CHAPTER 9 Text Changes

9.1 FORMAT OF TEXT CHANGES

Text changes are intended to clarify or correct information in the Draft EIR/EA in response to comments received on the document or as initiated by Lead Agency (WTA and FTA) staff. Revisions are shown in Volume 1a, Chapter 9 (Text Changes), as excerpts from the Draft EIR/EA text, with a ~~line through~~ deleted text and a double underline beneath inserted text. The text changes appear in order of their location in the Draft EIR/EA.

9.2 TEXT CHANGES

9.2.1 EXECUTIVE SUMMARY

Page xii, the first paragraph under the title Project Description has been modified to state:

The project includes construction of a ferry terminal (passenger waiting area, gangway ramp and float), bus terminal, striping for 56 vehicles, and reconfigured circulation and access. About 124 berths, approximately 21 percent of current berths, would be removed to create a path for entering and exiting ferries. This includes all of the slips at Gates 9 and 10, as well as individual slips at the far end of Gates 11, 12 and 13. ~~The occupants of the berths would be relocated to existing vacant berths within the Marina.~~ Consistent with the San Francisco Bay Plan policies, the San Francisco Bay Conservation and Development Commission (BCDC) established that the number of live-aboards in a marina should not exceed 10 percent of the total authorized boat berths, resulting in the 60 live aboards currently located within the Marina. Removal of the 124 berths proposed with the project would exceed the 10 percent limit, and approximately 10 live aboards may be required to relocate outside Oyster Point Marina. In addition, 3 boats docked at the end of slips which will be altered due to the terminal construction will no longer have spaces in the marina due to the size of their vessel. However, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~However, all live aboard vessels will be relocated within the marina and placed in slips in accordance with all rules and regulations which require specific spacing and setbacks.~~ No leases will be broken with the relocation of the vessels as all leases are month-to-month and will be adjusted accordingly.

Page xiii, the first sentence of the third paragraph has been clarified to state:

Based on the initial scoping, the WTA and the FTA determined that a Draft EIR/EA should be prepared for the proposed project. A summary of the impacts, mitigation measures, and residual impacts for the proposed project is provided in **Table ES-1** at the conclusion of this Executive Summary.

Page xiii, the second sentence of the fourth paragraph has been clarified to state:

The Draft EIR/EA is considered a "focused" EIR, in which those environmental impact categories identified by the WTA as having "potentially significant" impacts during the notice of preparation, scoping process, and public review period for the Draft EIR/EA are discussed in detail. However, as discussed in Chapter ~~5, "Other CEQA Considerations"~~3 (Environmental Analysis), several specific environmental concerns were found to have no impact, and therefore, are not discussed in this document.

Table ES-1 (Mitigation Measure(s) or Project Requirements), pages viii through xxii has been clarified to state:

Table ES-1 Summary of Environmental Impacts and Mitigation Measures			
Threshold	*Level of Significance Prior to Mitigation* LTS—Less Than Significant PS—Potentially Significant	*Mitigation Measure(s) or Project Requirements*	*Level of Significance After Mitigation* LTS—Less Than Significant PS—Potentially Significant
		BIOLOGICAL RESOURCES	
Would the project alter or diminish designated critical habitat or special aquatic sites, including eelgrass beds, mudflats, and wetlands	PS	MM 3.1-3(a) The FTA and WTA should collaborate with Save-the-Bay, UC Davis, and NOAA Fisheries to develop a native oyster survey protocol. Based on this protocol, FTA and WTA should conduct a survey of native oyster distribution at and near the project area during fall or summer months prior to ferry terminal construction and ferry operation. This survey should include the areas to be dredged for operational depth and the floating docks and pilings that will be removed. If no native oysters are found in any of these areas, then there is no impact and no further mitigation is required. If native oysters are observed, MM 3.1-3(b-d) shall be implemented. MM 3.1-3(b) If the survey conducted in MM 3.1-3(a) determines that oysters are present in the footprint of the area to be dredged for the ferry channel, within 53 feet adjacent to either side of the new ferry terminal, and/or on the underside of the floating docks that will be removed to complete the new ferry terminal, WTA should mitigate for the loss of native oysters with the placement of a NOAA Fisheries-approved substrate. Substrate should be placed in an area outside of direct impact by the project. NOAA Fisheries staff should be contacted to assist with substrate choice and site selection. MM 3.1-3(c) The FTA and WTA should collaborate with on-going oyster monitoring efforts in Oyster Point Marina with	LTS

Table ES-1 Summary of Environmental Impacts and Mitigation Measures			
Threshold	*Level of Significance Prior to Mitigation* LTS—Less Than Significant PS—Potentially Significant	*Mitigation Measure(s) or Project Requirements*	*Level of Significance After Mitigation* LTS—Less Than Significant PS—Potentially Significant
		Save-the-Bay, Oyster Point Marina, and UC Davis to monitor subtidal oyster distribution, abundance, settlement, and functioning within Oyster Point Marina. Monitoring protocols should include water quality parameters, oyster density, and oyster settlement. NOAA Fisheries recommends monitoring occur on a monthly basis one year before the ferry project is in place (or as close to a year as possible) during the fall and winter months, and on a bi-monthly basis during spring and summer months in order to determine baseline conditions for live oysters at Oyster Point Marina. After the ferry project is in place, NOAA Fisheries recommends monitoring on a monthly basis during the fall and winter months, and on a bi-monthly basis during the spring and summer months for a one year period. Monitoring beyond the one-year pre-construction period and one year post-construction should continue for one additional year if adverse affects to live native oysters are discerned by NOAA Fisheries staff based on the results of the first 24 months of data. MM 3.1-3(d):The FTA and WTA should produce an annual report for NOAA Fisheries after a year of monitoring data has been collected. The report should include oyster monitoring data and analysis of the effects of dredging and scouring on oyster abundance, distribution, settlement, and functioning.	
Would the project cause underwater sound pressure levels during construction or operation that exceed NOAA Fisheries guidelines for protection of marine mammals (160 decibels referenced to 1 micropascal)?	~~LTS~~PS	MM 3.1-8: The WTA shall monitor site-specific conditions during pile driving to ensure that aquatic species would not be impacted and that sound pressure measured outside of the Marina during pile driving would not exceed the 180 dB threshold. ▪ Measures could include the following: ▪ When creating the final dock design, use fewer or smaller piles and preferably solid piles. ▪ Drive piles with a vibratory device instead of an impact hammer if possible. ▪ Utilize a cushioning block between the hammer head and pile. ▪ Only drive piles during periods of minimal current (slack tide). ▪ If marine mammals are observed within 1,000 feet of the project, allow them to completely exit the project area before pile driving resumes. ▪ ~~If piles will be installed during the seasons when Chinook or steelhead are in the Bay, restrict~~ Restrict pile driving to the June 1 to November 30 work window as recommended by NOAA Fisheries to protect herring and salmonids. Depending on the pile specifics (material, size, hammer, etc) it may be necessary to restrict pile driving to periods of low tide to minimize the in-water portion of the	LTS

Table ES-1 Summary of Environmental Impacts and Mitigation Measures			
Threshold	*Level of Significance Prior to Mitigation* LTS—Less Than Significant PS—Potentially Significant	*Mitigation Measure(s) or Project Requirements*	*Level of Significance After Mitigation* LTS—Less Than Significant PS—Potentially Significant
		pile and therefore the sound created. ▪ ~~If seasonal or tidally-based work restrictions are not feasible, it may be necessary to~~ If steel piles must be installed with an impact hammer, install an air barrier between the pile and the surrounding water. This approach effectively disrupts the sound pressure as it travels from water to air then back to water. One way to do this is encase the new piles within a slightly larger hollow pile and pump air into the gap. Alternatively, bubble curtains created by pipes placed on the Marina seabed where the pile enters the ground also effectively disrupt pressure waves. ▪ If an impact hammer is used to install the steel piles, a qualified biologist shall monitor pile driving to ensure that the air curtain is functioning properly and project-generated sound waves do not exceed the established threshold.	
		WATER RESOURCES	
Would the project interfere substantially with the recreational water uses in San Francisco Bay through increases in the number of accidents involving the interaction of ferries and recreational vessels within the Marina as ferries transit the main east/west channel?	PS	MM 3.2-4(a) Upon permit approval of new ferry service and prior to commencement of new service, the WTA shall ensure that the following actions to mitigate navigational safety concerns occur (Johnson 2005): ▪ The breakwater entrance shall be modified to increase vessel visibility during ingress and egress from the Marina by water. Current breakwater design does not allow for direct visual contact of vessel traffic except at the breakwater opening. ▪ Signage shall be placed on the breakwater and at key access points to instruct boaters of the potential traffic concerns and wake restrictions. Final wording and locations of signs have not been determined at the time of this EIR/EA. ▪ A boating safety and vessel traffic brochure shall be included in all new Marina tenant handouts. The brochures shall also be posted and distributed at the launch ramp. ▪ During the initial startup of ferry service and on a regular basis during the most active boating seasons, ~~Harbor Patrol~~ WTA staff shall enter into public outreach educational programs on the facilities. These outreach programs shall target the active boating public and, specifically, Oyster Point Marina Park (Marina) users. MM 3.2-4(b) The WTA shall ensure that before commencement of ferry operations, monitoring of wave conditions shall be performed to verify adequate design performance and navigation safety within the entrance to the	LTS

