	0	0		
									point401	337	927.6	761.5	25.00	6.00	0.00	0	0		
									point402	338	927.1	753.1	25.00	6.00	0.00	0	0		
									point403	339	926.5	751.1	25.00	6.00	0.00	0	0		
									point404	340	907.3	752.3	25.00	6.00	0.00	0	0		
									point405	341	907.3	754.4	25.00	6.00	0.00	0	0		
									point406	342	906.6	754.5	25.00	6.00					
Barrier21	W	0.00	30.48	0.00				0.00	point407	343	928.1	762.3	25.00	6.00	0.00	0	0		
									point408	344	927.3	751.1	25.00	6.00	0.00	0	0		
									point409	345	938.9	750.2	25.00	6.00	0.00	0	0		
									point410	346	939.6	761.6	25.00	6.00	0.00	0	0		
									point411	347	928.1	762.3	25.00	6.00					
Barrier22	W	0.00	30.48	0.00				0.00	point412	348	895.1	803.1	26.00	6.00	0.00	0	0		
									point413	349	890.1	791.1	26.00	6.00	0.00	0	0		
									point414	350	891.7	790.5	26.00	6.00	0.00	0	0		
									point415	351	893.3	789.8	26.00	6.00	0.00	0	0		
									point416	352	899.8	787.2	26.00	6.00	0.00	0	0		
									point417	353	904.7	799.3	26.00	6.00	0.00	0	0		
									point418	354	895.1	803.1	26.00	6.00					
Barrier23	W	0.00	30.48	0.00				0.00	point420	355	905.6	821.8	26.00	6.00	0.00	0	0		
									point421	356	898.7	810.7	26.00	6.00	0.00	0	0		
									point422	357	907.8	804.7	26.00	6.00	0.00	0	0		
									point423	358	911.7	811.0	26.00	6.00	0.00	0	0		
									point424	359	912.7	810.4	26.00	6.00	0.00	0	0		
									point425	360	914.4	813.2	26.00	6.00	0.00	0	0		
									point426	361	913.4	813.8	26.00	6.00	0.00	0	0		
									point427	362	914.8	815.9	26.00	6.00	0.00	0	0		
									point428	363	905.6	821.8	26.00	6.00					
Barrier24	W	0.00	30.48	0.00				0.00	point430	364	941.3	815.9	25.00	6.00	0.00	0	0		
									point431	365	931.0	820.5	25.00	6.00	0.00	0	0		
									point432	366	930.9	820.5	25.00	6.00	0.00	0	0		
									point433	367	929.9	818.2	25.00	6.00	0.00	0	0		
									point434	368	928.4	818.9	25.00	6.00	0.00	0	0		
									point435	369	929.3	821.3	25.00	6.00	0.00	0	0		
									point436	370	928.9	821.4	25.00	6.00	0.00	0	0		
									point437	371	932.8	830.6	25.00	6.00	0.00	0	0		
									point438	372	935.9	829.3	25.00	6.00	0.00	0	0		
									point439	373	936.3	830.1	25.00	6.00	0.00	0	0		
									point440	374	936.9	829.8	25.00	6.00	0.00	0	0		
									point441	375	937.8	831.8	25.00	6.00	0.00	0	0		
									point442	376	943.1	829.5	25.00	6.00	0.00	0	0		
									point443	377	942.2	827.4	25.00	6.00	0.00	0	0		
									point444	378	942.6	827.2	25.00	6.00	0.00	0	0		

									point445	379	942.3	826.5	25.00	6.00	0.00	0	0		
									point446	380	945.3	825.0	25.00	6.00	0.00	0	0		
									point447	381	941.3	815.9	25.00	6.00					
Barrier25	W	0.00	30.48	0.00				0.00	point448	382	960.6	801.4	23.00	6.00	0.00	0	0		
									point449	383	951.4	797.8	23.00	6.00	0.00	0	0		
									point450	384	946.6	810.7	23.00	6.00	0.00	0	0		
									point451	385	955.5	814.2	23.00	6.00	0.00	0	0		
									point452	386	956.8	811.2	23.00	6.00	0.00	0	0		
									point453	387	957.7	811.5	23.00	6.00	0.00	0	0		
									point454	388	957.9	811.0	23.00	6.00	0.00	0	0		
									point455	389	959.8	811.8	23.00	6.00	0.00	0	0		
									point456	390	962.0	806.4	23.00	6.00	0.00	0	0		
									point457	391	960.0	805.6	23.00	6.00	0.00	0	0		
									point458	392	960.2	805.0	23.00	6.00	0.00	0	0		
									point459	393	959.4	804.7	23.00	6.00	0.00	0	0		
									point460	394	960.6	801.4	23.00	6.00					
Barrier26	W	0.00	30.48	0.00				0.00	point461	395	963.3	794.2	21.00	6.00	0.00	0	0		
									point462	396	954.1	790.6	21.00	6.00	0.00	0	0		
									point463	397	959.0	778.0	21.00	6.00	0.00	0	0		
									point464	398	968.2	781.6	21.00	6.00	0.00	0	0		
									point465	399	963.3	794.2	21.00	6.00					
Barrier27	W	0.00	30.48	0.00				0.00	point467	400	970.9	774.4	21.00	6.00	0.00	0	0		
									point468	401	976.8	759.4	21.00	6.00	0.00	0	0		
									point469	402	967.2	755.5	21.00	6.00	0.00	0	0		
									point470	403	961.3	770.5	21.00	6.00	0.00	0	0		
									point471	404	970.9	774.4	21.00	6.00					
Barrier28	W	0.00	30.48	0.00				0.00	point472	405	964.8	739.9	21.00	6.00	0.00	0	0		
									point473	406	964.9	739.6	21.00	6.00	0.00	0	0		
									point474	407	964.2	739.4	21.00	6.00	0.00	0	0		
									point475	408	965.0	737.5	21.00	6.00	0.00	0	0		
									point476	409	965.7	737.7	21.00	6.00	0.00	0	0		
									point477	410	967.6	733.0	21.00	6.00	0.00	0	0		
									point478	411	974.3	735.3	21.00	6.00	0.00	0	0		
									point479	412	975.6	731.9	21.00	6.00	0.00	0	0		
									point480	413	974.8	730.2	21.00	6.00	0.00	0	0		
									point481	414	974.9	730.1	21.00	6.00	0.00	0	0		
									point482	415	973.0	729.3	21.00	6.00	0.00	0	0		
									point483	416	973.9	727.3	21.00	6.00	0.00	0	0		
									point484	417	975.8	728.1	21.00	6.00	0.00	0	0		
									point485	418	975.8	727.9	21.00	6.00	0.00	0	0		
									point486	419	977.1	727.3	21.00	6.00	0.00	0	0		
									point487	420	977.5	727.4	21.00	6.00	0.00	0	0		
									point488	421	979.5	722.0	21.00	6.00	0.00	0	0		
									point489	422	978.2	721.6	21.00	6.00	0.00	0	0		
									point490	423	979.2	719.0	21.00	6.00	0.00	0	0		
									point491	424	980.7	719.6	21.00	6.00	0.00	0	0		
									point492	425	981.6	717.6	21.00	6.00	0.00	0	0		
									point493	426	991.0	721.1	21.00	6.00	0.00	0	0		
									point494	427	991.6	720.0	21.00	6.00	0.00	0	0		

									point495	428	994.3	721.0	21.00	6.00	0.00	0	0		
									point496	429	993.6	722.2	21.00	6.00	0.00	0	0		
									point497	430	994.7	722.6	21.00	6.00	0.00	0	0		
									point498	431	992.0	729.4	21.00	6.00	0.00	0	0		
									point499	432	992.4	729.6	21.00	6.00	0.00	0	0		
									point500	433	988.3	740.2	21.00	6.00	0.00	0	0		
									point501	434	987.8	740.1	21.00	6.00	0.00	0	0		
									point502	435	985.2	746.8	21.00	6.00	0.00	0	0		
									point503	436	984.0	746.3	21.00	6.00	0.00	0	0		
									point504	437	983.5	747.7	21.00	6.00	0.00	0	0		
									point505	438	981.1	746.7	21.00	6.00	0.00	0	0		
									point506	439	981.6	745.4	21.00	6.00	0.00	0	0		
									point507	440	972.2	741.6	21.00	6.00	0.00	0	0		
									point508	441	972.4	741.1	21.00	6.00	0.00	0	0		
									point509	442	968.7	739.6	21.00	6.00	0.00	0	0		
									point510	443	968.1	741.2	21.00	6.00	0.00	0	0		
									point511	444	964.8	739.9	21.00	6.00					

EDAW/AECOM			**13 August 2009**	
Mike Carr SN 65282			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**			
RUN:	**Existing**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line7	1	711.3	722.8	0.50
	2	708.4	693.7	10.00
	3	702.2	671.8	20.00
	4	697.4	656.0	30.00
	5	697.0	643.4	40.00
	6	698.4	633.3	50.00
	7	701.3	623.5	60.00
	8	701.6	614.8	66.50
	9	693.8	610.9	67.00
Terrain Line8	10	775.9	636.9	66.00
	11	776.0	652.2	60.00
	12	760.7	664.5	50.00
	13	749.2	666.9	40.00
	14	745.1	679.7	32.00
	15	741.0	692.2	20.00
	16	736.4	708.9	10.00
	17	728.9	726.6	0.50
Terrain Line9	18	793.5	779.6	0.50
	19	804.9	734.8	30.00
Terrain Line10	20	891.8	737.7	26.50
	21	880.2	742.8	25.00
	22	857.1	753.1	24.00
	23	849.0	763.4	14.00
	24	835.4	783.9	4.00

	25	835.0	795.2	0.50
Terrain Line11	26	855.1	809.6	0.50
	27	871.4	775.5	24.50
Terrain Line12	28	860.0	843.5	0.50
	29	880.1	821.7	20.00
Terrain Line13	30	882.2	862.6	0.50
	31	902.1	845.4	18.00
Terrain Line14	32	919.8	882.0	0.50
	33	927.1	861.2	16.00
Terrain Line15	34	940.8	864.0	16.00
	35	946.0	867.4	14.00
	36	949.1	881.7	8.00
	37	945.2	890.5	4.00
	38	937.9	894.6	0.50
Terrain Line16	39	968.5	886.1	0.50
	40	962.0	868.2	15.00
Terrain Line17	41	1,029.6	900.0	0.50
	42	1,031.9	878.5	12.00
Terrain Line19	43	927.7	853.3	18.00
	44	926.5	838.9	24.00
	45	926.7	832.6	25.50
Terrain Line20	46	959.6	860.0	15.50
	47	949.0	832.9	24.50
Terrain Line21	48	886.1	821.0	22.00
	49	888.6	814.3	24.00
	50	891.7	812.4	25.00
	51	898.1	806.1	26.00
Terrain Line22	52	880.7	778.3	26.00
	53	888.4	777.8	26.50
	54	889.8	777.7	27.50
	55	899.3	778.8	28.00
	56	912.4	784.1	29.00
Terrain Line23	57	900.8	756.4	26.00
	58	903.3	772.2	28.00
	59	913.2	783.0	29.00
Terrain Line24	60	915.3	796.2	26.00

	61	909.5	798.3	26.50
Terrain Line25	62	923.4	816.5	25.50
	63	923.6	813.4	27.00
	64	920.9	806.0	28.50
Terrain Line26	65	942.4	802.0	23.50
	66	935.6	803.3	26.50
	67	924.8	803.3	29.00
Terrain Line27	68	956.2	754.4	22.50
	69	948.0	764.3	23.50
	70	920.0	791.6	28.50
Terrain Line28	71	948.3	789.6	22.50
	72	942.9	787.8	26.00
Terrain Line29	73	954.5	822.7	24.50
	74	968.2	849.7	18.00
	75	985.8	861.3	13.50
	76	999.7	860.6	12.00
	77	1,026.4	859.3	11.00
	78	1,055.7	857.9	10.00
	79	1,071.0	858.7	9.50
Terrain Line31	80	1,027.1	836.6	11.50
	81	1,027.0	825.3	12.30
	82	1,025.8	810.2	11.50
Terrain Line32	83	1,054.2	841.3	11.50
	84	1,048.9	825.2	14.50
	85	1,050.8	811.9	12.00
	86	1,057.4	801.8	13.50
	87	1,063.4	797.9	11.50
Terrain Line33	88	932.1	688.7	39.00
	89	956.4	742.7	21.50
	90	990.1	750.3	20.50
	91	1,026.9	772.0	12.50
	92	1,050.9	792.9	11.50
	93	1,057.4	801.8	13.50
	94	1,064.4	802.2	12.00
	95	1,074.7	807.4	11.50
Terrain Line34	96	966.2	674.6	40.00

	97	983.7	710.3	21.00
	98	1,004.9	721.9	20.00
	99	1,019.3	727.2	18.00
	100	1,042.4	744.5	12.50
Terrain Line35	101	1,017.7	792.0	12.50
	102	996.2	786.0	18.50
	103	987.8	784.8	19.50
	104	979.8	783.7	20.50
	105	975.4	779.9	21.00
Terrain Line36	106	856.1	611.5	65.00
	107	895.4	623.0	57.50
	108	914.7	642.0	54.00
	109	922.7	641.4	52.00
	110	931.7	640.2	50.00
	111	943.2	632.3	48.00
Terrain Line37	112	886.6	610.1	58.00
	113	901.9	613.2	55.00
Terrain Line38	114	859.1	594.6	64.00
	115	875.4	593.9	60.00
	116	887.3	593.4	58.50
	117	901.8	591.4	56.00
Terrain Line39	118	783.7	476.6	87.00
	119	782.5	486.0	86.00
	120	790.7	502.0	82.00
	121	813.2	518.4	74.00
	122	820.2	527.2	70.00
	123	868.0	552.1	61.50
	124	885.8	570.3	58.70
	125	902.3	588.3	56.00
	126	914.6	597.3	54.00
Terrain Line41	127	989.0	652.2	44.50
	128	1,023.8	691.7	21.00
	129	1,041.5	713.5	20.50
	130	1,054.8	727.5	12.50
	131	1,118.0	792.3	11.00
	132	1,130.9	800.0	10.00

	133	1,136.6	803.3	9.00
Terrain Line46	134	793.0	430.2	103.00
	135	809.1	428.4	100.00
	136	827.3	439.8	89.00
	137	830.3	442.6	89.00
	138	838.8	456.3	72.00
	139	841.2	459.3	70.00
	140	838.5	469.1	69.00
Terrain Line47	141	782.1	440.8	103.50
	142	783.7	442.4	102.00
	143	797.3	470.1	88.00
	144	797.5	475.2	88.00
	145	804.3	488.2	80.00
	146	817.6	492.0	73.00
	147	829.5	495.4	66.00
	148	846.2	497.2	56.00
Terrain Line49	149	730.1	434.6	103.50
	150	708.8	445.6	100.00
	151	690.7	458.1	96.00
	152	674.2	481.7	90.00
	153	672.0	486.3	88.00
Terrain Line60	154	810.9	312.7	64.00
	155	809.0	344.2	83.00
	156	809.5	347.6	83.00
	157	807.3	368.4	91.00
	158	807.8	373.3	92.00
	159	810.8	387.2	96.00
	160	812.9	395.1	100.00
	161	810.2	400.2	100.50
	162	808.0	415.5	101.00
Terrain Line61	163	842.9	392.4	100.00
	164	927.1	293.8	64.00
Terrain Line62	165	840.9	400.5	100.00
	166	892.0	398.3	88.00
	167	910.4	418.5	78.00
	168	921.7	445.7	68.00

	169	914.4	475.3	57.00
Terrain Line63	170	840.9	400.5	100.00
	171	862.6	407.0	94.00
	172	868.2	413.8	88.60
	173	869.7	417.8	83.30
	174	871.2	429.8	78.00
	175	867.6	448.9	69.00
	176	867.2	458.6	60.00
	177	857.5	463.5	56.00
Terrain Line64	178	704.4	355.8	74.00
	179	720.8	337.9	45.00
Terrain Line65	180	704.8	353.7	73.00
	181	691.7	331.7	35.00
	182	642.7	268.9	28.00
	183	605.9	215.3	1.00
Terrain Line67	184	736.6	323.7	45.00
	185	764.3	305.5	63.50
Terrain Line68	186	637.9	185.4	28.00
	187	686.6	239.3	35.00
	188	725.5	278.7	50.00
	189	762.6	303.1	63.50
Terrain Line91	190	1,381.1	887.8	2.50
	191	1,388.2	888.0	0.50
Terrain Line92	192	1,255.4	835.2	4.80
	193	1,275.9	841.3	4.00
	194	1,302.6	857.7	21.50
	195	1,310.6	860.4	21.60
	196	1,319.0	863.7	21.80
	197	1,326.4	866.5	22.00
	198	1,342.1	870.6	8.00
	199	1,350.6	876.0	6.00
	200	1,359.8	876.3	3.50
Terrain Line93	201	1,374.2	884.6	3.50
	202	1,381.9	877.2	0.50
Terrain Line94	203	1,375.4	878.4	0.50
	204	1,370.7	880.7	3.50

Terrain Line95	205	1,367.1	875.0	3.50
	206	1,369.1	869.7	0.50
Terrain Line96	207	1,365.4	864.5	0.50
	208	1,361.8	867.1	3.00
Terrain Line97	209	1,359.7	853.1	0.50
	210	1,357.2	857.0	3.00
Terrain Line98	211	1,326.7	861.5	22.00
	212	1,336.5	858.0	6.00
	213	1,344.5	855.0	3.50
Terrain Line101	214	1,361.6	847.0	0.50
	215	1,353.4	848.2	3.00
Terrain Line104	216	1,229.0	777.5	2.80
	217	1,213.2	761.4	4.50
	218	1,205.9	754.1	2.50
Terrain Line105	219	1,215.0	782.3	3.00
	220	1,205.8	777.1	5.50
Terrain Line106	221	1,180.2	792.7	7.00
	222	1,189.0	800.8	4.00
	223	1,194.2	799.2	3.50
Terrain Line107	224	1,194.9	244.3	0.50
	225	1,185.4	457.2	0.50
	226	1,235.9	464.7	0.50
	227	1,266.6	541.5	0.50
	228	1,257.8	544.8	0.50
	229	1,229.2	473.2	0.50
	230	1,227.5	473.0	0.50
	231	1,199.6	469.0	0.50
	232	1,180.9	466.2	0.50
	233	1,180.3	469.1	0.50
	234	1,174.9	498.9	0.50
	235	1,173.2	509.1	0.50
	236	1,173.2	512.1	0.50
	237	1,172.0	518.2	0.50
	238	1,171.9	521.6	0.50
	239	1,171.4	525.3	0.50
	240	1,171.3	529.7	0.50

	241	1,172.5	531.1	0.50
	242	1,172.3	533.2	0.50
	243	1,172.1	539.1	0.50
	244	1,171.6	541.1	0.50
	245	1,172.0	544.4	0.50
	246	1,173.2	555.6	0.50
	247	1,174.5	564.4	0.50
	248	1,175.3	573.2	0.50
	249	1,179.6	585.3	0.50
	250	1,183.1	596.3	0.50
	251	1,187.5	611.4	0.50
	252	1,187.8	614.8	0.50
	253	1,189.4	622.0	0.50
	254	1,189.8	623.7	0.50
	255	1,188.6	625.3	0.50
	256	1,188.8	627.1	0.50
	257	1,189.2	630.8	0.50
	258	1,190.0	632.5	0.50
	259	1,190.4	636.0	0.50
	260	1,190.3	639.4	0.50
	261	1,190.7	642.2	0.50
	262	1,191.1	647.4	0.50
	263	1,191.1	650.2	0.50
	264	1,191.0	654.0	0.50
	265	1,190.9	659.3	0.50
	266	1,191.1	662.8	0.50
	267	1,191.1	666.6	0.50
	268	1,190.2	668.1	0.50
	269	1,190.2	672.3	0.50
	270	1,190.4	679.4	0.50
	271	1,190.5	682.7	0.50
	272	1,190.9	685.9	0.50
	273	1,191.2	690.0	0.50
	274	1,191.4	692.6	0.50
	275	1,191.9	695.6	0.50
	276	1,192.7	700.8	0.50

	277	1,194.1	706.5	0.50
	278	1,195.5	712.2	0.50
	279	1,196.9	715.2	0.50
	280	1,197.2	717.2	0.50
	281	1,197.8	718.6	0.50
	282	1,200.2	720.8	0.50
	283	1,203.2	727.2	0.50
	284	1,204.1	729.8	0.50
	285	1,212.5	738.1	0.50
	286	1,221.0	746.1	0.50
	287	1,227.9	752.4	0.50
	288	1,233.7	756.7	0.50
	289	1,244.8	764.6	0.50
	290	1,255.9	773.7	0.50
	291	1,258.1	775.0	0.50
	292	1,268.6	782.8	0.50
	293	1,280.0	790.9	0.50
	294	1,290.3	796.6	0.50
	295	1,303.1	804.8	0.50
	296	1,318.1	815.1	0.50
	297	1,324.4	818.4	0.50
	298	1,326.2	819.1	0.50
	299	1,327.8	819.2	0.50
	300	1,328.8	820.6	0.50
	301	1,330.4	820.3	0.50
	302	1,331.8	820.1	0.50
	303	1,332.5	818.7	0.50
	304	1,333.9	817.7	0.50
	305	1,335.2	818.5	0.50
	306	1,336.7	816.7	0.50
	307	1,337.6	815.9	0.50
	308	1,338.2	817.1	0.50
	309	1,337.6	818.8	0.50
	310	1,338.6	820.7	0.50
	311	1,341.8	822.5	0.50
	312	1,344.5	824.8	0.50

	313	1,349.8	825.0	0.50
	314	1,354.6	825.1	0.50
	315	1,358.7	826.3	0.50
	316	1,359.3	825.9	0.50
	317	1,365.3	836.6	0.50
	318	1,364.1	838.4	0.50
	319	1,362.9	840.3	0.50
	320	1,363.1	841.5	0.50
	321	1,360.5	844.2	0.50
Terrain Line108	322	1,181.9	757.8	6.50
	323	1,176.6	759.9	7.00
	324	1,166.9	766.8	8.00
Terrain Line109	325	1,163.8	737.6	3.50
	326	1,166.1	743.2	4.00
	327	1,167.8	756.3	7.00
Terrain Line110	328	1,124.1	751.2	4.50
	329	1,137.2	754.8	8.00
	330	1,149.2	753.7	8.50
	331	1,148.0	748.0	7.50
	332	1,154.0	741.7	5.00
	333	1,158.8	736.2	3.50
Terrain Line111	334	1,121.0	740.9	8.00
	335	1,117.9	735.8	8.00
	336	1,117.5	726.6	7.50
	337	1,116.9	722.0	6.50
	338	1,118.4	712.7	3.50
Terrain Line112	339	1,105.0	721.6	3.50
	340	1,103.1	731.0	8.00
Terrain Line113	341	1,072.7	688.4	8.00
	342	1,078.7	687.3	3.00
	343	1,107.3	690.7	2.60
Terrain Line114	344	990.9	602.5	46.00
	345	1,048.9	663.1	8.00
	346	1,064.8	669.3	7.80
	347	1,069.6	668.8	7.50
	348	1,079.5	670.4	5.00

	349	1,087.5	672.6	4.00
	350	1,104.2	674.3	3.00
Terrain Line115	351	1,038.5	622.4	10.00
	352	1,057.4	641.7	7.00
	353	1,068.2	649.1	6.50
	354	1,078.2	648.0	3.50
	355	1,082.0	647.3	3.00
Terrain Line116	356	1,071.2	619.8	3.00
	357	1,063.3	619.9	6.50
Terrain Line117	358	1,061.5	576.9	6.00
	359	1,064.6	593.9	6.00
	360	1,067.4	607.7	6.00
	361	1,070.8	617.6	6.00
Terrain Line118	362	982.9	544.4	49.00
	363	989.3	547.7	46.00
	364	999.8	555.6	46.00
	365	1,023.7	579.9	20.00
	366	1,038.7	588.3	10.00
	367	1,046.4	597.4	6.50
	368	1,062.2	594.6	6.00
Terrain Line119	369	1,007.5	504.4	47.50
	370	1,010.6	494.7	44.00
	371	1,014.9	493.3	43.50
	372	1,023.2	496.8	43.00
	373	1,069.9	515.7	10.00
	374	1,074.4	517.6	5.50
Terrain Line120	375	992.9	400.8	58.00
	376	1,006.1	412.7	50.00
	377	1,015.3	422.6	48.00
	378	1,023.7	431.6	46.00
	379	1,058.4	447.9	32.00
	380	1,083.4	468.6	10.00
	381	1,096.7	481.6	4.50
Terrain Line121	383	1,022.2	407.4	50.00
	384	1,055.4	413.0	40.00
	385	1,100.5	418.5	30.00

	386	1,136.9	455.0	3.50
Terrain Line122	387	1,028.9	370.3	48.00
	388	1,022.0	367.3	52.00
Terrain Line123	389	1,022.3	356.0	52.00
	390	1,030.1	356.4	48.00
	391	1,045.4	357.6	44.00
	392	1,111.6	368.9	30.00
	393	1,139.3	352.0	3.50
Terrain Line124	394	931.8	287.3	63.00
	395	939.6	267.2	52.00
Terrain Line125	396	623.1	170.0	0.50
	397	655.3	163.2	0.50
	398	675.3	159.5	0.50
	399	720.1	166.3	0.50
	400	767.8	185.0	0.50
	401	817.2	188.4	0.50
	402	841.6	182.2	0.50
	403	858.7	164.0	0.50
	404	870.5	170.5	0.50
	405	933.0	169.7	0.50
	406	1,000.2	168.9	0.50
	407	1,029.7	161.6	0.50
	408	1,045.0	146.3	0.50
	409	1,064.6	126.7	0.50
	410	1,089.9	124.5	0.50
	411	1,113.2	129.6	0.50
	412	1,123.2	150.0	0.50
	413	1,133.4	182.6	0.50
	414	1,147.6	197.2	0.50
	415	1,158.0	201.2	0.50
	416	1,157.6	215.4	0.50
	417	1,182.2	241.8	0.50
Terrain Line126	418	873.5	285.5	60.00
	419	852.1	231.5	43.50
Terrain Line127	420	774.2	202.5	32.00
	421	771.7	229.2	39.00

	422	773.0	258.5	45.50
	423	783.0	281.8	50.00
	424	789.5	299.9	62.00
Terrain Line128	425	731.2	322.8	62.00
	426	585.5	155.4	62.00
Terrain Line129	427	731.8	322.4	45.00
	428	585.4	154.2	45.00
Terrain Line99-Terrain Line100	429	1,316.3	855.7	22.00
	430	1,317.0	850.3	12.00
	431	1,318.4	839.6	3.50
Terrain Line40	432	735.6	450.1	103.50
	433	732.8	482.9	90.00
	434	747.1	487.5	86.50
	435	749.9	491.1	86.50
	436	750.6	493.1	86.50
	437	764.3	531.7	78.50
	438	759.0	550.4	75.50
	439	770.9	561.9	75.50
	440	769.7	567.1	74.00
	441	779.4	574.5	70.00
	442	790.9	603.2	68.00
Terrain Line30	443	1,079.1	831.3	11.00
	444	1,073.5	831.0	12.50
	445	1,060.1	827.9	13.50
	446	1,048.9	825.2	14.50
	447	1,039.4	825.3	13.50
	448	1,027.0	825.3	12.30
	449	1,014.9	823.9	11.80
	450	1,001.2	822.3	11.00
Terrain Line136	451	1,194.0	244.3	3.00
	452	1,184.9	457.6	3.00
	453	1,235.6	465.2	3.00
	454	1,266.0	541.2	3.00
	455	1,258.1	544.2	3.00
	456	1,229.6	472.7	3.00
	457	1,227.5	472.5	3.00

	458	1,199.7	468.5	3.00
	459	1,180.5	465.6	3.00
	460	1,179.8	469.0	3.00
	461	1,174.4	498.8	3.00
	462	1,172.7	509.1	3.00
	463	1,170.0	515.1	3.00
	464	1,169.7	519.3	3.00
	465	1,169.5	522.3	3.00
	466	1,168.3	525.4	3.00
	467	1,167.7	530.6	3.00
	468	1,167.4	534.2	3.00
	469	1,167.7	537.6	3.00
	470	1,168.1	540.8	3.00
	471	1,168.3	543.9	3.00
	472	1,167.8	546.3	3.00
	473	1,168.9	554.7	3.00
	474	1,170.9	566.0	3.00
	475	1,171.4	572.0	3.00
	476	1,173.6	580.4	3.00
	477	1,177.0	592.0	3.00
	478	1,181.4	606.3	3.00
	479	1,183.0	615.2	3.00
	480	1,183.4	622.6	3.00
	481	1,183.2	631.3	3.00
	482	1,183.4	633.6	3.00
	483	1,182.4	643.8	3.00
	484	1,183.0	646.5	3.00
	485	1,183.1	647.2	3.00
	486	1,184.0	655.7	3.00
	487	1,184.1	658.5	3.00
	488	1,184.2	660.1	3.00
	489	1,184.2	662.9	3.00
	490	1,184.1	666.7	3.00
	491	1,184.0	672.0	3.00
	492	1,184.2	675.5	3.00
	493	1,184.2	679.2	3.00

	494	1,183.3	680.6	3.00
	495	1,183.3	685.0	3.00
	496	1,183.9	690.2	3.00
	497	1,184.7	693.7	3.00
	498	1,186.4	697.2	3.00
	499	1,187.6	700.5	3.00
	500	1,188.5	704.7	3.00
	501	1,189.7	709.4	3.00
	502	1,190.3	712.9	3.00
	503	1,191.0	717.3	3.00
	504	1,192.2	721.2	3.00
	505	1,193.7	722.0	3.00
	506	1,194.4	723.6	3.00
	507	1,194.7	725.8	3.00
	508	1,194.2	728.5	3.00
	509	1,197.8	728.0	3.00
	510	1,199.9	731.9	3.00
	511	1,202.7	736.9	3.00
	512	1,205.2	742.3	3.00
	513	1,205.9	747.6	3.00
	514	1,209.3	752.7	3.00
	515	1,223.2	764.8	3.00
	516	1,229.4	767.7	3.00
	517	1,239.2	775.1	3.00
	518	1,257.9	788.1	3.00
	519	1,262.4	791.9	3.00
	520	1,267.0	794.0	3.00
	521	1,272.5	799.6	3.00
	522	1,294.5	811.0	3.00
	523	1,305.7	815.9	3.00
	524	1,312.6	820.8	3.00
	525	1,318.8	823.7	3.00
	526	1,323.2	825.6	3.00
	527	1,325.4	826.1	3.00
	528	1,333.6	825.3	3.00
	529	1,334.4	825.7	3.00

	530	1,335.4	827.4	3.00
	531	1,337.0	828.7	3.00
	532	1,338.4	828.8	3.00
	533	1,340.0	826.6	3.00
	534	1,344.4	825.1	3.00
	535	1,351.7	829.0	3.00
	536	1,359.1	833.1	3.00
	537	1,361.3	834.5	3.00
	538	1,360.8	836.6	3.00
	539	1,355.7	842.5	3.00
	540	1,354.4	844.7	3.00
Terrain Line128-2-2	541	573.6	173.9	62.00
	542	714.3	330.2	62.00
Terrain Line129-2-2	543	572.8	174.0	45.00
	544	713.8	330.7	45.00
Terrain Line141	545	0.0	1,500.0	0.00
	546	2,000.0	1,500.0	0.00
	547	2,000.0	0.0	0.00
	548	0.0	0.0	0.00
	549	0.0	1,500.0	0.00
Terrain Line142	550	861.8	450.3	69.00
	551	863.1	451.9	69.00
	552	857.5	456.7	69.00
	553	856.0	455.0	69.00
	554	834.0	474.6	69.00
	555	835.4	476.2	69.00
	556	829.9	481.1	69.00
	557	828.6	479.5	69.00
Terrain Line143	572	993.1	522.3	48.00
	571	992.3	505.4	50.00
	558	992.1	495.6	52.00
	559	990.7	485.9	52.50
	560	990.2	474.8	53.00
	562	989.5	445.6	55.00
	563	992.4	419.6	58.00
	564	990.0	376.3	61.00

	565	989.9	347.9	62.00
	566	995.0	340.8	58.00
	567	998.9	335.5	57.00
	568	1,000.8	332.5	56.50
	569	1,002.4	329.8	56.00
Terrain Line148	573	1,002.5	407.0	52.00
	574	1,005.9	407.0	51.80
	575	1,015.3	407.0	51.80
	576	1,020.0	405.4	51.80
	577	1,021.9	402.4	51.80

EDAW/AECOM				**13 August 2009**	
Mike Carr SN 65282				**TNM 2.5**	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**				
RUN:	**Existing**				
Ground Zone			**Points**		
Name	**Type**	**Flow Resistivity**	**No.**	**Coordinates X**	**Y**
		cgs rayls		m	m
Ground Zone3	Lawn	300	17	1,069.7	701.9
			18	1,037.8	627.8
			19	1,040.9	594.6
			20	1,091.6	476.6
			21	1,137.6	450.8
			22	1,144.3	356.9
			23	1,119.0	364.4
			24	996.0	342.4
			25	996.0	410.8
			26	996.0	448.3
			27	996.0	488.9
			28	1,006.5	490.8
			29	1,006.5	498.5
			30	1,015.3	522.2
			31	988.6	576.4
			32	990.1	608.1
			33	1,027.2	652.6
Ground Zone4	Lawn	300	34	1,161.5	563.3
			35	1,165.6	564.4
			36	1,172.6	592.4
			37	1,171.3	609.4
			38	1,168.9	612.9
			39	1,164.1	614.5

			40	1,135.6	610.0
			41	1,124.9	610.5
			42	1,120.5	607.2
			43	1,119.0	601.1
			44	1,121.1	584.5
			45	1,123.2	576.1
			46	1,132.4	567.7
			47	1,141.7	567.1
			48	1,152.2	568.7

EDAW/AECOM
Mike Carr SN 65282
20 October 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Existing
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	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R-1	9	1	67.4	67.5	71	0.1	12	----	67.5	0.0	5	-5.0
R-2 (ST-1)	16	1	71.4	71.4	71	0.0	12	Snd Lvl	71.4	0.0	5	-5.0
R-3	17	1	71.4	73.5	66	2.1	12	Snd Lvl	73.5	0.0	5	-5.0
R-4 (ST-3)	18	1	71.4	71.4	71	0.0	12	Snd Lvl	71.4	0.0	5	-5.0
R-5	19	1	70.4	70.4	71	0.0	12	----	70.4	0.0	5	-5.0
R-6	20	1	0.0	66.1	66	66.1	12	Snd Lvl	66.1	0.0	5	-5.0
R-7	21	1	0.0	67.1	66	67.1	12	Snd Lvl	67.1	0.0	5	-5.0
R-8	22	1	0.0	64.2	66	64.2	12	----	64.2	0.0	5	-5.0
R-9	24	1	0.0	63.4	66	63.4	12	----	63.4	0.0	5	-5.0
R-10 (ST-2)	25	1	65.9	65.7	66	-0.2	12	----	65.7	0.0	5	-5.0
R-11	38	1	0.0	54.8	66	54.8	12	----	54.8	0.0	5	-5.0
R-12 (ST-4)	39	1	63.5	65.5	66	2.0	12	----	65.5	0.0	5	-5.0
R-13 (ST-5)	40	1	60.9	57.0	71	-3.9	12	----	57.0	0.0	5	-5.0
R-14	41	1	0.0	64.6	66	64.6	12	----	64.6	0.0	5	-5.0
R-15	42	1	0.0	62.2	66	62.2	12	----	62.2	0.0	5	-5.0
R-16	43	1	73.1	71.2	71	-1.9	12	Snd Lvl	71.2	0.0	5	-5.0
R-17	59	1	0.0	60.2	66	60.2	12	----	60.2	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	6	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future No Build

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	%		
SFOBB WB OFF SE	3.7	point82	70	971.1	592.8	58.00				Average	
		point81	71	929.3	546.5	57.00				Average	
		point80	72	884.6	498.2	57.00				Average	
		point79	73	884.0	493.9	57.00				Average	
		point78	74	885.1	490.1	57.00				Average	
		point77	75	887.5	487.3	57.00				Average	
		point76	76	899.1	483.8	57.00				Average	
		point75	77	914.4	479.1	57.00				Average	
		point74	78	929.8	473.0	56.50				Average	
		point73	79	943.5	465.6	56.00					
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00				Average	
		point95	81	919.4	524.9	51.20				Average	
		point94	82	925.7	530.1	51.30				Average	
		point93	83	946.1	550.2	51.50				Average	
		point92	84	949.8	552.6	51.50				Average	
		point91	85	952.0	553.6	51.50				Average	
		point90	86	958.8	555.0	51.50				Average	
		point89	87	963.5	554.4	51.20				Average	
		point88	88	966.9	553.3	51.00				Average	
		point87	89	970.1	551.7	50.80				Average	
		point86	90	977.5	545.3	50.50				Average	
		point85	91	979.9	542.2	50.00				Average	
		point84	92	982.5	534.0	49.50				Average	
		point83	93	986.4	520.0	48.00					
SFOBB WB ON NE	3.7	point106	94	954.5	634.9	47.50	Onramp	72.00	100	Average	

		point105	95	883.6	554.9	56.50				Average	
		point104	96	880.6	550.8	56.80				Average	
		point103	97	879.5	546.3	57.00				Average	
		point102	98	877.6	528.5	57.00				Average	
		point101	99	875.6	521.9	57.00				Average	
		point100	100	873.2	516.6	57.00				Average	
		point99	101	862.9	501.7	56.70				Average	
		point98	102	848.1	482.2	56.50				Average	
		point97	103	840.5	473.4	56.00					
SFOBB WB OFF NE	3.7	point123	104	1,030.7	686.0	52.00				Average	
		point122	105	1,013.1	666.1	52.00				Average	
		point121	106	995.7	646.5	52.00				Average	
		point120	107	958.4	607.9	51.80				Average	
		point119	108	919.5	564.6	51.50				Average	
		point118	109	900.4	542.3	51.30				Average	
		point117	110	893.2	535.8	51.10				Average	
		point116	111	889.0	534.8	51.00				Average	
		point115	112	885.7	535.6	51.50				Average	
		point114	113	883.1	538.5	52.00				Average	
		point113	114	882.2	543.8	53.00				Average	
		point112	115	883.3	548.8	54.00				Average	
		point111	116	886.3	554.1	55.00				Average	
		point107	117	956.5	633.8	47.50					
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	100	Average	
		point136	119	984.2	536.2	49.50				Average	
		point135	120	980.5	547.6	50.50				Average	
		point134	121	976.7	558.8	51.00				Average	
		point133	122	974.1	567.2	51.50				Average	
		point132	123	973.6	572.5	51.50				Average	
		point131	124	974.0	578.1	51.40				Average	
		point130	125	974.6	580.7	51.40				Average	
		point129	126	975.7	584.7	51.30				Average	
		point128	127	981.1	597.1	51.40				Average	
		point127	128	987.9	608.4	51.50				Average	
		point126	129	995.6	619.1	51.70				Average	
		point125	130	1,008.7	635.6	51.90				Average	
		point124	131	1,018.4	646.7	52.00					
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00				Average	
		point369	355	624.3	463.0	92.50				Average	

		point368	356	629.2	458.1	92.00				Average	
		point367	357	639.7	452.1	91.00				Average	
		point366	358	653.3	443.1	90.50				Average	
		point365	359	657.8	439.3	90.00				Average	
		point364	360	673.3	420.0	90.00				Average	
		point363	361	678.0	415.8	90.00				Average	
		point362	362	693.7	404.9	90.00				Average	
		point361	363	712.9	394.2	91.00				Average	
		point360	364	731.8	386.5	90.00					
Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00				Average	
		point372	366	713.7	396.1	91.00				Average	
		point373	367	694.7	406.6	90.00				Average	
		point374	368	679.3	417.4	90.00				Average	
		point375	369	674.7	421.4	90.00				Average	
		point376	370	659.2	440.7	90.00				Average	
		point377	371	654.5	444.7	90.50				Average	
		point378	372	640.8	453.8	90.00				Average	
		point379	373	630.4	459.7	92.00				Average	
		point380	374	626.2	463.9	92.50				Average	
		point381	375	625.6	468.5	92.00					
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00				Average	
		point393	377	641.6	461.7	91.50				Average	
		point392	378	668.2	456.6	94.50				Average	
		point391	379	674.0	454.2	94.80				Average	
		point390	380	708.1	430.4	98.00				Average	
		point389	381	752.6	412.0	99.50				Average	
		point388	382	762.9	408.4	100.20				Average	
		point387	383	777.7	407.1	101.50				Average	
		point386	384	789.1	412.5	102.50				Average	
		point385	385	792.9	422.4	103.00				Average	
		point384	386	789.3	432.7	103.20				Average	
		point383	387	781.8	439.0	103.50				Average	
		point382	388	764.6	441.0	103.80					
Signal Rd - 2	3.7	point406	389	764.6	438.7	103.80				Average	
		point405	390	781.7	436.9	103.50				Average	
		point404	391	787.9	431.6	103.20				Average	
		point403	392	790.4	422.7	103.00				Average	
		point402	393	786.8	414.4	102.50				Average	
		point401	394	777.5	410.1	101.50				Average	

		point400	395	762.9	411.2	100.20				Average	
		point399	396	708.5	432.8	98.00				Average	
		point398	397	675.4	456.1	94.80				Average	
		point397	398	668.9	458.7	94.50				Average	
		point396	399	641.9	463.8	91.50				Average	
		point395	400	629.9	468.6	92.00					
SFOBB WB - 3	7.3	point668	668	1,553.4	1,058.5	58.00				Average	Y
		point667	667	1,444.4	1,022.8	58.00				Average	Y
		point666	666	1,355.7	983.9	58.00				Average	Y
		point626	626	1,266.5	925.5	58.50				Average	Y
		point625	625	1,244.7	909.5	59.70				Average	Y
		point624	624	1,209.3	881.4	59.80				Average	Y
		point623	623	1,184.1	859.5	60.00				Average	Y
		point622	622	1,141.5	818.3	60.20				Average	Y
		point621	621	1,112.6	787.8	60.50				Average	Y
		point620	620	1,083.8	753.4	60.40				Average	Y
		point619	619	1,061.4	723.7	60.20				Average	Y
		point618	618	1,048.6	705.0	60.00				Average	Y
		point617	617	988.2	619.9	56.70				Average	Y
		point616	616	969.4	597.5	56.60				Average	Y
		point615	615	951.9	577.6	56.50				Average	Y
		point614	614	864.5	478.7	56.00				Average	Y
		point613	613	851.3	463.7	56.00					
SFOBB WB - 2	7.3	point664	664	1,551.8	1,063.3	58.00				Average	Y
		point663	663	1,442.4	1,028.5	58.00				Average	Y
		point662	662	1,352.8	990.0	58.00				Average	Y
		point612	612	1,262.4	931.1	58.50				Average	Y
		point611	611	1,240.5	915.1	59.70				Average	Y
		point610	610	1,204.9	886.8	59.80				Average	Y
		point609	609	1,179.4	864.6	60.00				Average	Y
		point608	608	1,136.5	823.2	60.20				Average	Y
		point607	607	1,107.4	792.4	60.50				Average	Y
		point606	606	1,078.4	757.7	60.40				Average	Y
		point605	605	1,055.8	727.8	60.20				Average	Y
		point604	604	1,042.9	709.0	60.00				Average	Y
		point603	603	982.7	624.2	56.70				Average	Y
		point602	602	964.2	602.1	56.60				Average	Y
		point601	601	946.6	582.2	56.50				Average	Y
		point600	600	859.3	483.3	56.00				Average	Y

		point599	599	846.0	468.3	56.00					
SFOBB WB - 1	7.3	point660	660	1,551.3	1,067.4	58.00				Average	
		point659	659	1,441.3	1,033.4	58.00				Average	Y
		point658	658	1,351.6	995.1	58.00				Average	Y
		point596	596	1,258.3	936.8	58.50				Average	Y
		point595	595	1,236.2	920.6	59.70				Average	Y
		point594	594	1,200.4	892.2	59.80				Average	Y
		point593	593	1,174.7	869.8	60.00				Average	Y
		point592	592	1,131.5	828.1	60.20				Average	Y
		point591	591	1,102.2	797.1	60.50				Average	Y
		point590	590	1,072.9	762.1	60.40				Average	Y
		point589	589	1,050.1	731.9	60.20				Average	Y
		point588	588	1,037.2	713.0	60.00				Average	Y
		point587	587	977.1	628.5	56.70				Average	Y
		point586	586	958.9	606.6	56.60				Average	Y
		point585	585	941.4	586.9	56.50				Average	Y
		point584	584	854.1	487.9	56.00				Average	Y
		point583	583	840.8	473.0	56.00					
SFOBB EB - 1	7.3	point636	636	841.0	470.8	50.00				Average	Y
		point635	635	885.6	521.5	51.50				Average	Y
		point634	634	925.6	563.7	53.00				Average	Y
		point633	633	997.7	646.8	53.50				Average	Y
		point632	632	1,070.2	729.7	53.70				Average	Y
		point631	631	1,114.7	775.7	54.00				Average	Y
		point630	630	1,133.8	791.6	54.50				Average	Y
		point629	629	1,181.8	828.2	55.00				Average	Y
		point628	628	1,216.2	857.6	55.50				Average	Y
		point669	669	1,279.1	904.6	56.00				Average	Y
		point670	670	1,371.5	962.9	56.50				Average	Y
		point671	671	1,457.8	999.3	56.70				Average	Y
		point672	672	1,564.3	1,032.9	57.00					
SFOBB EB - 2	7.3	point646	646	846.3	466.2	50.00				Average	Y
		point645	645	890.8	516.8	51.50				Average	Y
		point644	644	930.7	559.0	53.00				Average	Y
		point643	643	1,003.0	642.2	53.50				Average	Y
		point642	642	1,075.3	725.0	53.70				Average	Y
		point641	641	1,119.4	770.6	54.00				Average	Y
		point640	640	1,138.2	786.2	54.50				Average	Y
		point639	639	1,186.2	822.8	55.00				Average	Y

		point638	638	1,220.6	852.2	55.50				Average	Y
		point673	673	1,283.3	899.0	56.00				Average	Y
		point674	674	1,375.5	956.8	56.50				Average	Y
		point675	675	1,461.4	992.4	56.70				Average	Y
		point676	676	1,566.7	1,026.1	57.00					
SFOBB EB - 3	7.3	point656	656	851.5	461.6	50.00				Average	Y
		point655	655	895.9	512.1	51.50				Average	Y
		point654	654	935.9	554.4	53.00				Average	Y
		point653	653	1,008.2	637.6	53.50				Average	Y
		point652	652	1,080.5	720.3	53.70				Average	Y
		point651	651	1,124.2	765.5	54.00				Average	Y
		point650	650	1,142.5	780.7	54.50				Average	Y
		point649	649	1,190.6	817.3	55.00				Average	Y
		point648	648	1,224.9	846.7	55.50				Average	Y
		point677	677	1,287.5	893.4	56.00				Average	Y
		point678	678	1,379.6	949.5	56.50				Average	Y
		point679	679	1,465.1	986.0	56.70				Average	Y
		point680	680	1,568.8	1,019.6	57.00					
North Gate Rd - 2	3.7	point681	681	974.6	640.0	45.50				Average	
		point242	208	980.6	648.5	44.80				Average	
		point241	209	978.9	658.9	43.50				Average	
		point240	210	974.3	664.4	43.00				Average	
		point239	211	968.3	668.3	42.00				Average	
		point238	212	946.7	679.7	40.50				Average	
		point237	213	920.0	690.1	38.50				Average	
		point236	214	903.8	696.0	38.00				Average	
		point235	215	874.7	706.7	36.50				Average	
		point234	216	856.7	711.6	35.50				Average	
		point233	217	837.9	712.7	34.50				Average	
		point232	218	808.2	706.6	33.00				Average	
		point231	219	802.6	707.5	32.80				Average	
		point230	220	798.2	714.0	32.50				Average	
		point229	221	799.2	722.3	32.80				Average	
		point228	222	808.3	725.7	31.50				Average	
		point227	223	838.9	724.6	30.20				Average	
		point226	224	869.2	727.4	28.20				Average	
		point225	225	891.3	726.1	28.00				Average	
		point224	226	899.9	736.4	26.70				Average	
		point223	227	896.7	745.8	26.50				Average	

		point222	228	887.6	757.5	26.00				Average	
		point221	229	875.8	776.9	25.50				Average	
		point220	230	873.5	791.2	23.50				Average	
		point219	231	878.3	813.9	21.50				Average	
		point218	232	887.7	828.1	20.00				Average	
		point217	233	912.6	848.7	18.00				Average	
		point216	234	931.5	858.7	16.50				Average	
		point215	235	966.3	865.7	15.00				Average	
		point214	236	1,029.0	871.4	10.50				Average	
		point213	237	1,059.1	870.7	10.00				Average	
		point212	238	1,075.1	869.6	9.50				Average	
		point211	239	1,088.1	866.9	9.30				Average	
		point210	240	1,092.6	863.7	9.30				Average	
		point209	241	1,105.7	847.3	9.00				Average	
		point208	242	1,132.0	810.7	8.70				Average	
		point207	243	1,140.5	802.3	8.60				Average	
		point206	244	1,171.5	789.1	7.00				Average	
		point205	245	1,185.8	782.0	6.50				Average	
		point204	246	1,191.4	775.4	6.00				Average	
		point203	247	1,192.7	771.5	5.50				Average	
		point202	248	1,193.2	765.2	5.00				Average	
		point201	249	1,191.2	756.4	4.50				Average	
		point200	250	1,177.4	740.0	4.00				Average	
		point199	251	1,167.8	727.2	3.60				Average	
		point198	252	1,158.1	712.1	3.50				Average	
		point197	253	1,092.8	633.7	3.50				Average	
		point196	254	1,080.9	616.6	4.00				Average	
		point195	255	1,070.5	593.7	5.50				Average	
		point194	256	1,067.2	577.5	5.70				Average	
		point193	257	1,066.7	564.7	5.80				Average	
		point192	258	1,070.5	554.0	5.60				Average	
		point191	259	1,079.2	537.3	5.40				Average	
		point190	260	1,096.3	488.5	4.50				Average	
		point189	261	1,109.6	471.9	4.00				Average	
		point188	262	1,122.5	464.6	3.50					
North Gate Rd - 1	3.7	point359	263	1,124.1	467.5	3.50				Average	
		point358	264	1,111.4	473.9	4.00				Average	
		point357	265	1,098.7	489.2	4.50				Average	
		point356	266	1,089.0	516.7	5.00				Average	

		point355	267	1,081.7	537.9	5.40				Average	
		point354	268	1,073.4	555.5	5.60				Average	
		point353	269	1,070.6	565.0	5.80				Average	
		point352	270	1,070.8	576.7	5.70				Average	
		point351	271	1,074.8	593.1	5.50				Average	
		point350	272	1,085.1	615.7	4.00				Average	
		point349	273	1,095.2	630.9	3.50				Average	
		point348	274	1,107.1	644.5	3.50				Average	
		point347	275	1,111.6	649.3	3.50				Average	
		point346	276	1,128.6	669.7	3.50				Average	
		point345	277	1,137.6	681.0	3.50				Average	
		point344	278	1,163.4	712.1	3.50				Average	
		point343	279	1,182.9	735.2	4.00				Average	
		point342	280	1,190.3	745.6	4.20				Average	
		point341	281	1,195.2	752.6	4.50				Average	
		point340	282	1,198.5	763.6	5.00				Average	
		point339	283	1,197.7	770.3	5.50				Average	
		point338	284	1,195.7	776.6	6.00				Average	
		point337	285	1,188.6	784.5	6.50				Average	
		point335	287	1,172.5	792.6	7.00				Average	
		point334	288	1,142.9	805.1	8.60				Average	
		point333	289	1,134.1	812.4	8.70				Average	
		point332	290	1,120.5	831.3	8.80				Average	
		point331	291	1,110.0	846.8	9.00				Average	
		point330	292	1,100.5	860.4	9.10				Average	
		point329	293	1,094.9	866.9	9.30				Average	
		point328	294	1,089.0	870.5	9.30				Average	
		point327	295	1,074.9	873.3	9.50				Average	
		point326	296	1,058.3	874.8	10.00				Average	
		point325	297	1,043.2	875.2	10.20				Average	
		point324	298	1,028.0	874.8	10.50				Average	
		point323	299	1,000.9	872.0	12.50				Average	
		point322	300	965.5	867.9	15.00				Average	
		point321	301	930.5	860.9	16.50				Average	
		point320	302	910.8	850.2	18.00				Average	
		point319	303	885.7	829.5	20.00				Average	
		point318	304	876.1	814.3	21.50				Average	
		point317	305	871.2	791.0	23.50				Average	
		point316	306	873.5	776.2	25.50				Average	

		point315	307	885.0	756.1	26.00				Average	
		point314	308	894.1	744.9	26.50				Average	
		point313	309	897.0	736.5	26.70				Average	
		point312	310	890.0	728.2	28.00				Average	
		point311	311	869.1	729.3	28.20				Average	
		point310	312	838.6	726.6	30.20				Average	
		point309	313	808.0	727.5	31.50				Average	
		point308	314	797.1	724.0	32.30				Average	
		point307	315	795.4	713.2	32.50				Average	
		point306	316	801.7	704.8	32.80				Average	
		point305	317	808.3	703.5	33.00				Average	
		point304	318	837.9	709.9	34.50				Average	
		point303	319	856.4	708.7	35.50				Average	
		point302	320	875.3	703.6	36.50				Average	
		point301	321	946.4	678.3	40.50				Average	
		point300	322	967.0	665.8	42.50				Average	
		point299	323	975.1	657.4	43.50				Average	
		point298	324	975.4	649.8	44.80				Average	
		point297	325	970.6	644.2	45.50					
Treasure Is Rd - 2	3.7	point164	132	985.1	519.1	48.00				Average	
		point163	133	986.0	503.2	48.00				Average	
		point162	134	984.4	452.2	53.50				Average	
		point161	135	979.4	378.0	60.50				Average	
		point160	136	975.4	356.4	61.50				Average	
		point159	137	961.6	319.8	63.00				Average	
		point158	138	950.8	306.7	63.50				Average	
		point157	139	935.5	296.0	64.00				Average	
		point156	140	921.7	290.2	64.00				Average	
		point155	141	904.0	289.3	60.50				Average	
		point154	142	896.6	291.0	60.80				Average	
		point153	143	798.8	311.0	62.50				Average	
		point152	144	776.7	316.4	62.20				Average	
		point151	145	769.7	319.5	62.00				Average	
		point150	146	728.3	352.1	71.50				Average	
		point149	147	707.3	362.0	72.80				Average	
		point148	148	694.4	363.4	74.00				Average	
		point147	149	683.5	362.8	73.00				Average	
		point146	150	671.9	360.6	72.50				Average	
		point145	151	660.7	356.8	71.50				Average	

		point144	152	654.9	355.4	70.00				Average	
		point143	153	602.5	340.2	63.00				Average	
		point142	154	591.8	337.9	62.00				Average	
		point141	155	582.9	336.9	61.00				Average	
		point140	156	571.6	337.4	60.00				Average	
		point139	157	557.7	340.8	57.50					
Macalla Rd - 1	3.7	point713	713	970.6	644.2	45.50				Average	
		point296	326	963.7	642.0	46.00				Average	
		point295	327	954.1	643.0	47.50				Average	
		point294	328	909.2	655.7	52.00				Average	
		point293	329	863.1	668.1	56.50				Average	
		point292	330	851.7	668.3	57.50				Average	
		point291	331	838.7	666.6	58.50				Average	
		point290	332	822.7	661.3	59.50				Average	
		point289	333	790.9	647.9	65.00				Average	
		point288	334	781.7	638.5	66.00				Average	
		point287	335	776.7	627.2	66.20				Average	
		point286	336	775.1	615.1	66.50				Average	
		point285	337	763.7	595.8	67.50				Average	
		point284	338	749.0	584.6	68.50				Average	
		point283	339	730.6	577.1	69.50				Average	
		point282	340	711.5	575.6	70.00				Average	
		point281	341	688.8	580.4	70.50				Average	
		point280	342	671.1	587.3	71.00				Average	
		point279	343	658.3	586.9	70.60				Average	
		point278	344	635.8	585.6	70.30				Average	
		point277	345	618.9	584.9	70.00				Average	
		point276	346	610.5	587.9	68.50				Average	
		point275	347	590.6	604.4	67.50					
Treasure Is Rd - 1-2	3.7	point715	715	556.4	336.6	57.50				Average	
		point185	161	571.0	332.7	60.00				Average	
		point184	162	583.3	332.3	61.00				Average	
		point183	163	594.8	332.7	62.00				Average	
		point182	164	664.7	354.5	71.00				Average	
		point181	165	676.6	357.9	72.50				Average	
		point180	166	686.6	359.0	73.00				Average	
		point179	167	694.3	359.5	74.00				Average	
		point178	168	706.9	358.4	72.80				Average	
		point177	169	726.5	348.7	71.50				Average	

		point176	170	767.9	316.6	62.00				Average	
		point175	171	776.8	312.8	62.20				Average	
		point174	172	904.5	285.9	60.00				Average	
		point173	173	924.4	287.5	64.00				Average	
		point172	174	940.3	294.3	64.00				Average	
		point171	175	956.4	306.2	63.50				Average	
		point170	176	966.8	319.1	63.00				Average	
		point169	177	975.3	338.1	61.00				Average	
		point168	178	980.9	359.6	61.50				Average	
		point167	179	983.1	378.2	60.50				Average	
		point166	180	990.1	506.3	48.50				Average	
		point165	181	988.9	518.9	48.00					
Macalla Rd - 2	3.7	point664	717	589.2	601.8	67.50				Average	
		point262	718	608.9	584.9	68.50				Average	
		point261	719	619.0	581.8	70.00				Average	
		point260	720	649.0	583.5	71.00				Average	
		point259	721	671.1	584.4	71.00				Average	
		point258	722	687.7	577.3	70.50				Average	
		point257	723	711.7	572.7	70.00				Average	
		point256	724	731.9	574.3	69.50				Average	
		point255	725	750.7	582.4	68.50				Average	
		point254	726	765.5	593.8	67.50				Average	
		point253	727	778.2	614.7	66.50				Average	
		point252	728	780.7	627.7	66.20				Average	
		point251	729	784.5	637.3	66.00				Average	
		point250	730	792.7	645.2	65.00				Average	
		point249	731	824.3	658.8	58.50				Average	
		point248	732	840.9	664.0	58.50				Average	
		point247	733	852.9	665.3	57.50				Average	
		point246	734	862.9	665.1	56.50				Average	
		point245	735	953.4	637.5	47.50				Average	
		point244	736	965.0	636.8	46.50				Average	
		point243	737	974.6	640.0	45.50					

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future No Build

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
SFOBB WB OFF SE	point82	70	314	88	4	88	5	88	0	0	0	0
	point81	71	314	88	4	88	5	88	0	0	0	0
	point80	72	314	88	4	88	5	88	0	0	0	0
	point79	73	314	88	4	88	5	88	0	0	0	0
	point78	74	314	88	4	88	5	88	0	0	0	0
	point77	75	314	88	4	88	5	88	0	0	0	0
	point76	76	314	88	4	88	5	88	0	0	0	0
	point75	77	314	88	4	88	5	88	0	0	0	0
	point74	78	314	88	4	88	5	88	0	0	0	0
	point73	79										
SFOBB EB OFF SE	point96	80	248	88	3	88	4	88	0	0	0	0
	point95	81	248	88	3	88	4	88	0	0	0	0
	point94	82	248	88	3	88	4	88	0	0	0	0
	point93	83	248	88	3	88	4	88	0	0	0	0
	point92	84	248	88	3	88	4	88	0	0	0	0
	point91	85	248	88	3	88	4	88	0	0	0	0
	point90	86	248	88	3	88	4	88	0	0	0	0
	point89	87	248	88	3	88	4	88	0	0	0	0
	point88	88	248	88	3	88	4	88	0	0	0	0
	point87	89	248	88	3	88	4	88	0	0	0	0
	point86	90	248	88	3	88	4	88	0	0	0	0
	point85	91	248	88	3	88	4	88	0	0	0	0
	point84	92	248	88	3	88	4	88	0	0	0	0

	point83	93										
SFOBB WB ON NE	point106	94	224	88	3	88	4	88	0	0	0	0
	point105	95	224	88	3	88	4	88	0	0	0	0
	point104	96	224	88	3	88	4	88	0	0	0	0
	point103	97	224	88	3	88	4	88	0	0	0	0
	point102	98	224	88	3	88	4	88	0	0	0	0
	point101	99	224	88	3	88	4	88	0	0	0	0
	point100	100	224	88	3	88	4	88	0	0	0	0
	point99	101	224	88	3	88	4	88	0	0	0	0
	point98	102	224	88	3	88	4	88	0	0	0	0
	point97	103										
SFOBB WB OFF NE	point123	104	314	88	4	88	5	88	0	0	0	0
	point122	105	314	88	4	88	5	88	0	0	0	0
	point121	106	314	88	4	88	5	88	0	0	0	0
	point120	107	314	88	4	88	5	88	0	0	0	0
	point119	108	314	88	4	88	5	88	0	0	0	0
	point118	109	314	88	4	88	5	88	0	0	0	0
	point117	110	314	88	4	88	5	88	0	0	0	0
	point116	111	314	88	4	88	5	88	0	0	0	0
	point115	112	314	88	4	88	5	88	0	0	0	0
	point114	113	314	88	4	88	5	88	0	0	0	0
	point113	114	314	88	4	88	5	88	0	0	0	0
	point112	115	314	88	4	88	5	88	0	0	0	0
	point111	116	314	88	4	88	5	88	0	0	0	0
	point107	117										
SFOBB EB ON SE	point137	118	476	88	6	88	8	88	0	0	0	0
	point136	119	476	88	6	88	8	88	0	0	0	0
	point135	120	476	88	6	88	8	88	0	0	0	0
	point134	121	476	88	6	88	8	88	0	0	0	0
	point133	122	476	88	6	88	8	88	0	0	0	0
	point132	123	476	88	6	88	8	88	0	0	0	0
	point131	124	476	88	6	88	8	88	0	0	0	0
	point130	125	476	88	6	88	8	88	0	0	0	0
	point129	126	476	88	6	88	8	88	0	0	0	0
	point128	127	476	88	6	88	8	88	0	0	0	0
	point127	128	476	88	6	88	8	88	0	0	0	0

	point126	129	476	88	6	88	8	88	0	0	0	0
	point125	130	476	88	6	88	8	88	0	0	0	0
	point124	131										
Forest Rd - 1	point370	354	12	25	0	0	0	0	0	0	0	0
	point369	355	12	25	0	0	0	0	0	0	0	0
	point368	356	12	25	0	0	0	0	0	0	0	0
	point367	357	12	25	0	0	0	0	0	0	0	0
	point366	358	12	25	0	0	0	0	0	0	0	0
	point365	359	12	25	0	0	0	0	0	0	0	0
	point364	360	12	25	0	0	0	0	0	0	0	0
	point363	361	12	25	0	0	0	0	0	0	0	0
	point362	362	12	25	0	0	0	0	0	0	0	0
	point361	363	12	25	0	0	0	0	0	0	0	0
	point360	364										
Forest Rd - 2	point371	365	12	25	0	0	0	0	0	0	0	0
	point372	366	12	25	0	0	0	0	0	0	0	0
	point373	367	12	25	0	0	0	0	0	0	0	0
	point374	368	12	25	0	0	0	0	0	0	0	0
	point375	369	12	25	0	0	0	0	0	0	0	0
	point376	370	12	25	0	0	0	0	0	0	0	0
	point377	371	12	25	0	0	0	0	0	0	0	0
	point378	372	12	25	0	0	0	0	0	0	0	0
	point379	373	12	25	0	0	0	0	0	0	0	0
	point380	374	12	25	0	0	0	0	0	0	0	0
	point381	375										
Signal Rd - 1	point394	376	10	40	0	0	0	0	0	0	0	0
	point393	377	10	40	0	0	0	0	0	0	0	0
	point392	378	10	40	0	0	0	0	0	0	0	0
	point391	379	10	40	0	0	0	0	0	0	0	0
	point390	380	10	40	0	0	0	0	0	0	0	0
	point389	381	10	40	0	0	0	0	0	0	0	0
	point388	382	10	40	0	0	0	0	0	0	0	0
	point387	383	10	40	0	0	0	0	0	0	0	0
	point386	384	10	40	0	0	0	0	0	0	0	0
	point385	385	10	40	0	0	0	0	0	0	0	0
	point384	386	10	40	0	0	0	0	0	0	0	0

	point383	387	10	40	0	0	0	0	0	0	0	0
	point382	388										
Signal Rd - 2	point406	389	10	40	0	0	0	0	0	0	0	0
	point405	390	10	40	0	0	0	0	0	0	0	0
	point404	391	10	40	0	0	0	0	0	0	0	0
	point403	392	10	40	0	0	0	0	0	0	0	0
	point402	393	10	40	0	0	0	0	0	0	0	0
	point401	394	10	40	0	0	0	0	0	0	0	0
	point400	395	10	40	0	0	0	0	0	0	0	0
	point399	396	10	40	0	0	0	0	0	0	0	0
	point398	397	10	40	0	0	0	0	0	0	0	0
	point397	398	10	40	0	0	0	0	0	0	0	0
	point396	399	10	40	0	0	0	0	0	0	0	0
	point395	400										
SFOBB WB - 3	point668	668	3075	105	41	105	51	88	0	0	0	0
	point667	667	3075	105	41	105	51	88	0	0	0	0
	point666	666	3075	105	41	105	51	88	0	0	0	0
	point626	626	3075	105	41	105	51	88	0	0	0	0
	point625	625	3075	105	41	105	51	88	0	0	0	0
	point624	624	3075	105	41	105	51	88	0	0	0	0
	point623	623	3075	105	41	105	51	88	0	0	0	0
	point622	622	3075	105	41	105	51	88	0	0	0	0
	point621	621	3075	105	41	105	51	88	0	0	0	0
	point620	620	3075	105	41	105	51	88	0	0	0	0
	point619	619	3075	105	41	105	51	88	0	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0	0
	point613	613										
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0	0

	point610	610	3075	105	41	105	51	88	0	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0	0
	point599	599										
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0	0
	point587	587	3075	105	41	105	51	88	0	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0	0
	point583	583										
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0	0

	point629	629	2754	105	37	105	45	88	0	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0	0
	point672	672										
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0	0
	point676	676										
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0	0
	point651	651	2754	105	37	105	45	88	0	0	0	0
	point650	650	2754	105	37	105	45	88	0	0	0	0
	point649	649	2754	105	37	105	45	88	0	0	0	0
	point648	648	2754	105	37	105	45	88	0	0	0	0
	point677	677	2754	105	37	105	45	88	0	0	0	0
	point678	678	2754	105	37	105	45	88	0	0	0	0
	point679	679	2754	105	37	105	45	88	0	0	0	0
	point680	680										
North Gate Rd - 2	point681	681	340	40	7	40	3	40	0	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0	0

	point239	211	340	40	7	40	3	40	0	0	0	0
	point238	212	340	40	7	40	3	40	0	0	0	0
	point237	213	340	40	7	40	3	40	0	0	0	0
	point236	214	340	40	7	40	3	40	0	0	0	0
	point235	215	340	40	7	40	3	40	0	0	0	0
	point234	216	340	40	7	40	3	40	0	0	0	0
	point233	217	340	40	7	40	3	40	0	0	0	0
	point232	218	340	40	7	40	3	40	0	0	0	0
	point231	219	340	40	7	40	3	40	0	0	0	0
	point230	220	340	40	7	40	3	40	0	0	0	0
	point229	221	340	40	7	40	3	40	0	0	0	0
	point228	222	340	40	7	40	3	40	0	0	0	0
	point227	223	340	40	7	40	3	40	0	0	0	0
	point226	224	340	40	7	40	3	40	0	0	0	0
	point225	225	340	40	7	40	3	40	0	0	0	0
	point224	226	340	40	7	40	3	40	0	0	0	0
	point223	227	340	40	7	40	3	40	0	0	0	0
	point222	228	340	40	7	40	3	40	0	0	0	0
	point221	229	340	40	7	40	3	40	0	0	0	0
	point220	230	340	40	7	40	3	40	0	0	0	0
	point219	231	340	40	7	40	3	40	0	0	0	0
	point218	232	340	40	7	40	3	40	0	0	0	0
	point217	233	340	40	7	40	3	40	0	0	0	0
	point216	234	340	40	7	40	3	40	0	0	0	0
	point215	235	340	40	7	40	3	40	0	0	0	0
	point214	236	340	40	7	40	3	40	0	0	0	0
	point213	237	340	40	7	40	3	40	0	0	0	0
	point212	238	340	40	7	40	3	40	0	0	0	0
	point211	239	340	40	7	40	3	40	0	0	0	0
	point210	240	340	40	7	40	3	40	0	0	0	0
	point209	241	340	40	7	40	3	40	0	0	0	0
	point208	242	340	40	7	40	3	40	0	0	0	0
	point207	243	340	40	7	40	3	40	0	0	0	0
	point206	244	340	40	7	40	3	40	0	0	0	0
	point205	245	340	40	7	40	3	40	0	0	0	0
	point204	246	340	40	7	40	3	40	0	0	0	0

	point203	247	340	40	7	40	3	40	0	0	0	0
	point202	248	340	40	7	40	3	40	0	0	0	0
	point201	249	340	40	7	40	3	40	0	0	0	0
	point200	250	340	40	7	40	3	40	0	0	0	0
	point199	251	340	40	7	40	3	40	0	0	0	0
	point198	252	340	40	7	40	3	40	0	0	0	0
	point197	253	340	40	7	40	3	40	0	0	0	0
	point196	254	340	40	7	40	3	40	0	0	0	0
	point195	255	340	40	7	40	3	40	0	0	0	0
	point194	256	340	40	7	40	3	40	0	0	0	0
	point193	257	340	40	7	40	3	40	0	0	0	0
	point192	258	340	40	7	40	3	40	0	0	0	0
	point191	259	340	40	7	40	3	40	0	0	0	0
	point190	260	340	40	7	40	3	40	0	0	0	0
	point189	261	340	40	7	40	3	40	0	0	0	0
	point188	262										
North Gate Rd - 1	point359	263	340	40	7	40	3	40	0	0	0	0
	point358	264	340	40	7	40	3	40	0	0	0	0
	point357	265	340	40	7	40	3	40	0	0	0	0
	point356	266	340	40	7	40	3	40	0	0	0	0
	point355	267	340	40	7	40	3	40	0	0	0	0
	point354	268	340	40	7	40	3	40	0	0	0	0
	point353	269	340	40	7	40	3	40	0	0	0	0
	point352	270	340	40	7	40	3	40	0	0	0	0
	point351	271	340	40	7	40	3	40	0	0	0	0
	point350	272	340	40	7	40	3	40	0	0	0	0
	point349	273	340	40	7	40	3	40	0	0	0	0
	point348	274	340	40	7	40	3	40	0	0	0	0
	point347	275	340	40	7	40	3	40	0	0	0	0
	point346	276	340	40	7	40	3	40	0	0	0	0
	point345	277	340	40	7	40	3	40	0	0	0	0
	point344	278	340	40	7	40	3	40	0	0	0	0
	point343	279	340	40	7	40	3	40	0	0	0	0
	point342	280	340	40	7	40	3	40	0	0	0	0
	point341	281	340	40	7	40	3	40	0	0	0	0
	point340	282	340	40	7	40	3	40	0	0	0	0

	point339	283	340	40	7	40	3	40	0	0	0	0
	point338	284	340	40	7	40	3	40	0	0	0	0
	point337	285	340	40	7	40	3	40	0	0	0	0
	point335	287	340	40	7	40	3	40	0	0	0	0
	point334	288	340	40	7	40	3	40	0	0	0	0
	point333	289	340	40	7	40	3	40	0	0	0	0
	point332	290	340	40	7	40	3	40	0	0	0	0
	point331	291	340	40	7	40	3	40	0	0	0	0
	point330	292	340	40	7	40	3	40	0	0	0	0
	point329	293	340	40	7	40	3	40	0	0	0	0
	point328	294	340	40	7	40	3	40	0	0	0	0
	point327	295	340	40	7	40	3	40	0	0	0	0
	point326	296	340	40	7	40	3	40	0	0	0	0
	point325	297	340	40	7	40	3	40	0	0	0	0
	point324	298	340	40	7	40	3	40	0	0	0	0
	point323	299	340	40	7	40	3	40	0	0	0	0
	point322	300	340	40	7	40	3	40	0	0	0	0
	point321	301	340	40	7	40	3	40	0	0	0	0
	point320	302	340	40	7	40	3	40	0	0	0	0
	point319	303	340	40	7	40	3	40	0	0	0	0
	point318	304	340	40	7	40	3	40	0	0	0	0
	point317	305	340	40	7	40	3	40	0	0	0	0
	point316	306	340	40	7	40	3	40	0	0	0	0
	point315	307	340	40	7	40	3	40	0	0	0	0
	point314	308	340	40	7	40	3	40	0	0	0	0
	point313	309	340	40	7	40	3	40	0	0	0	0
	point312	310	340	40	7	40	3	40	0	0	0	0
	point311	311	340	40	7	40	3	40	0	0	0	0
	point310	312	340	40	7	40	3	40	0	0	0	0
	point309	313	340	40	7	40	3	40	0	0	0	0
	point308	314	340	40	7	40	3	40	0	0	0	0
	point307	315	340	40	7	40	3	40	0	0	0	0
	point306	316	340	40	7	40	3	40	0	0	0	0
	point305	317	340	40	7	40	3	40	0	0	0	0
	point304	318	340	40	7	40	3	40	0	0	0	0
	point303	319	340	40	7	40	3	40	0	0	0	0

	point302	320	340	40	7	40	3	40	0	0	0	0
	point301	321	340	40	7	40	3	40	0	0	0	0
	point300	322	340	40	7	40	3	40	0	0	0	0
	point299	323	340	40	7	40	3	40	0	0	0	0
	point298	324	340	40	7	40	3	40	0	0	0	0
	point297	325										
Treasure Is Rd - 2	point164	132	340	65	7	65	3	65	0	0	0	0
	point163	133	340	65	7	65	3	65	0	0	0	0
	point162	134	340	65	7	65	3	65	0	0	0	0
	point161	135	340	65	7	65	3	65	0	0	0	0
	point160	136	340	65	7	65	3	65	0	0	0	0
	point159	137	340	65	7	65	3	65	0	0	0	0
	point158	138	340	65	7	65	3	65	0	0	0	0
	point157	139	340	65	7	65	3	65	0	0	0	0
	point156	140	340	65	7	65	3	65	0	0	0	0
	point155	141	340	65	7	65	3	65	0	0	0	0
	point154	142	340	65	7	65	3	65	0	0	0	0
	point153	143	340	65	7	65	3	65	0	0	0	0
	point152	144	340	65	7	65	3	65	0	0	0	0
	point151	145	340	65	7	65	3	65	0	0	0	0
	point150	146	340	65	7	65	3	65	0	0	0	0
	point149	147	340	65	7	65	3	65	0	0	0	0
	point148	148	340	65	7	65	3	65	0	0	0	0
	point147	149	340	65	7	65	3	65	0	0	0	0
	point146	150	340	65	7	65	3	65	0	0	0	0
	point145	151	340	65	7	65	3	65	0	0	0	0
	point144	152	340	65	7	65	3	65	0	0	0	0
	point143	153	340	65	7	65	3	65	0	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0	0
	point139	157										
Macalla Rd - 1	point713	713	340	40	7	40	3	40	0	0	0	0
	point296	326	340	40	7	40	3	40	0	0	0	0
	point295	327	340	40	7	40	3	40	0	0	0	0
	point294	328	340	40	7	40	3	40	0	0	0	0

	point293	329	340	40	7	40	3	40	0	0	0	0
	point292	330	340	40	7	40	3	40	0	0	0	0
	point291	331	340	40	7	40	3	40	0	0	0	0
	point290	332	340	40	7	40	3	40	0	0	0	0
	point289	333	340	40	7	40	3	40	0	0	0	0
	point288	334	340	40	7	40	3	40	0	0	0	0
	point287	335	340	40	7	40	3	40	0	0	0	0
	point286	336	340	40	7	40	3	40	0	0	0	0
	point285	337	340	40	7	40	3	40	0	0	0	0
	point284	338	340	40	7	40	3	40	0	0	0	0
	point283	339	340	40	7	40	3	40	0	0	0	0
	point282	340	340	40	7	40	3	40	0	0	0	0
	point281	341	340	40	7	40	3	40	0	0	0	0
	point280	342	340	40	7	40	3	40	0	0	0	0
	point279	343	340	40	7	40	3	40	0	0	0	0
	point278	344	340	40	7	40	3	40	0	0	0	0
	point277	345	340	40	7	40	3	40	0	0	0	0
	point276	346	340	40	7	40	3	40	0	0	0	0
	point275	347										
Treasure Is Rd - 1-2	point715	715	340	65	7	65	3	65	0	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0	0
	point170	176	340	0	7	65	3	65	0	0	0	0

	point169	177	340	65	7	65	3	65	0	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0	0
	point165	181										
Macalla Rd - 2	point664	717	340	40	7	40	3	40	0	0	0	0
	point262	718	340	40	7	40	3	40	0	0	0	0
	point261	719	340	40	7	40	3	40	0	0	0	0
	point260	720	340	40	7	40	3	40	0	0	0	0
	point259	721	340	40	7	40	3	40	0	0	0	0
	point258	722	340	40	7	40	3	40	0	0	0	0
	point257	723	340	40	7	40	3	40	0	0	0	0
	point256	724	340	40	7	40	3	40	0	0	0	0
	point255	725	340	40	7	40	3	40	0	0	0	0
	point254	726	340	40	7	40	3	40	0	0	0	0
	point253	727	340	40	7	40	3	40	0	0	0	0
	point252	728	340	40	7	40	3	40	0	0	0	0
	point251	729	340	40	7	40	3	40	0	0	0	0
	point250	730	340	40	7	40	3	40	0	0	0	0
	point249	731	340	40	7	40	3	40	0	0	0	0
	point248	732	340	40	7	40	3	40	0	0	0	0
	point247	733	340	40	7	40	3	40	0	0	0	0
	point246	734	340	40	7	40	3	40	0	0	0	0
	point245	735	340	40	7	40	3	40	0	0	0	0
	point244	736	340	40	7	40	3	40	0	0	0	0
	point243	737										