Table ES-1 Summary of Environmental Impacts and Mitigation Measures			
Threshold	*Level of Significance Prior to Mitigation* LTS—Less Than Significant PS—Potentially Significant	*Mitigation Measure(s) or Project Requirements*	*Level of Significance After Mitigation* LTS—Less Than Significant PS—Potentially Significant
		Marina.	
		NOISE AND VIBRATION	
Would the project expose terrestrial wildlife to 60 A-weighted dB ~~Community Noise Equivalent Level~~ equivalent energy noise level (L_{eq}) (or greater) ~~per the U.S. Fish and Wildlife Service~~?	LTS	No Mitigation is required	LTS
		PUBLIC SERVICES	
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection or emergency services?	PS	MM 3.15-2 The WTA shall create an Emergency Response Plan (e.g., USCG VMAP and Regional Maritime Contingency Plan) for emergencies on the water. Specifically, the WTA shall collaborate with the SSFFD, U.S. Coast Guard, Harbormaster, and the SFO Fire Marshal to create an emergency response plan for implementation in the event a water-based emergency were to occur during ~~construction and/or~~ project operations. The Emergency Response Plan shall include, but not be limited to, the identification of appropriate agencies and their associated responsibilities during a water-based emergency; standard operational procedures to detail how their assigned responsibilities will be performed to support implementation of the plan; circumstances under which emergency authorities would become effective; arrangements for the provision of direction and control during an emergency, and participation of the SSFFD in the U.S. Coast Guard VMAP annual training and exercise program. In addition, the Marine Exchange Program can notify tugboats to respond to emergencies. MM 3.15-3 WTA would participate in required joint fire drills including testing of landside facilities within the Marina.	LTS

9.2.2 PROJECT DESCRIPTION

Page 2-2, Section 2.3.1, the title of this subsection has been changed to state:

~~2.3.1 RELIEF OF TRAFFIC CONGESTION~~

2.3.1 INCREASED REGIONAL MOBILITY

Page 2-9 through 2-10, the first paragraph under Project Characteristics has been modified to state:

~~The occupants of the berths would be relocated to existing vacant berths within the Marina.~~ Consistent with the San Francisco Bay Plan policies, the San Francisco Bay Conservation and Development Commission (BCDC) established that the number of live-aboards in a marina should not exceed 10 percent of the total authorized boat berths, resulting in the 60 live-aboards currently located within the Marina. Removal of the 124 berths proposed with the project would exceed the 10 percent limit, and approximately 10 live aboards may be required to relocate outside Oyster Point Marina. In addition, 3 boats docked at the end of slips which will be altered due to the terminal construction will no longer have spaces in the marina due to the size of their vessel. However, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live-aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~However, all live aboard vessels will be relocated within the marina and placed in slips in accordance with all rules and regulations which require specific spacing and setbacks.~~ No leases will be broken with the relocation of the vessels as all leases are month-to-month and will be adjusted accordingly.

9.2.3 WATER RESOURCES

Page 3.2-2, the last paragraph has been changed to state:

~~San Francisco Bay ferry boat casualty[7] data for years 1996–2001 reflect that approximately 70 percent of ferry "casualties" were due to equipment failure, while the remainder were attributed to one collision, eight allisions, and two of each of the following: groundings, floodings, fires, and structural failures.~~

~~[7] "Casualty" is a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage.~~

According to U.S. Coast Guard marine casualty[7] reports for San Francisco Bay, for the years 2003 to 2005 there were a total of 603 reported casualties, which includes all reported equipment failure, personal injury and allision or collision. Of the 603 reported casualties over the three-year period, 25 involved ferries; this represents 4 percent of all reported casualties. Specific details about the nature of the reported casualties were not available at the time of the Draft EIR/EA preparation.

[7] "Casualty" is a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage.

Page 3.2-19, the last two sentences of the first paragraph, as well as the list of safety practices described under Impact 3.2-3 have incorporated the following changes to state:

~~Outside the Marina~~ At all times, the proposed vessel's travel would abide by general navigation safety rules and regulations set forth by the U.S. Coast Guard. ~~The U.S. Coast Guard~~ The WTA would also be responsible for implementing ~~the following safety practices to minimize navigation-related risk~~ best practices that meet or exceed U.S. Coast Guard requirements as listed below (NAV-1.1):

- Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as master-in-charge.
- When conditions make it difficult for the master-in-charge to effectively maintain situational awareness, assign another ~~person~~ crewmember to the bridge watch (i.e., another licensed master or a senior deckhand) to share the workload and serve as a safety double check.
- Install, operate, and maintain technology (e.g., portable pilot units, and/or automatic identification system tracking and display) to facilitate communication of intent and to audit conformance with navigational protocols.
- Install, operate, and maintain a backup radar and separate power supplies for radars.
- Train/certify all bridge watchstanders in radar operation.
- Periodically survey the water depth in the vicinity of a terminal to identify shoaling, and set and maintain private markers to identify shoal water.
- Conduct periodic electrical safety inspections and daily check of ground faults. Install a bridge alarm/indicator that alerts the licensed master of the location of electrical shorts.
- Install and maintain a fixed fire suppression system that has sufficient capacity to flood the engine room twice with CO_2 or equivalent fire suppression agent.
- Develop company policy and standard procedures for emergencies and adverse weather and normal operating conditions. Implement and enforce procedures through training and company communications. Audit conformance. Provide job aids for critical procedures.
- Will at all times comply with U.S. Coast Guard manning requirements.
- Maintain a safe lookout as required by US. Coast Guard navigation rules.

Page 3.2-20, the last paragraph of Impact 3.2-3 has been changed to state:

In addition, the ferry operator~~, under contract to the WTA,~~ would be required to comply and cooperate with U.S. Coast Guard regulations which would minimize potential effects of vessel navigation and safety effects ~~outside the Marina~~ at all times.

Page 3.2-20, the fist sentence of the the second paragraph of Impact 3.2-4 has been changed to state:

In terms of vertical clearance, the draft of the proposed vessel is not expected to exceed ~~5~~ 6 feet, while the required minimum water depth below the vessel keel based on existing criteria is approximately 2 feet (M&N 2005).

Page 3.2-21, the second paragraph. mitigation measures 3.2-4(a) and 3.2-4(b) have been changed to state:

MM 3.2-4(a) *Upon permit approval of new ferry service and prior to commencement of new service, the WTA shall ensure that the ~~SMCHD shall conduct the~~ following actions to mitigate navigational safety concerns occur (Johnson 2005):*

- *The breakwater entrance shall be modified to increase vessel visibility during ingress and egress from the Marina by water. Current breakwater design does not allow for direct visual contact of vessel traffic except at the breakwater opening.*
- *Signage shall be placed on the breakwater and at key access points to instruct boaters of the potential traffic concerns and wake restrictions. Final wording and locations of signs have not been determined at the time of this EIR/EA.*
- *A boating safety and vessel traffic brochure shall be included in all new Marina tenant handouts. The brochures shall also be posted and distributed at the launch ramp.*
- *During the initial startup of ferry service and on a regular basis during the most active boating seasons, ~~Harbor Patrol~~ WTA staff shall enter into public outreach educational programs on the facilities. These outreach programs shall target the active boating public and, specifically, Oyster Point Marina Park (Marina) users.*

MM 3.2-4(b) *The WTA shall ensure that before commencement of ferry operations, monitoring of wave conditions shall be performed to verify adequate design performance and navigation safety within the entrance to the Marina.*

9.2.4 Air Quality and Health Risk

Page 3.3-11, the first paragraph second bullet has been modified to state:

- **MMs:** A-2.1, A-4.1, A-5.1, A-5.2, A-6.1~~, A-6.2~~

9.2.5 Noise and Vibration

Page 3.4-8, the following changes have been made under the sub-heading Regulatory Setting:

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (FWS) ~~have determined significance criteria to be 60 dBA CNEL~~ have not established a significance criteria for impacts to terrestrial species resulting from increased noise levels; however, the FWS recognizes that noise levels exceeding 60 dBA L_{eq} at the line of habitat would potentially result in a significant impact[3].

[3] Email correspondence with Sheyna Wisdom, Senior Biologist URS Corporation, September 26, 2006.

Page 3.4-11, the following changes have been made under the sub-section Environmental Criteria:

- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project
- Expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, or for a project within the vicinity of a private air strip
- Expose ferry passengers and crew to noise levels greater than Occupational Safety and Health Administration standards
- Expose residents and noise-sensitive land use to "impacts" as defined by the Federal Transit Administration
- Expose terrestrial wildlife to 60 A-weighted dB ~~Community Noise Equivalent Level~~ equivalent energy noise level (L_{eq}) (or greater) ~~per the U.S. Fish and Wildlife Service~~
- Expose aquatic wildlife to underwater sound pressure levels at or above 160 dB, per the National Marine Fisheries Service

Page 3.4-17, the following changes have been made to Impact Statement 3.4-7, and the associated Threshold:

Threshold	Would the project expose terrestrial wildlife to 60 A-weighted dB Community Noise Equivalent Level equivalent energy noise level (L_{eq}) (or greater) per the U.S. Fish and Wildlife Service?

Impact 3.4-7 **Implementation of the project would not expose terrestrial wildlife to sound levels greater than 60 dBA ~~CNEL~~ L_{eq}.**

9.2.6 TRANSPORTATION AND CIRCULATION

Page 3.8-25, Table 3.8-9 has been changed to state:

Table 3.8-9 Service Levels of Intersections—Year 2025 Baseline and With Project

	2025 Baseline Without Project				2025 Baseline Plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
Intersections	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Oyster Point Blvd/Marina Blvd.	A	6.4	A	7.0	A	6.7	A	7.4
2. Oyster Point Blvd/Gull Road	C	27.4	C	31.9	C	28.8	C	32.2
3. Oyster Point Blvd/Gateway Blvd.	F	>80	F	>80	F	>80	F	>80
4. Dubuque Ave/US 101 Ramps	D	46.9	D	38.6	D	47.7	D	~~38.5~~42.0
5. Dubuque Ave/Oyster Point Blvd.	~~D~~E	~~45.1~~65.5	F	>80	~~D~~E	~~45.5~~64.0	F	>80
6. E Grand Ave/Executive Drive	C	22.0	B	10.3	C	22.0	B	10.3

SOURCE: Wilbur Smith Associates 2005

LOS = Level of Service

Delay indicates Average Vehicle Delay in seconds.