EDAW/AECOM						**21 October 2009**					
Maddux, B.						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**										
RUN:	**Future No Build**										
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	
R-1	9	1	916.0	782.7	28.00	1.50	0.00	71	12.0	5.0	
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	0.00	71	12.0	5.0	
R-3	17	1	855.5	618.7	64.00	1.50	0.00	66	12.0	5.0	
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	0.00	71	12.0	5.0	
R-5	19	1	1,125.6	585.5	2.80	1.50	0.00	71	12.0	5.0	
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0	
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0	
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0	
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0	
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	0.00	72	12.0	5.0	
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0	
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	0.00	66	12.0	5.0	Y
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	0.00	66	12.0	5.0	Y
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	Y
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	Y
R-16	43	1	794.8	434.3	101.50	1.50	0.00	71	12.0	5.0	Y
R-17	54	1	719.3	596.8	66.70	1.50	0.00	71	12.0	5.0	
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											

R-6 0											
R-7 0											
R-8 0											
R-9 0											
R-10 (ST-2) 0											
R-11 1											
R-12 (ST-4) 0											
R-13 (ST-5) 0											
R-14 0											
R-15 0											
R-16 0											

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future No Build

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Barrier1	W	0.00	30.48	0.00				0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0		
									point2	2	820.7	399.2	100.50	4.50	0.00	0	0		
									point3	3	817.8	398.3	100.50	4.50	0.00	0	0		
									point4	4	819.5	393.0	100.50	4.50	0.00	0	0		
									point5	5	828.7	396.0	100.50	4.50	0.00	0	0		
									point6	6	827.9	398.5	100.50	4.50	0.00	0	0		
									point7	7	834.2	400.4	100.50	4.50	0.00	0	0		
									point8	8	834.4	399.5	100.50	4.50	0.00	0	0		
									point9	9	838.3	400.8	100.50	4.50	0.00	0	0		
									point10	10	837.2	404.2	100.50	4.50	0.00	0	0		
									point11	11	839.7	405.0	100.50	4.50	0.00	0	0		
									point12	12	834.5	421.0	100.50	4.50	0.00	0	0		
									point13	13	823.0	417.3	100.50	4.50	0.00	0	0		
									point14	14	821.9	420.4	100.50	4.50	0.00	0	0		
									point15	15	814.3	417.7	100.50	4.50					
Barrier2	W	0.00	30.48	0.00				0.00	point16	16	723.3	398.9	92.00	6.00	0.00	0	0		
									point17	17	717.0	401.9	92.00	6.00	0.00	0	0		
									point18	18	717.7	403.4	92.00	6.00	0.00	0	0		
									point19	19	708.9	407.5	92.00	6.00	0.00	0	0		
									point20	20	708.3	406.0	92.00	6.00	0.00	0	0		
									point21	21	701.9	409.0	92.00	6.00	0.00	0	0		
									point22	22	705.7	417.0	92.00	6.00	0.00	0	0		
									point23	23	707.2	416.2	92.00	6.00	0.00	0	0		
									point24	24	708.0	418.0	92.00	6.00	0.00	0	0		
									point25	25	726.3	409.4	92.00	6.00	0.00	0	0		
									point26	26	725.5	407.6	92.00	6.00	0.00	0	0		
									point27	27	727.0	406.9	92.00	6.00	0.00	0	0		
									point28	28	723.3	398.9	92.00	6.00					
Barrier3	W	0.00	30.48	0.00				0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0		
									point30	30	685.8	419.6	92.00	6.00	0.00	0	0		
									point31	31	686.7	420.8	92.00	6.00	0.00	0	0		
									point32	32	694.7	415.3	92.00	6.00	0.00	0	0		
									point33	33	693.9	414.1	92.00	6.00	0.00	0	0		
									point34	34	699.6	410.5	92.00	6.00	0.00	0	0		
									point35	35	704.4	417.4	92.00	6.00	0.00	0	0		

									point36	36	703.0	418.2	92.00	6.00	0.00	0	0		
									point37	37	704.2	419.9	92.00	6.00	0.00	0	0		
									point38	38	687.4	431.4	92.00	6.00	0.00	0	0		
									point39	39	686.3	429.8	92.00	6.00	0.00	0	0		
									point40	40	685.0	430.7	92.00	6.00	0.00	0	0		
									point41	41	680.1	423.5	92.00	6.00					
Barrier4	W	0.00	30.48	0.00				0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0		
									point43	43	666.2	440.5	92.00	6.00	0.00	0	0		
									point44	44	667.5	441.4	92.00	6.00	0.00	0	0		
									point45	45	673.2	433.5	92.00	6.00	0.00	0	0		
									point46	46	672.0	432.6	92.00	6.00	0.00	0	0		
									point47	47	676.1	427.3	92.00	6.00	0.00	0	0		
									point48	48	683.0	432.2	92.00	6.00	0.00	0	0		
									point49	49	682.0	433.4	92.00	6.00	0.00	0	0		
									point50	50	683.6	434.6	92.00	6.00	0.00	0	0		
									point51	51	671.7	451.1	92.00	6.00	0.00	0	0		
									point52	52	670.2	449.9	92.00	6.00	0.00	0	0		
									point53	53	669.3	451.2	92.00	6.00	0.00	0	0		
									point54	54	662.2	446.1	92.00	6.00					
Barrier5	W	0.00	30.48	0.00				0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0		
									point56	56	629.0	439.2	86.00	6.00	0.00	0	0		
									point57	57	628.4	438.0	86.00	6.00	0.00	0	0		
									point58	58	632.9	435.5	86.00	6.00	0.00	0	0		
									point59	59	633.8	437.2	86.00	6.00	0.00	0	0		
									point60	60	641.4	433.0	86.00	6.00	0.00	0	0		
									point61	61	644.4	438.4	86.00	6.00	0.00	0	0		
									point62	62	642.8	439.3	86.00	6.00	0.00	0	0		
									point63	63	644.5	442.4	86.00	6.00	0.00	0	0		
									point64	64	639.2	445.2	86.00	6.00	0.00	0	0		
									point65	65	639.7	446.1	86.00	6.00	0.00	0	0		
									point66	66	633.5	449.5	86.00	6.00	0.00	0	0		
									point67	67	632.8	448.2	86.00	6.00	0.00	0	0		
									point68	68	627.3	451.2	86.00	6.00	0.00	0	0		
									point69	69	625.5	448.0	86.00	6.00	0.00	0	0		
									point70	70	624.1	448.7	86.00	6.00	0.00	0	0		
									point71	71	621.3	443.4	86.00	6.00					
Barrier6	W	0.00	30.48	0.00				0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0		
									point73	73	650.5	424.6	86.00	6.00	0.00	0	0		
									point74	74	649.2	423.6	86.00	6.00	0.00	0	0		
									point75	75	652.4	419.6	86.00	6.00	0.00	0	0		
									point76	76	653.6	420.6	86.00	6.00	0.00	0	0		
									point77	77	659.0	413.7	86.00	6.00	0.00	0	0		
									point78	78	663.7	417.4	86.00	6.00	0.00	0	0		
									point79	79	662.8	418.6	86.00	6.00	0.00	0	0		
									point80	80	665.5	420.8	86.00	6.00	0.00	0	0		
									point81	81	661.8	425.5	86.00	6.00	0.00	0	0		
									point82	82	663.0	426.4	86.00	6.00	0.00	0	0		
									point83	83	658.5	432.1	86.00	6.00	0.00	0	0		
									point84	84	658.0	431.7	86.00	6.00	0.00	0	0		

									point85	85	654.2	436.5	86.00	6.00	0.00	0	0		
									point86	86	651.1	433.9	86.00	6.00	0.00	0	0		
									point87	87	650.0	435.3	86.00	6.00	0.00	0	0		
									point88	88	645.1	431.4	86.00	6.00					
Barrier7	W	0.00	30.48	0.00				0.00	point89	89	662.9	409.7	88.00	6.00	0.00	0	0		
									point90	90	669.4	404.1	88.00	6.00	0.00	0	0		
									point91	91	668.3	402.8	88.00	6.00	0.00	0	0		
									point92	92	672.3	399.4	88.00	6.00	0.00	0	0		
									point93	93	673.3	400.6	88.00	6.00	0.00	0	0		
									point94	94	680.0	394.9	88.00	6.00	0.00	0	0		
									point95	95	684.0	399.6	88.00	6.00	0.00	0	0		
									point96	96	682.6	400.7	88.00	6.00	0.00	0	0		
									point97	97	684.8	403.2	88.00	6.00	0.00	0	0		
									point98	98	680.3	407.1	88.00	6.00	0.00	0	0		
									point99	99	681.2	408.2	88.00	6.00	0.00	0	0		
									point100	100	675.7	412.9	88.00	6.00	0.00	0	0		
									point101	101	674.9	411.8	88.00	6.00	0.00	0	0		
									point102	102	670.3	415.8	88.00	6.00	0.00	0	0		
									point103	103	668.1	413.2	88.00	6.00	0.00	0	0		
									point104	104	666.8	414.3	88.00	6.00	0.00	0	0		
									point105	105	662.9	409.7	88.00	6.00					
Barrier11	W	0.00	30.48	0.00				0.00	point165	165	687.1	600.9	67.50	4.50	0.00	0	0		
									point166	166	702.2	597.3	67.50	4.50	0.00	0	0		
									point167	167	703.4	601.6	67.50	4.50	0.00	0	0		
									point168	168	709.8	600.1	67.50	4.50	0.00	0	0		
									point169	169	709.4	598.5	67.50	4.50	0.00	0	0		
									point170	170	713.0	597.5	67.50	4.50	0.00	0	0		
									point171	171	710.8	588.7	67.50	4.50	0.00	0	0		
									point172	172	711.9	588.5	67.50	4.50	0.00	0	0		
									point173	173	723.7	588.6	67.50	4.50	0.00	0	0		
									point174	174	723.8	580.6	67.50	4.50	0.00	0	0		
									point175	175	716.3	580.6	67.50	4.50	0.00	0	0		
									point176	176	716.4	582.8	67.50	4.50	0.00	0	0		
									point177	177	709.9	584.3	67.50	4.50	0.00	0	0		
									point178	178	709.7	584.0	67.50	4.50	0.00	0	0		
									point179	179	697.7	586.9	67.50	4.50	0.00	0	0		
									point180	180	698.3	589.6	67.50	4.50	0.00	0	0		
									point181	181	691.1	591.2	67.50	4.50	0.00	0	0		
									point182	182	690.4	589.0	67.50	4.50	0.00	0	0		
									point183	183	684.2	590.4	67.50	4.50	0.00	0	0		
									point184	184	687.1	600.9	67.50	4.50					
Barrier12	W	0.00	30.48	0.00				0.00	point185	185	832.9	601.5	66.50	4.50	0.00	0	0		
									point186	186	831.2	585.8	66.50	4.50	0.00	0	0		
									point187	187	806.7	587.4	66.50	4.50	0.00	0	0		
									point188	188	805.9	573.9	66.50	4.50	0.00	0	0		
									point189	189	830.2	572.4	66.50	4.50	0.00	0	0		
									point190	190	829.5	558.0	66.50	4.50	0.00	0	0		
									point191	191	842.8	557.1	66.50	4.50	0.00	0	0		
									point192	192	844.9	587.0	66.50	4.50	0.00	0	0		

									point193	193	853.8	586.7	66.50	4.50	0.00	0	0		
									point194	194	854.9	600.3	66.50	4.50	0.00	0	0		
									point197	197	832.9	601.5	66.50	4.50					
Barrier13	W	0.00	30.48	0.00				0.00	point198	198	802.3	633.6	66.50	4.50	0.00	0	0		
									point199	199	805.0	625.0	66.50	4.50	0.00	0	0		
									point200	200	828.8	631.6	66.50	4.50	0.00	0	0		
									point201	201	832.6	618.0	66.50	4.50	0.00	0	0		
									point202	202	797.9	608.3	66.50	4.50	0.00	0	0		
									point203	203	800.3	599.2	66.50	4.50	0.00	0	0		
									point206	206	844.6	611.7	66.50	4.50	0.00	0	0		
									point207	207	839.4	630.6	66.50	4.50	0.00	0	0		
									point208	208	833.6	629.0	66.50	4.50	0.00	0	0		
									point209	209	830.1	641.6	66.50	4.50	0.00	0	0		
									point210	210	826.8	640.7	66.50	4.50	0.00	0	0		
									point211	211	826.7	641.1	66.50	4.50	0.00	0	0		
									point212	212	802.3	633.6	66.50	4.50					
Barrier14	W	0.00	30.48	0.00				0.00	point213	213	919.3	602.1	49.50	5.00	0.00	0	0		
									point214	214	901.4	618.0	49.50	5.00	0.00	0	0		
									point215	215	920.2	639.5	49.50	5.00	0.00	0	0		
									point216	216	929.2	631.7	49.50	5.00	0.00	0	0		
									point217	217	916.7	617.4	49.50	5.00	0.00	0	0		
									point218	218	925.8	609.3	49.50	5.00	0.00	0	0		
									point219	219	919.3	602.1	49.50	5.00					
Barrier15	W	0.00	30.48	0.00				0.00	point220	220	980.4	298.2	56.50	4.00	0.00	0	0		
									point221	221	990.4	296.2	56.50	4.00	0.00	0	0		
									point222	222	991.8	303.3	56.50	4.00	0.00	0	0		
									point223	223	981.8	305.3	56.50	4.00	0.00	0	0		
									point224	224	980.4	298.2	56.50	4.00					
Barrier16	W	0.00	30.48	0.00				0.00	point226	226	1,006.8	351.3	52.50	4.50	0.00	0	0		
									point227	227	1,017.7	351.4	52.50	4.50	0.00	0	0		
									point228	228	1,017.7	352.4	52.50	4.50	0.00	0	0		
									point229	229	1,018.7	352.4	52.50	4.50	0.00	0	0		
									point230	230	1,018.6	355.2	52.50	4.50	0.00	0	0		
									point231	231	1,017.5	355.2	52.50	4.50	0.00	0	0		
									point232	232	1,017.5	356.0	52.50	4.50	0.00	0	0		
									point233	233	1,015.4	356.0	52.50	4.50	0.00	0	0		
									point234	234	1,015.4	356.3	52.50	4.50	0.00	0	0		
									point235	235	1,015.2	357.0	52.50	4.50	0.00	0	0		
									point236	236	1,017.3	357.0	52.50	4.50	0.00	0	0		
									point237	237	1,017.2	367.3	52.50	4.50	0.00	0	0		
									point238	238	1,011.5	367.4	52.50	4.50	0.00	0	0		
									point239	239	1,011.4	365.4	52.50	4.50	0.00	0	0		
									point240	240	1,007.0	365.5	52.50	4.50	0.00	0	0		
									point241	241	1,006.9	364.2	52.50	4.50	0.00	0	0		
									point242	242	1,006.8	364.2	52.50	4.50	0.00	0	0		
									point243	243	1,006.8	351.3	52.50	4.50					
Barrier17	W	0.00	30.48	0.00				0.00	point244	244	1,006.5	403.5	51.75	4.50	0.00	0	0		
									point245	245	1,006.8	391.4	51.75	4.50	0.00	0	0		
									point246	246	1,017.4	391.7	51.75	4.50	0.00	0	0		

									point247	247	1,017.3	396.3	51.75	4.50	0.00	0	0		
									point248	248	1,015.3	396.2	51.75	4.50	0.00	0	0		
									point249	249	1,015.2	403.5	51.75	4.50	0.00	0	0		
									point250	250	1,006.5	403.5	51.75	4.50					
Barrier18	W	0.00	30.48	0.00				0.00	point251	251	1,013.7	450.3	45.50	4.50	0.00	0	0		
									point252	252	1,014.0	444.2	45.50	4.50	0.00	0	0		
									point253	253	1,015.3	444.1	45.50	4.50	0.00	0	0		
									point254	254	1,015.5	437.1	45.50	4.50	0.00	0	0		
									point255	255	1,027.5	437.3	45.50	4.50	0.00	0	0		
									point256	256	1,027.6	446.7	45.50	4.50	0.00	0	0		
									point257	257	1,025.9	446.9	45.50	4.50	0.00	0	0		
									point258	258	1,025.7	450.9	45.50	4.50	0.00	0	0		
									point259	259	1,013.7	450.3	45.50	4.50					
Barrier19	W	0.00	30.48	0.00				0.00	point260	260	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point261	261	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point262	262	1,162.0	649.6	3.50	5.00	0.00	0	0		
									point263	263	1,162.0	650.2	3.50	5.00	0.00	0	0		
									point264	264	1,161.5	650.8	3.50	5.00	0.00	0	0		
									point265	265	1,161.0	651.2	3.50	5.00	0.00	0	0		
									point266	266	1,160.3	651.2	3.50	5.00	0.00	0	0		
									point267	267	1,159.6	650.8	3.50	5.00	0.00	0	0		
									point268	268	1,159.1	650.2	3.50	5.00	0.00	0	0		
									point269	269	1,158.9	649.4	3.50	5.00	0.00	0	0		
									point270	270	1,159.3	648.8	3.50	5.00	0.00	0	0		
									point271	271	1,160.1	648.2	3.50	5.00	0.00	0	0		
									point272	272	1,160.7	648.1	3.50	5.00	0.00	0	0		
									point273	273	1,162.0	648.4	3.50	5.00	0.00	0	0		
									point274	274	1,162.0	648.3	3.50	5.00	0.00	0	0		
									point275	275	1,162.2	646.1	3.50	5.00	0.00	0	0		
									point276	276	1,158.0	645.7	3.50	5.00	0.00	0	0		
									point277	277	1,158.3	635.9	3.50	5.00	0.00	0	0		
									point278	278	1,161.3	636.1	3.50	5.00	0.00	0	0		
									point279	279	1,161.4	634.5	3.50	5.00	0.00	0	0		
									point280	280	1,160.2	634.5	3.50	5.00	0.00	0	0		
									point281	281	1,160.6	628.5	3.50	5.00	0.00	0	0		
									point282	282	1,160.1	628.5	3.50	5.00	0.00	0	0		
									point283	283	1,159.7	632.1	3.50	5.00	0.00	0	0		
									point284	284	1,156.3	632.1	3.50	5.00	0.00	0	0		
									point285	285	1,156.3	630.2	3.50	5.00	0.00	0	0		
									point286	286	1,151.5	629.8	3.50	5.00	0.00	0	0		
									point287	287	1,151.3	635.5	3.50	5.00	0.00	0	0		
									point288	288	1,133.4	634.8	3.50	5.00	0.00	0	0		
									point289	289	1,133.6	630.3	3.50	5.00	0.00	0	0		
									point290	290	1,132.3	630.2	3.50	5.00	0.00	0	0		
									point291	291	1,132.0	632.8	3.50	5.00	0.00	0	0		
									point292	292	1,123.9	632.8	3.50	5.00	0.00	0	0		
									point293	293	1,124.3	627.1	3.50	5.00	0.00	0	0		
									point294	294	1,123.5	626.9	3.50	5.00	0.00	0	0		
									point295	295	1,123.4	629.7	3.50	5.00	0.00	0	0		

									point296	296	1,120.9	629.7	3.50	5.00	0.00	0	0		
									point297	297	1,120.9	627.1	3.50	5.00	0.00	0	0		
									point298	298	1,115.5	626.9	3.50	5.00	0.00	0	0		
									point299	299	1,115.2	628.6	3.50	5.00	0.00	0	0		
									point300	300	1,108.0	628.2	3.50	5.00	0.00	0	0		
									point301	301	1,100.1	619.6	3.50	5.00	0.00	0	0		
									point302	302	1,102.4	613.9	3.50	5.00	0.00	0	0		
									point303	303	1,103.2	607.7	3.50	5.00	0.00	0	0		
									point304	304	1,099.9	603.6	3.50	5.00	0.00	0	0		
									point305	305	1,097.1	603.3	3.50	5.00	0.00	0	0		
									point306	306	1,097.7	589.6	3.50	5.00	0.00	0	0		
									point307	307	1,102.6	589.9	3.50	5.00	0.00	0	0		
									point308	308	1,102.6	588.5	3.50	5.00	0.00	0	0		
									point309	309	1,099.2	588.3	3.50	5.00	0.00	0	0		
									point310	310	1,099.9	572.5	3.50	5.00	0.00	0	0		
									point311	311	1,104.7	572.8	3.50	5.00	0.00	0	0		
									point312	312	1,104.8	569.0	3.50	5.00	0.00	0	0		
									point313	313	1,098.6	568.8	3.50	5.00	0.00	0	0		
									point314	314	1,098.7	563.4	3.50	5.00	0.00	0	0		
									point315	315	1,100.3	562.0	3.50	5.00	0.00	0	0		
									point316	316	1,100.6	554.8	3.50	5.00	0.00	0	0		
									point317	317	1,112.7	543.6	3.50	5.00	0.00	0	0		
									point318	318	1,123.7	544.2	3.50	5.00	0.00	0	0		
									point319	319	1,123.8	546.2	3.50	5.00	0.00	0	0		
									point320	320	1,124.8	546.2	3.50	5.00	0.00	0	0		
									point321	321	1,124.8	544.4	3.50	5.00	0.00	0	0		
									point322	322	1,127.8	544.4	3.50	5.00	0.00	0	0		
									point323	323	1,127.9	547.3	3.50	5.00	0.00	0	0		
									point324	324	1,142.8	548.1	3.50	5.00	0.00	0	0		
									point325	325	1,146.7	544.4	3.50	5.00	0.00	0	0		
									point326	326	1,148.7	544.5	3.50	5.00	0.00	0	0		
									point327	327	1,148.8	543.2	3.50	5.00	0.00	0	0		
									point328	328	1,146.9	543.2	3.50	5.00	0.00	0	0		
									point329	329	1,147.5	521.6	3.50	5.00	0.00	0	0		
									point330	330	1,149.7	521.6	3.50	5.00	0.00	0	0		
									point331	331	1,149.8	520.0	3.50	5.00	0.00	0	0		
									point332	332	1,146.6	520.0	3.50	5.00	0.00	0	0		
									point333	333	1,146.9	509.3	3.50	5.00	0.00	0	0		
									point334	334	1,153.2	509.3	3.50	5.00	0.00	0	0		
									point335	335	1,153.2	499.4	3.50	5.00	0.00	0	0		
									point336	336	1,149.4	495.2	3.50	5.00	0.00	0	0		
									point337	337	1,142.6	495.0	3.50	5.00	0.00	0	0		
									point338	338	1,142.6	496.3	3.50	5.00	0.00	0	0		
									point339	339	1,131.7	496.3	3.50	5.00	0.00	0	0		
									point340	340	1,131.9	490.0	3.50	5.00	0.00	0	0		
									point341	341	1,143.3	490.0	3.50	5.00	0.00	0	0		
									point342	342	1,143.3	491.5	3.50	5.00	0.00	0	0		
									point343	343	1,146.9	491.7	3.50	5.00	0.00	0	0		
									point344	344	1,146.9	487.6	3.50	5.00	0.00	0	0		

									point345	345	1,153.0	487.6	3.50	5.00	0.00	0	0		
									point346	346	1,161.1	496.4	3.50	5.00	0.00	0	0		
									point347	347	1,160.9	502.8	3.50	5.00	0.00	0	0		
									point348	348	1,156.6	502.8	3.50	5.00	0.00	0	0		
									point349	349	1,156.0	511.0	3.50	5.00	0.00	0	0		
									point350	350	1,162.1	511.2	3.50	5.00	0.00	0	0		
									point351	351	1,161.9	522.1	3.50	5.00	0.00	0	0		
									point352	352	1,158.1	521.9	3.50	5.00	0.00	0	0		
									point353	353	1,157.3	541.4	3.50	5.00	0.00	0	0		
									point354	354	1,155.0	541.4	3.50	5.00	0.00	0	0		
									point355	355	1,155.0	545.1	3.50	5.00	0.00	0	0		
									point356	356	1,158.8	545.1	3.50	5.00	0.00	0	0		
									point357	357	1,158.6	551.6	3.50	5.00	0.00	0	0		
									point358	358	1,149.1	560.3	3.50	5.00	0.00	0	0		
									point359	359	1,142.5	560.0	3.50	5.00	0.00	0	0		
									point360	360	1,142.5	558.1	3.50	5.00	0.00	0	0		
									point361	361	1,138.5	558.1	3.50	5.00	0.00	0	0		
									point362	362	1,131.4	558.1	3.50	5.00	0.00	0	0		
									point363	363	1,127.7	557.9	3.50	5.00	0.00	0	0		
									point364	364	1,118.2	557.6	3.50	5.00	0.00	0	0		
									point365	365	1,113.9	561.4	3.50	5.00	0.00	0	0		
									point366	366	1,113.6	567.7	3.50	5.00	0.00	0	0		
									point367	367	1,107.8	567.4	3.50	5.00	0.00	0	0		
									point368	368	1,107.3	575.9	3.50	5.00	0.00	0	0		
									point369	369	1,107.3	577.1	3.50	5.00	0.00	0	0		
									point370	370	1,113.2	577.1	3.50	5.00	0.00	0	0		
									point371	371	1,112.5	594.5	3.50	5.00	0.00	0	0		
									point372	372	1,108.0	594.4	3.50	5.00	0.00	0	0		
									point373	373	1,107.9	595.7	3.50	5.00	0.00	0	0		
									point374	374	1,110.9	595.9	3.50	5.00	0.00	0	0		
									point375	375	1,110.2	607.7	3.50	5.00	0.00	0	0		
									point376	376	1,106.4	607.7	3.50	5.00	0.00	0	0		
									point377	377	1,106.0	613.2	3.50	5.00	0.00	0	0		
									point378	378	1,109.9	613.1	3.50	5.00	0.00	0	0		
									point379	379	1,115.5	619.0	3.50	5.00	0.00	0	0		
									point380	380	1,115.5	623.0	3.50	5.00	0.00	0	0		
									point381	381	1,120.6	623.3	3.50	5.00	0.00	0	0		
									point382	382	1,120.8	619.4	3.50	5.00	0.00	0	0		
									point383	383	1,138.4	620.0	3.50	5.00	0.00	0	0		
									point384	384	1,138.4	624.7	3.50	5.00	0.00	0	0		
									point385	385	1,139.6	624.7	3.50	5.00	0.00	0	0		
									point386	386	1,139.8	621.7	3.50	5.00	0.00	0	0		
									point387	387	1,151.8	622.1	3.50	5.00	0.00	0	0		
									point388	388	1,151.6	626.3	3.50	5.00	0.00	0	0		
									point389	389	1,157.1	626.5	3.50	5.00	0.00	0	0		
									point390	390	1,157.1	618.9	3.50	5.00	0.00	0	0		
									point391	391	1,169.0	619.4	3.50	5.00	0.00	0	0		
									point392	392	1,173.9	625.1	3.50	5.00	0.00	0	0		
									point393	393	1,173.3	636.9	3.50	5.00	0.00	0	0		

									point394	394	1,167.0	636.9	3.50	5.00	0.00	0	0		
									point395	395	1,167.0	638.0	3.50	5.00	0.00	0	0		
									point396	396	1,169.9	638.0	3.50	5.00	0.00	0	0		
									point397	397	1,169.5	650.0	3.50	5.00	0.00	0	0		
									point398	398	1,162.1	649.0	3.50	5.00					
Barrier20	W	0.00	30.48	0.00				0.00	point399	399	906.6	754.5	25.00	6.00	0.00	0	0		
									point400	400	907.3	762.7	25.00	6.00	0.00	0	0		
									point401	401	927.6	761.5	25.00	6.00	0.00	0	0		
									point402	402	927.1	753.1	25.00	6.00	0.00	0	0		
									point403	403	926.5	751.1	25.00	6.00	0.00	0	0		
									point404	404	907.3	752.3	25.00	6.00	0.00	0	0		
									point405	405	907.3	754.4	25.00	6.00	0.00	0	0		
									point406	406	906.6	754.5	25.00	6.00					
Barrier21	W	0.00	30.48	0.00				0.00	point407	407	928.1	762.3	25.00	6.00	0.00	0	0		
									point408	408	927.3	751.1	25.00	6.00	0.00	0	0		
									point409	409	938.9	750.2	25.00	6.00	0.00	0	0		
									point410	410	939.6	761.6	25.00	6.00	0.00	0	0		
									point411	411	928.1	762.3	25.00	6.00					
Barrier22	W	0.00	30.48	0.00				0.00	point412	412	895.1	803.1	26.00	6.00	0.00	0	0		
									point413	413	890.1	791.1	26.00	6.00	0.00	0	0		
									point414	414	891.7	790.5	26.00	6.00	0.00	0	0		
									point415	415	893.3	789.8	26.00	6.00	0.00	0	0		
									point416	416	899.8	787.2	26.00	6.00	0.00	0	0		
									point417	417	904.7	799.3	26.00	6.00	0.00	0	0		
									point418	418	895.1	803.1	26.00	6.00					
Barrier23	W	0.00	30.48	0.00				0.00	point420	420	905.6	821.8	26.00	6.00	0.00	0	0		
									point421	421	898.7	810.7	26.00	6.00	0.00	0	0		
									point422	422	907.8	804.7	26.00	6.00	0.00	0	0		
									point423	423	911.7	811.0	26.00	6.00	0.00	0	0		
									point424	424	912.7	810.4	26.00	6.00	0.00	0	0		
									point425	425	914.4	813.2	26.00	6.00	0.00	0	0		
									point426	426	913.4	813.8	26.00	6.00	0.00	0	0		
									point427	427	914.8	815.9	26.00	6.00	0.00	0	0		
									point428	428	905.6	821.8	26.00	6.00					
Barrier24	W	0.00	30.48	0.00				0.00	point430	430	941.3	815.9	25.00	6.00	0.00	0	0		
									point431	431	931.0	820.5	25.00	6.00	0.00	0	0		
									point432	432	930.9	820.5	25.00	6.00	0.00	0	0		
									point433	433	929.9	818.2	25.00	6.00	0.00	0	0		
									point434	434	928.4	818.9	25.00	6.00	0.00	0	0		
									point435	435	929.3	821.3	25.00	6.00	0.00	0	0		
									point436	436	928.9	821.4	25.00	6.00	0.00	0	0		
									point437	437	932.8	830.6	25.00	6.00	0.00	0	0		
									point438	438	935.9	829.3	25.00	6.00	0.00	0	0		
									point439	439	936.3	830.1	25.00	6.00	0.00	0	0		
									point440	440	936.9	829.8	25.00	6.00	0.00	0	0		
									point441	441	937.8	831.8	25.00	6.00	0.00	0	0		
									point442	442	943.1	829.5	25.00	6.00	0.00	0	0		
									point443	443	942.2	827.4	25.00	6.00	0.00	0	0		
									point444	444	942.6	827.2	25.00	6.00	0.00	0	0		

									point445	445	942.3	826.5	25.00	6.00	0.00	0	0		
									point446	446	945.3	825.0	25.00	6.00	0.00	0	0		
									point447	447	941.3	815.9	25.00	6.00					
Barrier25	W	0.00	30.48	0.00				0.00	point448	448	960.6	801.4	23.00	6.00	0.00	0	0		
									point449	449	951.4	797.8	23.00	6.00	0.00	0	0		
									point450	450	946.6	810.7	23.00	6.00	0.00	0	0		
									point451	451	955.5	814.2	23.00	6.00	0.00	0	0		
									point452	452	956.8	811.2	23.00	6.00	0.00	0	0		
									point453	453	957.7	811.5	23.00	6.00	0.00	0	0		
									point454	454	957.9	811.0	23.00	6.00	0.00	0	0		
									point455	455	959.8	811.8	23.00	6.00	0.00	0	0		
									point456	456	962.0	806.4	23.00	6.00	0.00	0	0		
									point457	457	960.0	805.6	23.00	6.00	0.00	0	0		
									point458	458	960.2	805.0	23.00	6.00	0.00	0	0		
									point459	459	959.4	804.7	23.00	6.00	0.00	0	0		
									point460	460	960.6	801.4	23.00	6.00					
Barrier26	W	0.00	30.48	0.00				0.00	point461	461	963.3	794.2	21.00	6.00	0.00	0	0		
									point462	462	954.1	790.6	21.00	6.00	0.00	0	0		
									point463	463	959.0	778.0	21.00	6.00	0.00	0	0		
									point464	464	968.2	781.6	21.00	6.00	0.00	0	0		
									point465	465	963.3	794.2	21.00	6.00					
Barrier27	W	0.00	30.48	0.00				0.00	point467	467	970.9	774.4	21.00	6.00	0.00	0	0		
									point468	468	976.8	759.4	21.00	6.00	0.00	0	0		
									point469	469	967.2	755.5	21.00	6.00	0.00	0	0		
									point470	470	961.3	770.5	21.00	6.00	0.00	0	0		
									point471	471	970.9	774.4	21.00	6.00					
Barrier28	W	0.00	30.48	0.00				0.00	point472	472	964.8	739.9	21.00	6.00	0.00	0	0		
									point473	473	964.9	739.6	21.00	6.00	0.00	0	0		
									point474	474	964.2	739.4	21.00	6.00	0.00	0	0		
									point475	475	965.0	737.5	21.00	6.00	0.00	0	0		
									point476	476	965.7	737.7	21.00	6.00	0.00	0	0		
									point477	477	967.6	733.0	21.00	6.00	0.00	0	0		
									point478	478	974.3	735.3	21.00	6.00	0.00	0	0		
									point479	479	975.6	731.9	21.00	6.00	0.00	0	0		
									point480	480	974.8	730.2	21.00	6.00	0.00	0	0		
									point481	481	974.9	730.1	21.00	6.00	0.00	0	0		
									point482	482	973.0	729.3	21.00	6.00	0.00	0	0		
									point483	483	973.9	727.3	21.00	6.00	0.00	0	0		
									point484	484	975.8	728.1	21.00	6.00	0.00	0	0		
									point485	485	975.8	727.9	21.00	6.00	0.00	0	0		
									point486	486	977.1	727.3	21.00	6.00	0.00	0	0		
									point487	487	977.5	727.4	21.00	6.00	0.00	0	0		
									point488	488	979.5	722.0	21.00	6.00	0.00	0	0		
									point489	489	978.2	721.6	21.00	6.00	0.00	0	0		
									point490	490	979.2	719.0	21.00	6.00	0.00	0	0		
									point491	491	980.7	719.6	21.00	6.00	0.00	0	0		
									point492	492	981.6	717.6	21.00	6.00	0.00	0	0		
									point493	493	991.0	721.1	21.00	6.00	0.00	0	0		
									point494	494	991.6	720.0	21.00	6.00	0.00	0	0		

									point495	495	994.3	721.0	21.00	6.00	0.00	0	0		
									point496	496	993.6	722.2	21.00	6.00	0.00	0	0		
									point497	497	994.7	722.6	21.00	6.00	0.00	0	0		
									point498	498	992.0	729.4	21.00	6.00	0.00	0	0		
									point499	499	992.4	729.6	21.00	6.00	0.00	0	0		
									point500	500	988.3	740.2	21.00	6.00	0.00	0	0		
									point501	501	987.8	740.1	21.00	6.00	0.00	0	0		
									point502	502	985.2	746.8	21.00	6.00	0.00	0	0		
									point503	503	984.0	746.3	21.00	6.00	0.00	0	0		
									point504	504	983.5	747.7	21.00	6.00	0.00	0	0		
									point505	505	981.1	746.7	21.00	6.00	0.00	0	0		
									point506	506	981.6	745.4	21.00	6.00	0.00	0	0		
									point507	507	972.2	741.6	21.00	6.00	0.00	0	0		
									point508	508	972.4	741.1	21.00	6.00	0.00	0	0		
									point509	509	968.7	739.6	21.00	6.00	0.00	0	0		
									point510	510	968.1	741.2	21.00	6.00	0.00	0	0		
									point511	511	964.8	739.9	21.00	6.00					

EDAW/AECOM			**13 August 2009**	
Maddux, B.			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**			
RUN:	**Future No Build**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
	72	701.6	614.8	66.50
	73	693.8	610.9	67.00
Terrain Line8	74	775.9	636.9	66.00
	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
	81	728.9	726.6	0.50
Terrain Line9	82	793.5	779.6	0.50
	83	804.9	734.8	30.00
Terrain Line10	84	891.8	737.7	26.50
	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00
	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00

	127	909.5	798.3	26.50
Terrain Line25	128	923.4	816.5	25.50
	129	923.6	813.4	27.00
	130	920.9	806.0	28.50
Terrain Line26	131	942.4	802.0	23.50
	132	935.6	803.3	26.50
	133	924.8	803.3	29.00
Terrain Line27	134	956.2	754.4	22.50
	135	948.0	764.3	23.50
	136	920.0	791.6	28.50
Terrain Line28	137	948.3	789.6	22.50
	138	942.9	787.8	26.00
Terrain Line29	139	954.5	822.7	24.50
	140	968.2	849.7	18.00
	141	985.8	861.3	13.50
	142	999.7	860.6	12.00
	143	1,026.4	859.3	11.00
	144	1,055.7	857.9	10.00
	145	1,071.0	858.7	9.50
Terrain Line31	146	1,027.1	836.6	11.50
	147	1,027.0	825.3	12.30
	148	1,025.8	810.2	11.50
Terrain Line32	149	1,054.2	841.3	11.50
	150	1,048.9	825.2	14.50
	151	1,050.8	811.9	12.00
	152	1,057.4	801.8	13.50
	153	1,063.4	797.9	11.50
Terrain Line33	154	932.1	688.7	39.00
	155	956.4	742.7	21.50
	156	990.1	750.3	20.50
	157	1,026.9	772.0	12.50
	158	1,050.9	792.9	11.50
	159	1,057.4	801.8	13.50
	160	1,064.4	802.2	12.00
	161	1,074.7	807.4	11.50
Terrain Line34	162	966.2	674.6	40.00

	163	983.7	710.3	21.00
	164	1,004.9	721.9	20.00
	165	1,019.3	727.2	18.00
	166	1,042.4	744.5	12.50
Terrain Line35	167	1,017.7	792.0	12.50
	168	996.2	786.0	18.50
	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00
	218	838.8	456.3	72.00
	219	841.2	459.3	70.00

	220	838.5	469.1	69.00
Terrain Line47	221	782.1	440.8	103.50
	222	783.7	442.4	102.00
	223	797.3	470.1	88.00
	224	797.5	475.2	88.00
	225	804.3	488.2	80.00
	226	817.6	492.0	73.00
	227	829.5	495.4	66.00
	228	846.2	497.2	56.00
Terrain Line49	229	730.1	434.6	103.50
	230	708.8	445.6	100.00
	231	690.7	458.1	96.00
	232	674.2	481.7	90.00
	233	672.0	486.3	88.00
Terrain Line60	283	810.9	312.7	64.00
	284	809.0	344.2	83.00
	285	809.5	347.6	83.00
	286	807.3	368.4	91.00
	287	807.8	373.3	92.00
	288	810.8	387.2	96.00
	289	812.9	395.1	100.00
	290	810.2	400.2	100.50
	291	808.0	415.5	101.00
Terrain Line61	292	842.9	392.4	100.00
	293	927.1	293.8	64.00
Terrain Line62	294	840.9	400.5	100.00
	295	892.0	398.3	88.00
	296	910.4	418.5	78.00
	297	921.7	445.7	68.00
	298	914.4	475.3	57.00
Terrain Line63	299	840.9	400.5	100.00
	300	862.6	407.0	94.00
	301	868.2	413.8	88.60
	302	869.7	417.8	83.30
	303	871.2	429.8	78.00
	304	867.6	448.9	69.00

	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00
	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50
	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00

	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50
	522	1,205.9	754.1	2.50
Terrain Line105	523	1,215.0	782.3	3.00
	524	1,205.8	777.1	5.50
Terrain Line106	525	1,180.2	792.7	7.00
	526	1,189.0	800.8	4.00
	527	1,194.2	799.2	3.50
Terrain Line107	528	1,194.9	244.3	0.50
	529	1,185.4	457.2	0.50
	530	1,235.9	464.7	0.50
	531	1,266.6	541.5	0.50
	532	1,257.8	544.8	0.50
	533	1,229.2	473.2	0.50
	534	1,227.5	473.0	0.50
	535	1,199.6	469.0	0.50
	536	1,180.9	466.2	0.50
	537	1,180.3	469.1	0.50
	538	1,174.9	498.9	0.50
	539	1,173.2	509.1	0.50
	540	1,173.2	512.1	0.50
	541	1,172.0	518.2	0.50
	542	1,171.9	521.6	0.50
	543	1,171.4	525.3	0.50
	544	1,171.3	529.7	0.50
	545	1,172.5	531.1	0.50
	546	1,172.3	533.2	0.50
	547	1,172.1	539.1	0.50
	548	1,171.6	541.1	0.50
	549	1,172.0	544.4	0.50
	550	1,173.2	555.6	0.50
	551	1,174.5	564.4	0.50

	552	1,175.3	573.2	0.50
	553	1,179.6	585.3	0.50
	554	1,183.1	596.3	0.50
	555	1,187.5	611.4	0.50
	556	1,187.8	614.8	0.50
	557	1,189.4	622.0	0.50
	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50
	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50

	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50
	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50
	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50

	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line108	626	1,181.9	757.8	6.50
	627	1,176.6	759.9	7.00
	628	1,166.9	766.8	8.00
Terrain Line109	629	1,163.8	737.6	3.50
	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line110	632	1,124.1	751.2	4.50
	633	1,137.2	754.8	8.00
	634	1,149.2	753.7	8.50
	635	1,148.0	748.0	7.50
	636	1,154.0	741.7	5.00
	637	1,158.8	736.2	3.50
Terrain Line111	638	1,121.0	740.9	8.00
	639	1,117.9	735.8	8.00
	640	1,117.5	726.6	7.50
	641	1,116.9	722.0	6.50
	642	1,118.4	712.7	3.50
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line113	633	1,072.7	688.4	8.00
	646	1,078.7	687.3	3.00
	647	1,107.3	690.7	2.60
Terrain Line114	648	990.9	602.5	46.00
	649	1,048.9	663.1	8.00
	650	1,064.8	669.3	7.80
	651	1,069.6	668.8	7.50
	652	1,079.5	670.4	5.00
	653	1,087.5	672.6	4.00
	654	1,104.2	674.3	3.00
Terrain Line115	655	1,038.5	622.4	10.00
	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00

Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00
Terrain Line118	666	982.9	544.4	49.00
	667	989.3	547.7	46.00
	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00
	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00

	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50
	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50
	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00

Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00
	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50
	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00

	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00
	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00
	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00

	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00
	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00
	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00

	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00
	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	872	992.3	505.4	50.00
	873	992.1	495.6	52.00
	874	990.7	485.9	52.50
	875	990.2	474.8	53.00
	876	989.5	445.6	55.00
	877	992.4	419.6	58.00
	878	990.0	376.3	61.00
	879	989.9	347.9	62.00
	880	995.0	340.8	58.00
	881	998.9	335.5	57.00
	882	1,000.8	332.5	56.50
	871	1,002.4	329.8	56.00
Terrain Line138	883	1,002.5	407.0	52.00
	884	1,005.9	407.0	51.80
	885	1,015.3	407.0	51.80
	886	1,020.0	405.4	51.80
	887	1,021.9	402.4	51.80

EDAW/AECOM				**13 August 2009**	
Maddux, B.				**TNM 2.5**	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**				
RUN:	**Future No Build**				
Ground Zone			**Points**		
Name	**Type**	**Flow Resistivity**	**No.**	**Coordinates X**	**Y**
		cgs rayls		m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9

EDAW/AECOM
21 October 2009
Maddux, B.
TNM 2.5
Calculated with TNM 2.5
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future No Build
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	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R-1	9	1	0.0	67.1	71	67.1	12	----	67.1	0.0	5	-5.0
R-2 (ST-1)	16	1	0.0	67.4	71	67.4	12	----	67.4	0.0	5	-5.0
R-3	17	1	0.0	73.1	66	73.1	12	Snd Lvl	73.1	0.0	5	-5.0
R-4 (ST-3)	18	1	0.0	66.3	71	66.3	12	----	66.3	0.0	5	-5.0
R-5	19	1	0.0	66.5	71	66.5	12	----	66.5	0.0	5	-5.0
R-6	20	1	0.0	65.9	66	65.9	12	----	65.9	0.0	5	-5.0
R-7	21	1	0.0	66.7	66	66.7	12	Snd Lvl	66.7	0.0	5	-5.0
R-8	22	1	0.0	63.5	66	63.5	12	----	63.5	0.0	5	-5.0
R-9	24	1	0.0	62.4	66	62.4	12	----	62.4	0.0	5	-5.0
R-10 (ST-2)	25	1	0.0	65.1	72	65.1	12	----	65.1	0.0	5	-5.0
R-11	38	1	0.0	53.4	66	53.4	12	----	53.4	0.0	5	-5.0
R-12 (ST-4)	39	1	0.0	65.4	66	65.4	12	----	65.4	0.0	5	-5.0
R-13 (ST-5)	40	1	0.0	57.5	66	57.5	12	----	57.5	0.0	5	-5.0
R-14	41	1	0.0	65.3	66	65.3	12	----	65.3	0.0	5	-5.0
R-15	42	1	0.0	63.5	66	63.5	12	----	63.5	0.0	5	-5.0
R-16	43	1	0.0	72.1	71	72.1	12	Snd Lvl	72.1	0.0	5	-5.0
R-17	54	1	0.0	60.8	71	60.8	12	----	60.8	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 2B

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	%		
SFOBB WB OFF SE	3.7	point82	70	971.1	592.8	58.00				Average	
		point81	71	929.3	546.5	57.00				Average	
		point80	72	884.6	498.2	57.00				Average	
		point79	73	884.0	493.9	57.00				Average	
		point78	74	885.1	490.1	57.00				Average	
		point77	75	887.5	487.3	57.00				Average	
		point76	76	899.1	483.8	57.00				Average	
		point75	77	914.4	479.1	57.00				Average	
		point74	78	929.8	473.0	56.50				Average	
		point73	79	943.5	465.6	56.00					
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00				Average	
		point95	81	919.4	524.9	51.20				Average	
		point94	82	925.7	530.1	51.30				Average	
		point93	83	946.1	550.2	51.50				Average	
		point92	84	949.8	552.6	51.50				Average	
		point91	85	952.0	553.6	51.50				Average	
		point90	86	958.8	555.0	51.50				Average	
		point89	87	963.5	554.4	51.20				Average	
		point88	88	966.9	553.3	51.00				Average	
		point87	89	970.1	551.7	50.80				Average	
		point86	90	977.5	545.3	50.50				Average	
		point85	91	979.9	542.2	50.00				Average	
		point84	92	982.5	534.0	49.50				Average	
		point83	93	986.4	520.0	48.00					
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	100	Average	

		point136	119	984.2	536.2	49.50				Average	
		point135	120	980.5	547.6	50.50				Average	
		point134	121	976.7	558.8	51.00				Average	
		point133	122	974.1	567.2	51.50				Average	
		point132	123	973.6	572.5	51.50				Average	
		point131	124	974.0	578.1	51.40				Average	
		point130	125	974.6	580.7	51.40				Average	
		point129	126	975.7	584.7	51.30				Average	
		point128	127	981.1	597.1	51.40				Average	
		point127	128	987.9	608.4	51.50				Average	
		point126	129	995.6	619.1	51.70				Average	
		point125	130	1,008.7	635.6	51.90				Average	
		point124	131	1,018.4	646.7	52.00					
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00				Average	
		point369	355	624.3	463.0	92.50				Average	
		point368	356	629.2	458.1	92.00				Average	
		point367	357	639.7	452.1	91.00				Average	
		point366	358	653.3	443.1	90.50				Average	
		point365	359	657.8	439.3	90.00				Average	
		point364	360	673.3	420.0	90.00				Average	
		point363	361	678.0	415.8	90.00				Average	
		point362	362	693.7	404.9	90.00				Average	
		point361	363	712.9	394.2	91.00				Average	
		point360	364	731.8	386.5	90.00					
Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00				Average	
		point372	366	713.7	396.1	91.00				Average	
		point373	367	694.7	406.6	90.00				Average	
		point374	368	679.3	417.4	90.00				Average	
		point375	369	674.7	421.4	90.00				Average	
		point376	370	659.2	440.7	90.00				Average	
		point377	371	654.5	444.7	90.50				Average	
		point378	372	640.8	453.8	90.00				Average	
		point379	373	630.4	459.7	92.00				Average	
		point380	374	626.2	463.9	92.50				Average	
		point381	375	625.6	468.5	92.00					
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00				Average	
		point393	377	641.6	461.7	91.50				Average	
		point392	378	668.2	456.6	94.50				Average	
		point391	379	674.0	454.2	94.80				Average	

		point390	380	708.1	430.4	98.00				Average	
		point389	381	752.6	412.0	99.50				Average	
		point388	382	762.9	408.4	100.20				Average	
		point387	383	777.7	407.1	101.50				Average	
		point386	384	789.1	412.5	102.50				Average	
		point385	385	792.9	422.4	103.00				Average	
		point384	386	789.3	432.7	103.20				Average	
		point383	387	781.8	439.0	103.50				Average	
		point382	388	764.6	441.0	103.80					
Signal Rd - 2	3.7	point406	389	764.6	438.7	103.80				Average	
		point405	390	781.7	436.9	103.50				Average	
		point404	391	787.9	431.6	103.20				Average	
		point403	392	790.4	422.7	103.00				Average	
		point402	393	786.8	414.4	102.50				Average	
		point401	394	777.5	410.1	101.50				Average	
		point400	395	762.9	411.2	100.20				Average	
		point399	396	708.5	432.8	98.00				Average	
		point398	397	675.4	456.1	94.80				Average	
		point397	398	668.9	458.7	94.50				Average	
		point396	399	641.9	463.8	91.50				Average	
		point395	400	629.9	468.6	92.00					
SFOBB WB - 3	7.3	point668	668	1,553.4	1,058.5	58.00				Average	Y
		point667	667	1,444.4	1,022.8	58.00				Average	Y
		point666	666	1,355.7	983.9	58.00				Average	Y
		point626	626	1,266.5	925.5	58.50				Average	Y
		point625	625	1,244.7	909.5	59.70				Average	Y
		point624	624	1,209.3	881.4	59.80				Average	Y
		point623	623	1,184.1	859.5	60.00				Average	Y
		point622	622	1,141.5	818.3	60.20				Average	Y
		point621	621	1,112.6	787.8	60.50				Average	Y
		point620	620	1,083.8	753.4	60.40				Average	Y
		point619	619	1,061.4	723.7	60.20				Average	Y
		point618	618	1,048.6	705.0	60.00				Average	Y
		point617	617	988.2	619.9	56.70				Average	Y
		point616	616	969.4	597.5	56.60				Average	Y
		point615	615	951.9	577.6	56.50				Average	Y
		point614	614	864.5	478.7	56.00				Average	Y
		point613	613	851.3	463.7	56.00					
SFOBB WB - 2	7.3	point664	664	1,551.8	1,063.3	58.00				Average	Y

		point663	663	1,442.4	1,028.5	58.00				Average	Y
		point662	662	1,352.8	990.0	58.00				Average	Y
		point612	612	1,262.4	931.1	58.50				Average	Y
		point611	611	1,240.5	915.1	59.70				Average	Y
		point610	610	1,204.9	886.8	59.80				Average	Y
		point609	609	1,179.4	864.6	60.00				Average	Y
		point608	608	1,136.5	823.2	60.20				Average	Y
		point607	607	1,107.4	792.4	60.50				Average	Y
		point606	606	1,078.4	757.7	60.40				Average	Y
		point605	605	1,055.8	727.8	60.20				Average	Y
		point604	604	1,042.9	709.0	60.00				Average	Y
		point603	603	982.7	624.2	56.70				Average	Y
		point602	602	964.2	602.1	56.60				Average	Y
		point601	601	946.6	582.2	56.50				Average	Y
		point600	600	859.3	483.3	56.00				Average	Y
		point599	599	846.0	468.3	56.00					
SFOBB WB - 1	7.3	point660	660	1,551.3	1,067.4	58.00				Average	
		point659	659	1,441.3	1,033.4	58.00				Average	Y
		point658	658	1,351.6	995.1	58.00				Average	Y
		point596	596	1,258.3	936.8	58.50				Average	Y
		point595	595	1,236.2	920.6	59.70				Average	Y
		point594	594	1,200.4	892.2	59.80				Average	Y
		point593	593	1,174.7	869.8	60.00				Average	Y
		point592	592	1,131.5	828.1	60.20				Average	Y
		point591	591	1,102.2	797.1	60.50				Average	Y
		point590	590	1,072.9	762.1	60.40				Average	Y
		point589	589	1,050.1	731.9	60.20				Average	Y
		point588	588	1,037.2	713.0	60.00				Average	Y
		point587	587	977.1	628.5	56.70				Average	Y
		point586	586	958.9	606.6	56.60				Average	Y
		point585	585	941.4	586.9	56.50				Average	Y
		point584	584	854.1	487.9	56.00				Average	Y
		point583	583	840.8	473.0	56.00					
SFOBB EB - 1	7.3	point636	636	841.0	470.8	50.00				Average	Y
		point635	635	885.6	521.5	51.50				Average	Y
		point634	634	925.6	563.7	53.00				Average	Y
		point633	633	997.7	646.8	53.50				Average	Y
		point632	632	1,070.2	729.7	53.70				Average	Y
		point631	631	1,114.7	775.7	54.00				Average	Y

		point630	630	1,133.8	791.6	54.50				Average	Y
		point629	629	1,181.8	828.2	55.00				Average	Y
		point628	628	1,216.2	857.6	55.50				Average	Y
		point669	669	1,279.1	904.6	56.00				Average	Y
		point670	670	1,371.5	962.9	56.50				Average	Y
		point671	671	1,457.8	999.3	56.70				Average	Y
		point672	672	1,564.3	1,032.9	57.00					
SFOBB EB - 2	7.3	point646	646	846.3	466.2	50.00				Average	Y
		point645	645	890.8	516.8	51.50				Average	Y
		point644	644	930.7	559.0	53.00				Average	Y
		point643	643	1,003.0	642.2	53.50				Average	Y
		point642	642	1,075.3	725.0	53.70				Average	Y
		point641	641	1,119.4	770.6	54.00				Average	Y
		point640	640	1,138.2	786.2	54.50				Average	Y
		point639	639	1,186.2	822.8	55.00				Average	Y
		point638	638	1,220.6	852.2	55.50				Average	Y
		point673	673	1,283.3	899.0	56.00				Average	Y
		point674	674	1,375.5	956.8	56.50				Average	Y
		point675	675	1,461.4	992.4	56.70				Average	Y
		point676	676	1,566.7	1,026.1	57.00					
SFOBB EB - 3	7.3	point656	656	851.5	461.6	50.00				Average	Y
		point655	655	895.9	512.1	51.50				Average	Y
		point654	654	935.9	554.4	53.00				Average	Y
		point653	653	1,008.2	637.6	53.50				Average	Y
		point652	652	1,080.5	720.3	53.70				Average	Y
		point651	651	1,124.2	765.5	54.00				Average	Y
		point650	650	1,142.5	780.7	54.50				Average	Y
		point649	649	1,190.6	817.3	55.00				Average	Y
		point648	648	1,224.9	846.7	55.50				Average	Y
		point677	677	1,287.5	893.4	56.00				Average	Y
		point678	678	1,379.6	949.5	56.50				Average	Y
		point679	679	1,465.1	986.0	56.70				Average	Y
		point680	680	1,568.8	1,019.6	57.00					
SFOBB WB ON NE	3.7	point704	704	932.7	650.5	49.00	Onramp	0.00	100	Average	
		point703	703	923.0	654.9	50.00				Average	Y
		point702	702	916.7	662.2	51.00				Average	Y
		point701	701	914.1	674.4	52.00				Average	Y
		point700	700	916.8	681.8	52.50				Average	Y
		point699	699	920.5	687.6	53.00				Average	Y

		point698	698	925.2	692.2	53.50				Average	Y
		point697	697	931.0	696.0	54.00				Average	Y
		point696	696	938.0	698.3	54.50				Average	Y
		point695	695	944.7	699.2	55.00				Average	Y
		point694	694	951.8	698.5	55.50				Average	Y
		point693	693	958.9	696.2	56.00				Average	Y
		point692	692	964.8	692.8	56.50				Average	Y
		point691	691	969.3	688.7	57.00				Average	Y
		point690	690	973.0	683.9	57.50				Average	Y
		point689	689	976.0	677.3	58.00				Average	Y
		point688	688	977.5	668.7	58.50				Average	Y
		point687	687	977.6	664.4	58.70				Average	Y
		point686	686	976.1	655.8	59.00				Average	Y
		point685	685	967.8	637.2	59.00				Average	Y
		point684	684	953.0	612.2	58.50				Average	Y
		point683	683	936.1	589.4	58.00				Average	Y
		point682	682	918.0	568.0	57.50				Average	Y
		point681	681	907.8	556.7	57.20					
SFOBB WB OFF NE	3.7	point723	723	1,149.9	850.5	59.00				Average	Y
		point722	722	1,115.9	820.6	59.50				Average	Y
		point721	721	1,083.8	789.7	60.00				Average	Y
		point720	720	1,057.2	761.3	60.00				Average	Y
		point719	719	1,033.9	735.0	59.50				Average	Y
		point718	718	1,021.0	723.4	59.00				Average	Y
		point717	717	1,004.0	712.9	58.50				Average	Y
		point716	716	987.7	708.4	58.00				Average	Y
		point715	715	973.9	708.5	57.50				Average	Y
		point714	714	961.5	711.2	57.00				Average	Y
		point713	713	948.8	713.5	56.50				Average	Y
		point712	712	937.3	712.4	56.00				Average	Y
		point711	711	927.1	709.1	55.50				Average	Y
		point710	710	918.2	703.9	55.00				Average	Y
		point709	709	911.6	698.0	54.50				Average	Y
		point708	708	906.8	691.6	54.00				Average	Y
		point707	707	903.1	684.5	53.50				Average	Y
		point706	706	898.2	673.6	53.00				Average	Y
		point705	705	894.0	662.4	52.70					
North Gate Rd - 2	3.7	point724	724	974.6	640.0	45.50				Average	
		point242	208	980.6	648.5	44.80				Average	

		point241	209	978.9	658.9	43.50				Average	
		point240	210	974.3	664.4	43.00				Average	
		point239	211	968.3	668.3	42.00				Average	
		point238	212	946.7	679.7	40.50				Average	
		point237	213	920.0	690.1	38.50				Average	
		point236	214	903.8	696.0	38.00				Average	
		point235	215	874.7	706.7	36.50				Average	
		point234	216	856.7	711.6	35.50				Average	
		point233	217	837.9	712.7	34.50				Average	
		point232	218	808.2	706.6	33.00				Average	
		point231	219	802.6	707.5	32.80				Average	
		point230	220	798.2	714.0	32.50				Average	
		point229	221	799.2	722.3	32.80				Average	
		point228	222	808.3	725.7	31.50				Average	
		point227	223	838.9	724.6	30.20				Average	
		point226	224	869.2	727.4	28.20				Average	
		point225	225	891.3	726.1	28.00				Average	
		point224	226	899.9	736.4	26.70				Average	
		point223	227	896.7	745.8	26.50				Average	
		point222	228	887.6	757.5	26.00				Average	
		point221	229	875.8	776.9	25.50				Average	
		point220	230	873.5	791.2	23.50				Average	
		point219	231	878.3	813.9	21.50				Average	
		point218	232	887.7	828.1	20.00				Average	
		point217	233	912.6	848.7	18.00				Average	
		point216	234	931.5	858.7	16.50				Average	
		point215	235	966.3	865.7	15.00				Average	
		point214	236	1,029.0	871.4	10.50				Average	
		point213	237	1,059.1	870.7	10.00				Average	
		point212	238	1,075.1	869.6	9.50				Average	
		point211	239	1,088.1	866.9	9.30				Average	
		point210	240	1,092.6	863.7	9.30				Average	
		point209	241	1,105.7	847.3	9.00				Average	
		point208	242	1,132.0	810.7	8.70				Average	
		point207	243	1,140.5	802.3	8.60				Average	
		point206	244	1,171.5	789.1	7.00				Average	
		point205	245	1,185.8	782.0	6.50				Average	
		point204	246	1,191.4	775.4	6.00				Average	
		point203	247	1,192.7	771.5	5.50				Average	

		point202	248	1,193.2	765.2	5.00				Average	
		point201	249	1,191.2	756.4	4.50				Average	
		point200	250	1,177.4	740.0	4.00				Average	
		point199	251	1,167.8	727.2	3.60				Average	
		point198	252	1,158.1	712.1	3.50				Average	
		point197	253	1,092.8	633.7	3.50				Average	
		point196	254	1,080.9	616.6	4.00				Average	
		point195	255	1,070.5	593.7	5.50				Average	
		point194	256	1,067.2	577.5	5.70				Average	
		point193	257	1,066.7	564.7	5.80				Average	
		point192	258	1,070.5	554.0	5.60				Average	
		point191	259	1,079.2	537.3	5.40				Average	
		point190	260	1,096.3	488.5	4.50				Average	
		point189	261	1,109.6	471.9	4.00				Average	
		point188	262	1,122.5	464.6	3.50					
North Gate Rd - 1	3.7	point359	263	1,124.1	467.5	3.50				Average	
		point358	264	1,111.4	473.9	4.00				Average	
		point357	265	1,098.7	489.2	4.50				Average	
		point356	266	1,089.0	516.7	5.00				Average	
		point355	267	1,081.7	537.9	5.40				Average	
		point354	268	1,073.4	555.5	5.60				Average	
		point353	269	1,070.6	565.0	5.80				Average	
		point352	270	1,070.8	576.7	5.70				Average	
		point351	271	1,074.8	593.1	5.50				Average	
		point350	272	1,085.1	615.7	4.00				Average	
		point349	273	1,095.2	630.9	3.50				Average	
		point348	274	1,107.1	644.5	3.50				Average	
		point347	275	1,111.6	649.3	3.50				Average	
		point346	276	1,128.6	669.7	3.50				Average	
		point345	277	1,137.6	681.0	3.50				Average	
		point344	278	1,163.4	712.1	3.50				Average	
		point343	279	1,182.9	735.2	4.00				Average	
		point342	280	1,190.3	745.6	4.20				Average	
		point341	281	1,195.2	752.6	4.50				Average	
		point340	282	1,198.5	763.6	5.00				Average	
		point339	283	1,197.7	770.3	5.50				Average	
		point338	284	1,195.7	776.6	6.00				Average	
		point337	285	1,188.6	784.5	6.50				Average	
		point335	287	1,172.5	792.6	7.00				Average	

		point334	288	1,142.9	805.1	8.60				Average	
		point333	289	1,134.1	812.4	8.70				Average	
		point332	290	1,120.5	831.3	8.80				Average	
		point331	291	1,110.0	846.8	9.00				Average	
		point330	292	1,100.5	860.4	9.10				Average	
		point329	293	1,094.9	866.9	9.30				Average	
		point328	294	1,089.0	870.5	9.30				Average	
		point327	295	1,074.9	873.3	9.50				Average	
		point326	296	1,058.3	874.8	10.00				Average	
		point325	297	1,043.2	875.2	10.20				Average	
		point324	298	1,028.0	874.8	10.50				Average	
		point323	299	1,000.9	872.0	12.50				Average	
		point322	300	965.5	867.9	15.00				Average	
		point321	301	930.5	860.9	16.50				Average	
		point320	302	910.8	850.2	18.00				Average	
		point319	303	885.7	829.5	20.00				Average	
		point318	304	876.1	814.3	21.50				Average	
		point317	305	871.2	791.0	23.50				Average	
		point316	306	873.5	776.2	25.50				Average	
		point315	307	885.0	756.1	26.00				Average	
		point314	308	894.1	744.9	26.50				Average	
		point313	309	897.0	736.5	26.70				Average	
		point312	310	890.0	728.2	28.00				Average	
		point311	311	869.1	729.3	28.20				Average	
		point310	312	838.6	726.6	30.20				Average	
		point309	313	808.0	727.5	31.50				Average	
		point308	314	797.1	724.0	32.30				Average	
		point307	315	795.4	713.2	32.50				Average	
		point306	316	801.7	704.8	32.80				Average	
		point305	317	808.3	703.5	33.00				Average	
		point304	318	837.9	709.9	34.50				Average	
		point303	319	856.4	708.7	35.50				Average	
		point302	320	875.3	703.6	36.50				Average	
		point301	321	946.4	678.3	40.50				Average	
		point300	322	967.0	665.8	42.50				Average	
		point299	323	975.1	657.4	43.50				Average	
		point298	324	975.4	649.8	44.80				Average	
		point297	325	970.6	644.2	45.50					
Treasure Is Rd - 2	3.7	point164	132	985.1	519.1	48.00				Average	

		point163	133	986.0	503.2	48.00				Average	
		point162	134	984.4	452.2	53.50				Average	
		point161	135	979.4	378.0	60.50				Average	
		point160	136	975.4	356.4	61.50				Average	
		point159	137	961.6	319.8	63.00				Average	
		point158	138	950.8	306.7	63.50				Average	
		point157	139	935.5	296.0	64.00				Average	
		point156	140	921.7	290.2	64.00				Average	
		point155	141	904.0	289.3	60.50				Average	
		point154	142	896.6	291.0	60.80				Average	
		point153	143	798.8	311.0	62.50				Average	
		point152	144	776.7	316.4	62.20				Average	
		point151	145	769.7	319.5	62.00				Average	
		point150	146	728.3	352.1	71.50				Average	
		point149	147	707.3	362.0	72.80				Average	
		point148	148	694.4	363.4	74.00				Average	
		point147	149	683.5	362.8	73.00				Average	
		point146	150	671.9	360.6	72.50				Average	
		point145	151	660.7	356.8	71.50				Average	
		point144	152	654.9	355.4	70.00				Average	
		point143	153	602.5	340.2	63.00				Average	
		point142	154	591.8	337.9	62.00				Average	
		point141	155	582.9	336.9	61.00				Average	
		point140	156	571.6	337.4	60.00				Average	
		point139	157	557.7	340.8	57.50					
Macalla Rd - 1	3.7	point754	754	970.6	644.2	45.50				Average	
		point296	326	963.7	642.0	46.00				Average	
		point295	327	954.1	643.0	47.50				Average	
		point294	328	909.2	655.7	52.00				Average	
		point293	329	863.1	668.1	56.50				Average	
		point292	330	851.7	668.3	57.50				Average	
		point291	331	838.7	666.6	58.50				Average	
		point290	332	822.7	661.3	59.50				Average	
		point289	333	790.9	647.9	65.00				Average	
		point288	334	781.7	638.5	66.00				Average	
		point287	335	776.7	627.2	66.20				Average	
		point286	336	775.1	615.1	66.50				Average	
		point285	337	763.7	595.8	67.50				Average	
		point284	338	749.0	584.6	68.50				Average	

		point283	339	730.6	577.1	69.50				Average	
		point282	340	711.5	575.6	70.00				Average	
		point281	341	688.8	580.4	70.50				Average	
		point280	342	671.1	587.3	71.00				Average	
		point279	343	658.3	586.9	70.60				Average	
		point278	344	635.8	585.6	70.30				Average	
		point277	345	618.9	584.9	70.00				Average	
		point276	346	610.5	587.9	68.50				Average	
		point275	347	590.6	604.4	67.50					
Treasure Is Rd - 1-2	3.7	point756	756	556.4	336.6	57.50				Average	
		point185	161	571.0	332.7	60.00				Average	
		point184	162	583.3	332.3	61.00				Average	
		point183	163	594.8	332.7	62.00				Average	
		point182	164	664.7	354.5	71.00				Average	
		point181	165	676.6	357.9	72.50				Average	
		point180	166	686.6	359.0	73.00				Average	
		point179	167	694.3	359.5	74.00				Average	
		point178	168	706.9	358.4	72.80				Average	
		point177	169	726.5	348.7	71.50				Average	
		point176	170	767.9	316.6	62.00				Average	
		point175	171	776.8	312.8	62.20				Average	
		point174	172	904.5	285.9	60.00				Average	
		point173	173	924.4	287.5	64.00				Average	
		point172	174	940.3	294.3	64.00				Average	
		point171	175	956.4	306.2	63.50				Average	
		point170	176	966.8	319.1	63.00				Average	
		point169	177	975.3	338.1	61.00				Average	
		point168	178	980.9	359.6	61.50				Average	
		point167	179	983.1	378.2	60.50				Average	
		point166	180	990.1	506.3	48.50				Average	
		point165	181	988.9	518.9	48.00					
Roadway60	3.7	point664	758	589.2	601.8	67.50				Average	
		point262	759	608.9	584.9	68.50				Average	
		point261	760	619.0	581.8	70.00				Average	
		point260	761	649.0	583.5	71.00				Average	
		point259	762	671.1	584.4	71.00				Average	
		point258	763	687.7	577.3	70.50				Average	
		point257	764	711.7	572.7	70.00				Average	
		point256	765	731.9	574.3	69.50				Average	

		point255	766	750.7	582.4	68.50				Average	
		point254	767	765.5	593.8	67.50				Average	
		point253	768	778.2	614.7	66.50				Average	
		point252	769	780.7	627.7	66.20				Average	
		point251	770	784.5	637.3	66.00				Average	
		point250	771	792.7	645.2	65.00				Average	
		point249	772	824.3	658.8	58.50				Average	
		point248	773	840.9	664.0	58.50				Average	
		point247	774	852.9	665.3	57.50				Average	
		point246	775	862.9	665.1	56.50				Average	
		point245	776	953.4	637.5	47.50				Average	
		point244	777	965.0	636.8	46.50				Average	
		point243	778	974.6	640.0	45.50					