Bold indicates intersection LOS exceeds acceptable value

9.2.7 LAND USE, PLANS AND POLICIES

Page 3.9-14, the second paragraph has been modified to state:

The proposed project would result in the removal of approximately 124 berths within the existing Marina including seven live-aboard vessels. Consistent with the San Francisco Bay Plan policies, the San Francisco Bay Conservation and Development Commission (BCDC) established that the number of live-aboards in a marina should not exceed 10 percent of the total authorized boat berths. Removal of the 124 berths proposed with the project may require approximately 10 live aboards to relocate outside Oyster Point Marina. However, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~The seven live-aboard vessels would be relocated to other berths at Docks 2, 3, or 4 (for the 30-foot live-aboard vessels) or to docks 6 or 12 (for the 40-foot live-aboard vessels).~~ As shown in Figure 3.13-2 (Proposed Berths to be Removed), Docks 2, 3, 4, and 6 are on the opposite side of the mole away from where the proposed ferry terminal would be located.

Page 3.9-15, the first paragraph has been modified to state:

The proposed project would not physically divide an established community in the project site. As described earlier, the proposed project would result in the ~~relocation~~ removal of 124 berths within the existing marina including seven live-aboard vessels. ~~All of these live-aboard vessels would be relocated to other berths within the marina.~~ Removal of the 124 berths proposed with the project may require approximately 10 live aboards to relocate outside Oyster Point Marina. However, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. Residents residing in ~~such~~ live aboard vessels would not be physically divided by the project site and the proposed ferry terminal would be a marine-oriented use that is compatible with surrounding land uses and the live–aboard vessels.

Page 3.9-15, the last paragraph has been modified to state:

As discussed earlier, the proposed project would not physically divide an established community in the project site, would relocate existing tenants to other berths, ~~within the marina~~ would relocate the live aboards either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan, and none of the live-aboard vessels would be located directly adjacent to the proposed terminal and/or bus stops. Therefore, the proposed project would not create physical or psychological barriers for an existing community or affect neighborhood cohesiveness. As discussed further in Section 3.14 (Population, Housing, and Growth) and Section 3.8 (Transportation and Circulation), the proposed project would not change or alter existing population densities or impede

circulation access or access to services. The proposed project would not significantly alter or impact existing land use patterns.

Page 3.9-20, the second sentence of fifth paragraph has been modified to state:

Consistency Analysis: The proposed project does not contain any residential uses. Existing live-aboards would be relocated ~~within the existing project site~~ either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan (see Section 3.13 [Environmental Justice]). The creation of a multi-modal ferry transit facility in the Oyster Point area will complement existing commercial, industrial and recreational land uses near the project site. The proposed project is consistent with this Policy.

Page 3.9-29, the sixth paragraph has been modified to state:

As discussed in greater detail in Section 3.13 (Environmental Justice), implementation of the proposed project would result in the removal of 124 berths within the existing marina. For the seven live-aboard vessels currently docked at berths, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~all would be relocated to other berths within the marina. These berths would be moved to docks 2, 3, or 4 (for the 30-foot live-aboard vessels) or to docks 6 or 12 (for the 40-foot live-aboard vessels).~~ As shown in Figure 3.13-2 (Proposed Berths to be Removed), docks 2, 3, 4, and 6 are on the opposite side of the mole away from where the proposed ferry terminal would be located.

9.2.8 ENVIRONMENTAL JUSTICE

Page 3.13-7, the third paragraph has been modified to state:

Implementation of the project would result in the removal of approximately 124 berths within the existing Marina including seven live-aboard vessels. For the seven live-aboard vessels currently docked at berths, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~The seven live-aboard vessels would be relocated to other berths at Docks 2, 3, or 4 (for the 30-foot live-aboard vessels) or to Docks 6 or 12 (for the 40-foot live-aboard vessels).~~ As shown in Figure 3.13-2 (Proposed Berths to be Removed), Docks 2, 3, 4, and 6 are on the opposite side of the mole away from where the proposed ferry terminal would be located. Since the racial and ethnic population of the study area and the income status of the population in the study area are not considered environmental justice communities, there would be no disproportionate effects on an environmental justice community.

9.2.9 PUBLIC SERVICES AND UTILITIES

Page 3.15-3, first paragraph, line five has been changed to state:

Station #61, is located at ~~201 Baden Avenue~~480 North Canal Street, approximately ~~1.83~~ miles

Page 3.15-3, first paragraph, line seven has been changed to state:

… emergency response times from Stations #62 and #61 to the Project site are approximately 4 minutes and 6 minutes respectively.

Page 3.15-3, second paragraph has been changed to state:

For emergencies on the water, the SSFFD has jurisdiction over waters within the city limits, similar to other cities it relies on the U.S. Coast Guard to respond to emergency incidents on the San Francisco Bay. ~~outside the marina but relies in part on the US Coast Guard (USCG) or aid from the San Francisco International Airport Fire Marshal (SFOFM). However, the airport is required to dedicate its resources to airport needs only as required by the Federal Aviation Administration (FAA).~~ Response within the marina is assisted by the marina staff and Harbor Patrol Vessel. The USCG responds to emergency incidents in the San Francisco Bay and is stationed at Yerba Buena. The USCG response time to South San Francisco is approximately ~~15-~~ 30 minutes. ~~However, assistance from the USCG is for support only and is not supposed to be and leaves the responsibility of firefighting and dewatering to local authorities.~~ The U.S. Coast Guard San Francisco Bay Mutual Assistance Program (SF VMAP) uses ferry vessels as a mutual assistance response to a marine search and rescue operation involving a large number of victims or potential victims.

Page 3.15-7, paragraph 3, second sentence has been changed to state:

In the event that there is a situation that occurs outside the breakwater of the Marina and the existing fire suppression capabilities at the Marina are not sufficient, existing protocol typically calls for the deputy harbormaster to coordinate with other regional fire departments to obtain fire suppression support. The U.S. Coast Guard would respond to vessel requests for assistance, and the SF VMAP Response would be activated. Within approximately eight miles of the Marina, there are fire protection services available from the San Francisco Airport Fire Department, Oakland Fire Department, Alameda Fire Department, and Alameda Sheriff Department Marina Patrol Unit.

Page 3.15-7, the fourth paragraph has been changed to state:

MM 3.15-2 *The WTA shall create an Emergency Response Plan (e.g., USCG VMAP and Regional Maritime Contingency Plan) for emergencies on the water. Specifically, the WTA shall collaborate with the SSFFD, U.S. Coast Guard, Harbormaster, and the SFO Fire Marshal to create an emergency response plan for implementation in the event a water-based emergency were to occur during ~~construction and/or~~ project operations. The Emergency Response Plan shall include, but not be limited to, the identification of appropriate agencies and their associated responsibilities during a*

water-based emergency; standard operational procedures to detail how their assigned responsibilities will be performed to support implementation of the plan; circumstances under which emergency authorities would become effective; arrangements for the provision of direction and control during an emergency, and participation of the SSFFD in the U.S. Coast Guard VMAP annual training and exercise program. In addition, the Marine Exchange Program can notify tugboats to respond to emergencies.

Page 3.15-7, the fourth paragraph has been changed to state:

MM 3.15-3 WTA would participate in required joint fire drills including testing of landside facilities within the Marina.

CEQA Conclusion: After implementation of mitigation measures MM 3.15-2 and MM 3.15-3, the potential impact to emergency services would be reduced to a less-than-significant level because an adequate Emergency Response Plan would ensure that effective coordination between responsible agencies would occur in the event of a water-based emergency.

9.2.10 OTHER CEQA AND NEPA CONSIDERATIONS

Page 4-17, the fifth paragraph has been modified to state:

Cumulative Impact on Community Displacement. As indicated in Section 3.9 Land Use and Planning, the proposed project would not cause displacement of existing businesses within the project site or area, or create land uses that are in conflict with existing businesses; or impede circulation access to existing businesses or reduce the parking capacity that serve these businesses. The project would result in the removal of approximately 124 berths within the existing Marina including seven live-aboard vessels. For the seven live-aboard vessels currently docked at berths, the Harbor District and BCDC would collaborate with the vessel owners that would be affected by terminal construction, and the live aboards would be relocated either within the Oyster Point Marina, or elsewhere in the Bay in accordance with all rules and regulations and consistent with the San Francisco Bay Plan. ~~The seven live-aboard vessels would be relocated to berths in the West Basin away from the proposed ferry terminal.~~ With mitigation identified in other sections (i.e., Noise and Vibration, Air Quality), no project community displacement impacts would occur.

9.2.11 ALTERNATIVES ANALYSIS

Page 5-4 through 5-5, Reduced Project Alternative, has incorporated the following changes to state:

In the Reduced Project Alternative, a scaled down version of the South San Francisco Ferry Terminal project is considered. The purpose of looking into this option is to analyze whether a smaller version of the project would reduce the project impacts. The Reduced Project Alternative would involve decreasing the number of daily ferry crossings and therein, daily ferry passengers. There are no other versions of a scaled down project that would be feasible, as the ferry terminal is sized to accommodate a standard,

149-passenger ferry boat. Any change in size of the terminal would therefore immediately render the project infeasible.

As outlined in Chapter 4 (Other CEQA and NEPA Considerations) Section 4.2 (Adverse Environmental Effects that Cannot be Avoided if the Project is Implemented), the development of the project would not result in ~~the following~~ any significant and unavoidable project-related impacts. Further, this Alternative would not meet any of the project's objectives.

- ~~Year 2025 Baseline (without project) traffic at the intersection of Dubuque Avenue/Oyster Point Boulevard would operate at unacceptable LOS F conditions during the weekday PM peak hour. Growth in cumulative traffic by year 2025, including the addition of project-generated traffic, would result in a potentially adverse and unavoidable impact to this intersection to which the project would contribute.~~

~~Future baseline conditions for the Dubuque Avenue/Oyster Point Boulevard intersection, show that this intersection would operate at unacceptable LOS F conditions during weekday peak hours without the project. While the Reduced Project Alternative could result in a marginal reduction of the project's significant environmental effect at this intersection, the impact would remain significant and unavoidable. This Alternative would not meet any of the project's objectives.~~

As described in the Project Description (Chapter 2), one of the most significant issues facing the Bay Area is severe traffic congestion and its related impacts. The purpose of the South San Francisco Ferry Terminal Project is to address this issue by increasing Bay Area mobility and transportation options through new and expanded water transit services and a related ground transportation terminal in the Bay Area. The expanded ferry service is meant to aid in reducing the region's gridlock, by decreasing the number of single occupancy commuters and providing alternative transportation options to Bay Area commuters. The Reduced Project Alterative would not suitably meet these objectives as it would not function at a reasonable capacity.