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 2B

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
SFOBB WB OFF SE	point82	70	314	88	4	88	5	88	0	0	0	0
	point81	71	314	88	4	88	5	88	0	0	0	0
	point80	72	314	88	4	88	5	88	0	0	0	0
	point79	73	314	88	4	88	5	88	0	0	0	0
	point78	74	314	88	4	88	5	88	0	0	0	0
	point77	75	314	88	4	88	5	88	0	0	0	0
	point76	76	314	88	4	88	5	88	0	0	0	0
	point75	77	314	88	4	88	5	88	0	0	0	0
	point74	78	314	88	4	88	5	88	0	0	0	0
	point73	79										
SFOBB EB OFF SE	point96	80	248	88	3	88	4	88	0	0	0	0
	point95	81	248	88	3	88	4	88	0	0	0	0
	point94	82	248	88	3	88	4	88	0	0	0	0
	point93	83	248	88	3	88	4	88	0	0	0	0
	point92	84	248	88	3	88	4	88	0	0	0	0
	point91	85	248	88	3	88	4	88	0	0	0	0
	point90	86	248	88	3	88	4	88	0	0	0	0
	point89	87	248	88	3	88	4	88	0	0	0	0
	point88	88	248	88	3	88	4	88	0	0	0	0
	point87	89	248	88	3	88	4	88	0	0	0	0
	point86	90	248	88	3	88	4	88	0	0	0	0
	point85	91	248	88	3	88	4	88	0	0	0	0
	point84	92	248	88	3	88	4	88	0	0	0	0

	point83	93										
SFOBB EB ON SE	point137	118	476	88	6	88	8	88	0	0	0	0
	point136	119	476	88	6	88	8	88	0	0	0	0
	point135	120	476	88	6	88	8	88	0	0	0	0
	point134	121	476	88	6	88	8	88	0	0	0	0
	point133	122	476	88	6	88	8	88	0	0	0	0
	point132	123	476	88	6	88	8	88	0	0	0	0
	point131	124	476	88	6	88	8	88	0	0	0	0
	point130	125	476	88	6	88	8	88	0	0	0	0
	point129	126	476	88	6	88	8	88	0	0	0	0
	point128	127	476	88	6	88	8	88	0	0	0	0
	point127	128	476	88	6	88	8	88	0	0	0	0
	point126	129	476	88	6	88	8	88	0	0	0	0
	point125	130	476	88	6	88	8	88	0	0	0	0
	point124	131										
Forest Rd - 1	point370	354	12	25	0	0	0	0	0	0	0	0
	point369	355	12	25	0	0	0	0	0	0	0	0
	point368	356	12	25	0	0	0	0	0	0	0	0
	point367	357	12	25	0	0	0	0	0	0	0	0
	point366	358	12	25	0	0	0	0	0	0	0	0
	point365	359	12	25	0	0	0	0	0	0	0	0
	point364	360	12	25	0	0	0	0	0	0	0	0
	point363	361	12	25	0	0	0	0	0	0	0	0
	point362	362	12	25	0	0	0	0	0	0	0	0
	point361	363	12	25	0	0	0	0	0	0	0	0
	point360	364										
Forest Rd - 2	point371	365	12	25	0	0	0	0	0	0	0	0
	point372	366	12	25	0	0	0	0	0	0	0	0
	point373	367	12	25	0	0	0	0	0	0	0	0
	point374	368	12	25	0	0	0	0	0	0	0	0
	point375	369	12	25	0	0	0	0	0	0	0	0
	point376	370	12	25	0	0	0	0	0	0	0	0
	point377	371	12	25	0	0	0	0	0	0	0	0
	point378	372	12	25	0	0	0	0	0	0	0	0
	point379	373	12	25	0	0	0	0	0	0	0	0
	point380	374	12	25	0	0	0	0	0	0	0	0

	point381	375										
Signal Rd - 1	point394	376	10	40	0	0	0	0	0	0	0	0
	point393	377	10	40	0	0	0	0	0	0	0	0
	point392	378	10	40	0	0	0	0	0	0	0	0
	point391	379	10	40	0	0	0	0	0	0	0	0
	point390	380	10	40	0	0	0	0	0	0	0	0
	point389	381	10	40	0	0	0	0	0	0	0	0
	point388	382	10	40	0	0	0	0	0	0	0	0
	point387	383	10	40	0	0	0	0	0	0	0	0
	point386	384	10	40	0	0	0	0	0	0	0	0
	point385	385	10	40	0	0	0	0	0	0	0	0
	point384	386	10	40	0	0	0	0	0	0	0	0
	point383	387	10	40	0	0	0	0	0	0	0	0
	point382	388										
Signal Rd - 2	point406	389	10	40	0	0	0	0	0	0	0	0
	point405	390	10	40	0	0	0	0	0	0	0	0
	point404	391	10	40	0	0	0	0	0	0	0	0
	point403	392	10	40	0	0	0	0	0	0	0	0
	point402	393	10	40	0	0	0	0	0	0	0	0
	point401	394	10	40	0	0	0	0	0	0	0	0
	point400	395	10	40	0	0	0	0	0	0	0	0
	point399	396	10	40	0	0	0	0	0	0	0	0
	point398	397	10	40	0	0	0	0	0	0	0	0
	point397	398	10	40	0	0	0	0	0	0	0	0
	point396	399	10	40	0	0	0	0	0	0	0	0
	point395	400										
SFOBB WB - 3	point668	668	3075	105	41	105	51	88	0	0	0	0
	point667	667	3075	105	41	105	51	88	0	0	0	0
	point666	666	3075	105	41	105	51	88	0	0	0	0
	point626	626	3075	105	41	105	51	88	0	0	0	0
	point625	625	3075	105	41	105	51	88	0	0	0	0
	point624	624	3075	105	41	105	51	88	0	0	0	0
	point623	623	3075	105	41	105	51	88	0	0	0	0
	point622	622	3075	105	41	105	51	88	0	0	0	0
	point621	621	3075	105	41	105	51	88	0	0	0	0
	point620	620	3075	105	41	105	51	88	0	0	0	0

	point619	619	3075	105	41	105	51	88	0	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0	0
	point613	613										
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0	0
	point610	610	3075	105	41	105	51	88	0	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0	0
	point599	599										
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0	0

	point587	587	3075	105	41	105	51	88	0	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0	0
	point583	583										
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0	0
	point629	629	2754	105	37	105	45	88	0	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0	0
	point672	672										
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0	0
	point676	676										
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0	0

	point651	651	2754	105	37	105	45	88	0	0	0	0
	point650	650	2754	105	37	105	45	88	0	0	0	0
	point649	649	2754	105	37	105	45	88	0	0	0	0
	point648	648	2754	105	37	105	45	88	0	0	0	0
	point677	677	2754	105	37	105	45	88	0	0	0	0
	point678	678	2754	105	37	105	45	88	0	0	0	0
	point679	679	2754	105	37	105	45	88	0	0	0	0
	point680	680										
SFOBB WB ON NE	point704	704	848	88	11	88	14	88	0	0	0	0
	point703	703	848	88	11	88	14	88	0	0	0	0
	point702	702	848	88	11	88	14	88	0	0	0	0
	point701	701	848	88	11	88	14	88	0	0	0	0
	point700	700	848	88	11	88	14	88	0	0	0	0
	point699	699	848	88	11	88	14	88	0	0	0	0
	point698	698	848	88	11	88	14	88	0	0	0	0
	point697	697	848	88	11	88	14	88	0	0	0	0
	point696	696	848	88	11	88	14	88	0	0	0	0
	point695	695	848	88	11	88	14	88	0	0	0	0
	point694	694	848	88	11	88	14	88	0	0	0	0
	point693	693	848	88	11	88	14	88	0	0	0	0
	point692	692	848	88	11	88	14	88	0	0	0	0
	point691	691	848	88	11	88	14	88	0	0	0	0
	point690	690	848	88	11	88	14	88	0	0	0	0
	point689	689	848	88	11	88	14	88	0	0	0	0
	point688	688	848	88	11	88	14	88	0	0	0	0
	point687	687	848	88	11	88	14	88	0	0	0	0
	point686	686	848	88	11	88	14	88	0	0	0	0
	point685	685	848	88	11	88	14	88	0	0	0	0
	point684	684	848	88	11	88	14	88	0	0	0	0
	point683	683	848	88	11	88	14	88	0	0	0	0
	point682	682	848	88	11	88	14	88	0	0	0	0
	point681	681										
SFOBB WB OFF NE	point723	723	314	88	4	88	5	88	0	0	0	0
	point722	722	314	88	4	88	5	88	0	0	0	0
	point721	721	314	88	4	88	5	88	0	0	0	0
	point720	720	314	88	4	88	5	88	0	0	0	0

	point719	719	314	88	4	88	5	88	0	0	0	0
	point718	718	314	88	4	88	5	88	0	0	0	0
	point717	717	314	88	4	88	5	88	0	0	0	0
	point716	716	314	88	4	88	5	88	0	0	0	0
	point715	715	314	88	4	88	5	88	0	0	0	0
	point714	714	314	88	4	88	5	88	0	0	0	0
	point713	713	314	88	4	88	5	88	0	0	0	0
	point712	712	314	88	4	88	5	88	0	0	0	0
	point711	711	314	88	4	88	5	88	0	0	0	0
	point710	710	314	88	4	88	5	88	0	0	0	0
	point709	709	314	88	4	88	5	88	0	0	0	0
	point708	708	314	88	4	88	5	88	0	0	0	0
	point707	707	314	88	4	88	5	88	0	0	0	0
	point706	706	314	88	4	88	5	88	0	0	0	0
	point705	705										
North Gate Rd - 2	point724	724	340	40	7	40	3	40	0	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0	0
	point239	211	340	40	7	40	3	40	0	0	0	0
	point238	212	340	40	7	40	3	40	0	0	0	0
	point237	213	340	40	7	40	3	40	0	0	0	0
	point236	214	340	40	7	40	3	40	0	0	0	0
	point235	215	340	40	7	40	3	40	0	0	0	0
	point234	216	340	40	7	40	3	40	0	0	0	0
	point233	217	340	40	7	40	3	40	0	0	0	0
	point232	218	340	40	7	40	3	40	0	0	0	0
	point231	219	340	40	7	40	3	40	0	0	0	0
	point230	220	340	40	7	40	3	40	0	0	0	0
	point229	221	340	40	7	40	3	40	0	0	0	0
	point228	222	340	40	7	40	3	40	0	0	0	0
	point227	223	340	40	7	40	3	40	0	0	0	0
	point226	224	340	40	7	40	3	40	0	0	0	0
	point225	225	340	40	7	40	3	40	0	0	0	0
	point224	226	340	40	7	40	3	40	0	0	0	0
	point223	227	340	40	7	40	3	40	0	0	0	0

	point222	228	340	40	7	40	3	40	0	0	0	0
	point221	229	340	40	7	40	3	40	0	0	0	0
	point220	230	340	40	7	40	3	40	0	0	0	0
	point219	231	340	40	7	40	3	40	0	0	0	0
	point218	232	340	40	7	40	3	40	0	0	0	0
	point217	233	340	40	7	40	3	40	0	0	0	0
	point216	234	340	40	7	40	3	40	0	0	0	0
	point215	235	340	40	7	40	3	40	0	0	0	0
	point214	236	340	40	7	40	3	40	0	0	0	0
	point213	237	340	40	7	40	3	40	0	0	0	0
	point212	238	340	40	7	40	3	40	0	0	0	0
	point211	239	340	40	7	40	3	40	0	0	0	0
	point210	240	340	40	7	40	3	40	0	0	0	0
	point209	241	340	40	7	40	3	40	0	0	0	0
	point208	242	340	40	7	40	3	40	0	0	0	0
	point207	243	340	40	7	40	3	40	0	0	0	0
	point206	244	340	40	7	40	3	40	0	0	0	0
	point205	245	340	40	7	40	3	40	0	0	0	0
	point204	246	340	40	7	40	3	40	0	0	0	0
	point203	247	340	40	7	40	3	40	0	0	0	0
	point202	248	340	40	7	40	3	40	0	0	0	0
	point201	249	340	40	7	40	3	40	0	0	0	0
	point200	250	340	40	7	40	3	40	0	0	0	0
	point199	251	340	40	7	40	3	40	0	0	0	0
	point198	252	340	40	7	40	3	40	0	0	0	0
	point197	253	340	40	7	40	3	40	0	0	0	0
	point196	254	340	40	7	40	3	40	0	0	0	0
	point195	255	340	40	7	40	3	40	0	0	0	0
	point194	256	340	40	7	40	3	40	0	0	0	0
	point193	257	340	40	7	40	3	40	0	0	0	0
	point192	258	340	40	7	40	3	40	0	0	0	0
	point191	259	340	40	7	40	3	40	0	0	0	0
	point190	260	340	40	7	40	3	40	0	0	0	0
	point189	261	340	40	7	40	3	40	0	0	0	0
	point188	262										
North Gate Rd - 1	point359	263	340	40	7	40	3	40	0	0	0	0

	point358	264	340	40	7	40	3	40	0	0	0	0
	point357	265	340	40	7	40	3	40	0	0	0	0
	point356	266	340	40	7	40	3	40	0	0	0	0
	point355	267	340	40	7	40	3	40	0	0	0	0
	point354	268	340	40	7	40	3	40	0	0	0	0
	point353	269	340	40	7	40	3	40	0	0	0	0
	point352	270	340	40	7	40	3	40	0	0	0	0
	point351	271	340	40	7	40	3	40	0	0	0	0
	point350	272	340	40	7	40	3	40	0	0	0	0
	point349	273	340	40	7	40	3	40	0	0	0	0
	point348	274	340	40	7	40	3	40	0	0	0	0
	point347	275	340	40	7	40	3	40	0	0	0	0
	point346	276	340	40	7	40	3	40	0	0	0	0
	point345	277	340	40	7	40	3	40	0	0	0	0
	point344	278	340	40	7	40	3	40	0	0	0	0
	point343	279	340	40	7	40	3	40	0	0	0	0
	point342	280	340	40	7	40	3	40	0	0	0	0
	point341	281	340	40	7	40	3	40	0	0	0	0
	point340	282	340	40	7	40	3	40	0	0	0	0
	point339	283	340	40	7	40	3	40	0	0	0	0
	point338	284	340	40	7	40	3	40	0	0	0	0
	point337	285	340	40	7	40	3	40	0	0	0	0
	point335	287	340	40	7	40	3	40	0	0	0	0
	point334	288	340	40	7	40	3	40	0	0	0	0
	point333	289	340	40	7	40	3	40	0	0	0	0
	point332	290	340	40	7	40	3	40	0	0	0	0
	point331	291	340	40	7	40	3	40	0	0	0	0
	point330	292	340	40	7	40	3	40	0	0	0	0
	point329	293	340	40	7	40	3	40	0	0	0	0
	point328	294	340	40	7	40	3	40	0	0	0	0
	point327	295	340	40	7	40	3	40	0	0	0	0
	point326	296	340	40	7	40	3	40	0	0	0	0
	point325	297	340	40	7	40	3	40	0	0	0	0
	point324	298	340	40	7	40	3	40	0	0	0	0
	point323	299	340	40	7	40	3	40	0	0	0	0
	point322	300	340	40	7	40	3	40	0	0	0	0

	point321	301	340	40	7	40	3	40	0	0	0	0
	point320	302	340	40	7	40	3	40	0	0	0	0
	point319	303	340	40	7	40	3	40	0	0	0	0
	point318	304	340	40	7	40	3	40	0	0	0	0
	point317	305	340	40	7	40	3	40	0	0	0	0
	point316	306	340	40	7	40	3	40	0	0	0	0
	point315	307	340	40	7	40	3	40	0	0	0	0
	point314	308	340	40	7	40	3	40	0	0	0	0
	point313	309	340	40	7	40	3	40	0	0	0	0
	point312	310	340	40	7	40	3	40	0	0	0	0
	point311	311	340	40	7	40	3	40	0	0	0	0
	point310	312	340	40	7	40	3	40	0	0	0	0
	point309	313	340	40	7	40	3	40	0	0	0	0
	point308	314	340	40	7	40	3	40	0	0	0	0
	point307	315	340	40	7	40	3	40	0	0	0	0
	point306	316	340	40	7	40	3	40	0	0	0	0
	point305	317	340	40	7	40	3	40	0	0	0	0
	point304	318	340	40	7	40	3	40	0	0	0	0
	point303	319	340	40	7	40	3	40	0	0	0	0
	point302	320	340	40	7	40	3	40	0	0	0	0
	point301	321	340	40	7	40	3	40	0	0	0	0
	point300	322	340	40	7	40	3	40	0	0	0	0
	point299	323	340	40	7	40	3	40	0	0	0	0
	point298	324	340	40	7	40	3	40	0	0	0	0
	point297	325										
Treasure Is Rd - 2	point164	132	340	65	7	65	3	65	0	0	0	0
	point163	133	340	65	7	65	3	65	0	0	0	0
	point162	134	340	65	7	65	3	65	0	0	0	0
	point161	135	340	65	7	65	3	65	0	0	0	0
	point160	136	340	65	7	65	3	65	0	0	0	0
	point159	137	340	65	7	65	3	65	0	0	0	0
	point158	138	340	65	7	65	3	65	0	0	0	0
	point157	139	340	65	7	65	3	65	0	0	0	0
	point156	140	340	65	7	65	3	65	0	0	0	0
	point155	141	340	65	7	65	3	65	0	0	0	0
	point154	142	340	65	7	65	3	65	0	0	0	0

	point153	143	340	65	7	65	3	65	0	0	0	0
	point152	144	340	65	7	65	3	65	0	0	0	0
	point151	145	340	65	7	65	3	65	0	0	0	0
	point150	146	340	65	7	65	3	65	0	0	0	0
	point149	147	340	65	7	65	3	65	0	0	0	0
	point148	148	340	65	7	65	3	65	0	0	0	0
	point147	149	340	65	7	65	3	65	0	0	0	0
	point146	150	340	65	7	65	3	65	0	0	0	0
	point145	151	340	65	7	65	3	65	0	0	0	0
	point144	152	340	65	7	65	3	65	0	0	0	0
	point143	153	340	65	7	65	3	65	0	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0	0
	point139	157										
Macalla Rd - 1	point754	754	340	40	7	40	3	40	0	0	0	0
	point296	326	340	40	7	40	3	40	0	0	0	0
	point295	327	340	40	7	40	3	40	0	0	0	0
	point294	328	340	40	7	40	3	40	0	0	0	0
	point293	329	340	40	7	40	3	40	0	0	0	0
	point292	330	340	40	7	40	3	40	0	0	0	0
	point291	331	340	40	7	40	3	40	0	0	0	0
	point290	332	340	40	7	40	3	40	0	0	0	0
	point289	333	340	40	7	40	3	40	0	0	0	0
	point288	334	340	40	7	40	3	40	0	0	0	0
	point287	335	340	40	7	40	3	40	0	0	0	0
	point286	336	340	40	7	40	3	40	0	0	0	0
	point285	337	340	40	7	40	3	40	0	0	0	0
	point284	338	340	40	7	40	3	40	0	0	0	0
	point283	339	340	40	7	40	3	40	0	0	0	0
	point282	340	340	40	7	40	3	40	0	0	0	0
	point281	341	340	40	7	40	3	40	0	0	0	0
	point280	342	340	40	7	40	3	40	0	0	0	0
	point279	343	340	40	7	40	3	40	0	0	0	0
	point278	344	340	40	7	40	3	40	0	0	0	0
	point277	345	340	40	7	40	3	40	0	0	0	0

	point276	346	340	40	7	40	3	40	0	0	0	0
	point275	347										
Treasure Is Rd - 1-2	point756	756	340	65	7	65	3	65	0	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0	0
	point170	176	340	65	7	65	3	65	0	0	0	0
	point169	177	340	65	7	65	3	65	0	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0	0
	point165	181										
Roadway60	point664	758	340	40	7	40	3	40	0	0	0	0
	point262	759	340	40	7	40	3	40	0	0	0	0
	point261	760	340	40	7	40	3	40	0	0	0	0
	point260	761	340	40	7	40	3	40	0	0	0	0
	point259	762	340	40	7	40	3	40	0	0	0	0
	point258	763	340	40	7	40	3	40	0	0	0	0
	point257	764	340	40	7	40	3	40	0	0	0	0
	point256	765	340	40	7	40	3	40	0	0	0	0
	point255	766	340	40	7	40	3	40	0	0	0	0
	point254	767	340	40	7	40	3	40	0	0	0	0
	point253	768	340	40	7	40	3	40	0	0	0	0
	point252	769	340	40	7	40	3	40	0	0	0	0

	point251	770	340	40	7	40	3	40	0	0	0	0
	point250	771	340	40	7	40	3	40	0	0	0	0
	point249	772	340	40	7	40	3	40	0	0	0	0
	point248	773	340	40	7	40	3	40	0	0	0	0
	point247	774	340	40	7	40	3	40	0	0	0	0
	point246	775	340	40	7	40	3	40	0	0	0	0
	point245	776	340	40	7	40	3	40	0	0	0	0
	point244	777	340	40	7	40	3	40	0	0	0	0
	point243	778										

EDAW/AECOM						20 October 2009					
Maddux, B.						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	Yerba Buena Island 08080090.11										
RUN:	Future Alternative 2B										
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	
R-1	9	1	916.0	782.7	28.00	1.50	0.00	71	12.0	5.0	
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	0.00	71	12.0	5.0	
R-3	17	1	855.5	618.7	64.00	1.50	0.00	66	12.0	5.0	
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	0.00	71	12.0	5.0	
R-5	19	1	1,125.6	585.5	2.80	1.50	0.00	71	12.0	5.0	
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0	
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0	
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0	
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0	
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	0.00	72	12.0	5.0	
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0	
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	0.00	66	12.0	5.0	
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	0.00	66	12.0	5.0	
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	Y
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	Y
R-16	43	1	794.8	434.3	101.50	1.50	0.00	71	12.0	5.0	
R-17	54	1	719.3	596.8	66.70	1.50	0.00	71	12.0	5.0	
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											

R-6 0											
R-7 0											
R-8 0											
R-9 0											
R-10 (ST-2) 0											
R-11 1											
R-12 (ST-4) 0											
R-13 (ST-5) 0											
R-14 0											
R-15 0											
R-16 0											

EDAW/AECOM 13 August 2009
Maddux, B. TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 2B

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht	Perturbs		On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Barrier1	W	0.00	30.48	0.00				0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0		
									point2	2	820.7	399.2	100.50	4.50	0.00	0	0		
									point3	3	817.8	398.3	100.50	4.50	0.00	0	0		
									point4	4	819.5	393.0	100.50	4.50	0.00	0	0		
									point5	5	828.7	396.0	100.50	4.50	0.00	0	0		
									point6	6	827.9	398.5	100.50	4.50	0.00	0	0		
									point7	7	834.2	400.4	100.50	4.50	0.00	0	0		
									point8	8	834.4	399.5	100.50	4.50	0.00	0	0		
									point9	9	838.3	400.8	100.50	4.50	0.00	0	0		
									point10	10	837.2	404.2	100.50	4.50	0.00	0	0		
									point11	11	839.7	405.0	100.50	4.50	0.00	0	0		
									point12	12	834.5	421.0	100.50	4.50	0.00	0	0		
									point13	13	823.0	417.3	100.50	4.50	0.00	0	0		
									point14	14	821.9	420.4	100.50	4.50	0.00	0	0		
									point15	15	814.3	417.7	100.50	4.50					
Barrier2	W	0.00	30.48	0.00				0.00	point16	16	723.3	398.9	92.00	6.00	0.00	0	0		
									point17	17	717.0	401.9	92.00	6.00	0.00	0	0		
									point18	18	717.7	403.4	92.00	6.00	0.00	0	0		
									point19	19	708.9	407.5	92.00	6.00	0.00	0	0		
									point20	20	708.3	406.0	92.00	6.00	0.00	0	0		
									point21	21	701.9	409.0	92.00	6.00	0.00	0	0		
									point22	22	705.7	417.0	92.00	6.00	0.00	0	0		
									point23	23	707.2	416.2	92.00	6.00	0.00	0	0		
									point24	24	708.0	418.0	92.00	6.00	0.00	0	0		
									point25	25	726.3	409.4	92.00	6.00	0.00	0	0		
									point26	26	725.5	407.6	92.00	6.00	0.00	0	0		
									point27	27	727.0	406.9	92.00	6.00	0.00	0	0		
									point28	28	723.3	398.9	92.00	6.00					
Barrier3	W	0.00	30.48	0.00				0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0		
									point30	30	685.8	419.6	92.00	6.00	0.00	0	0		
									point31	31	686.7	420.8	92.00	6.00	0.00	0	0		
									point32	32	694.7	415.3	92.00	6.00	0.00	0	0		
									point33	33	693.9	414.1	92.00	6.00	0.00	0	0		
									point34	34	699.6	410.5	92.00	6.00	0.00	0	0		
									point35	35	704.4	417.4	92.00	6.00	0.00	0	0		

									point36	36	703.0	418.2	92.00	6.00	0.00	0	0		
									point37	37	704.2	419.9	92.00	6.00	0.00	0	0		
									point38	38	687.4	431.4	92.00	6.00	0.00	0	0		
									point39	39	686.3	429.8	92.00	6.00	0.00	0	0		
									point40	40	685.0	430.7	92.00	6.00	0.00	0	0		
									point41	41	680.1	423.5	92.00	6.00					
Barrier4	W	0.00	30.48	0.00				0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0		
									point43	43	666.2	440.5	92.00	6.00	0.00	0	0		
									point44	44	667.5	441.4	92.00	6.00	0.00	0	0		
									point45	45	673.2	433.5	92.00	6.00	0.00	0	0		
									point46	46	672.0	432.6	92.00	6.00	0.00	0	0		
									point47	47	676.1	427.3	92.00	6.00	0.00	0	0		
									point48	48	683.0	432.2	92.00	6.00	0.00	0	0		
									point49	49	682.0	433.4	92.00	6.00	0.00	0	0		
									point50	50	683.6	434.6	92.00	6.00	0.00	0	0		
									point51	51	671.7	451.1	92.00	6.00	0.00	0	0		
									point52	52	670.2	449.9	92.00	6.00	0.00	0	0		
									point53	53	669.3	451.2	92.00	6.00	0.00	0	0		
									point54	54	662.2	446.1	92.00	6.00					
Barrier5	W	0.00	30.48	0.00				0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0		
									point56	56	629.0	439.2	86.00	6.00	0.00	0	0		
									point57	57	628.4	438.0	86.00	6.00	0.00	0	0		
									point58	58	632.9	435.5	86.00	6.00	0.00	0	0		
									point59	59	633.8	437.2	86.00	6.00	0.00	0	0		
									point60	60	641.4	433.0	86.00	6.00	0.00	0	0		
									point61	61	644.4	438.4	86.00	6.00	0.00	0	0		
									point62	62	642.8	439.3	86.00	6.00	0.00	0	0		
									point63	63	644.5	442.4	86.00	6.00	0.00	0	0		
									point64	64	639.2	445.2	86.00	6.00	0.00	0	0		
									point65	65	639.7	446.1	86.00	6.00	0.00	0	0		
									point66	66	633.5	449.5	86.00	6.00	0.00	0	0		
									point67	67	632.8	448.2	86.00	6.00	0.00	0	0		
									point68	68	627.3	451.2	86.00	6.00	0.00	0	0		
									point69	69	625.5	448.0	86.00	6.00	0.00	0	0		
									point70	70	624.1	448.7	86.00	6.00	0.00	0	0		
									point71	71	621.3	443.4	86.00	6.00					
Barrier6	W	0.00	30.48	0.00				0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0		
									point73	73	650.5	424.6	86.00	6.00	0.00	0	0		
									point74	74	649.2	423.6	86.00	6.00	0.00	0	0		
									point75	75	652.4	419.6	86.00	6.00	0.00	0	0		
									point76	76	653.6	420.6	86.00	6.00	0.00	0	0		
									point77	77	659.0	413.7	86.00	6.00	0.00	0	0		
									point78	78	663.7	417.4	86.00	6.00	0.00	0	0		
									point79	79	662.8	418.6	86.00	6.00	0.00	0	0		
									point80	80	665.5	420.8	86.00	6.00	0.00	0	0		
									point81	81	661.8	425.5	86.00	6.00	0.00	0	0		
									point82	82	663.0	426.4	86.00	6.00	0.00	0	0		
									point83	83	658.5	432.1	86.00	6.00	0.00	0	0		
									point84	84	658.0	431.7	86.00	6.00	0.00	0	0		

									point85	85	654.2	436.5	86.00	6.00	0.00	0	0		
									point86	86	651.1	433.9	86.00	6.00	0.00	0	0		
									point87	87	650.0	435.3	86.00	6.00	0.00	0	0		
									point88	88	645.1	431.4	86.00	6.00					
Barrier7	W	0.00	30.48	0.00				0.00	point89	89	662.9	409.7	88.00	6.00	0.00	0	0		
									point90	90	669.4	404.1	88.00	6.00	0.00	0	0		
									point91	91	668.3	402.8	88.00	6.00	0.00	0	0		
									point92	92	672.3	399.4	88.00	6.00	0.00	0	0		
									point93	93	673.3	400.6	88.00	6.00	0.00	0	0		
									point94	94	680.0	394.9	88.00	6.00	0.00	0	0		
									point95	95	684.0	399.6	88.00	6.00	0.00	0	0		
									point96	96	682.6	400.7	88.00	6.00	0.00	0	0		
									point97	97	684.8	403.2	88.00	6.00	0.00	0	0		
									point98	98	680.3	407.1	88.00	6.00	0.00	0	0		
									point99	99	681.2	408.2	88.00	6.00	0.00	0	0		
									point100	100	675.7	412.9	88.00	6.00	0.00	0	0		
									point101	101	674.9	411.8	88.00	6.00	0.00	0	0		
									point102	102	670.3	415.8	88.00	6.00	0.00	0	0		
									point103	103	668.1	413.2	88.00	6.00	0.00	0	0		
									point104	104	666.8	414.3	88.00	6.00	0.00	0	0		
									point105	105	662.9	409.7	88.00	6.00					
Barrier11	W	0.00	30.48	0.00				0.00	point165	165	687.1	600.9	67.50	4.50	0.00	0	0		
									point166	166	702.2	597.3	67.50	4.50	0.00	0	0		
									point167	167	703.4	601.6	67.50	4.50	0.00	0	0		
									point168	168	709.8	600.1	67.50	4.50	0.00	0	0		
									point169	169	709.4	598.5	67.50	4.50	0.00	0	0		
									point170	170	713.0	597.5	67.50	4.50	0.00	0	0		
									point171	171	710.8	588.7	67.50	4.50	0.00	0	0		
									point172	172	711.9	588.5	67.50	4.50	0.00	0	0		
									point173	173	723.7	588.6	67.50	4.50	0.00	0	0		
									point174	174	723.8	580.6	67.50	4.50	0.00	0	0		
									point175	175	716.3	580.6	67.50	4.50	0.00	0	0		
									point176	176	716.4	582.8	67.50	4.50	0.00	0	0		
									point177	177	709.9	584.3	67.50	4.50	0.00	0	0		
									point178	178	709.7	584.0	67.50	4.50	0.00	0	0		
									point179	179	697.7	586.9	67.50	4.50	0.00	0	0		
									point180	180	698.3	589.6	67.50	4.50	0.00	0	0		
									point181	181	691.1	591.2	67.50	4.50	0.00	0	0		
									point182	182	690.4	589.0	67.50	4.50	0.00	0	0		
									point183	183	684.2	590.4	67.50	4.50	0.00	0	0		
									point184	184	687.1	600.9	67.50	4.50					
Barrier12	W	0.00	30.48	0.00				0.00	point185	185	832.9	601.5	66.50	4.50	0.00	0	0		
									point186	186	831.2	585.8	66.50	4.50	0.00	0	0		
									point187	187	806.7	587.4	66.50	4.50	0.00	0	0		
									point188	188	805.9	573.9	66.50	4.50	0.00	0	0		
									point189	189	830.2	572.4	66.50	4.50	0.00	0	0		
									point190	190	829.5	558.0	66.50	4.50	0.00	0	0		
									point191	191	842.8	557.1	66.50	4.50	0.00	0	0		
									point192	192	844.9	587.0	66.50	4.50	0.00	0	0		

									point193	193	853.8	586.7	66.50	4.50	0.00	0	0		
									point194	194	854.9	600.3	66.50	4.50	0.00	0	0		
									point197	197	832.9	601.5	66.50	4.50					
Barrier13	W	0.00	30.48	0.00				0.00	point198	198	802.3	633.6	66.50	4.50	0.00	0	0		
									point199	199	805.0	625.0	66.50	4.50	0.00	0	0		
									point200	200	828.8	631.6	66.50	4.50	0.00	0	0		
									point201	201	832.6	618.0	66.50	4.50	0.00	0	0		
									point202	202	797.9	608.3	66.50	4.50	0.00	0	0		
									point203	203	800.3	599.2	66.50	4.50	0.00	0	0		
									point206	206	844.6	611.7	66.50	4.50	0.00	0	0		
									point207	207	839.4	630.6	66.50	4.50	0.00	0	0		
									point208	208	833.6	629.0	66.50	4.50	0.00	0	0		
									point209	209	830.1	641.6	66.50	4.50	0.00	0	0		
									point210	210	826.8	640.7	66.50	4.50	0.00	0	0		
									point211	211	826.7	641.1	66.50	4.50	0.00	0	0		
									point212	212	802.3	633.6	66.50	4.50					
Barrier14	W	0.00	30.48	0.00				0.00	point213	213	919.3	602.1	49.50	5.00	0.00	0	0		
									point214	214	901.4	618.0	49.50	5.00	0.00	0	0		
									point215	215	920.2	639.5	49.50	5.00	0.00	0	0		
									point216	216	929.2	631.7	49.50	5.00	0.00	0	0		
									point217	217	916.7	617.4	49.50	5.00	0.00	0	0		
									point218	218	925.8	609.3	49.50	5.00	0.00	0	0		
									point219	219	919.3	602.1	49.50	5.00					
Barrier15	W	0.00	30.48	0.00				0.00	point220	220	980.4	298.2	56.50	4.00	0.00	0	0		
									point221	221	990.4	296.2	56.50	4.00	0.00	0	0		
									point222	222	991.8	303.3	56.50	4.00	0.00	0	0		
									point223	223	981.8	305.3	56.50	4.00	0.00	0	0		
									point224	224	980.4	298.2	56.50	4.00					
Barrier16	W	0.00	30.48	0.00				0.00	point226	226	1,006.8	351.3	52.50	4.50	0.00	0	0		
									point227	227	1,017.7	351.4	52.50	4.50	0.00	0	0		
									point228	228	1,017.7	352.4	52.50	4.50	0.00	0	0		
									point229	229	1,018.7	352.4	52.50	4.50	0.00	0	0		
									point230	230	1,018.6	355.2	52.50	4.50	0.00	0	0		
									point231	231	1,017.5	355.2	52.50	4.50	0.00	0	0		
									point232	232	1,017.5	356.0	52.50	4.50	0.00	0	0		
									point233	233	1,015.4	356.0	52.50	4.50	0.00	0	0		
									point234	234	1,015.4	356.3	52.50	4.50	0.00	0	0		
									point235	235	1,015.2	357.0	52.50	4.50	0.00	0	0		
									point236	236	1,017.3	357.0	52.50	4.50	0.00	0	0		
									point237	237	1,017.2	367.3	52.50	4.50	0.00	0	0		
									point238	238	1,011.5	367.4	52.50	4.50	0.00	0	0		
									point239	239	1,011.4	365.4	52.50	4.50	0.00	0	0		
									point240	240	1,007.0	365.5	52.50	4.50	0.00	0	0		
									point241	241	1,006.9	364.2	52.50	4.50	0.00	0	0		
									point242	242	1,006.8	364.2	52.50	4.50	0.00	0	0		
									point243	243	1,006.8	351.3	52.50	4.50					
Barrier17	W	0.00	30.48	0.00				0.00	point244	244	1,006.5	403.5	51.75	4.50	0.00	0	0		
									point245	245	1,006.8	391.4	51.75	4.50	0.00	0	0		
									point246	246	1,017.4	391.7	51.75	4.50	0.00	0	0		

									point247	247	1,017.3	396.3	51.75	4.50	0.00	0	0		
									point248	248	1,015.3	396.2	51.75	4.50	0.00	0	0		
									point249	249	1,015.2	403.5	51.75	4.50	0.00	0	0		
									point250	250	1,006.5	403.5	51.75	4.50					
Barrier18	W	0.00	30.48	0.00				0.00	point251	251	1,013.7	450.3	45.50	4.50	0.00	0	0		
									point252	252	1,014.0	444.2	45.50	4.50	0.00	0	0		
									point253	253	1,015.3	444.1	45.50	4.50	0.00	0	0		
									point254	254	1,015.5	437.1	45.50	4.50	0.00	0	0		
									point255	255	1,027.5	437.3	45.50	4.50	0.00	0	0		
									point256	256	1,027.6	446.7	45.50	4.50	0.00	0	0		
									point257	257	1,025.9	446.9	45.50	4.50	0.00	0	0		
									point258	258	1,025.7	450.9	45.50	4.50	0.00	0	0		
									point259	259	1,013.7	450.3	45.50	4.50					
Barrier19	W	0.00	30.48	0.00				0.00	point260	260	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point261	261	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point262	262	1,162.0	649.6	3.50	5.00	0.00	0	0		
									point263	263	1,162.0	650.2	3.50	5.00	0.00	0	0		
									point264	264	1,161.5	650.8	3.50	5.00	0.00	0	0		
									point265	265	1,161.0	651.2	3.50	5.00	0.00	0	0		
									point266	266	1,160.3	651.2	3.50	5.00	0.00	0	0		
									point267	267	1,159.6	650.8	3.50	5.00	0.00	0	0		
									point268	268	1,159.1	650.2	3.50	5.00	0.00	0	0		
									point269	269	1,158.9	649.4	3.50	5.00	0.00	0	0		
									point270	270	1,159.3	648.8	3.50	5.00	0.00	0	0		
									point271	271	1,160.1	648.2	3.50	5.00	0.00	0	0		
									point272	272	1,160.7	648.1	3.50	5.00	0.00	0	0		
									point273	273	1,162.0	648.4	3.50	5.00	0.00	0	0		
									point274	274	1,162.0	648.3	3.50	5.00	0.00	0	0		
									point275	275	1,162.2	646.1	3.50	5.00	0.00	0	0		
									point276	276	1,158.0	645.7	3.50	5.00	0.00	0	0		
									point277	277	1,158.3	635.9	3.50	5.00	0.00	0	0		
									point278	278	1,161.3	636.1	3.50	5.00	0.00	0	0		
									point279	279	1,161.4	634.5	3.50	5.00	0.00	0	0		
									point280	280	1,160.2	634.5	3.50	5.00	0.00	0	0		
									point281	281	1,160.6	628.5	3.50	5.00	0.00	0	0		
									point282	282	1,160.1	628.5	3.50	5.00	0.00	0	0		
									point283	283	1,159.7	632.1	3.50	5.00	0.00	0	0		
									point284	284	1,156.3	632.1	3.50	5.00	0.00	0	0		
									point285	285	1,156.3	630.2	3.50	5.00	0.00	0	0		
									point286	286	1,151.5	629.8	3.50	5.00	0.00	0	0		
									point287	287	1,151.3	635.5	3.50	5.00	0.00	0	0		
									point288	288	1,133.4	634.8	3.50	5.00	0.00	0	0		
									point289	289	1,133.6	630.3	3.50	5.00	0.00	0	0		
									point290	290	1,132.3	630.2	3.50	5.00	0.00	0	0		
									point291	291	1,132.0	632.8	3.50	5.00	0.00	0	0		
									point292	292	1,123.9	632.8	3.50	5.00	0.00	0	0		
									point293	293	1,124.3	627.1	3.50	5.00	0.00	0	0		
									point294	294	1,123.5	626.9	3.50	5.00	0.00	0	0		
									point295	295	1,123.4	629.7	3.50	5.00	0.00	0	0		

									point296	296	1,120.9	629.7	3.50	5.00	0.00	0	0		
									point297	297	1,120.9	627.1	3.50	5.00	0.00	0	0		
									point298	298	1,115.5	626.9	3.50	5.00	0.00	0	0		
									point299	299	1,115.2	628.6	3.50	5.00	0.00	0	0		
									point300	300	1,108.0	628.2	3.50	5.00	0.00	0	0		
									point301	301	1,100.1	619.6	3.50	5.00	0.00	0	0		
									point302	302	1,102.4	613.9	3.50	5.00	0.00	0	0		
									point303	303	1,103.2	607.7	3.50	5.00	0.00	0	0		
									point304	304	1,099.9	603.6	3.50	5.00	0.00	0	0		
									point305	305	1,097.1	603.3	3.50	5.00	0.00	0	0		
									point306	306	1,097.7	589.6	3.50	5.00	0.00	0	0		
									point307	307	1,102.6	589.9	3.50	5.00	0.00	0	0		
									point308	308	1,102.6	588.5	3.50	5.00	0.00	0	0		
									point309	309	1,099.2	588.3	3.50	5.00	0.00	0	0		
									point310	310	1,099.9	572.5	3.50	5.00	0.00	0	0		
									point311	311	1,104.7	572.8	3.50	5.00	0.00	0	0		
									point312	312	1,104.8	569.0	3.50	5.00	0.00	0	0		
									point313	313	1,098.6	568.8	3.50	5.00	0.00	0	0		
									point314	314	1,098.7	563.4	3.50	5.00	0.00	0	0		
									point315	315	1,100.3	562.0	3.50	5.00	0.00	0	0		
									point316	316	1,100.6	554.8	3.50	5.00	0.00	0	0		
									point317	317	1,112.7	543.6	3.50	5.00	0.00	0	0		
									point318	318	1,123.7	544.2	3.50	5.00	0.00	0	0		
									point319	319	1,123.8	546.2	3.50	5.00	0.00	0	0		
									point320	320	1,124.8	546.2	3.50	5.00	0.00	0	0		
									point321	321	1,124.8	544.4	3.50	5.00	0.00	0	0		
									point322	322	1,127.8	544.4	3.50	5.00	0.00	0	0		
									point323	323	1,127.9	547.3	3.50	5.00	0.00	0	0		
									point324	324	1,142.8	548.1	3.50	5.00	0.00	0	0		
									point325	325	1,146.7	544.4	3.50	5.00	0.00	0	0		
									point326	326	1,148.7	544.5	3.50	5.00	0.00	0	0		
									point327	327	1,148.8	543.2	3.50	5.00	0.00	0	0		
									point328	328	1,146.9	543.2	3.50	5.00	0.00	0	0		
									point329	329	1,147.5	521.6	3.50	5.00	0.00	0	0		
									point330	330	1,149.7	521.6	3.50	5.00	0.00	0	0		
									point331	331	1,149.8	520.0	3.50	5.00	0.00	0	0		
									point332	332	1,146.6	520.0	3.50	5.00	0.00	0	0		
									point333	333	1,146.9	509.3	3.50	5.00	0.00	0	0		
									point334	334	1,153.2	509.3	3.50	5.00	0.00	0	0		
									point335	335	1,153.2	499.4	3.50	5.00	0.00	0	0		
									point336	336	1,149.4	495.2	3.50	5.00	0.00	0	0		
									point337	337	1,142.6	495.0	3.50	5.00	0.00	0	0		
									point338	338	1,142.6	496.3	3.50	5.00	0.00	0	0		
									point339	339	1,131.7	496.3	3.50	5.00	0.00	0	0		
									point340	340	1,131.9	490.0	3.50	5.00	0.00	0	0		
									point341	341	1,143.3	490.0	3.50	5.00	0.00	0	0		
									point342	342	1,143.3	491.5	3.50	5.00	0.00	0	0		
									point343	343	1,146.9	491.7	3.50	5.00	0.00	0	0		
									point344	344	1,146.9	487.6	3.50	5.00	0.00	0	0		