Additionally, the severity of congestion in ~~the Dubuque Avenue/Oyster Point Boulevard intersections and in~~ the entire Bay Area System is projected to worsen as Bay Area population and employment numbers increase. The Project Description (Chapter 2) details the Metropolitan Transportation Commission's (MTC) 2002 San Francisco Bay Crossing Study, which shows an increase of 1.2 million Bay area jobs in the next 25 years, and a 1.4 million increase in population. While the proposed project is meant to help the region meet the growing demands on transportation infrastructure related to this projected growth, the restricted capacity of the Reduced Project Alternative would not aptly accommodate this projected growth in population and employment in the Bay Area.

~~As is shown below, alternative sites were considered for the proposed project. Many of these sites are located south of the proposed Oyster Point Marina, and would therefore potentially move the traffic flow south and away from these two highly-impacted intersections. However, as with the Reduced Project Alternative, even if the project was moved to a more southern site, the Dubuque Avenue/Oyster Point Boulevard intersection would remain overly congested without project traffic. Additionally, because the other sites do not use an existing marina as the proposed Oyster Point Marina site does, the added effects on~~

~~traffic through increased construction and dredging that would be necessary at the other sites would likely increase traffic at the alternative locations.~~

The Reduced Project Alternative would therefore not meet the project objectives. It would not improve mobility and increase transit ridership to acceptable levels. It would not aptly relieve existing and projected traffic congestion, nor would it meet the needs of transit-dependent residents at the rate of the proposed project. Additionally, no substantial environmental benefit would be gained by this alternative. As this project is similar to the proposed project, but determined not to be feasible, a full analysis of the impacts was not provided: for a review of the impacts that could occur under this alternative, refer to the environmental analysis of the proposed project in Sections 3.1 through 3.15. This alternative has been rejected from further consideration.

The WTA evaluated several potential sites for the proposed ferry terminal. Nine separate sites were considered, including 4 on Genentech property. Genentech is one of the largest employers in South San Francisco with about 5,500 employees, and providing service adjacent to the largest employer appeared a desirable goal. Potential terminal sites were selected based on their ability to fulfill the basic objectives of the project and meet established guidelines for terminal location. A site was deemed suitable and was evaluated if it met size, topography, and environmental criterion. Many of these sites are located south of the proposed Oyster Point Marina, and would therefore potentially move the traffic flow south and away from the project site. However, as with the Reduced Project Alternative, even if the project was moved to a more southern site, intersections would remain overly congested without project traffic. Additionally, because the other sites do not use an existing marina as the proposed Oyster Point Marina site does, the added effects on traffic through increased construction and dredging that would be necessary at the other sites would likely increase traffic at the alternative locations. Alternative sites identified for the proposed terminal are shown in Figure 5-1 and are described below.

9.2.12 SECTION 3.1 BIOLOGICAL RESOURCES

As a result of consultation with other agencies, including the NMFS, Section 3.1 (Biological Resources), of the DEIR/EA has been substantially modified. As such, Section 3.1 (Biological Resources) has been reproduced in its entirety as follows (the figure associated with this section has not changed and has not been included in this Final EIR):

3.1 BIOLOGICAL RESOURCES

This section describes existing biological resources at the project site and describes whether implementation of the project would have a substantial impact on these resources. The analysis within this section relies on the analysis within the Natural Environment Study (NES) prepared by EIP for this project in 2005 (included as Appendix B1 to this document).

The 2003 WTA PEIR for the expansion of ferry service in the Bay Area evaluated environmental impacts related to biological resources (URS 2003). Many natural resource topics were discussed in adequate detail within the 2003 WTA PEIR and not discussed further within this section.

For the purposes of the discussion within this section, the project area is defined by the actual project footprint or areas in which construction or construction related activities would occur. The conceptual site design had resulted in an in-water project area that encompasses all of docks 9, 10, and the last one or two slips at the end of all the other docks in the east basin. The shoreward component of the project includes existing parking areas, streets, and landscaped areas near the center of the Oyster Point Marina Park (Marina) (Figure 2-3, Chapter 2 [Project Description]). Project vicinity is defined as the project area immediate surroundings, approximately 0.5 mile in any direction from the boundary of the project area. The project area is fully developed and includes surface parking lots and landscaped areas of Oyster Point Marina Park (Marina), the existing mole, and the west and east basins of the harbor.

Taxonomy and nomenclature generally follows American Ornithologist's Union (AOU 2003) for birds, Laudenslayer et al. (1991) for all other terrestrial vertebrates, Nelson et al. (2004) for fish, and Jepson (Hickman 1993) for plants.

One comment letter related to biological resources was received in response to the December 17, 2004, Notice of Preparation (NOP) circulated for the project. This letter was received from NOAA Fisheries; it was related to shoreline erosion at the project site. The NOP and a summary of issues raised during the Public Scoping process are included in Appendix A of this EIR/EA.

3.1.1 ENVIRONMENTAL SETTING

Terrestrial Habitats

Habitat types within the project area were delineated on a 1995 aerial photograph of the project area. Seven different habitat types were mapped within the project area accounting for approximately 33.1 hectares (82 acres) (Figure 3.1-1). These include the waters of San Francisco Bay, developed (roads, surface parking lots, and structures), non-native grasslands, turf grass/landscaping, intertidal zone (coastal wetlands), bare dirt, and sandy beach. Table 3.1-1 lists the seven habitat types and their existing area.

Most off the project area is developed and is primarily comprised of landscaped vegetation. Wetland vegetation is present along the shore and is discussed in the following section on aquatic habitats. The

landscape vegetation consists of grasses, shrubs, and trees. Much of the project site is planted with Bermuda grass (*Cynodon dactylon*). Bermuda grass is a popular lawn grass that spreads rapidly and can grow in almost any soil that is not too wet or shady. The landscape vegetation could provide shelter, foraging opportunity and nesting sites for small birds (passerines), and rodents, such as rats, mice, voles, ground squirrels, and gophers.

Table 3.1-1 Habitat Types Occurring within the Project Area

Habitat Type	Existing hectare (acres)	Impacted hectares (acres)
San Francisco Bay	13.66 (33.75)	0.15 (0.38)
Developed	11.2 (27.67)	0.89 (2.19)
Non-native Grassland	4.31 (10.66)	0
Turf Grass/Landscape	1.83 (4.51)	0
Intertidal Zone (Coastal Wetlands)	1.66 (4.11)	0.05 (0.12)
Bare Dirt	0.44 (1.08)	0.02 (0.03)
Sandy Beach	0.04 (0.1)	0
Total	*33.14 (81.89)*	*1.10 (2.72)*

Aquatic Habitats

Wetlands are a transitional landscape occurring within a continuum that begins in aquatic habitats and ends in dry upland habitats. Because of their intermediate location, wetlands contain characteristics of both aquatic and terrestrial environments. Bacteria, protozoa, algae, vascular plants, invertebrates, amphibians, fish, birds, and mammals can all be found within wetlands.

The wetland habitat in the project area is limited to the shoreline. The shoreline within the Marina supports some vegetation common to coastal wetlands. Specifically, brass buttons (*Cotula coronopifolia*), marsh gumplant (*Grindelia stricta*), pickleweed (*Salicornia virginica*), and Italian ryegrass (*Lolium perenne*) grow within the project area, adjacent to Bay waters.

The true aquatic habitat within the project area is the open water of San Francisco Bay within the Marina. The Marina is maintained to depths of -2.44 m (-8 ft) in the East Basin and -1.83 m (-6 ft) in the West Basin. The average tidal fluctuation is about 1.6 m (5.3 ft). A detailed biological investigation of the sub-tidal areas was not conducted. However, the Marina is dredged on a routine basis to maintain operational depth (Sullivan 2005); this last occurred in 1999 (Johnson 2006). Routine dredging prevents benthic vegetation, like eelgrass, from becoming established. Therefore, the Marina sea floor is likely comprised of Bay mud that has been colonized by small sessile invertebrates. Routine fish movement is likely to occur from the Bay into and out of the Marina.

Native oysters (*Ostreola conchaphila*) were historically abundant in San Francisco Bay. Oyster beds are a cornerstone in the benthic habitat, improving water quality, and habitat complexity that favors fish and

Figure 3.1-1 Vegetation Communities

Pg 1—8.5x11 color

Pg 2—8.5x11 color

vegetation. They also provide a important link between pelagic and benthic food webs. Native oyster populations were severely depressed by overharvest and the introduction of non-native oysters for the rapidly growing food market in the 19th Century which also brought the non-native oyster drill, an oyster-predator not previously present. These factors, combined with declines in water quality, reduced the native oyster population in San Francisco Bay to a point that it was unclear if a population even remained.

Recently, small populations of native oysters have been documented within the Bay including a population within the Marina (Harris 2004; Latta 2006; Johnson 2006). They have been reported colonizing the swim buoy lines near the western beach, on dock supports in the east basin, and other hard surfaces (Johnson 2006). They have also been reported adjacent to the Marina on the rocky shoreline of Oyster Point (Zabin 2006). Detailed surveys for native oysters were not conducted as part of this project. They are assumed to be present on suitable substrate throughout the Marina. Suitable substrate is believed to be solid surfaces to which the larvae can easily attach (Harris 2004).

Sensitive Species and Habitats

Information on sensitive species and habitats occurring in the vicinity of the project was obtained from the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) (information dated January 5, 2005) for the U.S. Geological Survey's 7.5-minute San Francisco South, San Francisco North, Hunters Point, Montara Mountain, San Mateo, Oakland West, Oakland East, San Leandro, and Redwood Point quadrangles, and USFWS generated species lists for the above quadrangles (USFWS 2005). These sources have been compiled into a single list of special-status species and their potential to occur in the project area (Appendix B2). A combined total of 192 species are reported by the USFWS and CNDDB as potentially occurring within the above mentioned quadrangles. To determine the potential for a species to occur in the project area, any of the following criteria were applied:

- Habitat for the species has been identified within the project area
- The project has potential to effect the species
- The species is well known to the public and resource agencies, thereby garnering attention and concern

Application of this criteria to the list of sensitive species reveals that habitat in the project vicinity is not suitable for many of these species. Species that warrant further detailed discussion are limited to nine animal species.

Sensitive Species

Pacific Herring (*Clupea pallasi*)

San Francisco Bay supports a small yet productive commercial Pacific herring fishery. Pacific herring are not protected by either the state of California or the federal government. Because herring are harvested for their roe, they are an important species in the economy of the San Francisco Bay Area and their populations are closely monitored by CDFG. The Pacific herring is an important species in the ecology of San Francisco Bay

as well, because herring, along with sardines and anchovies, are a primary food source for salmon and other sport fish. Pacific herring generally enter the Bay from November 1 to March 30 of each year and spawn in intertidal and subtidal habitats (Barnhart 1988). The actual sites where Pacific herring spawn in San Francisco Bay changes from year to year and spawning may occur at numerous locations around the Bay. The North Bay is typically the preferred area although limited spawning has historically been observed at San Mateo Point (Miller and Schmidtke 1956). National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries)[1] does not map herring spawning habitat south of Hunters Point (NOAA 2005). Herring prefer to spawn over algae and eelgrass first, rocky substrates second, and flat surfaces such as marina pilings, retaining walls, and bulkheads occurring along the San Francisco Bay waterfront last (Barnhart 1988).

Alameda Song Sparrow (*Melospiza melodia pusillula*)

The Alameda song sparrow is a federal and CDFG Species of Special Concern. The Alameda song sparrow occurs only in the marshlands of the San Francisco Bay Region (Jurek 1974). The primary range of the Alameda song sparrow extends from Coyote Creek, at the southern extremity of the Bay, northward along the west shore of South San Francisco Bay to Belmont Slough and along the east shore to San Lorenzo. Song sparrows nest in dense riparian thickets, emergent wetlands (including salt marshes), and dense thickets of other vegetation (Madrone Audubon Society 1995). The Alameda song sparrow uses tidal salt marsh habitats along the edge of the Bay and streams where tidal flow affects the vegetation. The EIP field survey did not result in the direct observation or evidence of the Alameda song sparrow in the project area. The CNDDB does not report occurrences of this bird in the project area. The project area contains marginal habitat for this species in several small areas of salt grass.

Central California Coast Steelhead (*Oncorhynchus mykiss*)

The central California coast population of steelhead is a federally threatened species (62 FR 43937). Critical habitat has been proposed for this species and the project site is within proposed Habitat Unit 6 (69 FR 74572). The primary constituent elements of critical habitat for this species are freshwater spawning, rearing, and migration areas; estuarine areas free of obstructions and of sufficient quality to support adult and juvenile rearing; and nearshore and offshore marine areas. The Oyster Point Marina Park (Marina) is closest to the estuarine classification, but the Marina does not contain any natural cover, large woody debris, side channels, and other features that would make it productive rearing habitat for steelhead. Therefore, the site does not support any of the primary constituent elements to be considered critical habitat.

Adult steelhead spend two to three years in the open ocean before returning to their natal streams to spawn. Juveniles spend one to two years in freshwater before migrating to the ocean. The closest known population of this species to the project area is in San Francisquito Creek. Although quite some distance south of the project area, it is possible that the adults and juveniles could move through the Bay adjacent to the project site on their way to and from San Francisquito Creek.

[1] NOAA Fisheries was formerly known as the National Marine Fisheries Service (NMFS).

Green Sturgeon (*Acipenser medirostris*)

Green sturgeon are found from the Bearing Sea south to northern Mexico with the Sacramento River supporting the southern-most spawning population (Moyle 2002). Population estimates put the population of green sturgeon at less than 2,000 adults in the early 1990s (Moyle 2002). Green sturgeon were proposed for listing under the FESA in April 2005 (70 FR 17386). This proposed rule was made final in April, 2006 (71 FR 17757). Adult sturgeon move into the Sacramento River presumably between February and May (USFWS 1995) and have been observed in the mainstem Sacramento River near Red Bluff (Moyle et al 1995). Spawning takes place in March-July with peaks in April-June (70 FR 17386). Juveniles spend 1-4 years in freshwater and estuarine habitats before moving to the ocean in the summer and fall (Moyle 2002). The project site does not provide spawning or migratory habitat for green sturgeon. However, young sturgeon may rear in San Francisco Bay for sometime after leaving the estuary. The Marina could provide marginal foraging habitat for this species.

Black Skimmer (*Rynchops niger*)

The black skimmer is a federal and CDFG Species of Special Concern when it is nesting (Appendix B2). The black skimmer requires shallow, calm water for foraging. Nesting usually occurs in colonies of skimmers on protected sand bars, beaches, or low islands. The EIP field survey did not result in the direct observation or evidence of a black skimmer in the project area. The CNDDB does not report occurrences of black skimmer within the project vicinity. The only nesting records in the CNDDB for the San Francisco Bay are from East Bay Regional Parks District lands south of San Leandro in the East Bay (CNDDB 2005). The breakwaters surrounding the Marina could provide perching habitat. Also, at times the Bay is calm enough to allow foraging. However, the site does not provide suitable nesting habitat. While the project area has some suitable foraging and perching habitat for this species, no suitable nesting sites exist within the project area.

Black Turnstone (*Arenaria melanocephala*)

The black turnstone is a federal Species of Special Concern (Appendix B2). Black turnstone is strictly a coastal species, migrating and wintering along the rocky shorelines of the Pacific Coast and breeding in western Alaska. The black turnstone prefers rocky coasts and beaches. The EIP field survey did not result in the direct observation or evidence of suitable habitat for a black turnstone in the project area. The CNDDB does not report occurrences of black turnstones within the project vicinity. Since the project area is highly developed and does not have rocky coasts, suitable foraging habitat is not present and this species is not expected within the project area.

California Brown Pelican (*Pelecanus occidentalis californicus*)

The California brown pelican is a federal and state endangered species. It is fully protected by CDFG. The brown pelican is found in estuarine, marine subtidal, and marine pelagic waters along the California coast. The pelicans nest from the Channel Islands of Southern California southward along the Baja California coast and in the Gulf of California to coastal southern Mexico (CDFG 2004). The pelican builds nests of sticks on the ground, typically on islands or offshore rocks. The EIP field survey did not result in the direct

observation or evidence of California brown pelicans in the project area. The CNDDB does not report occurrences of California brown pelicans in the project vicinity. Foraging habitat for the California brown pelican is present in the project area.

California Clapper Rail (*Rallus longirostris obsoletus*)

The California clapper rail is an inhabitant of tidal salt marshes of the greater San Francisco Bay, although some individuals use brackish marshes during the spring breeding season. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, clapper rails typically inhabit salt marshes dominated by pickleweed and Pacific cordgrass (*Spartina foliosa*) (USFWS 2005). The California clapper rail was listed as endangered by the USFWS in 1970 and by the CDFG in 1971. The nearest known clapper rail populations are located at Belmont Slough, approximately 12 miles south of the project site, and along Colma Creek between Utah Avenue and Navigable Slough approximately 1.5 miles away (EIP 2002). The shoreline within the Oyster Point Marina Park (Marina) is mostly lacking in vegetation. There are a few areas of the shoreline that support relatively small stands of salt grasses. These areas tend to be isolated from each other with extensive open unvegetated areas between them. This fragmentation of vegetated shoreline creates patches of salt grass that are too small and too far apart to support clapper rails. No clapper rails were observed within the project area. Clapper rails were heard calling from near Colma Creek south of the project area indicating that birds were active during the survey period. The project area does not contain suitable habitat for this species.

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The western snowy plover is a federally threatened species and a CDFG species of concern. Also, the USFWS has designated critical habitats for this species; however, the project area is not within designated critical habitat (69 FR 75607). The western snowy plover nests on sandy beaches of the ocean, bays, salt ponds, and larger lakes. The EIP field survey did not result in observation or evidence of this species. The CNDDB does not report occurrences of western snowy plover in the project vicinity. The project area contains marginal quality nesting habitat along the shoreline of the mole and on the sandy beach at the western end of the Marina. However, it is unlikely that the western snowy plover would nest in these areas due to the high level of human disturbance and activity (i.e., boats docking, recreational use of the beach by people and dogs, etc.).

Salt Marsh Vagrant Shrew (*Sorex vagrans halicoetes*) and Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)

The salt marsh vagrant shrew is a federal and CDFG Species of Special Concern (Appendix B2). This species is found in dense, low cover, primarily pickleweed, above high tide line of tidal marshes of the South San Francisco Bay. The EIP field survey did not result in the direct observation or evidence of this species. The CNDDB does not report occurrences of this species in the project vicinity. The project area does contain low quality habitat for this species in the salt grass patches.

The salt marsh harvest mouse is a federal and state endangered species and is fully protected by CDFG. This species is found only in emergent salt marsh habitats of San Francisco Bay where pickleweed is the primary vegetation. The EIP field survey did not result in the observation of habitat suitable for this species within the project area. There are a few stands of salt grass, but pickleweed is almost entirely absent from the project area. The pickleweed plants that are present are separate individuals and do not form any marsh habitat. The EIP field survey did not result in the direct observation or evidence of this species. The CNDDB does not report occurrence of this species in the project vicinity. The project site does not contain suitable habitat for this species because there is essentially no dense pickleweed present.

Critical Habitat

Information provided by USFWS indicates that critical habitat has been designated for several species (Appendix B). All the listings of critical habitat were reviewed and the project area does not contain lands designated as critical habitat for any threatened or endangered terrestrial species. The aquatic species with designated critical habitat in the Bay Area are Chinook (*Oncorhynchus tshawytscha*) and the previously discussed steelhead critical habitat. Designated critical habitat for Central Valley Chinook populations extends south only to the Bay Bridge, well north of the project.