									point345	345	1,153.0	487.6	3.50	5.00	0.00	0	0		
									point346	346	1,161.1	496.4	3.50	5.00	0.00	0	0		
									point347	347	1,160.9	502.8	3.50	5.00	0.00	0	0		
									point348	348	1,156.6	502.8	3.50	5.00	0.00	0	0		
									point349	349	1,156.0	511.0	3.50	5.00	0.00	0	0		
									point350	350	1,162.1	511.2	3.50	5.00	0.00	0	0		
									point351	351	1,161.9	522.1	3.50	5.00	0.00	0	0		
									point352	352	1,158.1	521.9	3.50	5.00	0.00	0	0		
									point353	353	1,157.3	541.4	3.50	5.00	0.00	0	0		
									point354	354	1,155.0	541.4	3.50	5.00	0.00	0	0		
									point355	355	1,155.0	545.1	3.50	5.00	0.00	0	0		
									point356	356	1,158.8	545.1	3.50	5.00	0.00	0	0		
									point357	357	1,158.6	551.6	3.50	5.00	0.00	0	0		
									point358	358	1,149.1	560.3	3.50	5.00	0.00	0	0		
									point359	359	1,142.5	560.0	3.50	5.00	0.00	0	0		
									point360	360	1,142.5	558.1	3.50	5.00	0.00	0	0		
									point361	361	1,138.5	558.1	3.50	5.00	0.00	0	0		
									point362	362	1,131.4	558.1	3.50	5.00	0.00	0	0		
									point363	363	1,127.7	557.9	3.50	5.00	0.00	0	0		
									point364	364	1,118.2	557.6	3.50	5.00	0.00	0	0		
									point365	365	1,113.9	561.4	3.50	5.00	0.00	0	0		
									point366	366	1,113.6	567.7	3.50	5.00	0.00	0	0		
									point367	367	1,107.8	567.4	3.50	5.00	0.00	0	0		
									point368	368	1,107.3	575.9	3.50	5.00	0.00	0	0		
									point369	369	1,107.3	577.1	3.50	5.00	0.00	0	0		
									point370	370	1,113.2	577.1	3.50	5.00	0.00	0	0		
									point371	371	1,112.5	594.5	3.50	5.00	0.00	0	0		
									point372	372	1,108.0	594.4	3.50	5.00	0.00	0	0		
									point373	373	1,107.9	595.7	3.50	5.00	0.00	0	0		
									point374	374	1,110.9	595.9	3.50	5.00	0.00	0	0		
									point375	375	1,110.2	607.7	3.50	5.00	0.00	0	0		
									point376	376	1,106.4	607.7	3.50	5.00	0.00	0	0		
									point377	377	1,106.0	613.2	3.50	5.00	0.00	0	0		
									point378	378	1,109.9	613.1	3.50	5.00	0.00	0	0		
									point379	379	1,115.5	619.0	3.50	5.00	0.00	0	0		
									point380	380	1,115.5	623.0	3.50	5.00	0.00	0	0		
									point381	381	1,120.6	623.3	3.50	5.00	0.00	0	0		
									point382	382	1,120.8	619.4	3.50	5.00	0.00	0	0		
									point383	383	1,138.4	620.0	3.50	5.00	0.00	0	0		
									point384	384	1,138.4	624.7	3.50	5.00	0.00	0	0		
									point385	385	1,139.6	624.7	3.50	5.00	0.00	0	0		
									point386	386	1,139.8	621.7	3.50	5.00	0.00	0	0		
									point387	387	1,151.8	622.1	3.50	5.00	0.00	0	0		
									point388	388	1,151.6	626.3	3.50	5.00	0.00	0	0		
									point389	389	1,157.1	626.5	3.50	5.00	0.00	0	0		
									point390	390	1,157.1	618.9	3.50	5.00	0.00	0	0		
									point391	391	1,169.0	619.4	3.50	5.00	0.00	0	0		
									point392	392	1,173.9	625.1	3.50	5.00	0.00	0	0		
									point393	393	1,173.3	636.9	3.50	5.00	0.00	0	0		

									point394	394	1,167.0	636.9	3.50	5.00	0.00	0	0		
									point395	395	1,167.0	638.0	3.50	5.00	0.00	0	0		
									point396	396	1,169.9	638.0	3.50	5.00	0.00	0	0		
									point397	397	1,169.5	650.0	3.50	5.00	0.00	0	0		
									point398	398	1,162.1	649.0	3.50	5.00					
Barrier20	W	0.00	30.48	0.00				0.00	point399	399	906.6	754.5	25.00	6.00	0.00	0	0		
									point400	400	907.3	762.7	25.00	6.00	0.00	0	0		
									point401	401	927.6	761.5	25.00	6.00	0.00	0	0		
									point402	402	927.1	753.1	25.00	6.00	0.00	0	0		
									point403	403	926.5	751.1	25.00	6.00	0.00	0	0		
									point404	404	907.3	752.3	25.00	6.00	0.00	0	0		
									point405	405	907.3	754.4	25.00	6.00	0.00	0	0		
									point406	406	906.6	754.5	25.00	6.00					
Barrier21	W	0.00	30.48	0.00				0.00	point407	407	928.1	762.3	25.00	6.00	0.00	0	0		
									point408	408	927.3	751.1	25.00	6.00	0.00	0	0		
									point409	409	938.9	750.2	25.00	6.00	0.00	0	0		
									point410	410	939.6	761.6	25.00	6.00	0.00	0	0		
									point411	411	928.1	762.3	25.00	6.00					
Barrier22	W	0.00	30.48	0.00				0.00	point412	412	895.1	803.1	26.00	6.00	0.00	0	0		
									point413	413	890.1	791.1	26.00	6.00	0.00	0	0		
									point414	414	891.7	790.5	26.00	6.00	0.00	0	0		
									point415	415	893.3	789.8	26.00	6.00	0.00	0	0		
									point416	416	899.8	787.2	26.00	6.00	0.00	0	0		
									point417	417	904.7	799.3	26.00	6.00	0.00	0	0		
									point418	418	895.1	803.1	26.00	6.00					
Barrier23	W	0.00	30.48	0.00				0.00	point420	420	905.6	821.8	26.00	6.00	0.00	0	0		
									point421	421	898.7	810.7	26.00	6.00	0.00	0	0		
									point422	422	907.8	804.7	26.00	6.00	0.00	0	0		
									point423	423	911.7	811.0	26.00	6.00	0.00	0	0		
									point424	424	912.7	810.4	26.00	6.00	0.00	0	0		
									point425	425	914.4	813.2	26.00	6.00	0.00	0	0		
									point426	426	913.4	813.8	26.00	6.00	0.00	0	0		
									point427	427	914.8	815.9	26.00	6.00	0.00	0	0		
									point428	428	905.6	821.8	26.00	6.00					
Barrier24	W	0.00	30.48	0.00				0.00	point430	430	941.3	815.9	25.00	6.00	0.00	0	0		
									point431	431	931.0	820.5	25.00	6.00	0.00	0	0		
									point432	432	930.9	820.5	25.00	6.00	0.00	0	0		
									point433	433	929.9	818.2	25.00	6.00	0.00	0	0		
									point434	434	928.4	818.9	25.00	6.00	0.00	0	0		
									point435	435	929.3	821.3	25.00	6.00	0.00	0	0		
									point436	436	928.9	821.4	25.00	6.00	0.00	0	0		
									point437	437	932.8	830.6	25.00	6.00	0.00	0	0		
									point438	438	935.9	829.3	25.00	6.00	0.00	0	0		
									point439	439	936.3	830.1	25.00	6.00	0.00	0	0		
									point440	440	936.9	829.8	25.00	6.00	0.00	0	0		
									point441	441	937.8	831.8	25.00	6.00	0.00	0	0		
									point442	442	943.1	829.5	25.00	6.00	0.00	0	0		
									point443	443	942.2	827.4	25.00	6.00	0.00	0	0		
									point444	444	942.6	827.2	25.00	6.00	0.00	0	0		

									point445	445	942.3	826.5	25.00	6.00	0.00	0	0		
									point446	446	945.3	825.0	25.00	6.00	0.00	0	0		
									point447	447	941.3	815.9	25.00	6.00					
Barrier25	W	0.00	30.48	0.00				0.00	point448	448	960.6	801.4	23.00	6.00	0.00	0	0		
									point449	449	951.4	797.8	23.00	6.00	0.00	0	0		
									point450	450	946.6	810.7	23.00	6.00	0.00	0	0		
									point451	451	955.5	814.2	23.00	6.00	0.00	0	0		
									point452	452	956.8	811.2	23.00	6.00	0.00	0	0		
									point453	453	957.7	811.5	23.00	6.00	0.00	0	0		
									point454	454	957.9	811.0	23.00	6.00	0.00	0	0		
									point455	455	959.8	811.8	23.00	6.00	0.00	0	0		
									point456	456	962.0	806.4	23.00	6.00	0.00	0	0		
									point457	457	960.0	805.6	23.00	6.00	0.00	0	0		
									point458	458	960.2	805.0	23.00	6.00	0.00	0	0		
									point459	459	959.4	804.7	23.00	6.00	0.00	0	0		
									point460	460	960.6	801.4	23.00	6.00					
Barrier26	W	0.00	30.48	0.00				0.00	point461	461	963.3	794.2	21.00	6.00	0.00	0	0		
									point462	462	954.1	790.6	21.00	6.00	0.00	0	0		
									point463	463	959.0	778.0	21.00	6.00	0.00	0	0		
									point464	464	968.2	781.6	21.00	6.00	0.00	0	0		
									point465	465	963.3	794.2	21.00	6.00					
Barrier27	W	0.00	30.48	0.00				0.00	point467	467	970.9	774.4	21.00	6.00	0.00	0	0		
									point468	468	976.8	759.4	21.00	6.00	0.00	0	0		
									point469	469	967.2	755.5	21.00	6.00	0.00	0	0		
									point470	470	961.3	770.5	21.00	6.00	0.00	0	0		
									point471	471	970.9	774.4	21.00	6.00					
Barrier28	W	0.00	30.48	0.00				0.00	point472	472	964.8	739.9	21.00	6.00	0.00	0	0		
									point473	473	964.9	739.6	21.00	6.00	0.00	0	0		
									point474	474	964.2	739.4	21.00	6.00	0.00	0	0		
									point475	475	965.0	737.5	21.00	6.00	0.00	0	0		
									point476	476	965.7	737.7	21.00	6.00	0.00	0	0		
									point477	477	967.6	733.0	21.00	6.00	0.00	0	0		
									point478	478	974.3	735.3	21.00	6.00	0.00	0	0		
									point479	479	975.6	731.9	21.00	6.00	0.00	0	0		
									point480	480	974.8	730.2	21.00	6.00	0.00	0	0		
									point481	481	974.9	730.1	21.00	6.00	0.00	0	0		
									point482	482	973.0	729.3	21.00	6.00	0.00	0	0		
									point483	483	973.9	727.3	21.00	6.00	0.00	0	0		
									point484	484	975.8	728.1	21.00	6.00	0.00	0	0		
									point485	485	975.8	727.9	21.00	6.00	0.00	0	0		
									point486	486	977.1	727.3	21.00	6.00	0.00	0	0		
									point487	487	977.5	727.4	21.00	6.00	0.00	0	0		
									point488	488	979.5	722.0	21.00	6.00	0.00	0	0		
									point489	489	978.2	721.6	21.00	6.00	0.00	0	0		
									point490	490	979.2	719.0	21.00	6.00	0.00	0	0		
									point491	491	980.7	719.6	21.00	6.00	0.00	0	0		
									point492	492	981.6	717.6	21.00	6.00	0.00	0	0		
									point493	493	991.0	721.1	21.00	6.00	0.00	0	0		
									point494	494	991.6	720.0	21.00	6.00	0.00	0	0		

									point495	495	994.3	721.0	21.00	6.00	0.00	0	0		
									point496	496	993.6	722.2	21.00	6.00	0.00	0	0		
									point497	497	994.7	722.6	21.00	6.00	0.00	0	0		
									point498	498	992.0	729.4	21.00	6.00	0.00	0	0		
									point499	499	992.4	729.6	21.00	6.00	0.00	0	0		
									point500	500	988.3	740.2	21.00	6.00	0.00	0	0		
									point501	501	987.8	740.1	21.00	6.00	0.00	0	0		
									point502	502	985.2	746.8	21.00	6.00	0.00	0	0		
									point503	503	984.0	746.3	21.00	6.00	0.00	0	0		
									point504	504	983.5	747.7	21.00	6.00	0.00	0	0		
									point505	505	981.1	746.7	21.00	6.00	0.00	0	0		
									point506	506	981.6	745.4	21.00	6.00	0.00	0	0		
									point507	507	972.2	741.6	21.00	6.00	0.00	0	0		
									point508	508	972.4	741.1	21.00	6.00	0.00	0	0		
									point509	509	968.7	739.6	21.00	6.00	0.00	0	0		
									point510	510	968.1	741.2	21.00	6.00	0.00	0	0		
									point511	511	964.8	739.9	21.00	6.00					

EDAW/AECOM			**13 August 2009**	
Maddux, B.			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**			
RUN:	**Future Alternative 2B**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
	72	701.6	614.8	66.50
	73	693.8	610.9	67.00
Terrain Line8	74	775.9	636.9	66.00
	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
	81	728.9	726.6	0.50
Terrain Line9	82	793.5	779.6	0.50
	83	804.9	734.8	30.00
Terrain Line10	84	891.8	737.7	26.50
	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00
	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00

	127	909.5	798.3	26.50
Terrain Line25	128	923.4	816.5	25.50
	129	923.6	813.4	27.00
	130	920.9	806.0	28.50
Terrain Line26	131	942.4	802.0	23.50
	132	935.6	803.3	26.50
	133	924.8	803.3	29.00
Terrain Line27	134	956.2	754.4	22.50
	135	948.0	764.3	23.50
	136	920.0	791.6	28.50
Terrain Line28	137	948.3	789.6	22.50
	138	942.9	787.8	26.00
Terrain Line29	139	954.5	822.7	24.50
	140	968.2	849.7	18.00
	141	985.8	861.3	13.50
	142	999.7	860.6	12.00
	143	1,026.4	859.3	11.00
	144	1,055.7	857.9	10.00
	145	1,071.0	858.7	9.50
Terrain Line31	146	1,027.1	836.6	11.50
	147	1,027.0	825.3	12.30
	148	1,025.8	810.2	11.50
Terrain Line32	149	1,054.2	841.3	11.50
	150	1,048.9	825.2	14.50
	151	1,050.8	811.9	12.00
	152	1,057.4	801.8	13.50
	153	1,063.4	797.9	11.50
Terrain Line33	155	956.4	742.7	21.50
	156	990.1	750.3	20.50
	157	1,026.9	772.0	12.50
	158	1,050.9	792.9	11.50
	159	1,057.4	801.8	13.50
	160	1,064.4	802.2	12.00
	161	1,074.7	807.4	11.50
Terrain Line35	167	1,017.7	792.0	12.50
	168	996.2	786.0	18.50

	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00
	218	838.8	456.3	72.00
	219	841.2	459.3	70.00
	220	838.5	469.1	69.00
Terrain Line47	221	782.1	440.8	103.50
	222	783.7	442.4	102.00
	223	797.3	470.1	88.00
	224	797.5	475.2	88.00
	225	804.3	488.2	80.00

	226	817.6	492.0	73.00
	227	829.5	495.4	66.00
	228	846.2	497.2	56.00
Terrain Line49	229	730.1	434.6	103.50
	230	708.8	445.6	100.00
	231	690.7	458.1	96.00
	232	674.2	481.7	90.00
	233	672.0	486.3	88.00
Terrain Line60	283	810.9	312.7	64.00
	284	809.0	344.2	83.00
	285	809.5	347.6	83.00
	286	807.3	368.4	91.00
	287	807.8	373.3	92.00
	288	810.8	387.2	96.00
	289	812.9	395.1	100.00
	290	810.2	400.2	100.50
	291	808.0	415.5	101.00
Terrain Line61	292	842.9	392.4	100.00
	293	927.1	293.8	64.00
Terrain Line62	294	840.9	400.5	100.00
	295	892.0	398.3	88.00
	296	910.4	418.5	78.00
	297	921.7	445.7	68.00
	298	914.4	475.3	57.00
Terrain Line63	299	840.9	400.5	100.00
	300	862.6	407.0	94.00
	301	868.2	413.8	88.60
	302	869.7	417.8	83.30
	303	871.2	429.8	78.00
	304	867.6	448.9	69.00
	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00

	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50
	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00
	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50

	522	1,205.9	754.1	2.50
Terrain Line105	523	1,215.0	782.3	3.00
	524	1,205.8	777.1	5.50
Terrain Line106	525	1,180.2	792.7	7.00
	526	1,189.0	800.8	4.00
	527	1,194.2	799.2	3.50
Terrain Line107	528	1,194.9	244.3	0.50
	529	1,185.4	457.2	0.50
	530	1,235.9	464.7	0.50
	531	1,266.6	541.5	0.50
	532	1,257.8	544.8	0.50
	533	1,229.2	473.2	0.50
	534	1,227.5	473.0	0.50
	535	1,199.6	469.0	0.50
	536	1,180.9	466.2	0.50
	537	1,180.3	469.1	0.50
	538	1,174.9	498.9	0.50
	539	1,173.2	509.1	0.50
	540	1,173.2	512.1	0.50
	541	1,172.0	518.2	0.50
	542	1,171.9	521.6	0.50
	543	1,171.4	525.3	0.50
	544	1,171.3	529.7	0.50
	545	1,172.5	531.1	0.50
	546	1,172.3	533.2	0.50
	547	1,172.1	539.1	0.50
	548	1,171.6	541.1	0.50
	549	1,172.0	544.4	0.50
	550	1,173.2	555.6	0.50
	551	1,174.5	564.4	0.50
	552	1,175.3	573.2	0.50
	553	1,179.6	585.3	0.50
	554	1,183.1	596.3	0.50
	555	1,187.5	611.4	0.50
	556	1,187.8	614.8	0.50
	557	1,189.4	622.0	0.50

	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50
	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50
	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50

	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50
	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50
	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line108	626	1,181.9	757.8	6.50
	627	1,176.6	759.9	7.00
	628	1,166.9	766.8	8.00
Terrain Line109	629	1,163.8	737.6	3.50

	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line110	632	1,124.1	751.2	4.50
	633	1,137.2	754.8	8.00
	634	1,149.2	753.7	8.50
	635	1,148.0	748.0	7.50
	636	1,154.0	741.7	5.00
	637	1,158.8	736.2	3.50
Terrain Line111	638	1,121.0	740.9	8.00
	639	1,117.9	735.8	8.00
	640	1,117.5	726.6	7.50
	641	1,116.9	722.0	6.50
	642	1,118.4	712.7	3.50
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line113	645	1,072.7	688.4	8.00
	646	1,078.7	687.3	3.00
	647	1,107.3	690.7	2.60
Terrain Line114	648	990.9	602.5	46.00
	649	1,048.9	663.1	8.00
	650	1,064.8	669.3	7.80
	651	1,069.6	668.8	7.50
	652	1,079.5	670.4	5.00
	653	1,087.5	672.6	4.00
	654	1,104.2	674.3	3.00
Terrain Line115	655	1,038.5	622.4	10.00
	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00
Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00

Terrain Line118	666	982.9	544.4	49.00
	667	989.3	547.7	46.00
	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00
	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00
	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50

	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50
	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00
Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00

	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50
	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00
	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00

	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00
	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00
	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00

	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00
	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00
	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00

	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	870	992.3	505.4	50.00
	871	992.1	495.6	52.00
	872	990.7	485.9	52.50
	873	990.2	474.8	53.00
	874	989.5	445.6	55.00
	875	992.4	419.6	58.00
	876	990.0	376.3	61.00
	877	989.9	347.9	62.00
	878	995.0	340.8	58.00
	879	998.9	335.5	57.00
	880	1,000.8	332.5	56.50
	881	1,002.4	329.8	56.00
Terrain Line138	882	1,002.5	407.0	52.00
	883	1,005.9	407.0	51.80
	884	1,015.3	407.0	51.80
	885	1,020.0	405.4	51.80
	886	1,021.9	402.4	51.80

EDAW/AECOM				**13 August 2009**	
Maddux, B.				**TNM 2.5**	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**				
RUN:	**Future Alternative 2B**				
Ground Zone			**Points**		
Name	**Type**	**Flow Resistivity**	**No.**	**Coordinates X**	**Y**
		cgs rayls		m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9

EDAW/AECOM
Maddux, B.
20 October 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 2B
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	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R-1	9	1	0.0	67.4	71	67.4	12	----	67.4	0.0	5	-5.0
R-2 (ST-1)	16	1	0.0	68.4	71	68.4	12	----	68.4	0.0	5	-5.0
R-3	17	1	0.0	72.7	66	72.7	12	Snd Lvl	72.7	0.0	5	-5.0
R-4 (ST-3)	18	1	0.0	66.3	71	66.3	12	----	66.3	0.0	5	-5.0
R-5	19	1	0.0	66.5	71	66.5	12	----	66.5	0.0	5	-5.0
R-6	20	1	0.0	66.0	66	66.0	12	Snd Lvl	66.0	0.0	5	-5.0
R-7	21	1	0.0	66.8	66	66.8	12	Snd Lvl	66.8	0.0	5	-5.0
R-8	22	1	0.0	63.6	66	63.6	12	----	63.6	0.0	5	-5.0
R-9	24	1	0.0	62.4	66	62.4	12	----	62.4	0.0	5	-5.0
R-10 (ST-2)	25	1	0.0	65.2	72	65.2	12	----	65.2	0.0	5	-5.0
R-11	38	1	0.0	53.4	66	53.4	12	----	53.4	0.0	5	-5.0
R-12 (ST-4)	39	1	0.0	65.5	66	65.5	12	----	65.5	0.0	5	-5.0
R-13 (ST-5)	40	1	0.0	57.5	66	57.5	12	----	57.5	0.0	5	-5.0
R-14	41	1	0.0	65.3	66	65.3	12	----	65.3	0.0	5	-5.0
R-15	42	1	0.0	63.6	66	63.6	12	----	63.6	0.0	5	-5.0
R-16	43	1	0.0	72.4	71	72.4	12	Snd Lvl	72.4	0.0	5	-5.0
R-17	54	1	0.0	60.9	71	60.9	12	----	60.9	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EDAW/AECOM 13 August 2009
Maddux B. TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 4

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	%		
SFOBB WB OFF SE	3.7	point82	70	971.1	592.8	58.00				Average	
		point81	71	929.3	546.5	57.00				Average	
		point80	72	884.6	498.2	57.00				Average	
		point79	73	884.0	493.9	57.00				Average	
		point78	74	885.1	490.1	57.00				Average	
		point77	75	887.5	487.3	57.00				Average	
		point76	76	899.1	483.8	57.00				Average	
		point75	77	914.4	479.1	57.00				Average	
		point74	78	929.8	473.0	56.50				Average	
		point73	79	943.5	465.6	56.00					
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00				Average	
		point95	81	919.4	524.9	51.20				Average	
		point94	82	925.7	530.1	51.30				Average	
		point93	83	946.1	550.2	51.50				Average	
		point92	84	949.8	552.6	51.50				Average	
		point91	85	952.0	553.6	51.50				Average	
		point90	86	958.8	555.0	51.50				Average	
		point89	87	963.5	554.4	51.20				Average	
		point88	88	966.9	553.3	51.00				Average	
		point87	89	970.1	551.7	50.80				Average	
		point86	90	977.5	545.3	50.50				Average	
		point85	91	979.9	542.2	50.00				Average	
		point84	92	982.5	534.0	49.50				Average	
		point83	93	986.4	520.0	48.00					
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	100	Average	

		point136	119	984.2	536.2	49.50				Average	
		point135	120	980.5	547.6	50.50				Average	
		point134	121	976.7	558.8	51.00				Average	
		point133	122	974.1	567.2	51.50				Average	
		point132	123	973.6	572.5	51.50				Average	
		point131	124	974.0	578.1	51.40				Average	
		point130	125	974.6	580.7	51.40				Average	
		point129	126	975.7	584.7	51.30				Average	
		point128	127	981.1	597.1	51.40				Average	
		point127	128	987.9	608.4	51.50				Average	
		point126	129	995.6	619.1	51.70				Average	
		point125	130	1,008.7	635.6	51.90				Average	
		point124	131	1,018.4	646.7	52.00					
Treasure Is Rd - 2	3.7	point164	132	985.1	519.1	48.00				Average	
		point163	133	986.0	503.2	48.00				Average	
		point162	134	984.4	452.2	53.50				Average	
		point161	135	979.4	378.0	60.50				Average	
		point160	136	975.4	356.4	61.50				Average	
		point159	137	961.6	319.8	63.00				Average	
		point158	138	950.8	306.7	63.50				Average	
		point157	139	935.5	296.0	64.00				Average	
		point156	140	921.7	290.2	64.00				Average	
		point155	141	904.0	289.3	60.50				Average	
		point154	142	896.6	291.0	60.80				Average	
		point153	143	798.8	311.0	62.50				Average	
		point152	144	776.7	316.4	62.20				Average	
		point151	145	769.7	319.5	62.00				Average	
		point150	146	728.3	352.1	71.50				Average	
		point149	147	707.3	362.0	72.80				Average	
		point148	148	694.4	363.4	74.00				Average	
		point147	149	683.5	362.8	73.00				Average	
		point146	150	671.9	360.6	72.50				Average	
		point145	151	660.7	356.8	71.50				Average	
		point144	152	654.9	355.4	70.00				Average	
		point143	153	602.5	340.2	63.00				Average	
		point142	154	591.8	337.9	62.00				Average	
		point141	155	582.9	336.9	61.00				Average	
		point140	156	571.6	337.4	60.00				Average	
		point139	157	557.7	340.8	57.50					

Treasure Is Rd - 1	3.7	point186	160	556.4	336.6	57.50				Average	
		point185	161	571.0	332.7	60.00				Average	
		point184	162	583.3	332.3	61.00				Average	
		point183	163	594.8	332.7	62.00				Average	
		point182	164	664.7	354.5	71.00				Average	
		point181	165	676.6	357.9	72.50				Average	
		point180	166	686.6	359.0	73.00				Average	
		point179	167	694.3	359.5	74.00				Average	
		point178	168	706.9	358.4	72.80				Average	
		point177	169	726.5	348.7	71.50				Average	
		point176	170	767.9	316.6	62.00				Average	
		point175	171	776.8	312.8	62.20				Average	
		point174	172	904.5	285.9	60.00				Average	
		point173	173	924.4	287.5	64.00				Average	
		point172	174	940.3	294.3	64.00				Average	
		point171	175	956.4	306.2	63.50				Average	
		point170	176	966.8	319.1	63.00				Average	
		point169	177	975.3	338.1	61.00				Average	
		point168	178	980.9	359.6	61.50				Average	
		point167	179	983.1	378.2	60.50				Average	
		point166	180	990.1	506.3	48.50				Average	
		point165	181	988.9	518.9	48.00					
Macalla Rd - 1	3.7	point359	263	1,124.1	467.5	3.50				Average	
		point358	264	1,111.4	473.9	4.00				Average	
		point357	265	1,098.7	489.2	4.50				Average	
		point356	266	1,089.0	516.7	5.00				Average	
		point355	267	1,081.7	537.9	5.40				Average	
		point354	268	1,073.4	555.5	5.60				Average	
		point353	269	1,070.6	565.0	5.80				Average	
		point352	270	1,070.8	576.7	5.70				Average	
		point351	271	1,074.8	593.1	5.50				Average	
		point350	272	1,085.1	615.7	4.00				Average	
		point349	273	1,095.2	630.9	3.50				Average	
		point348	274	1,107.1	644.5	3.50				Average	
		point347	275	1,111.6	649.3	3.50				Average	
		point346	276	1,128.6	669.7	3.50				Average	
		point345	277	1,137.6	681.0	3.50				Average	
		point344	278	1,163.4	712.1	3.50				Average	
		point343	279	1,182.9	735.2	4.00				Average	

		point342	280	1,190.3	745.6	4.20				Average	
		point341	281	1,195.2	752.6	4.50				Average	
		point340	282	1,198.5	763.6	5.00				Average	
		point339	283	1,197.7	770.3	5.50				Average	
		point338	284	1,195.7	776.6	6.00				Average	
		point337	285	1,188.6	784.5	6.50				Average	
		point335	287	1,172.5	792.6	7.00				Average	
		point334	288	1,142.9	805.1	8.60				Average	
		point333	289	1,134.1	812.4	8.70				Average	
		point332	290	1,120.5	831.3	8.80				Average	
		point331	291	1,110.0	846.8	9.00				Average	
		point330	292	1,100.5	860.4	9.10				Average	
		point329	293	1,094.9	866.9	9.30				Average	
		point328	294	1,089.0	870.5	9.30				Average	
		point327	295	1,074.9	873.3	9.50				Average	
		point326	296	1,058.3	874.8	10.00				Average	
		point325	297	1,043.2	875.2	10.20				Average	
		point324	298	1,028.0	874.8	10.50				Average	
		point323	299	1,000.9	872.0	12.50				Average	
		point322	300	965.5	867.9	15.00				Average	
		point321	301	930.5	860.9	16.50				Average	
		point320	302	910.8	850.2	18.00				Average	
		point319	303	885.7	829.5	20.00				Average	
		point318	304	876.1	814.3	21.50				Average	
		point317	305	871.2	791.0	23.50				Average	
		point316	306	873.5	776.2	25.50				Average	
		point315	307	885.0	756.1	26.00				Average	
		point314	308	894.1	744.9	26.50				Average	
		point313	309	897.0	736.5	26.70				Average	
		point312	310	890.0	728.2	28.00				Average	
		point311	311	869.1	729.3	28.20				Average	
		point310	312	838.6	726.6	30.20				Average	
		point309	313	808.0	727.5	31.50				Average	
		point308	314	797.1	724.0	32.30				Average	
		point307	315	795.4	713.2	32.50				Average	
		point306	316	801.7	704.8	32.80				Average	
		point305	317	808.3	703.5	33.00				Average	
		point304	318	837.9	709.9	34.50				Average	
		point303	319	856.4	708.7	35.50				Average	

		point302	320	875.3	703.6	36.50				Average	
		point301	321	946.4	678.3	40.50				Average	
		point300	322	967.0	665.8	42.50				Average	
		point299	323	975.1	657.4	43.50				Average	
		point298	324	975.4	649.8	44.80				Average	
		point297	325	970.6	644.2	45.50				Average	
		point296	326	963.7	642.0	46.00				Average	
		point295	327	954.1	643.0	47.50				Average	
		point294	328	909.2	655.7	52.00				Average	
		point293	329	863.1	668.1	56.50				Average	
		point292	330	851.7	668.3	57.50				Average	
		point291	331	838.7	666.6	58.50				Average	
		point290	332	822.7	661.3	59.50				Average	
		point289	333	790.9	647.9	65.00				Average	
		point288	334	781.7	638.5	66.00				Average	
		point287	335	776.7	627.2	66.20				Average	
		point286	336	775.1	615.1	66.50				Average	
		point285	337	763.7	595.8	67.50				Average	
		point284	338	749.0	584.6	68.50				Average	
		point283	339	730.6	577.1	69.50				Average	
		point282	340	711.5	575.6	70.00				Average	
		point281	341	688.8	580.4	70.50				Average	
		point280	342	671.1	587.3	71.00				Average	
		point279	343	658.3	586.9	70.60				Average	
		point278	344	635.8	585.6	70.30				Average	
		point277	345	618.9	584.9	70.00				Average	
		point276	346	610.5	587.9	68.50				Average	
		point275	347	590.6	604.4	67.50					
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00				Average	
		point369	355	624.3	463.0	92.50				Average	
		point368	356	629.2	458.1	92.00				Average	
		point367	357	639.7	452.1	91.00				Average	
		point366	358	653.3	443.1	90.50				Average	
		point365	359	657.8	439.3	90.00				Average	
		point364	360	673.3	420.0	90.00				Average	
		point363	361	678.0	415.8	90.00				Average	
		point362	362	693.7	404.9	90.00				Average	
		point361	363	712.9	394.2	91.00				Average	
		point360	364	731.8	386.5	90.00					

Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00				Average	
		point372	366	713.7	396.1	91.00				Average	
		point373	367	694.7	406.6	90.00				Average	
		point374	368	679.3	417.4	90.00				Average	
		point375	369	674.7	421.4	90.00				Average	
		point376	370	659.2	440.7	90.00				Average	
		point377	371	654.5	444.7	90.50				Average	
		point378	372	640.8	453.8	90.00				Average	
		point379	373	630.4	459.7	92.00				Average	
		point380	374	626.2	463.9	92.50				Average	
		point381	375	625.6	468.5	92.00					
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00				Average	
		point393	377	641.6	461.7	91.50				Average	
		point392	378	668.2	456.6	94.50				Average	
		point391	379	674.0	454.2	94.80				Average	
		point390	380	708.1	430.4	98.00				Average	
		point389	381	752.6	412.0	99.50				Average	
		point388	382	762.9	408.4	100.20				Average	
		point387	383	777.7	407.1	101.50				Average	
		point386	384	789.1	412.5	102.50				Average	
		point385	385	792.9	422.4	103.00				Average	
		point384	386	789.3	432.7	103.20				Average	
		point383	387	781.8	439.0	103.50				Average	
		point382	388	764.6	441.0	103.80					
Signal Rd - 2	3.7	point406	389	764.6	438.7	103.80				Average	
		point405	390	781.7	436.9	103.50				Average	
		point404	391	787.9	431.6	103.20				Average	
		point403	392	790.4	422.7	103.00				Average	
		point402	393	786.8	414.4	102.50				Average	
		point401	394	777.5	410.1	101.50				Average	
		point400	395	762.9	411.2	100.20				Average	
		point399	396	708.5	432.8	98.00				Average	
		point398	397	675.4	456.1	94.80				Average	
		point397	398	668.9	458.7	94.50				Average	
		point396	399	641.9	463.8	91.50				Average	
		point395	400	629.9	468.6	92.00					
SFOBB WB - 3	7.3	point668	668	1,553.4	1,058.5	58.00				Average	Y
		point667	667	1,444.4	1,022.8	58.00				Average	Y
		point666	666	1,355.7	983.9	58.00				Average	Y

		point626	626	1,266.5	925.5	58.50				Average	Y
		point625	625	1,244.7	909.5	59.70				Average	Y
		point624	624	1,209.3	881.4	59.80				Average	Y
		point623	623	1,184.1	859.5	60.00				Average	Y
		point622	622	1,141.5	818.3	60.20				Average	Y
		point621	621	1,112.6	787.8	60.50				Average	Y
		point620	620	1,083.8	753.4	60.40				Average	Y
		point619	619	1,061.4	723.7	60.20				Average	Y
		point618	618	1,048.6	705.0	60.00				Average	Y
		point617	617	988.2	619.9	56.70				Average	Y
		point616	616	969.4	597.5	56.60				Average	Y
		point615	615	951.9	577.6	56.50				Average	Y
		point614	614	864.5	478.7	56.00				Average	Y
		point613	613	851.3	463.7	56.00					
SFOBB WB - 2	7.3	point664	664	1,551.8	1,063.3	58.00				Average	Y
		point663	663	1,442.4	1,028.5	58.00				Average	Y
		point662	662	1,352.8	990.0	58.00				Average	Y
		point612	612	1,262.4	931.1	58.50				Average	Y
		point611	611	1,240.5	915.1	59.70				Average	Y
		point610	610	1,204.9	886.8	59.80				Average	Y
		point609	609	1,179.4	864.6	60.00				Average	Y
		point608	608	1,136.5	823.2	60.20				Average	Y
		point607	607	1,107.4	792.4	60.50				Average	Y
		point606	606	1,078.4	757.7	60.40				Average	Y
		point605	605	1,055.8	727.8	60.20				Average	Y
		point604	604	1,042.9	709.0	60.00				Average	Y
		point603	603	982.7	624.2	56.70				Average	Y
		point602	602	964.2	602.1	56.60				Average	Y
		point601	601	946.6	582.2	56.50				Average	Y
		point600	600	859.3	483.3	56.00				Average	Y
		point599	599	846.0	468.3	56.00					
SFOBB WB - 1	7.3	point660	660	1,551.3	1,067.4	58.00				Average	
		point659	659	1,441.3	1,033.4	58.00				Average	Y
		point658	658	1,351.6	995.1	58.00				Average	Y
		point596	596	1,258.3	936.8	58.50				Average	Y
		point595	595	1,236.2	920.6	59.70				Average	Y
		point594	594	1,200.4	892.2	59.80				Average	Y
		point593	593	1,174.7	869.8	60.00				Average	Y
		point592	592	1,131.5	828.1	60.20				Average	Y

		point591	591	1,102.2	797.1	60.50				Average	Y
		point590	590	1,072.9	762.1	60.40				Average	Y
		point589	589	1,050.1	731.9	60.20				Average	Y
		point588	588	1,037.2	713.0	60.00				Average	Y
		point587	587	977.1	628.5	56.70				Average	Y
		point586	586	958.9	606.6	56.60				Average	Y
		point585	585	941.4	586.9	56.50				Average	Y
		point584	584	854.1	487.9	56.00				Average	Y
		point583	583	840.8	473.0	56.00					
SFOBB EB - 1	7.3	point636	636	841.0	470.8	50.00				Average	Y
		point635	635	885.6	521.5	51.50				Average	Y
		point634	634	925.6	563.7	53.00				Average	Y
		point633	633	997.7	646.8	53.50				Average	Y
		point632	632	1,070.2	729.7	53.70				Average	Y
		point631	631	1,114.7	775.7	54.00				Average	Y
		point630	630	1,133.8	791.6	54.50				Average	Y
		point629	629	1,181.8	828.2	55.00				Average	Y
		point628	628	1,216.2	857.6	55.50				Average	Y
		point669	669	1,279.1	904.6	56.00				Average	Y
		point670	670	1,371.5	962.9	56.50				Average	Y
		point671	671	1,457.8	999.3	56.70				Average	Y
		point672	672	1,564.3	1,032.9	57.00					
SFOBB EB - 2	7.3	point646	646	846.3	466.2	50.00				Average	Y
		point645	645	890.8	516.8	51.50				Average	Y
		point644	644	930.7	559.0	53.00				Average	Y
		point643	643	1,003.0	642.2	53.50				Average	Y
		point642	642	1,075.3	725.0	53.70				Average	Y
		point641	641	1,119.4	770.6	54.00				Average	Y
		point640	640	1,138.2	786.2	54.50				Average	Y
		point639	639	1,186.2	822.8	55.00				Average	Y
		point638	638	1,220.6	852.2	55.50				Average	Y
		point673	673	1,283.3	899.0	56.00				Average	Y
		point674	674	1,375.5	956.8	56.50				Average	Y
		point675	675	1,461.4	992.4	56.70				Average	Y
		point676	676	1,566.7	1,026.1	57.00					
SFOBB EB - 3	7.3	point656	656	851.5	461.6	50.00				Average	Y
		point655	655	895.9	512.1	51.50				Average	Y
		point654	654	935.9	554.4	53.00				Average	Y
		point653	653	1,008.2	637.6	53.50				Average	Y

		point652	652	1,080.5	720.3	53.70				Average	Y
		point651	651	1,124.2	765.5	54.00				Average	Y
		point650	650	1,142.5	780.7	54.50				Average	Y
		point649	649	1,190.6	817.3	55.00				Average	Y
		point648	648	1,224.9	846.7	55.50				Average	Y
		point677	677	1,287.5	893.4	56.00				Average	Y
		point678	678	1,379.6	949.5	56.50				Average	Y
		point679	679	1,465.1	986.0	56.70				Average	Y
		point680	680	1,568.8	1,019.6	57.00					
SFOBB WB OFF NE	3.7	point775	775	1,252.8	935.7	58.00				Average	Y
		point774	774	1,211.5	909.2	58.50				Average	Y
		point773	773	1,184.1	889.9	59.00				Average	Y
		point772	772	1,153.7	866.7	59.50				Average	Y
		point771	771	1,132.3	848.1	59.50				Average	Y
		point770	770	1,111.2	827.1	58.00				Average	Y
		point769	769	1,080.4	789.4	54.00				Average	Y
		point768	768	1,055.9	761.1	51.00				Average	Y
		point767	767	1,014.6	714.0	46.00				Average	Y
		point766	766	995.7	690.5	44.50				Average	Y
		point765	765	988.0	680.0	44.40				Average	Y
		point764	764	974.9	664.8	44.20					
SFOBB WB ON NE	3.7	point776	776	991.5	518.7	48.00	Onramp	0.00	100	Average	
		point777	777	986.9	549.4	47.00				Average	Y
		point763	763	990.7	560.8	45.00				Average	Y
		point762	762	1,051.4	641.1	43.50				Average	Y
		point761	761	1,072.7	669.6	41.00				Average	Y
		point760	760	1,102.4	705.2	38.50				Average	Y
		point759	759	1,130.8	734.1	36.00				Average	Y
		point758	758	1,143.3	746.0	35.00				Average	Y
		point757	757	1,173.1	773.1	33.50				Average	Y
		point756	756	1,198.9	796.8	33.50				Average	Y
		point755	755	1,227.6	822.8	35.00				Average	Y
		point754	754	1,238.9	833.6	36.00				Average	Y
		point753	753	1,246.2	845.1	37.00				Average	Y
		point752	752	1,250.2	857.6	38.00				Average	Y
		point751	751	1,251.2	870.7	39.00				Average	Y
		point750	750	1,249.0	883.6	40.00				Average	Y
		point749	749	1,243.5	895.6	41.00				Average	Y
		point748	748	1,235.2	906.0	42.00				Average	Y

		point747	747	1,218.6	917.0	43.50				Average	Y
		point746	746	1,205.4	920.4	44.50				Average	Y
		point745	745	1,185.5	919.3	46.00				Average	Y
		point744	744	1,172.7	914.0	47.00				Average	Y
		point743	743	1,161.8	905.4	48.00				Average	Y
		point742	742	1,151.9	896.8	49.00				Average	Y
		point741	741	1,142.4	888.4	50.00				Average	Y
		point740	740	1,133.0	878.7	51.00				Average	Y
		point739	739	1,124.1	869.8	52.00				Average	Y
		point738	738	1,111.3	856.1	53.50				Average	Y
		point737	737	1,098.9	842.2	55.00				Average	Y
		point736	736	1,083.4	822.4	57.00				Average	Y
		point735	735	1,071.2	804.5	58.00				Average	Y
		point734	734	1,061.5	790.5	59.50				Average	Y
		point733	733	1,049.8	771.9	60.50				Average	Y
		point732	732	1,040.0	753.1	61.00				Average	Y
		point731	731	1,015.4	707.4	61.00				Average	Y
		point730	730	1,000.3	679.1	60.50				Average	Y
		point729	729	984.4	653.0	60.00				Average	Y
		point728	728	968.3	629.9	59.50				Average	Y
		point727	727	947.0	603.3	59.30				Average	Y
		point726	726	933.9	586.6	59.20				Average	Y
		point725	725	915.0	563.6	59.10				Average	Y
		point724	724	838.4	473.2	59.00					
North Gate Rd - 2	3.7	point779	779	974.6	640.0	45.50				Average	
		point242	208	980.6	648.5	44.80				Average	
		point241	209	978.9	658.9	43.50				Average	
		point240	210	974.3	664.4	43.00				Average	
		point239	211	968.3	668.3	42.00				Average	
		point238	212	946.7	679.7	40.50				Average	
		point237	213	920.0	690.1	38.50				Average	
		point236	214	903.8	696.0	38.00				Average	
		point235	215	874.7	706.7	36.50				Average	
		point234	216	856.7	711.6	35.50				Average	
		point233	217	837.9	712.7	34.50				Average	
		point232	218	808.2	706.6	33.00				Average	
		point231	219	802.6	707.5	32.80				Average	
		point230	220	798.2	714.0	32.50				Average	
		point229	221	799.2	722.3	32.80				Average	

		point228	222	808.3	725.7	31.50				Average	
		point227	223	838.9	724.6	30.20				Average	
		point226	224	869.2	727.4	28.20				Average	
		point225	225	891.3	726.1	28.00				Average	
		point224	226	899.9	736.4	26.70				Average	
		point223	227	896.7	745.8	26.50				Average	
		point222	228	887.6	757.5	26.00				Average	
		point221	229	875.8	776.9	25.50				Average	
		point220	230	873.5	791.2	23.50				Average	
		point219	231	878.3	813.9	21.50				Average	
		point218	232	887.7	828.1	20.00				Average	
		point217	233	912.6	848.7	18.00				Average	
		point216	234	931.5	858.7	16.50				Average	
		point215	235	966.3	865.7	15.00				Average	
		point214	236	1,029.0	871.4	10.50				Average	
		point213	237	1,059.1	870.7	10.00				Average	
		point212	238	1,075.1	869.6	9.50				Average	
		point211	239	1,088.1	866.9	9.30				Average	
		point210	240	1,092.6	863.7	9.30				Average	
		point209	241	1,105.7	847.3	9.00				Average	
		point208	242	1,132.0	810.7	8.70				Average	
		point207	243	1,140.5	802.3	8.60				Average	
		point206	244	1,171.5	789.1	7.00				Average	
		point205	245	1,185.8	782.0	6.50				Average	
		point204	246	1,191.4	775.4	6.00				Average	
		point203	247	1,192.7	771.5	5.50				Average	
		point202	248	1,193.2	765.2	5.00				Average	
		point201	249	1,191.2	756.4	4.50				Average	
		point200	250	1,177.4	740.0	4.00				Average	
		point199	251	1,167.8	727.2	3.60				Average	
		point198	252	1,158.1	712.1	3.50				Average	
		point197	253	1,092.8	633.7	3.50				Average	
		point196	254	1,080.9	616.6	4.00				Average	
		point195	255	1,070.5	593.7	5.50				Average	
		point194	256	1,067.2	577.5	5.70				Average	
		point193	257	1,066.7	564.7	5.80				Average	
		point192	258	1,070.5	554.0	5.60				Average	
		point191	259	1,079.2	537.3	5.40				Average	
		point190	260	1,096.3	488.5	4.50				Average	

		point189	261	1,109.6	471.9	4.00				Average	
		point188	262	1,122.5	464.6	3.50					
Macalla - 2	3.7	point664	781	589.2	601.8	67.50				Average	
		point262	782	608.9	584.9	68.50				Average	
		point261	783	619.0	581.8	70.00				Average	
		point260	784	649.0	583.5	71.00				Average	
		point259	785	671.1	584.4	71.00				Average	
		point258	786	687.7	577.3	70.50				Average	
		point257	787	711.7	572.7	70.00				Average	
		point256	788	731.9	574.3	69.50				Average	
		point255	789	750.7	582.4	68.50				Average	
		point254	790	765.5	593.8	67.50				Average	
		point253	791	778.2	614.7	66.50				Average	
		point252	792	780.7	627.7	66.20				Average	
		point251	793	784.5	637.3	66.00				Average	
		point250	794	792.7	645.2	65.00				Average	
		point249	795	824.3	658.8	58.50				Average	
		point248	796	840.9	664.0	58.50				Average	
		point247	797	852.9	665.3	57.50				Average	
		point246	798	862.9	665.1	56.50				Average	
		point245	799	953.4	637.5	47.50				Average	
		point244	800	965.0	636.8	46.50				Average	
		point243	801	974.6	640.0	45.50					

EDAW/AECOM **13 August 2009**
Maddux B. **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **Yerba Buena Island 08080090.11**
RUN: **Future Alternative 4**

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
SFOBB WB OFF SE	point82	70	314	88	4	88	5	88	0	0	0	0
	point81	71	314	88	4	88	5	88	0	0	0	0
	point80	72	314	88	4	88	5	88	0	0	0	0
	point79	73	314	88	4	88	5	88	0	0	0	0
	point78	74	314	88	4	88	5	88	0	0	0	0
	point77	75	314	88	4	88	5	88	0	0	0	0
	point76	76	314	88	4	88	5	88	0	0	0	0
	point75	77	314	88	4	88	5	88	0	0	0	0
	point74	78	314	88	4	88	5	88	0	0	0	0
	point73	79										
SFOBB EB OFF SE	point96	80	248	88	3	88	4	88	0	0	0	0
	point95	81	248	88	3	88	4	88	0	0	0	0
	point94	82	248	88	3	88	4	88	0	0	0	0
	point93	83	248	88	3	88	4	88	0	0	0	0
	point92	84	248	88	3	88	4	88	0	0	0	0
	point91	85	248	88	3	88	4	88	0	0	0	0
	point90	86	248	88	3	88	4	88	0	0	0	0
	point89	87	248	88	3	88	4	88	0	0	0	0
	point88	88	248	88	3	88	4	88	0	0	0	0
	point87	89	248	88	3	88	4	88	0	0	0	0
	point86	90	248	88	3	88	4	88	0	0	0	0
	point85	91	248	88	3	88	4	88	0	0	0	0
	point84	92	248	88	3	88	4	88	0	0	0	0

	point83	93										
SFOBB EB ON SE	point137	118	476	88	6	88	8	88	0	0	0	0
	point136	119	476	88	6	88	8	88	0	0	0	0
	point135	120	476	88	6	88	8	88	0	0	0	0
	point134	121	476	88	6	88	8	88	0	0	0	0
	point133	122	476	88	6	88	8	88	0	0	0	0
	point132	123	476	88	6	88	8	88	0	0	0	0
	point131	124	476	88	6	88	8	88	0	0	0	0
	point130	125	476	88	6	88	8	88	0	0	0	0
	point129	126	476	88	6	88	8	88	0	0	0	0
	point128	127	476	88	6	88	8	88	0	0	0	0
	point127	128	476	88	6	88	8	88	0	0	0	0
	point126	129	476	88	6	88	8	88	0	0	0	0
	point125	130	476	88	6	88	8	88	0	0	0	0
	point124	131										
Treasure Is Rd - 2	point164	132	340	65	7	65	3	65	0	0	0	0
	point163	133	340	65	7	65	3	65	0	0	0	0
	point162	134	340	65	7	65	3	65	0	0	0	0
	point161	135	340	65	7	65	3	65	0	0	0	0
	point160	136	340	65	7	65	3	65	0	0	0	0
	point159	137	340	65	7	65	3	65	0	0	0	0
	point158	138	340	65	7	65	3	65	0	0	0	0
	point157	139	340	65	7	65	3	65	0	0	0	0
	point156	140	340	65	7	65	3	65	0	0	0	0
	point155	141	340	65	7	65	3	65	0	0	0	0
	point154	142	340	65	7	65	3	65	0	0	0	0
	point153	143	340	65	7	65	3	65	0	0	0	0
	point152	144	340	65	7	65	3	65	0	0	0	0
	point151	145	340	65	7	65	3	65	0	0	0	0
	point150	146	340	65	7	65	3	65	0	0	0	0
	point149	147	340	65	7	65	3	65	0	0	0	0
	point148	148	340	65	7	65	3	65	0	0	0	0
	point147	149	340	65	7	65	3	65	0	0	0	0
	point146	150	340	65	7	65	3	65	0	0	0	0
	point145	151	340	65	7	65	3	65	0	0	0	0
	point144	152	340	65	7	65	3	65	0	0	0	0

	point143	153	340	65	7	65	3	65	0	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0	0
	point139	157										
Treasure Is Rd - 1	point186	160	340	65	7	65	3	65	0	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0	0
	point170	176	340	65	7	65	3	65	0	0	0	0
	point169	177	340	65	7	65	3	65	0	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0	0
	point165	181										
Macalla Rd - 1	point359	263	340	40	7	40	3	40	0	0	0	0
	point358	264	340	40	7	40	3	40	0	0	0	0
	point357	265	340	40	7	40	3	40	0	0	0	0
	point356	266	340	40	7	40	3	40	0	0	0	0
	point355	267	340	40	7	40	3	40	0	0	0	0
	point354	268	340	40	7	40	3	40	0	0	0	0
	point353	269	340	40	7	40	3	40	0	0	0	0
	point352	270	340	40	7	40	3	40	0	0	0	0
	point351	271	340	40	7	40	3	40	0	0	0	0

	point350	272	340	40	7	40	3	40	0	0	0	0
	point349	273	340	40	7	40	3	40	0	0	0	0
	point348	274	340	40	7	40	3	40	0	0	0	0
	point347	275	340	40	7	40	3	40	0	0	0	0
	point346	276	340	40	7	40	3	40	0	0	0	0
	point345	277	340	40	7	40	3	40	0	0	0	0
	point344	278	340	40	7	40	3	40	0	0	0	0
	point343	279	340	40	7	40	3	40	0	0	0	0
	point342	280	340	40	7	40	3	40	0	0	0	0
	point341	281	340	40	7	40	3	40	0	0	0	0
	point340	282	340	40	7	40	3	40	0	0	0	0
	point339	283	340	40	7	40	3	40	0	0	0	0
	point338	284	340	40	7	40	3	40	0	0	0	0
	point337	285	340	40	7	40	3	40	0	0	0	0
	point335	287	340	40	7	40	3	40	0	0	0	0
	point334	288	340	40	7	40	3	40	0	0	0	0
	point333	289	340	40	7	40	3	40	0	0	0	0
	point332	290	340	40	7	40	3	40	0	0	0	0
	point331	291	340	40	7	40	3	40	0	0	0	0
	point330	292	340	40	7	40	3	40	0	0	0	0
	point329	293	340	40	7	40	3	40	0	0	0	0
	point328	294	340	40	7	40	3	40	0	0	0	0
	point327	295	340	40	7	40	3	40	0	0	0	0
	point326	296	340	40	7	40	3	40	0	0	0	0
	point325	297	340	40	7	40	3	40	0	0	0	0
	point324	298	340	40	7	40	3	40	0	0	0	0
	point323	299	340	40	7	40	3	40	0	0	0	0
	point322	300	340	40	7	40	3	40	0	0	0	0
	point321	301	340	40	7	40	3	40	0	0	0	0
	point320	302	340	40	7	40	3	40	0	0	0	0
	point319	303	340	40	7	40	3	40	0	0	0	0
	point318	304	340	40	7	40	3	40	0	0	0	0
	point317	305	340	40	7	40	3	40	0	0	0	0
	point316	306	340	40	7	40	3	40	0	0	0	0
	point315	307	340	40	7	40	3	40	0	0	0	0
	point314	308	340	40	7	40	3	40	0	0	0	0

	point313	309	340	40	7	40	3	40	0	0	0	0
	point312	310	340	40	7	40	3	40	0	0	0	0
	point311	311	340	40	7	40	3	40	0	0	0	0
	point310	312	340	40	7	40	3	40	0	0	0	0
	point309	313	340	40	7	40	3	40	0	0	0	0
	point308	314	340	40	7	40	3	40	0	0	0	0
	point307	315	340	40	7	40	3	40	0	0	0	0
	point306	316	340	40	7	40	3	40	0	0	0	0
	point305	317	340	40	7	40	3	40	0	0	0	0
	point304	318	340	40	7	40	3	40	0	0	0	0
	point303	319	340	40	7	40	3	40	0	0	0	0
	point302	320	340	40	7	40	3	40	0	0	0	0
	point301	321	340	40	7	40	3	40	0	0	0	0
	point300	322	340	40	7	40	3	40	0	0	0	0
	point299	323	340	40	7	40	3	40	0	0	0	0
	point298	324	340	40	7	40	3	40	0	0	0	0
	point297	325	340	40	7	40	3	40	0	0	0	0
	point296	326	340	40	7	40	3	40	0	0	0	0
	point295	327	340	40	7	40	3	40	0	0	0	0
	point294	328	340	40	7	40	3	40	0	0	0	0
	point293	329	340	40	7	40	3	40	0	0	0	0
	point292	330	340	40	7	40	3	40	0	0	0	0
	point291	331	340	40	7	40	3	40	0	0	0	0
	point290	332	340	40	7	40	3	40	0	0	0	0
	point289	333	340	40	7	40	3	40	0	0	0	0
	point288	334	340	40	7	40	3	40	0	0	0	0
	point287	335	340	40	7	40	3	40	0	0	0	0
	point286	336	340	40	7	40	3	40	0	0	0	0
	point285	337	340	40	7	40	3	40	0	0	0	0
	point284	338	340	40	7	40	3	40	0	0	0	0
	point283	339	340	40	7	40	3	40	0	0	0	0
	point282	340	340	40	7	40	3	40	0	0	0	0
	point281	341	340	40	7	40	3	40	0	0	0	0
	point280	342	340	40	7	40	3	40	0	0	0	0
	point279	343	340	40	7	40	3	40	0	0	0	0
	point278	344	340	40	7	40	3	40	0	0	0	0

	point277	345	340	40	7	40	3	40	0	0	0	0
	point276	346	340	40	7	40	3	40	0	0	0	0
	point275	347										
Forest Rd - 1	point370	354	12	25	0	0	0	0	0	0	0	0
	point369	355	12	25	0	0	0	0	0	0	0	0
	point368	356	12	25	0	0	0	0	0	0	0	0
	point367	357	12	25	0	0	0	0	0	0	0	0
	point366	358	12	25	0	0	0	0	0	0	0	0
	point365	359	12	25	0	0	0	0	0	0	0	0
	point364	360	12	25	0	0	0	0	0	0	0	0
	point363	361	12	25	0	0	0	0	0	0	0	0
	point362	362	12	25	0	0	0	0	0	0	0	0
	point361	363	12	25	0	0	0	0	0	0	0	0
	point360	364										
Forest Rd - 2	point371	365	12	25	0	0	0	0	0	0	0	0
	point372	366	12	25	0	0	0	0	0	0	0	0
	point373	367	12	25	0	0	0	0	0	0	0	0
	point374	368	12	25	0	0	0	0	0	0	0	0
	point375	369	12	25	0	0	0	0	0	0	0	0
	point376	370	12	25	0	0	0	0	0	0	0	0
	point377	371	12	25	0	0	0	0	0	0	0	0
	point378	372	12	25	0	0	0	0	0	0	0	0
	point379	373	12	25	0	0	0	0	0	0	0	0
	point380	374	12	25	0	0	0	0	0	0	0	0
	point381	375										
Signal Rd - 1	point394	376	10	40	0	0	0	0	0	0	0	0
	point393	377	10	40	0	0	0	0	0	0	0	0
	point392	378	10	40	0	0	0	0	0	0	0	0
	point391	379	10	40	0	0	0	0	0	0	0	0
	point390	380	10	40	0	0	0	0	0	0	0	0
	point389	381	10	40	0	0	0	0	0	0	0	0
	point388	382	10	40	0	0	0	0	0	0	0	0
	point387	383	10	40	0	0	0	0	0	0	0	0
	point386	384	10	40	0	0	0	0	0	0	0	0
	point385	385	10	40	0	0	0	0	0	0	0	0
	point384	386	10	40	0	0	0	0	0	0	0	0

	point383	387	10	40	0	0	0	0	0	0	0	0
	point382	388										
Signal Rd - 2	point406	389	10	40	0	0	0	0	0	0	0	0
	point405	390	10	40	0	0	0	0	0	0	0	0
	point404	391	10	40	0	0	0	0	0	0	0	0
	point403	392	10	40	0	0	0	0	0	0	0	0
	point402	393	10	40	0	0	0	0	0	0	0	0
	point401	394	10	40	0	0	0	0	0	0	0	0
	point400	395	10	40	0	0	0	0	0	0	0	0
	point399	396	10	40	0	0	0	0	0	0	0	0
	point398	397	10	40	0	0	0	0	0	0	0	0
	point397	398	10	40	0	0	0	0	0	0	0	0
	point396	399	10	40	0	0	0	0	0	0	0	0
	point395	400										
SFOBB WB - 3	point668	668	3075	105	41	105	51	88	0	0	0	0
	point667	667	3075	105	41	105	51	88	0	0	0	0
	point666	666	3075	105	41	105	51	88	0	0	0	0
	point626	626	3075	105	41	105	51	88	0	0	0	0
	point625	625	3075	105	41	105	51	88	0	0	0	0
	point624	624	3075	105	41	105	51	88	0	0	0	0
	point623	623	3075	105	41	105	51	88	0	0	0	0
	point622	622	3075	105	41	105	51	88	0	0	0	0
	point621	621	3075	105	41	105	51	88	0	0	0	0
	point620	620	3075	105	41	105	51	88	0	0	0	0
	point619	619	3075	105	41	105	51	88	0	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0	0
	point613	613										
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0	0

	point610	610	3075	105	41	105	51	88	0	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0	0
	point599	599										
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0	0
	point587	587	3075	105	41	105	51	88	0	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0	0
	point583	583										
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0	0

	point629	629	2754	105	37	105	45	88	0	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0	0
	point672	672										
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0	0
	point676	676										
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0	0
	point651	651	2754	105	37	105	45	88	0	0	0	0
	point650	650	2754	105	37	105	45	88	0	0	0	0
	point649	649	2754	105	37	105	45	88	0	0	0	0
	point648	648	2754	105	37	105	45	88	0	0	0	0
	point677	677	2754	105	37	105	45	88	0	0	0	0
	point678	678	2754	105	37	105	45	88	0	0	0	0
	point679	679	2754	105	37	105	45	88	0	0	0	0
	point680	680										
SFOBB WB OFF NE	point775	775	314	88	4	88	5	88	0	0	0	0
	point774	774	314	88	4	88	5	88	0	0	0	0
	point773	773	314	88	4	88	5	88	0	0	0	0
	point772	772	314	88	4	88	5	88	0	0	0	0

	point771	771	314	88	4	88	5	88	0	0	0	0
	point770	770	314	88	4	88	5	88	0	0	0	0
	point769	769	314	88	4	88	5	88	0	0	0	0
	point768	768	314	88	4	88	5	88	0	0	0	0
	point767	767	314	88	4	88	5	88	0	0	0	0
	point766	766	314	88	4	88	5	88	0	0	0	0
	point765	765	314	88	4	88	5	88	0	0	0	0
	point764	764										
SFOBB WB ON NE	point776	776	848	88	11	88	14	88	0	0	0	0
	point777	777	848	88	11	88	14	88	0	0	0	0
	point763	763	848	88	11	88	14	88	0	0	0	0
	point762	762	848	88	11	88	14	88	0	0	0	0
	point761	761	848	88	11	88	14	88	0	0	0	0
	point760	760	848	88	11	88	14	88	0	0	0	0
	point759	759	848	88	11	88	14	88	0	0	0	0
	point758	758	848	88	11	88	14	88	0	0	0	0
	point757	757	848	88	11	88	14	88	0	0	0	0
	point756	756	848	88	11	88	14	88	0	0	0	0
	point755	755	848	88	11	88	14	88	0	0	0	0
	point754	754	848	88	11	88	14	88	0	0	0	0
	point753	753	848	88	11	88	14	88	0	0	0	0
	point752	752	848	88	11	88	14	88	0	0	0	0
	point751	751	848	88	11	88	14	88	0	0	0	0
	point750	750	848	88	11	88	14	88	0	0	0	0
	point749	749	848	88	11	88	14	88	0	0	0	0
	point748	748	848	88	11	88	14	88	0	0	0	0
	point747	747	0□□	88	11	88	14	88	0	0	0	0
	point746	746	848	88	11	88	14	88	0	0	0	0
	point745	745	848	88	11	88	14	88	0	0	0	0
	point744	744	848	88	11	88	14	88	0	0	0	0
	point743	743	848	88	11	88	14	88	0	0	0	0
	point742	742	848	88	11	88	14	88	0	0	0	0
	point741	741	848	88	11	88	14	88	0	0	0	0
	point740	740	848	88	11	88	14	88	0	0	0	0
	point739	739	848	88	11	88	14	88	0	0	0	0
	point738	738	848	88	11	88	14	88	0	0	0	0

	point737	737	848	88	11	88	14	88	0	0	0	0
	point736	736	848	88	11	88	14	88	0	0	0	0
	point735	735	848	88	11	88	14	88	0	0	0	0
	point734	734	848	88	11	88	14	88	0	0	0	0
	point733	733	848	88	11	88	14	88	0	0	0	0
	point732	732	848	88	11	88	14	88	0	0	0	0
	point731	731	848	88	11	88	14	88	0	0	0	0
	point730	730	848	88	11	88	14	88	0	0	0	0
	point729	729	848	88	11	88	14	88	0	0	0	0
	point728	728	848	88	11	88	14	88	0	0	0	0
	point727	727	848	88	11	88	14	88	0	0	0	0
	point726	726	848	88	11	88	14	88	0	0	0	0
	point725	725	848	88	11	88	14	88	0	0	0	0
	point724	724										
North Gate Rd - 2	point779	779	340	40	7	40	3	40	0	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0	0
	point239	211	340	40	7	40	3	40	0	0	0	0
	point238	212	340	40	7	40	3	40	0	0	0	0
	point237	213	340	40	7	40	3	40	0	0	0	0
	point236	214	340	40	7	40	3	40	0	0	0	0
	point235	215	340	40	7	40	3	40	0	0	0	0
	point234	216	340	40	7	40	3	40	0	0	0	0
	point233	217	340	40	7	40	3	40	0	0	0	0
	point232	218	340	40	7	40	3	40	0	0	0	0
	point231	219	340	40	7	40	3	40	0	0	0	0
	point230	220	340	40	7	40	3	40	0	0	0	0
	point229	221	340	40	7	40	3	40	0	0	0	0
	point228	222	340	40	7	40	3	40	0	0	0	0
	point227	223	340	40	7	40	3	40	0	0	0	0
	point226	224	340	40	7	40	3	40	0	0	0	0
	point225	225	340	40	7	40	3	40	0	0	0	0
	point224	226	340	40	7	40	3	40	0	0	0	0
	point223	227	340	40	7	40	3	40	0	0	0	0
	point222	228	340	40	7	40	3	40	0	0	0	0

	point221	229	340	40	7	40	3	40	0	0	0	0
	point220	230	340	40	7	40	3	40	0	0	0	0
	point219	231	340	40	7	40	3	40	0	0	0	0
	point218	232	340	40	7	40	3	40	0	0	0	0
	point217	233	340	40	7	40	3	40	0	0	0	0
	point216	234	340	40	7	40	3	40	0	0	0	0
	point215	235	340	40	7	40	3	40	0	0	0	0
	point214	236	340	40	7	40	3	40	0	0	0	0
	point213	237	340	40	7	40	3	40	0	0	0	0
	point212	238	340	40	7	40	3	40	0	0	0	0
	point211	239	340	40	7	40	3	40	0	0	0	0
	point210	240	340	40	7	40	3	40	0	0	0	0
	point209	241	340	40	7	40	3	40	0	0	0	0
	point208	242	340	40	7	40	3	40	0	0	0	0
	point207	243	340	40	7	40	3	40	0	0	0	0
	point206	244	340	40	7	40	3	40	0	0	0	0
	point205	245	340	40	7	40	3	40	0	0	0	0
	point204	246	340	40	7	40	3	40	0	0	0	0
	point203	247	340	40	7	40	3	40	0	0	0	0
	point202	248	340	40	7	40	3	40	0	0	0	0
	point201	249	340	40	7	40	3	40	0	0	0	0
	point200	250	340	40	7	40	3	40	0	0	0	0
	point199	251	340	40	7	40	3	40	0	0	0	0
	point198	252	340	40	7	40	3	40	0	0	0	0
	point197	253	340	40	7	40	3	40	0	0	0	0
	point196	254	340	40	7	40	3	40	0	0	0	0
	point195	255	340	40	7	40	3	40	0	0	0	0
	point194	256	340	40	7	40	3	40	0	0	0	0
	point193	257	340	40	7	40	3	40	0	0	0	0
	point192	258	340	40	7	40	3	40	0	0	0	0
	point191	259	340	40	7	40	3	40	0	0	0	0
	point190	260	340	40	7	40	3	40	0	0	0	0
	point189	261	340	40	7	40	3	40	0	0	0	0
	point188	262										
Macalla - 2	point664	781	340	40	7	40	3	40	0	0	0	0
	point262	782	340	40	7	40	3	40	0	0	0	0

	point261	783	340	40	7	40	3	40	0	0	0	0
	point260	784	340	40	7	40	3	40	0	0	0	0
	point259	785	340	40	7	40	3	40	0	0	0	0
	point258	786	340	40	7	40	3	40	0	0	0	0
	point257	787	340	40	7	40	3	40	0	0	0	0
	point256	788	340	40	7	40	3	40	0	0	0	0
	point255	789	340	40	7	40	3	40	0	0	0	0
	point254	790	340	40	7	40	3	40	0	0	0	0
	point253	791	340	40	7	40	3	40	0	0	0	0
	point252	792	340	40	7	40	3	40	0	0	0	0
	point251	793	340	40	7	40	3	40	0	0	0	0
	point250	794	340	40	7	40	3	40	0	0	0	0
	point249	795	340	40	7	40	3	40	0	0	0	0
	point248	796	340	40	7	40	3	40	0	0	0	0
	point247	797	340	40	7	40	3	40	0	0	0	0
	point246	798	340	40	7	40	3	40	0	0	0	0
	point245	799	340	40	7	40	3	40	0	0	0	0
	point244	800	340	40	7	40	3	40	0	0	0	0
	point243	801										

EDAW/AECOM						**20 October 2009**					
Maddux B.						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**										
RUN:	**Future Alternative 4**										
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	
R-1	9	1	916.0	782.7	28.00	1.50	67.40	71	12.0	5.0	
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	71.40	71	12.0	5.0	Y
R-3	17	1	855.5	618.7	64.00	1.50	71.40	66	12.0	5.0	Y
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	71.40	71	12.0	5.0	Y
R-5	19	1	1,125.6	585.5	2.80	1.50	70.40	71	12.0	5.0	Y
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0	
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0	
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0	
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0	
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	65.90	66	12.0	5.0	
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0	
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	63.50	66	12.0	5.0	
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	60.90	71	12.0	5.0	
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	
R-16	43	1	794.8	434.3	101.50	1.50	73.10	71	12.0	5.0	
R-17	54	1	719.3	596.8	66.70	1.50	0.00	66	12.0	5.0	
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											

R-6 0											
R-7 0											
R-8 0											
R-9 0											
R-10 (ST-2) 0											
R-11 1											
R-12 (ST-4) 0											
R-13 (ST-5) 0											
R-14 0											
R-15 0											
R-16 0											

EDAW/AECOM 13 August 2009
Maddux B. TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 4