3.1.2 REGULATORY FRAMEWORK

■ Federal Regulations

Section 404 of the Clean Water Act

Section 404 of the *Clean Water Act* requires that a permit be obtained from the U.S. Army Corps of Engineers (USACE) prior to the discharge of dredged or fill materials into any "waters of the United States or wetlands." Waters of the United States are broadly defined in the USACE's regulations (33 CFR 328) to include navigable waterways, their tributaries, lakes, ponds, and wetlands. Wetlands are defined as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that normally do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (Federal Register 1982). Wetlands that are not specifically exempt from Section 404 regulations (such as drainage channels excavated on dry land) are considered to be "jurisdictional wetlands." The USACE is required to consult with the U.S. Fish and Wildlife Service, Environmental Protection Agency, State Regional Water Quality Control Board, and California Department of Fish and Game (among other agencies) in carrying out its discretionary authority under Section 404.

The USACE grants two types of permits, individual and nationwide. Project-specific individual permits are required for certain activities that may have a potential for more than a minimal impact and necessitate a detailed application. The most common type of permit is a nationwide permit. Nationwide permits authorize activities on a nationwide basis unless specifically limited, and are designed to regulate with little delay or paperwork certain activities having minimal impacts. Nationwide permits typically take two to

three months to obtain whereas individual permits can take a year or more. To qualify for a nationwide permit, strict conditions must be met. If conditions are met, permittees may proceed with certain activities without notifying the USACE. Some nationwide permits require a 30-day pre-construction notification period before activities can begin. Fill of certain isolated waters or wetlands that affect less than 0.5 acre of impact per project may be permitted with a pre-construction notification. If impacts affect less than 0.1 acre, no notification is required in certain cases. A permit from the USACE will be required for installation of pilings to anchor the ferry dock within the Marina.

Migratory Bird Treaty Act of 1918

The *Migratory Bird Treaty Act* (MBTA) makes it unlawful to "take" (kill, harm, harass, etc) any migratory bird listed in 50 CFR 10, including their nests, eggs, or products. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, and many others. There are over 800 species listed in the MBTA including common species observed within the project area such as the American robin (*Turdus migratorius*), Brewer's blackbird (*Euphagus cyanocephalus*), northern mockingbird (*Mimus polyglottos*), and surf scoter (*Melanitta perspicillata*).

Federal Endangered Species Act of 1973

Section 3 of the *Federal Endangered Species Act* (FESA) defines an endangered species as any species or subspecies of fish, wildlife, or plants "in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as any species or subspecies "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Designated endangered and threatened species, as listed through publication of a final rule in the Federal Register, are fully protected from a "take" without an incidental take permit administered by the U. S. Fish and Wildlife Service (USFWS) under Section 10 of the FESA. Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (50 CFR 17.3). The term "harm" in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR 17.3). The term "harass" in the definition of "take" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). Proposed endangered or threatened species are those for which a proposed regulation, but not a final rule, has been published in the Federal Register.

Section 7 of the FESA requires that federal agencies ensure that their actions are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat. This obligation requires federal agencies to consult with the USFWS on any actions (issuing permits including Section 404 permits, issuing licenses, providing federal funding) that may affect listed species to ensure that reasonable and prudent measures will be undertaken to mitigate impacts on listed species. Consultation with USFWS can be either formal or informal depending on the likelihood of the action to affect listed species or critical

habitat. Once a formal consultation is initiated, USFWS will issue a Biological Opinion (either a "jeopardy" or a "no jeopardy" opinion) indicating whether the proposed agency action will or will not jeopardize the continued existence of a listed species or result in the destruction or modification of its critical habitat. A permit cannot be issued for a project with a "jeopardy" opinion unless the project is redesigned to lessen impacts.

In the absence of any federal involvement, as in a privately-funded project on private land with no federal permit, only Section 10(a) of the FESA can empower the USFWS to authorize incidental take of a listed species provided a habitat conservation plan (HCP) is developed. To qualify for a formal Section 10(a) permit, strict conditions must be met including a lengthy procedure involving discussions with USFWS and local agencies, preparation of a HCP, and a detailed Section 10(a) permit application.

The Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan (FMP). Section 305(b)(2) of the Magnuson-Stevens Act requires Federal action agencies to consult with NOAA's National Marine Fisheries Service (NOAA Fisheries) on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)). The Oyster Point Marina is within an area that is managed with the Pacific Groundfish FMP (starry flounder, leopard shark), the Coastal Pelagics FMP (northern anchovy), and the Pacific Coast Salmon FMP (Chinook). Additionally a population of native oysters exists within the Marina. Native oysters are included as EFH because they increase the quality of EFH for groundfish, pelagic, and salmon species.

State Regulations

California Endangered Species Act

The *California Endangered Species Act* (CESA) declares that deserving plant or animal species will be given protection by the state because they are of ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of the state. CESA established that it is state policy to conserve, protect, restore, and enhance endangered species and their habitats. Under State law, plant and animal species may be formally designated rare, threatened, or endangered by official listing by the California Fish and Game Commission. Listed species are generally given greater attention during the land use planning process by local governments, public agencies, and landowners than are species that have not been listed.

CESA authorizes that "Private entities may take plant or wildlife species listed as endangered or threatened under the federal ESA and CESA, pursuant to a federal incidental take permit issued in accordance with Section 10 of the federal ESA, if the California Department of Fish and Game (CDFG) certifies that the

incidental take statement or incidental take permit is consistent with CESA (Fish & Game Code § 2080.1(a)).

California Environmental Quality Act—Treatment of Listed Plant and Animal Species

Both the federal and state *Endangered Species Acts* protect only those species formally listed as threatened or endangered (or rare in the case of the state list). Section 15380 of CEQA Guidelines, however, independently defines "endangered" species of plants, fish or wildlife as those whose survival and reproduction in the wild are in immediate jeopardy and "rare" species as those who are in such low numbers that they could become endangered if their environment worsens. Therefore, a project will normally have a significant affect on the environment if it will substantially affect a rare or endangered species or the habitat of the species. The significance of impacts to a species under CEQA must be based on analyzing actual rarity and threat of extinction despite legal status or lack thereof.

State of California—Sections 3503, 3503.5, 3800 of the Fish and Game Code

These sections of the Fish and Game Code prohibit the "take, possession, or destruction of birds, their nests or eggs." Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a "take."

Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* charges the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB) statewide with protecting water quality throughout California. Typically, the SWRCB and RWQCB act in concert with the USACE under Section 401 of the *Clean Water Act* in relation to permitting fill of federally jurisdictional waters. The U.S. Supreme Court recently acted to limit the regulatory jurisdiction of the USACE under Section 404 of the *Clean Water Act* (USSC 2001). This action did not limit the state's regulatory jurisdiction over Waters of the State (Guzy and Porter 2001). Waters of the state are defined in Section 13050(e) of the *Porter-Cologne Water Quality Control Act* as "…any surface water or groundwater, including saline waters, within the boundaries of the state." Currently, an applicant would delineate the wetlands on their property utilizing methodology presented in the 1987 U.S. Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the delineation would be verified by the USACE. In cases where an area meets the criteria to be considered a wetland, but the USACE does not have jurisdiction, the applicant is referred to the appropriate RWQCB. For the project area, the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) could exercise its jurisdiction over wetlands where a project does not require a federal permit, but involves removal or placement of material into Waters of the State. The USACE has indicated that the waters and wetlands potentially impacted by the project are subject to their jurisdiction. A Section 401 clean water certification or waiver will be required as part of the permitting process for this project.

The McAteer-Petris Act (California Government Code 66600–66682)

The *McAteer-Petris Act* created the San Francisco Bay Conservation and Development Commission (BCDC) in 1965. BCDC's mission was the preservation of San Francisco Bay from indiscriminate filling. BCDC's first task was compilation of a comprehensive study of the Bay and determining how future development of the Bay should occur. This effort resulted in the San Francisco Bay Plan in 1968. In 1969 the findings and policies of the Bay Plan were incorporated into the *McAteer-Petris Act* which was amended making BCDC a permanent state agency. The Bay Plan continues to evolve and remains the guiding document for BCDC's actions. Section 66610 of the *McAteer-Petris Act* establishes the boundaries of San Francisco Bay in relation to BCDC's jurisdiction. Essentially, all areas below the mean high tide line and an area within a shoreline band that extends landward for 100 feet from the mean high tide line are subject to their jurisdiction. Section 66632 of the *McAteer-Petris Act* establishes the permitting process for projects which would place fill in, on, or over any part of BCDC's jurisdiction as defined in Section 66610. Most of the project would be in the water or within the shoreline band and therefore be subject to BCDC's jurisdiction.

3.1.3 Impacts and Mitigation Measures

Methodology

Project Construction. The site design (Figure 2-3, Chapter 2, Project Description) was assumed to be the project that would actually be constructed. Because this design is only conceptual, it was necessary to make some assumptions about how the facility would be built. For the in-water areas, it was assumed that all existing pilings would be removed within the area designated for the ferry dock. The new dock would be anchored by somewhere between 20 and 60 pilings between 45.7 and 91.4 cm (18 and 36 in) in diameter and about 15.8 m (52 ft) long. The volume of required dredging was calculated within the geographic information system (GIS) based on existing bathymetric data for the east basin and a design depth of 3.0 m (10.0 ft) below mean lower low water for the dock and 3.7 m (12 ft) for the navigational channel.

Habitats. The conceptual site design was used within the GIS to calculate acreages of the different habitats potentially impacted by the project (Table 3.1-1). It was assumed that the terrestrial work would require removal or alteration of all existing habitats within the designated area. The in-water work was assumed to be limited to the actual footprint of the floating dock and the area to be dredged for navigational purposes. Site visits by EIP biologists, in combination with existing habitat information, was used to evaluate the potential for specific species to occur within the project area.

Project Operation. Coast and Harbor Engineering conducted wake wash, wave run-up, and jet-plume scour analysis for the project area and the ferry routes (CHE 2005). This information was used in conjunction with sensitive receptors identified by EIP biologists to determine if operation of the project could result in erosion or sedimentation of wetlands or exacerbated wake wash of sensitive species or habitats.

Impacts and Mitigation Measures Incorporated from 2003 WTA PEIR

The 2003 WTA PEIR included many impacts and mitigation measures that are either addressed in this document or are not applicable to this project. A table of impacts and mitigation measures from the PEIR is included as Appendix H of this document and includes a column showing how the PEIR impacts and MMs are applied to this project (i.e. *IR*—Incorporated by Reference, *AD*—Addressed in EIR/EA, and *NA*—Not Applicable). For biological resources, the following impacts and mitigation measures from the PEIR would apply to the project and are assumed to be incorporated in this project by reference.

- **Impacts:** B-4-8, B-10-12,B-14, B-15, B-17-20
- **MMs:** B-7.1, B-8.1-2, B-10.1, B-11.1, B-14.1, B-15.1-2, B-17.1, B-18.1, B-19.1, B-20.1

Environmental Criteria

Based on environmental criteria developed by the WTA, and in accordance with the requirements of CEQA and NEPA and all applicable state and federal environmental laws, the project would have an adverse effect on the environment if it would result in any of the following:

- Result in the re-suspension of bottom material causing turbidity during vessel maneuvering
- Substantially affect threatened, endangered, or protected species in a manner that results in a take under the *Endangered Species Act*
- Alter or diminish designated critical habitat or special aquatic sites, including eelgrass beds, mudflats, and wetlands
- Result in the reduction of protected wetland habitat as defined in Section 404 of the *Clean Water Act* and/or in Section 6610 of the BCDC *McAteer-Petris Act* or result in alteration of desirable functions and values through direct removal, filling, hydrological interruption, or other means
- Cause the introduction or substantial spread of invasive nonnative plants or wildlife
- Interfere substantially with the movement of resident or migratory fish or wildlife species
- Cause substantial or sustained impact to spawning habitat of commercially important species (e.g., Pacific herring)
- Cause underwater sound pressure levels during construction or operation that exceed NOAA Fisheries guidelines for protection of marine mammals (160 decibels referenced to 1 micropascal)

Impacts and Mitigation

Threshold	Result in the re-suspension of bottom material causing turbidity during vessel maneuvering.

Impact 3.1-1 **Operation of the ferry service to and from Oyster Point Marina Park (Marina) could result in increased wave action that could re-suspend Bay mud that would later deposit in sensitive habitats.**

Operation of the ferry both within the Marina and to and from the Marina could result in increased suspension of Bay mud, wave wash, localized re-suspension of sediments, and potentially deposition or erosion of sensitive habitats. A detailed modeling exercise was conducted by Coast & Harbor Engineering

(CHE 2005) to evaluate the potential for the project to impact sensitive resources at various points along transit routes. The first step in this process was to identify potentially sensitive receptors along the ferry route. Overall, ten locations were identified on the main north/south route (mostly tidal mudflats or tidal marsh) and five on the east/west route into Jack London Square (tidal mudflats, eelgrass beds, sandy shoreline, and a marine mammal haul-out area). The detailed analysis looked at conditions generated by wind-waves and existing marine traffic, and compared those to project-generated wakes. The modeling looked at the relationship between wind-generated and project-generated wave height, wave period[2], bottom velocity, energy, vertical run-up, and onshore and offshore transport of sediment. In general, for all of these parameters, modeling indicates that wave height, bottom velocity, energy, vertical run-up, and onshore and offshore transport of sediment from project-generated wakes are less than those generated by wind waves (CHE 2005). Modeling indicates that the wave period generated by ferry operations will be greater than existing wind waves or vessel traffic. Increased wave periods do not necessarily increase levels of impact because most parameters, except wave run-up, are not affected by wave period (CHE 2005). Modeling also indicated that ferry-generated waves were similar to those of existing vessel traffic. These results indicate that ferry operations should not create wave conditions substantially different than existing vessel traffic. Wave conditions should also be less than wind-generated wave conditions.

The preceding analysis considers the wake generated by a single ferry trip. The second step was to look at the potential effects of long-term operation of ferry service. Because there was very little data relating to existing marine traffic, the modeling effort and this discussion focuses on the relationship between wind waves and the wakes generated by the proposed ferry service. To study this relationship, the previous parameters of onshore and offshore transport were first modeled in relation to wake refraction and reflection. This was necessary because seafloor features and turns in the ferry routes can lead to situations where wakes complement each other creating substantially higher wakes of greater energy than those generated by the project alone.

The 2003 WTA PEIR threshold for a potentially significant project-generated wave was wave wash height of 16 cm (6.3 in) at 1500 m (4,921 ft) from the travel line (URS 2003). This approach was adequate for the 2003 WTA PEIR, but in the site-specific analysis it was necessary to carry wave wash analysis to the San Francisco peninsula and shoreline. Using the same sensitive receptors identified previously, modeling was conducted that looked at significant waves by tide and the long-term movement of sediment at these sites. When considering wave wash on the north to south route, three areas of tidal mudflat (3, 6, and 9) may be exposed to increased wave heights of 0.20 m (7.9 in), depending on the tide, as a result of the project (CHE 2005). When considering the south to the north route from Oyster Point, three other areas of tidal mudflat (6, 8, and 9) may be exposed to increased wave heights of 0.20 m (7.9 in), depending on the tide, as a result of the project (CHE 2005). The route towards Jack London Square will result in wave heights over 0.24 m (9.4 in) higher at the mudflat and eelgrass habitat at the western end of Alameda Island (CHE 2005).

To get a better idea of what sort of long-term potential impacts of this increase could be, an additional modeling step was taken that evaluated gross sediment movement at all fifteen locations identified as

[2] Wave period is the time it takes for two successive wave crests or troughs to pass a point in space.

sensitive receptors based on the number of monthly crossings. To evaluate the potential impacts, an estimate of 1,560 crossings per month on the main north/south route (south bay) and 640 crossings along the east/west route (central bay) into Jack London Square or Harbor Bay[3] was applied to the site-specific sediment transport rates previously modeled. The result of this effort was estimated monthly sediment transport rates that were not differentiable from existing conditions at most sites (CHE 2005). The results of the model indicate that there are three sites along the south bay route and one site along the central bay route where the project could contribute sediment movement. The volume of required dredging was calculated within the geographic information system (GIS) based on existing bathymetric data for the east basin and a design depth of 3.0 m (10.0 ft) below mean lower low water for the navigational channel and 3.7 m (12 ft) for the dock .

Table 3.1-2 Monthly Sediment Transport at Three South Bay (SB) Sites and Two Central Bay (CB) Sites
(based on Tables 3 and 4 of CHE 2005)

	Gross Monthly Sediment Transport (north to south route)		Gross Monthly Sediment Transport (south to north route)	
Site	Wind Waves	Wake Wash	Wind Waves	Wake Wash
SB-1	7	Negligible	16	1
SB-2	25	3	39	7
SB-3	7	Negligible	26	3
CB-5	Negligible	Negligible	35	5

All units are in cubic-meters of sediment per meter of beach.

All estimates are based on units of cubic-meters of material that could move per meter of resource area (beach, eelgrass bed, mudflat, etc). One thing that the model is not capable of predicting is the net direction of sediment movement. What this means is that it is possible for the model to estimate sediment movement, but not to predict if that movement is a net gain, loss, or if material is moving along the beach. Because the net direction of sediment cannot be predicted, the material predicted by the model to move, may move onshore, offshore, or up or down the beach. Sediment movement along beaches and mudflats is a natural part of coastal processes. However, if the project results in a net movement offshore, areas could face a net loss of sediment and eventually erode to a point that they would no longer be considered tidal mudflats. Conversely, net movement of material into a location could bury eelgrass beds or salt marsh habitats below sediment effectively removing this important habitat or altering it such that it no longer provides the desired functions. Alternatively, material could simply move laterally along the beach and not alter local conditions. One of the major caveats of this modeling effort is that there is no data relating to how existing vessel traffic contributes to the movement of sediment at these locations.

Tidal mudflats, eelgrass beds, and salt marshes are all considered sensitive habitat. Modeling indicates that the project could result in sediment movement but predicts that this movement will not be a substantial

[3] Based on 78 one-way crossings per month and a 20-day average month (5 days per week) on the north/south route and 32 one-way crossings per month on the east/west route.

amount. Although project operations could result in sediment movement, the magnitude of this effect is not substantial.

When the ferry is holding at the dock while loading and unloading, the jets are run at high speed to help hold the ferry steady at the dock. Modeling of these operations while at the terminal indicates that the jets will likely cause the suspension of Bay mud from the area below the dock (CHE 2005). The total area affected depends on the water depth and ranges between 12 and 16 m across (40 to 53 ft) (CHE 2005). This material will likely settle out within the Marina. Sensitive aquatic resources within the Marina are limited to small areas of wetland vegetation along the margins of the open water. These habitats are unlikely to accumulate substantial amounts of sediment as a result of vessel operations. Therefore, vessel operations within the Marina will not significantly impact sensitive resources by re-suspending bay mud.

CEQA Conclusion: The impact of bottom material causing turbidity during vessel maneuvering would be less than significant. Operation of the project could result in localized re-suspension and deposition of bay mud and other sediments at areas along the main travel routes that support sensitive habitats but only at levels considered less than significant. No mitigation would be required.

Threshold	Substantially affect threatened, endangered, or protected species.

Impact 3.1-2 Construction of a terminal and operation of Oyster Point ferry service would not substantially affect threatened, endangered, or protected species.