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Barrier1	W	0.00	30.48	0.00				0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0		
									point2	2	820.7	399.2	100.50	4.50	0.00	0	0		
									point3	3	817.8	398.3	100.50	4.50	0.00	0	0		
									point4	4	819.5	393.0	100.50	4.50	0.00	0	0		
									point5	5	828.7	396.0	100.50	4.50	0.00	0	0		
									point6	6	827.9	398.5	100.50	4.50	0.00	0	0		
									point7	7	834.2	400.4	100.50	4.50	0.00	0	0		
									point8	8	834.4	399.5	100.50	4.50	0.00	0	0		
									point9	9	838.3	400.8	100.50	4.50	0.00	0	0		
									point10	10	837.2	404.2	100.50	4.50	0.00	0	0		
									point11	11	839.7	405.0	100.50	4.50	0.00	0	0		
									point12	12	834.5	421.0	100.50	4.50	0.00	0	0		
									point13	13	823.0	417.3	100.50	4.50	0.00	0	0		
									point14	14	821.9	420.4	100.50	4.50	0.00	0	0		
									point15	15	814.3	417.7	100.50	4.50					
Barrier2	W	0.00	30.48	0.00				0.00	point16	16	723.3	398.9	92.00	6.00	0.00	0	0		
									point17	17	717.0	401.9	92.00	6.00	0.00	0	0		
									point18	18	717.7	403.4	92.00	6.00	0.00	0	0		
									point19	19	708.9	407.5	92.00	6.00	0.00	0	0		
									point20	20	708.3	406.0	92.00	6.00	0.00	0	0		
									point21	21	701.9	409.0	92.00	6.00	0.00	0	0		
									point22	22	705.7	417.0	92.00	6.00	0.00	0	0		
									point23	23	707.2	416.2	92.00	6.00	0.00	0	0		
									point24	24	708.0	418.0	92.00	6.00	0.00	0	0		
									point25	25	726.3	409.4	92.00	6.00	0.00	0	0		
									point26	26	725.5	407.6	92.00	6.00	0.00	0	0		
									point27	27	727.0	406.9	92.00	6.00	0.00	0	0		
									point28	28	723.3	398.9	92.00	6.00					
Barrier3	W	0.00	30.48	0.00				0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0		
									point30	30	685.8	419.6	92.00	6.00	0.00	0	0		
									point31	31	686.7	420.8	92.00	6.00	0.00	0	0		
									point32	32	694.7	415.3	92.00	6.00	0.00	0	0		
									point33	33	693.9	414.1	92.00	6.00	0.00	0	0		
									point34	34	699.6	410.5	92.00	6.00	0.00	0	0		
									point35	35	704.4	417.4	92.00	6.00	0.00	0	0		

									point36	36	703.0	418.2	92.00	6.00	0.00	0	0		
									point37	37	704.2	419.9	92.00	6.00	0.00	0	0		
									point38	38	687.4	431.4	92.00	6.00	0.00	0	0		
									point39	39	686.3	429.8	92.00	6.00	0.00	0	0		
									point40	40	685.0	430.7	92.00	6.00	0.00	0	0		
									point41	41	680.1	423.5	92.00	6.00					
Barrier4	W	0.00	30.48	0.00				0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0		
									point43	43	666.2	440.5	92.00	6.00	0.00	0	0		
									point44	44	667.5	441.4	92.00	6.00	0.00	0	0		
									point45	45	673.2	433.5	92.00	6.00	0.00	0	0		
									point46	46	672.0	432.6	92.00	6.00	0.00	0	0		
									point47	47	676.1	427.3	92.00	6.00	0.00	0	0		
									point48	48	683.0	432.2	92.00	6.00	0.00	0	0		
									point49	49	682.0	433.4	92.00	6.00	0.00	0	0		
									point50	50	683.6	434.6	92.00	6.00	0.00	0	0		
									point51	51	671.7	451.1	92.00	6.00	0.00	0	0		
									point52	52	670.2	449.9	92.00	6.00	0.00	0	0		
									point53	53	669.3	451.2	92.00	6.00	0.00	0	0		
									point54	54	662.2	446.1	92.00	6.00					
Barrier5	W	0.00	30.48	0.00				0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0		
									point56	56	629.0	439.2	86.00	6.00	0.00	0	0		
									point57	57	628.4	438.0	86.00	6.00	0.00	0	0		
									point58	58	632.9	435.5	86.00	6.00	0.00	0	0		
									point59	59	633.8	437.2	86.00	6.00	0.00	0	0		
									point60	60	641.4	433.0	86.00	6.00	0.00	0	0		
									point61	61	644.4	438.4	86.00	6.00	0.00	0	0		
									point62	62	642.8	439.3	86.00	6.00	0.00	0	0		
									point63	63	644.5	442.4	86.00	6.00	0.00	0	0		
									point64	64	639.2	445.2	86.00	6.00	0.00	0	0		
									point65	65	639.7	446.1	86.00	6.00	0.00	0	0		
									point66	66	633.5	449.5	86.00	6.00	0.00	0	0		
									point67	67	632.8	448.2	86.00	6.00	0.00	0	0		
									point68	68	627.3	451.2	86.00	6.00	0.00	0	0		
									point69	69	625.5	448.0	86.00	6.00	0.00	0	0		
									point70	70	624.1	448.7	86.00	6.00	0.00	0	0		
									point71	71	621.3	443.4	86.00	6.00					
Barrier6	W	0.00	30.48	0.00				0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0		
									point73	73	650.5	424.6	86.00	6.00	0.00	0	0		
									point74	74	649.2	423.6	86.00	6.00	0.00	0	0		
									point75	75	652.4	419.6	86.00	6.00	0.00	0	0		
									point76	76	653.6	420.6	86.00	6.00	0.00	0	0		
									point77	77	659.0	413.7	86.00	6.00	0.00	0	0		
									point78	78	663.7	417.4	86.00	6.00	0.00	0	0		
									point79	79	662.8	418.6	86.00	6.00	0.00	0	0		
									point80	80	665.5	420.8	86.00	6.00	0.00	0	0		
									point81	81	661.8	425.5	86.00	6.00	0.00	0	0		
									point82	82	663.0	426.4	86.00	6.00	0.00	0	0		
									point83	83	658.5	432.1	86.00	6.00	0.00	0	0		
									point84	84	658.0	431.7	86.00	6.00	0.00	0	0		

									point85	85	654.2	436.5	86.00	6.00	0.00	0	0		
									point86	86	651.1	433.9	86.00	6.00	0.00	0	0		
									point87	87	650.0	435.3	86.00	6.00	0.00	0	0		
									point88	88	645.1	431.4	86.00	6.00					
Barrier7	W	0.00	30.48	0.00				0.00	point89	89	662.9	409.7	88.00	6.00	0.00	0	0		
									point90	90	669.4	404.1	88.00	6.00	0.00	0	0		
									point91	91	668.3	402.8	88.00	6.00	0.00	0	0		
									point92	92	672.3	399.4	88.00	6.00	0.00	0	0		
									point93	93	673.3	400.6	88.00	6.00	0.00	0	0		
									point94	94	680.0	394.9	88.00	6.00	0.00	0	0		
									point95	95	684.0	399.6	88.00	6.00	0.00	0	0		
									point96	96	682.6	400.7	88.00	6.00	0.00	0	0		
									point97	97	684.8	403.2	88.00	6.00	0.00	0	0		
									point98	98	680.3	407.1	88.00	6.00	0.00	0	0		
									point99	99	681.2	408.2	88.00	6.00	0.00	0	0		
									point100	100	675.7	412.9	88.00	6.00	0.00	0	0		
									point101	101	674.9	411.8	88.00	6.00	0.00	0	0		
									point102	102	670.3	415.8	88.00	6.00	0.00	0	0		
									point103	103	668.1	413.2	88.00	6.00	0.00	0	0		
									point104	104	666.8	414.3	88.00	6.00	0.00	0	0		
									point105	105	662.9	409.7	88.00	6.00					
Barrier11	W	0.00	30.48	0.00				0.00	point165	165	687.1	600.9	67.50	4.50	0.00	0	0		
									point166	166	702.2	597.3	67.50	4.50	0.00	0	0		
									point167	167	703.4	601.6	67.50	4.50	0.00	0	0		
									point168	168	709.8	600.1	67.50	4.50	0.00	0	0		
									point169	169	709.4	598.5	67.50	4.50	0.00	0	0		
									point170	170	713.0	597.5	67.50	4.50	0.00	0	0		
									point171	171	710.8	588.7	67.50	4.50	0.00	0	0		
									point172	172	711.9	588.5	67.50	4.50	0.00	0	0		
									point173	173	723.7	588.6	67.50	4.50	0.00	0	0		
									point174	174	723.8	580.6	67.50	4.50	0.00	0	0		
									point175	175	716.3	580.6	67.50	4.50	0.00	0	0		
									point176	176	716.4	582.8	67.50	4.50	0.00	0	0		
									point177	177	709.9	584.3	67.50	4.50	0.00	0	0		
									point178	178	709.7	584.0	67.50	4.50	0.00	0	0		
									point179	179	697.7	586.9	67.50	4.50	0.00	0	0		
									point180	180	698.3	589.6	67.50	4.50	0.00	0	0		
									point181	181	691.1	591.2	67.50	4.50	0.00	0	0		
									point182	182	690.4	589.0	67.50	4.50	0.00	0	0		
									point183	183	684.2	590.4	67.50	4.50	0.00	0	0		
									point184	184	687.1	600.9	67.50	4.50					
Barrier12	W	0.00	30.48	0.00				0.00	point185	185	832.9	601.5	66.50	4.50	0.00	0	0		
									point186	186	831.2	585.8	66.50	4.50	0.00	0	0		
									point187	187	806.7	587.4	66.50	4.50	0.00	0	0		
									point188	188	805.9	573.9	66.50	4.50	0.00	0	0		
									point189	189	830.2	572.4	66.50	4.50	0.00	0	0		
									point190	190	829.5	558.0	66.50	4.50	0.00	0	0		
									point191	191	842.8	557.1	66.50	4.50	0.00	0	0		
									point192	192	844.9	587.0	66.50	4.50	0.00	0	0		

									point193	193	853.8	586.7	66.50	4.50	0.00	0	0		
									point194	194	854.9	600.3	66.50	4.50	0.00	0	0		
									point197	197	832.9	601.5	66.50	4.50					
Barrier13	W	0.00	30.48	0.00				0.00	point198	198	802.3	633.6	66.50	4.50	0.00	0	0		
									point199	199	805.0	625.0	66.50	4.50	0.00	0	0		
									point200	200	828.8	631.6	66.50	4.50	0.00	0	0		
									point201	201	832.6	618.0	66.50	4.50	0.00	0	0		
									point202	202	797.9	608.3	66.50	4.50	0.00	0	0		
									point203	203	800.3	599.2	66.50	4.50	0.00	0	0		
									point206	206	844.6	611.7	66.50	4.50	0.00	0	0		
									point207	207	839.4	630.6	66.50	4.50	0.00	0	0		
									point208	208	833.6	629.0	66.50	4.50	0.00	0	0		
									point209	209	830.1	641.6	66.50	4.50	0.00	0	0		
									point210	210	826.8	640.7	66.50	4.50	0.00	0	0		
									point211	211	826.7	641.1	66.50	4.50	0.00	0	0		
									point212	212	802.3	633.6	66.50	4.50					
Barrier14	W	0.00	30.48	0.00				0.00	point213	213	919.3	602.1	49.50	5.00	0.00	0	0		
									point214	214	901.4	618.0	49.50	5.00	0.00	0	0		
									point215	215	920.2	639.5	49.50	5.00	0.00	0	0		
									point216	216	929.2	631.7	49.50	5.00	0.00	0	0		
									point217	217	916.7	617.4	49.50	5.00	0.00	0	0		
									point218	218	925.8	609.3	49.50	5.00	0.00	0	0		
									point219	219	919.3	602.1	49.50	5.00					
Barrier15	W	0.00	30.48	0.00				0.00	point220	220	980.4	298.2	56.50	4.00	0.00	0	0		
									point221	221	990.4	296.2	56.50	4.00	0.00	0	0		
									point222	222	991.8	303.3	56.50	4.00	0.00	0	0		
									point223	223	981.8	305.3	56.50	4.00	0.00	0	0		
									point224	224	980.4	298.2	56.50	4.00					
Barrier16	W	0.00	30.48	0.00				0.00	point226	226	1,006.8	351.3	52.50	4.50	0.00	0	0		
									point227	227	1,017.7	351.4	52.50	4.50	0.00	0	0		
									point228	228	1,017.7	352.4	52.50	4.50	0.00	0	0		
									point229	229	1,018.7	352.4	52.50	4.50	0.00	0	0		
									point230	230	1,018.6	355.2	52.50	4.50	0.00	0	0		
									point231	231	1,017.5	355.2	52.50	4.50	0.00	0	0		
									point232	232	1,017.5	356.0	52.50	4.50	0.00	0	0		
									point233	233	1,015.4	356.0	52.50	4.50	0.00	0	0		
									point234	234	1,015.4	356.3	52.50	4.50	0.00	0	0		
									point235	235	1,015.2	357.0	52.50	4.50	0.00	0	0		
									point236	236	1,017.3	357.0	52.50	4.50	0.00	0	0		
									point237	237	1,017.2	367.3	52.50	4.50	0.00	0	0		
									point238	238	1,011.5	367.4	52.50	4.50	0.00	0	0		
									point239	239	1,011.4	365.4	52.50	4.50	0.00	0	0		
									point240	240	1,007.0	365.5	52.50	4.50	0.00	0	0		
									point241	241	1,006.9	364.2	52.50	4.50	0.00	0	0		
									point242	242	1,006.8	364.2	52.50	4.50	0.00	0	0		
									point243	243	1,006.8	351.3	52.50	4.50					
Barrier17	W	0.00	30.48	0.00				0.00	point244	244	1,006.5	403.5	51.75	4.50	0.00	0	0		
									point245	245	1,006.8	391.4	51.75	4.50	0.00	0	0		
									point246	246	1,017.4	391.7	51.75	4.50	0.00	0	0		

									point247	247	1,017.3	396.3	51.75	4.50	0.00	0	0		
									point248	248	1,015.3	396.2	51.75	4.50	0.00	0	0		
									point249	249	1,015.2	403.5	51.75	4.50	0.00	0	0		
									point250	250	1,006.5	403.5	51.75	4.50					
Barrier18	W	0.00	30.48	0.00				0.00	point251	251	1,013.7	450.3	45.50	4.50	0.00	2	0		
									point252	252	1,014.0	444.2	45.50	4.50	0.00	0	0		
									point253	253	1,015.3	444.1	45.50	4.50	0.00	0	0		
									point254	254	1,015.5	437.1	45.50	4.50	0.00	0	0		
									point255	255	1,027.5	437.3	45.50	4.50	0.00	0	0		
									point256	256	1,027.6	446.7	45.50	4.50	0.00	0	0		
									point257	257	1,025.9	446.9	45.50	4.50	0.00	0	0		
									point258	258	1,025.7	450.9	45.50	4.50	0.00	0	0		
									point259	259	1,013.7	450.3	45.50	4.50					
Barrier19	W	0.00	30.48	0.00				0.00	point260	260	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point261	261	1,162.1	649.0	3.50	5.00	0.00	0	0		
									point262	262	1,162.0	649.6	3.50	5.00	0.00	0	0		
									point263	263	1,162.0	650.2	3.50	5.00	0.00	0	0		
									point264	264	1,161.5	650.8	3.50	5.00	0.00	0	0		
									point265	265	1,161.0	651.2	3.50	5.00	0.00	0	0		
									point266	266	1,160.3	651.2	3.50	5.00	0.00	0	0		
									point267	267	1,159.6	650.8	3.50	5.00	0.00	0	0		
									point268	268	1,159.1	650.2	3.50	5.00	0.00	0	0		
									point269	269	1,158.9	649.4	3.50	5.00	0.00	0	0		
									point270	270	1,159.3	648.8	3.50	5.00	0.00	0	0		
									point271	271	1,160.1	648.2	3.50	5.00	0.00	0	0		
									point272	272	1,160.7	648.1	3.50	5.00	0.00	0	0		
									point273	273	1,162.0	648.4	3.50	5.00	0.00	0	0		
									point274	274	1,162.0	648.3	3.50	5.00	0.00	0	0		
									point275	275	1,162.2	646.1	3.50	5.00	0.00	0	0		
									point276	276	1,158.0	645.7	3.50	5.00	0.00	0	0		
									point277	277	1,158.3	635.9	3.50	5.00	0.00	0	0		
									point278	278	1,161.3	636.1	3.50	5.00	0.00	0	0		
									point279	279	1,161.4	634.5	3.50	5.00	0.00	0	0		
									point280	280	1,160.2	634.5	3.50	5.00	0.00	0	0		
									point281	281	1,160.6	628.5	3.50	5.00	0.00	0	0		
									point282	282	1,160.1	628.5	3.50	5.00	0.00	0	0		
									point283	283	1,159.7	632.1	3.50	5.00	0.00	0	0		
									point284	284	1,156.3	632.1	3.50	5.00	0.00	0	0		
									point285	285	1,156.3	630.2	3.50	5.00	0.00	0	0		
									point286	286	1,151.5	629.8	3.50	5.00	0.00	0	0		
									point287	287	1,151.3	635.5	3.50	5.00	0.00	0	0		
									point288	288	1,133.4	634.8	3.50	5.00	0.00	0	0		
									point289	289	1,133.6	630.3	3.50	5.00	0.00	0	0		
									point290	290	1,132.3	630.2	3.50	5.00	0.00	0	0		
									point291	291	1,132.0	632.8	3.50	5.00	0.00	0	0		
									point292	292	1,123.9	632.8	3.50	5.00	0.00	0	0		
									point293	293	1,124.3	627.1	3.50	5.00	0.00	0	0		
									point294	294	1,123.5	626.9	3.50	5.00	0.00	0	0		
									point295	295	1,123.4	629.7	3.50	5.00	0.00	0	0		

									point296	296	1,120.9	629.7	3.50	5.00	0.00	0	0		
									point297	297	1,120.9	627.1	3.50	5.00	0.00	0	0		
									point298	298	1,115.5	626.9	3.50	5.00	0.00	0	0		
									point299	299	1,115.2	628.6	3.50	5.00	0.00	0	0		
									point300	300	1,108.0	628.2	3.50	5.00	0.00	0	0		
									point301	301	1,100.1	619.6	3.50	5.00	0.00	0	0		
									point302	302	1,102.4	613.9	3.50	5.00	0.00	0	0		
									point303	303	1,103.2	607.7	3.50	5.00	0.00	0	0		
									point304	304	1,099.9	603.6	3.50	5.00	0.00	0	0		
									point305	305	1,097.1	603.3	3.50	5.00	0.00	0	0		
									point306	306	1,097.7	589.6	3.50	5.00	0.00	0	0		
									point307	307	1,102.6	589.9	3.50	5.00	0.00	0	0		
									point308	308	1,102.6	588.5	3.50	5.00	0.00	0	0		
									point309	309	1,099.2	588.3	3.50	5.00	0.00	0	0		
									point310	310	1,099.9	572.5	3.50	5.00	0.00	0	0		
									point311	311	1,104.7	572.8	3.50	5.00	0.00	0	0		
									point312	312	1,104.8	569.0	3.50	5.00	0.00	0	0		
									point313	313	1,098.6	568.8	3.50	5.00	0.00	0	0		
									point314	314	1,098.7	563.4	3.50	5.00	0.00	0	0		
									point315	315	1,100.3	562.0	3.50	5.00	0.00	0	0		
									point316	316	1,100.6	554.8	3.50	5.00	0.00	0	0		
									point317	317	1,112.7	543.6	3.50	5.00	0.00	0	0		
									point318	318	1,123.7	544.2	3.50	5.00	0.00	0	0		
									point319	319	1,123.8	546.2	3.50	5.00	0.00	0	0		
									point320	320	1,124.8	546.2	3.50	5.00	0.00	0	0		
									point321	321	1,124.8	544.4	3.50	5.00	0.00	0	0		
									point322	322	1,127.8	544.4	3.50	5.00	0.00	0	0		
									point323	323	1,127.9	547.3	3.50	5.00	0.00	0	0		
									point324	324	1,142.8	548.1	3.50	5.00	0.00	0	0		
									point325	325	1,146.7	544.4	3.50	5.00	0.00	0	0		
									point326	326	1,148.7	544.5	3.50	5.00	0.00	0	0		
									point327	327	1,148.8	543.2	3.50	5.00	0.00	0	0		
									point328	328	1,146.9	543.2	3.50	5.00	0.00	0	0		
									point329	329	1,147.5	521.6	3.50	5.00	0.00	0	0		
									point330	330	1,149.7	521.6	3.50	5.00	0.00	0	0		
									point331	331	1,149.8	520.0	3.50	5.00	0.00	0	0		
									point332	332	1,146.6	520.0	3.50	5.00	0.00	0	0		
									point333	333	1,146.9	509.3	3.50	5.00	0.00	0	0		
									point334	334	1,153.2	509.3	3.50	5.00	0.00	0	0		
									point335	335	1,153.2	499.4	3.50	5.00	0.00	0	0		
									point336	336	1,149.4	495.2	3.50	5.00	0.00	0	0		
									point337	337	1,142.6	495.0	3.50	5.00	0.00	0	0		
									point338	338	1,142.6	496.3	3.50	5.00	0.00	0	0		
									point339	339	1,131.7	496.3	3.50	5.00	0.00	0	0		
									point340	340	1,131.9	490.0	3.50	5.00	0.00	0	0		
									point341	341	1,143.3	490.0	3.50	5.00	0.00	0	0		
									point342	342	1,143.3	491.5	3.50	5.00	0.00	0	0		
									point343	343	1,146.9	491.7	3.50	5.00	0.00	0	0		
									point344	344	1,146.9	487.6	3.50	5.00	0.00	0	0		

									point345	345	1,153.0	487.6	3.50	5.00	0.00	0	0		
									point346	346	1,161.1	496.4	3.50	5.00	0.00	0	0		
									point347	347	1,160.9	502.8	3.50	5.00	0.00	0	0		
									point348	348	1,156.6	502.8	3.50	5.00	0.00	0	0		
									point349	349	1,156.0	511.0	3.50	5.00	0.00	0	0		
									point350	350	1,162.1	511.2	3.50	5.00	0.00	0	0		
									point351	351	1,161.9	522.1	3.50	5.00	0.00	0	0		
									point352	352	1,158.1	521.9	3.50	5.00	0.00	0	0		
									point353	353	1,157.3	541.4	3.50	5.00	0.00	0	0		
									point354	354	1,155.0	541.4	3.50	5.00	0.00	0	0		
									point355	355	1,155.0	545.1	3.50	5.00	0.00	0	0		
									point356	356	1,158.8	545.1	3.50	5.00	0.00	0	0		
									point357	357	1,158.6	551.6	3.50	5.00	0.00	0	0		
									point358	358	1,149.1	560.3	3.50	5.00	0.00	0	0		
									point359	359	1,142.5	560.0	3.50	5.00	0.00	0	0		
									point360	360	1,142.5	558.1	3.50	5.00	0.00	0	0		
									point361	361	1,138.5	558.1	3.50	5.00	0.00	0	0		
									point362	362	1,131.4	558.1	3.50	5.00	0.00	0	0		
									point363	363	1,127.7	557.9	3.50	5.00	0.00	0	0		
									point364	364	1,118.2	557.6	3.50	5.00	0.00	0	0		
									point365	365	1,113.9	561.4	3.50	5.00	0.00	0	0		
									point366	366	1,113.6	567.7	3.50	5.00	0.00	0	0		
									point367	367	1,107.8	567.4	3.50	5.00	0.00	0	0		
									point368	368	1,107.3	575.9	3.50	5.00	0.00	0	0		
									point369	369	1,107.3	577.1	3.50	5.00	0.00	0	0		
									point370	370	1,113.2	577.1	3.50	5.00	0.00	0	0		
									point371	371	1,112.5	594.5	3.50	5.00	0.00	0	0		
									point372	372	1,108.0	594.4	3.50	5.00	0.00	0	0		
									point373	373	1,107.9	595.7	3.50	5.00	0.00	0	0		
									point374	374	1,110.9	595.9	3.50	5.00	0.00	0	0		
									point375	375	1,110.2	607.7	3.50	5.00	0.00	0	0		
									point376	376	1,106.4	607.7	3.50	5.00	0.00	0	0		
									point377	377	1,106.0	613.2	3.50	5.00	0.00	0	0		
									point378	378	1,109.9	613.1	3.50	5.00	0.00	0	0		
									point379	379	1,115.5	619.0	3.50	5.00	0.00	0	0		
									point380	380	1,115.5	623.0	3.50	5.00	0.00	0	0		
									point381	381	1,120.6	623.3	3.50	5.00	0.00	0	0		
									point382	382	1,120.8	619.4	3.50	5.00	0.00	0	0		
									point383	383	1,138.4	620.0	3.50	5.00	0.00	0	0		
									point384	384	1,138.4	624.7	3.50	5.00	0.00	0	0		
									point385	385	1,139.6	624.7	3.50	5.00	0.00	0	0		
									point386	386	1,139.8	621.7	3.50	5.00	0.00	0	0		
									point387	387	1,151.8	622.1	3.50	5.00	0.00	0	0		
									point388	388	1,151.6	626.3	3.50	5.00	0.00	0	0		
									point389	389	1,157.1	626.5	3.50	5.00	0.00	0	0		
									point390	390	1,157.1	618.9	3.50	5.00	0.00	0	0		
									point391	391	1,169.0	619.4	3.50	5.00	0.00	0	0		
									point392	392	1,173.9	625.1	3.50	5.00	0.00	0	0		
									point393	393	1,173.3	636.9	3.50	5.00	0.00	0	0		

									point394	394	1,167.0	636.9	3.50	5.00	0.00	0	0		
									point395	395	1,167.0	638.0	3.50	5.00	0.00	0	0		
									point396	396	1,169.9	638.0	3.50	5.00	0.00	0	0		
									point397	397	1,169.5	650.0	3.50	5.00	0.00	0	0		
									point398	398	1,162.1	649.0	3.50	5.00					
Barrier20	W	0.00	30.48	0.00				0.00	point399	399	906.6	754.5	25.00	6.00	0.00	0	0		
									point400	400	907.3	762.7	25.00	6.00	0.00	0	0		
									point401	401	927.6	761.5	25.00	6.00	0.00	0	0		
									point402	402	927.1	753.1	25.00	6.00	0.00	0	0		
									point403	403	926.5	751.1	25.00	6.00	0.00	0	0		
									point404	404	907.3	752.3	25.00	6.00	0.00	0	0		
									point405	405	907.3	754.4	25.00	6.00	0.00	0	0		
									point406	406	906.6	754.5	25.00	6.00					
Barrier21	W	0.00	30.48	0.00				0.00	point407	407	928.1	762.3	25.00	6.00	0.00	0	0		
									point408	408	927.3	751.1	25.00	6.00	0.00	0	0		
									point409	409	938.9	750.2	25.00	6.00	0.00	0	0		
									point410	410	939.6	761.6	25.00	6.00	0.00	0	0		
									point411	411	928.1	762.3	25.00	6.00					
Barrier22	W	0.00	30.48	0.00				0.00	point412	412	895.1	803.1	26.00	6.00	0.00	0	0		
									point413	413	890.1	791.1	26.00	6.00	0.00	0	0		
									point414	414	891.7	790.5	26.00	6.00	0.00	0	0		
									point415	415	893.3	789.8	26.00	6.00	0.00	0	0		
									point416	416	899.8	787.2	26.00	6.00	0.00	0	0		
									point417	417	904.7	799.3	26.00	6.00	0.00	0	0		
									point418	418	895.1	803.1	26.00	6.00					
Barrier23	W	0.00	30.48	0.00				0.00	point420	420	905.6	821.8	26.00	6.00	0.00	0	0		
									point421	421	898.7	810.7	26.00	6.00	0.00	0	0		
									point422	422	907.8	804.7	26.00	6.00	0.00	0	0		
									point423	423	911.7	811.0	26.00	6.00	0.00	0	0		
									point424	424	912.7	810.4	26.00	6.00	0.00	0	0		
									point425	425	914.4	813.2	26.00	6.00	0.00	0	0		
									point426	426	913.4	813.8	26.00	6.00	0.00	0	0		
									point427	427	914.8	815.9	26.00	6.00	0.00	0	0		
									point428	428	905.6	821.8	26.00	6.00					
Barrier24	W	0.00	30.48	0.00				0.00	point430	430	941.3	815.9	25.00	6.00	0.00	0	0		
									point431	431	931.0	820.5	25.00	6.00	0.00	0	0		
									point432	432	930.9	820.5	25.00	6.00	0.00	0	0		
									point433	433	929.9	818.2	25.00	6.00	0.00	0	0		
									point434	434	928.4	818.9	25.00	6.00	0.00	0	0		
									point435	435	929.3	821.3	25.00	6.00	0.00	0	0		
									point436	436	928.9	821.4	25.00	6.00	0.00	0	0		
									point437	437	932.8	830.6	25.00	6.00	0.00	0	0		
									point438	438	935.9	829.3	25.00	6.00	0.00	0	0		
									point439	439	936.3	830.1	25.00	6.00	0.00	0	0		
									point440	440	936.9	829.8	25.00	6.00	0.00	0	0		
									point441	441	937.8	831.8	25.00	6.00	0.00	0	0		
									point442	442	943.1	829.5	25.00	6.00	0.00	0	0		
									point443	443	942.2	827.4	25.00	6.00	0.00	0	0		
									point444	444	942.6	827.2	25.00	6.00	0.00	0	0		

									point445	445	942.3	826.5	25.00	6.00	0.00	0	0		
									point446	446	945.3	825.0	25.00	6.00	0.00	0	0		
									point447	447	941.3	815.9	25.00	6.00					
Barrier25	W	0.00	30.48	0.00				0.00	point448	448	960.6	801.4	23.00	6.00	0.00	0	0		
									point449	449	951.4	797.8	23.00	6.00	0.00	0	0		
									point450	450	946.6	810.7	23.00	6.00	0.00	0	0		
									point451	451	955.5	814.2	23.00	6.00	0.00	0	0		
									point452	452	956.8	811.2	23.00	6.00	0.00	0	0		
									point453	453	957.7	811.5	23.00	6.00	0.00	0	0		
									point454	454	957.9	811.0	23.00	6.00	0.00	0	0		
									point455	455	959.8	811.8	23.00	6.00	0.00	0	0		
									point456	456	962.0	806.4	23.00	6.00	0.00	0	0		
									point457	457	960.0	805.6	23.00	6.00	0.00	0	0		
									point458	458	960.2	805.0	23.00	6.00	0.00	0	0		
									point459	459	959.4	804.7	23.00	6.00	0.00	0	0		
									point460	460	960.6	801.4	23.00	6.00					
Barrier26	W	0.00	30.48	0.00				0.00	point461	461	963.3	794.2	21.00	6.00	0.00	0	0		
									point462	462	954.1	790.6	21.00	6.00	0.00	0	0		
									point463	463	959.0	778.0	21.00	6.00	0.00	0	0		
									point464	464	968.2	781.6	21.00	6.00	0.00	0	0		
									point465	465	963.3	794.2	21.00	6.00					
Barrier27	W	0.00	30.48	0.00				0.00	point467	467	970.9	774.4	21.00	6.00	0.00	0	0		
									point468	468	976.8	759.4	21.00	6.00	0.00	0	0		
									point469	469	967.2	755.5	21.00	6.00	0.00	0	0		
									point470	470	961.3	770.5	21.00	6.00	0.00	0	0		
									point471	471	970.9	774.4	21.00	6.00					
Barrier28	W	0.00	30.48	0.00				0.00	point472	472	964.8	739.9	21.00	6.00	0.00	0	0		
									point473	473	964.9	739.6	21.00	6.00	0.00	0	0		
									point474	474	964.2	739.4	21.00	6.00	0.00	0	0		
									point475	475	965.0	737.5	21.00	6.00	0.00	0	0		
									point476	476	965.7	737.7	21.00	6.00	0.00	0	0		
									point477	477	967.6	733.0	21.00	6.00	0.00	0	0		
									point478	478	974.3	735.3	21.00	6.00	0.00	0	0		
									point479	479	975.6	731.9	21.00	6.00	0.00	0	0		
									point480	480	974.8	730.2	21.00	6.00	0.00	0	0		
									point481	481	974.9	730.1	21.00	6.00	0.00	0	0		
									point482	482	973.0	729.3	21.00	6.00	0.00	0	0		
									point483	483	973.9	727.3	21.00	6.00	0.00	0	0		
									point484	484	975.8	728.1	21.00	6.00	0.00	0	0		
									point485	485	975.8	727.9	21.00	6.00	0.00	0	0		
									point486	486	977.1	727.3	21.00	6.00	0.00	0	0		
									point487	487	977.5	727.4	21.00	6.00	0.00	0	0		
									point488	488	979.5	722.0	21.00	6.00	0.00	0	0		
									point489	489	978.2	721.6	21.00	6.00	0.00	0	0		
									point490	490	979.2	719.0	21.00	6.00	0.00	0	0		
									point491	491	980.7	719.6	21.00	6.00	0.00	0	0		
									point492	492	981.6	717.6	21.00	6.00	0.00	0	0		
									point493	493	991.0	721.1	21.00	6.00	0.00	0	0		
									point494	494	991.6	720.0	21.00	6.00	0.00	0	0		

									point495	495	994.3	721.0	21.00	6.00	0.00	0	0		
									point496	496	993.6	722.2	21.00	6.00	0.00	0	0		
									point497	497	994.7	722.6	21.00	6.00	0.00	0	0		
									point498	498	992.0	729.4	21.00	6.00	0.00	0	0		
									point499	499	992.4	729.6	21.00	6.00	0.00	0	0		
									point500	500	988.3	740.2	21.00	6.00	0.00	0	0		
									point501	501	987.8	740.1	21.00	6.00	0.00	0	0		
									point502	502	985.2	746.8	21.00	6.00	0.00	0	0		
									point503	503	984.0	746.3	21.00	6.00	0.00	0	0		
									point504	504	983.5	747.7	21.00	6.00	0.00	0	0		
									point505	505	981.1	746.7	21.00	6.00	0.00	0	0		
									point506	506	981.6	745.4	21.00	6.00	0.00	0	0		
									point507	507	972.2	741.6	21.00	6.00	0.00	0	0		
									point508	508	972.4	741.1	21.00	6.00	0.00	0	0		
									point509	509	968.7	739.6	21.00	6.00	0.00	0	0		
									point510	510	968.1	741.2	21.00	6.00	0.00	0	0		
									point511	511	964.8	739.9	21.00	6.00					

EDAW/AECOM			**13 August 2009**	
Maddux B.			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**			
RUN:	**Future Alternative 4**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
	72	701.6	614.8	66.50
	73	693.8	610.9	67.00
Terrain Line8	74	775.9	636.9	66.00
	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
	81	728.9	726.6	0.50
Terrain Line9	82	793.5	779.6	0.50
	83	804.9	734.8	30.00
Terrain Line10	84	891.8	737.7	26.50
	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line18	107	1,109.0	899.0	0.50
	108	1,110.1	877.1	9.50
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00

	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00
	127	909.5	798.3	26.50
Terrain Line25	128	923.4	816.5	25.50
	129	923.6	813.4	27.00
	130	920.9	806.0	28.50
Terrain Line26	131	942.4	802.0	23.50
	132	935.6	803.3	26.50
	133	924.8	803.3	29.00
Terrain Line27	134	956.2	754.4	22.50
	135	948.0	764.3	23.50
	136	920.0	791.6	28.50
Terrain Line28	137	948.3	789.6	22.50
	138	942.9	787.8	26.00
Terrain Line29	139	954.5	822.7	24.50
	140	968.2	849.7	18.00
	141	985.8	861.3	13.50
	142	999.7	860.6	12.00
	143	1,026.4	859.3	11.00
	144	1,055.7	857.9	10.00
	145	1,071.0	858.7	9.50
Terrain Line31	146	1,027.1	836.6	11.50
	147	1,027.0	825.3	12.30
	148	1,025.8	810.2	11.50
Terrain Line32	149	1,054.2	841.3	11.50
	150	1,048.9	825.2	14.50
	151	1,050.8	811.9	12.00
	152	1,057.4	801.8	13.50
	153	1,063.4	797.9	11.50
Terrain Line33	154	932.1	688.7	39.00
	155	956.4	742.7	21.50
	156	990.1	750.3	20.50
	157	1,026.9	772.0	12.50
	158	1,050.9	792.9	11.50
	159	1,057.4	801.8	13.50
	160	1,064.4	802.2	12.00

Terrain Line34	162	966.2	674.6	40.00
	163	983.7	710.3	21.00
	164	1,004.9	721.9	20.00
	165	1,019.3	727.2	18.00
Terrain Line35	167	1,017.7	792.0	12.50
	168	996.2	786.0	18.50
	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line44	209	1,123.2	905.6	0.50
	210	1,139.2	892.5	14.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00

	218	838.8	456.3	72.00
	219	841.2	459.3	70.00
	220	838.5	469.1	69.00
Terrain Line47	221	782.1	440.8	103.50
	222	783.7	442.4	102.00
	223	797.3	470.1	88.00
	224	797.5	475.2	88.00
	225	804.3	488.2	80.00
	226	817.6	492.0	73.00
	227	829.5	495.4	66.00
	228	846.2	497.2	56.00
Terrain Line49	229	730.1	434.6	103.50
	230	708.8	445.6	100.00
	231	690.7	458.1	96.00
	232	674.2	481.7	90.00
	233	672.0	486.3	88.00
Terrain Line60	283	810.9	312.7	64.00
	284	809.0	344.2	83.00
	285	809.5	347.6	83.00
	286	807.3	368.4	91.00
	287	807.8	373.3	92.00
	288	810.8	387.2	96.00
	289	812.9	395.1	100.00
	290	810.2	400.2	100.50
	291	808.0	415.5	101.00
Terrain Line61	292	842.9	392.4	100.00
	293	927.1	293.8	64.00
Terrain Line62	294	840.9	400.5	100.00
	295	892.0	398.3	88.00
	296	910.4	418.5	78.00
	297	921.7	445.7	68.00
	298	914.4	475.3	57.00
Terrain Line63	299	840.9	400.5	100.00
	300	862.6	407.0	94.00
	301	868.2	413.8	88.60
	302	869.7	417.8	83.30

	303	871.2	429.8	78.00
	304	867.6	448.9	69.00
	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00
	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line72	335	1,144.3	937.4	0.50
	336	1,156.6	911.2	16.00
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50

	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00
	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50
	522	1,205.9	754.1	2.50
Terrain Line105	523	1,215.0	782.3	3.00
	524	1,205.8	777.1	5.50
Terrain Line106	525	1,180.2	792.7	7.00
	526	1,189.0	800.8	4.00
	527	1,194.2	799.2	3.50
Terrain Line107	528	1,194.9	244.3	0.50
	529	1,185.4	457.2	0.50
	530	1,235.9	464.7	0.50
	531	1,266.6	541.5	0.50
	532	1,257.8	544.8	0.50
	533	1,229.2	473.2	0.50
	534	1,227.5	473.0	0.50
	535	1,199.6	469.0	0.50
	536	1,180.9	466.2	0.50
	537	1,180.3	469.1	0.50
	538	1,174.9	498.9	0.50
	539	1,173.2	509.1	0.50
	540	1,173.2	512.1	0.50
	541	1,172.0	518.2	0.50
	542	1,171.9	521.6	0.50
	543	1,171.4	525.3	0.50
	544	1,171.3	529.7	0.50
	545	1,172.5	531.1	0.50
	546	1,172.3	533.2	0.50
	547	1,172.1	539.1	0.50

	548	1,171.6	541.1	0.50
	549	1,172.0	544.4	0.50
	550	1,173.2	555.6	0.50
	551	1,174.5	564.4	0.50
	552	1,175.3	573.2	0.50
	553	1,179.6	585.3	0.50
	554	1,183.1	596.3	0.50
	555	1,187.5	611.4	0.50
	556	1,187.8	614.8	0.50
	557	1,189.4	622.0	0.50
	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50

	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50
	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50
	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50

	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50
	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line109	629	1,163.8	737.6	3.50
	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line115	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00
Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00
Terrain Line118	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00

	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00
	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50
	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50

	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00
Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00
	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50

	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00
	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00
	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00

	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00
	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00
	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00

	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00
	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00
	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	870	992.3	505.4	50.00
	871	992.1	495.6	52.00
	872	990.7	485.9	52.50
	873	990.2	474.8	53.00
	874	989.5	445.6	55.00
	875	992.4	419.6	58.00
	876	990.0	376.3	61.00
	877	989.9	347.9	62.00
	878	995.0	340.8	58.00
	879	998.9	335.5	57.00
	880	1,000.8	332.5	56.50
	881	1,002.4	329.8	56.00
Terrain Line138	882	1,002.5	407.0	52.00
	883	1,005.9	407.0	51.80

	884	1,015.3	407.0	51.80
	885	1,020.0	405.4	51.80
	886	1,021.9	402.4	51.80

EDAW/AECOM				**13 August 2009**	
Maddux B.				**TNM 2.5**	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	**Yerba Buena Island 08080090.11**				
RUN:	**Future Alternative 4**				
Ground Zone			**Points**		
Name	**Type**	**Flow Resistivity**	**No.**	**Coordinates X**	**Y**
		cgs rayls		m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9

EDAW/AECOM
Maddux B.
20 October 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Yerba Buena Island 08080090.11
RUN: Future Alternative 4
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	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R-1	9	1	67.4	67.4	71	0.0	12	----	67.4	0.0	5	-5.0
R-2 (ST-1)	16	1	71.4	68.5	71	-2.9	12	----	68.5	0.0	5	-5.0
R-3	17	1	71.4	72.7	66	1.3	12	Snd Lvl	72.7	0.0	5	-5.0
R-4 (ST-3)	18	1	71.4	67.0	71	-4.4	12	----	67.0	0.0	5	-5.0
R-5	19	1	70.4	66.9	71	-3.5	12	----	66.9	0.0	5	-5.0
R-6	20	1	0.0	66.5	66	66.5	12	Snd Lvl	66.5	0.0	5	-5.0
R-7	21	1	0.0	67.4	66	67.4	12	Snd Lvl	67.4	0.0	5	-5.0
R-8	22	1	0.0	64.3	66	64.3	12	----	64.3	0.0	5	-5.0
R-9	24	1	0.0	63.0	66	63.0	12	----	63.0	0.0	5	-5.0
R-10 (ST-2)	25	1	65.9	65.3	66	-0.6	12	----	65.3	0.0	5	-5.0
R-11	38	1	0.0	53.5	66	53.5	12	----	53.5	0.0	5	-5.0
R-12 (ST-4)	39	1	63.5	65.9	66	2.4	12	----	65.9	0.0	5	-5.0
R-13 (ST-5)	40	1	60.9	57.6	71	-3.3	12	----	57.6	0.0	5	-5.0
R-14	41	1	0.0	65.4	66	65.4	12	----	65.4	0.0	5	-5.0
R-15	42	1	0.0	63.7	66	63.7	12	----	63.7	0.0	5	-5.0
R-16	43	1	73.1	72.5	71	-0.6	12	Snd Lvl	72.5	0.0	5	-5.0
R-17	54	1	0.0	61.0	66	61.0	12	----	61.0	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0