Review of the query results from the CNDDB and the USFWS indicates that there are ~~five~~ seven state- or federally listed species that have the potential to occur within the project area. These include California coast steelhead, green sturgeon, California brown pelican, California clapper rail, western snowy plover, vagrant wandering shrew, and salt marsh harvest mouse. Steelhead are found in either freshwater streams or marine environments. They may pass the Marina during migration, but would not use it as foraging habitat. Although unlikely to be directly affected by the project, following the allowed work window as outlined by the Dredge Material Management Office (DMMO) and NOAA Fisheries of June 1 through November 30 for dredging and pile driving would ensure that construction of the project would not substantially affect this steelhead. Green sturgeon are found within the Bay throughout the year. Because of this, they could occur in the vicinity of the Marina. Discussion of how pile installation could affect this species is presented in Impact 3.1-8. This species forages on the bottom of the Bay and will not be impacted by operation of the ferry service to and from Oyster Point. The brown pelican may roost on Marina breakwaters and forage in the area. The project does not alter the breakwaters and foraging habitat will remain essentially the same. California clapper rail, vagrant wandering shrew, and salt marsh harvest mice are dependant on high quality coastal marsh habitats, especially those with dense stands of pickleweed. This type of habitat does not exist within the Marina. Western snowy plovers nest on sandy beaches and salt flats; both habitats are not found within the project area. The beach at the west end of the Marina likely receives too much disturbance to be considered potential nesting habitat. Habitat required by each of these species is not present within the

project area and therefore it cannot be altered. Because habitat does not exist to support these species, they are not expected to be found within the project area.

CEQA Conclusion: The impact of the project on threatened, endangered, or protected species would be less than significant. No mitigation would be required.

Threshold	Alter or diminish designated critical habitat or special aquatic sites, including eelgrass beds, mudflats, and wetlands;

Impact 3.1-3 **The project would not alter or diminish designated critical habitat or eelgrass beds. ~~special aquatic sites.~~ However, it could result in the disturbance of native oyster beds.**

Information provided by USFWS indicates that critical habitat has been designated for several species included on Appendix B2. The project area does not contain lands designated as critical habitat for any threatened or endangered terrestrial species. The aquatic species with designated critical habitat in the Bay Area are Chinook and steelhead. The critical habitat designations for Central Valley Chinook populations extends south only to the Bay Bridge.

Critical habitat has been proposed for steelhead and the project site is within proposed Habitat Unit 6 (69 FR 74572). The primary constituent elements of critical habitat for steelhead are freshwater spawning, rearing, and migration areas; estuarine areas free of obstructions and of sufficient quality to support adult and juvenile rearing; and nearshore and offshore marine areas. The Oyster Point Marina Park (Marina) is closest to the estuarine classification, but the Marina does not contain any natural cover, large woody debris, side channels, and other features that would make it productive rearing habitat for steelhead. Therefore, the site does not support any of the primary constituent elements to be considered critical habitat.

The Oyster Point Marina supports a population of native oysters. Native oysters are considered an important aquatic resource because of their many benefits to the food webs and importance as essential fish habitat. The distribution of oysters within the Marina is unknown but they have been reported in both the east and west basins. It is likely that they are attached to most suitable substrate (hard surfaces). The proposed project has the potential to affect these populations in two ways. First, oysters could be lost when the harbor is dredged and when piers and docks are removed to provide operational depth and width respectively. Secondly, the re-suspension of fine Bay mud during ferry operations could suffocate oysters or decrease the efficiency with which they can filter water. The wake-wash model used for this project predicts the largest scour zone of about 53-feet wide to occur at water depths of 16 feet (CHE 2005). Depending on the magnitude of either construction or operational affects, the project could reduce the productivity of this special aquatic habitat. This would be considered a potentially significant impact.

A detailed analysis of the potential result of ferry operations on sensitive habitats (tidal mudflats, eelgrass beds, etc) has been conducted and is discussed in Impact 3.1-1. The same analysis applies to this threshold.

MM 3.1-3(a) The FTA and WTA should collaborate with Save-the-Bay, UC Davis, and NOAA Fisheries to develop a native oyster survey protocol. Based on this protocol, FTA and WTA should conduct a survey of native oyster distribution at and near the project area during fall or summer months prior to ferry terminal construction and ferry operation. This survey should include the areas to be dredged for operational depth and the floating docks and pilings that will be removed. If no native oysters are found in any of these areas, then there is no impact and no further mitigation is required. If native oysters are observed, MM 3.1-3(b-d) shall be implemented.

MM 3.1-3(b) If the survey conducted in MM 3.1-3(a) determines that oysters are present in the footprint of the area to be dredged for the ferry channel, within 53 feet adjacent to either side of the new ferry terminal, and/or on the underside of the floating docks that will be removed to complete the new ferry terminal, WTA should mitigate for the loss of native oysters with the placement of a NOAA Fisheries-approved substrate. Substrate should be placed in an area outside of direct impact by the project. NOAA Fisheries staff should be contacted to assist with substrate choice and site selection.

MM 3.1-3(c) The FTA and WTA should collaborate with on-going oyster monitoring efforts in Oyster Point Marina with Save-the-Bay, Oyster Point Marina, and UC Davis to monitor subtidal oyster distribution, abundance, settlement, and functioning within Oyster Point Marina. Monitoring protocols should include water quality parameters, oyster density, and oyster settlement. NOAA Fisheries recommends monitoring occur on a monthly basis one year before the ferry project is in place (or as close to a year as possible) during the fall and winter months, and on a bi-monthly basis during spring and summer months in order to determine baseline conditions for live oysters at Oyster Point Marina. After the ferry project is in place, NOAA Fisheries recommends monitoring on a monthly basis during the fall and winter months, and on a bi-monthly basis during the spring and summer months for a one year period. Monitoring beyond the one-year pre-construction period and one year post-construction should continue for one additional year if adverse affects to live native oysters are discerned by NOAA Fisheries staff based on the results of the first 24 months of data.

MM 3.1-3(d) The FTA and WTA should produce an annual report for NOAA Fisheries after a year of monitoring data has been collected. The report should include oyster monitoring data and analysis of the effects of dredging and scouring on oyster abundance, distribution, settlement, and functioning.

CEQA Conclusion: The impact of the project operations on critical habitat or sensitive habitats would be less than significant. No mitigation would be required. The potentially significant impact to special aquatic habitat, native oysters, would be reduced to a less-than-significant level through implementation of MM 3.1-3(a) to 3.1-3(d).

Threshold	Result in the reduction of protected wetland habitat as defined in Section 404 of the *Clean Water Act* and/or in Section 6610 of the San Francisco Bay Conservation and Development Commission (BCDC) *McAteer-Petris Act* or result in alteration of desirable functions and values through direct removal, filling, hydrological interruption, or other means.

Impact 3.1-4 The project could result in reduction of wetland habitats subject to the USACE or BCDC's jurisdiction.

According to the conceptual design, about 0.05 ha (0.12 acres) of coastal wetlands subject to the USACE jurisdiction under Section 404 the *Clean Water Act* could be filled as a result of this project. Additionally, installation of the floating dock would cover about 0.15 ha (0.38 acres) of water subject to Section 10 of the *Rivers and Harbors Act*. Placement of new pilings to support the floating dock would require between 52 and 625 cubic-meters (68 and 817 cubic-yards) of pilings depending on the size and length of the pilings.[4] However, consideration is being given to creating dock support by using more, shorter (maximum 50 ft.) piles which would be smaller in diameter. The total area of these piles would be equivalent to or less than the total area of the analyzed piles. The analysis of impacts associated with the piles uses the worst case scenario of 60 piles at 92 cm each which covers both possible scenarios. Removal of the pilings anchoring docks 9 and 10 and shortening of the remaining docks in the east basin would remove a total of about 85 cubic-meters (111.7 cubic-yards) of material from the Bay. Additionally, removal of docks 9 and 10 would result in the removal of material from the Bay.

The BCDC would also take jurisdiction over the floating dock and pilings. In addition, BCDC has jurisdiction over an area 100 feet inland from the shoreline as defined in Section 66610(b) of the *McAteer-Petris Act*. According to the conceptual plan the bus drop-off and loading areas, public vehicle loading, and a large portion of the parking spaces would be within the shoreline band. Project acreage within the shoreline band has not been calculated.

In addition to a required permit for fill of open water and development within the shoreline band, BCDC also retains jurisdiction over dredging actions. As currently designed, the project would require dredging to depths of 3.0-3.7 m (10-12 ft) below mean lower low water to provide adequate draft for vessel maneuverability within the Marina. This would require the removal of about 12,989 cubic-meters (16,989 cubic-yards) of sediment from below the proposed dock area and an additional 507 cubic-meters (663 cubic-yards) to a depth of 3.7 m (12 ft) below the navigational channel. Therefore, the project has potential to impact federally protected wetlands and areas subject to BCDC's jurisdiction as defined in Section 66610 of the *McAteer-Petris Act*.

MM 3.1-4(a) *A wetland specialist shall prepare an application for fill of waters subject to the USACE and BCDC's jurisdiction that would result from construction of the ferry dock and upland facilities. The preferred first step in this process is a pre-application meeting with the applicant and the respective permitting agencies. At this meeting the project can be presented and the appropriate permitting vehicle recommended by the agencies.*

MM 3.1-4(b) *Depending on the results of the pre-application meeting, it may be necessary to develop a comprehensive wetland restoration plan to offset impacts to these resources. Restoration could include on- or off-site enhancement of wetlands, contribution of funds to a local mitigation bank, or restoration of existing yet relatively poor quality wetlands. The USACE goal is to permit no net loss*

[4] Calculations based on 20, 18-inch diameter 52-foot long piles and 60, 36-inch diameter 52 foot long piles. A more specific calculation of Bay fill is not possible until site-specific designs are available but these two calculations should cover the range of possibilities. It is expected that the final number of piles to be installed will be less than the maximum calculated here.

of functions and values of wetland habitat. The replacement ratio of wetland acreage required to achieve this goal is a minimum of 1(new):1(old) but could be higher.

MM 3.1-4(c) *Dredging permits shall be obtained from the USACE's DMMO and BCDC as required. Testing of the sediment shall be conducted as required by the DMMO and all dredge materials disposed of accordingly. According to the DMMO dredging cannot occur between December 1 and the end of February to protect aquatic resources without a waiver from CDFG (USACE 2004).*

CEQA Conclusion: The potentially significant impact to jurisdictional wetlands would be reduced to less than significant with implementation of mitigation measures MM 3.1-4 (a) through MM 3.1-4 (c).

Threshold	Cause the introduction or substantial spread of invasive nonnative plants or wildlife.

Impact 3.1-5 The project could cause the introduction of or substantially contribute to the spread of invasive nonnative species.

Because it is a major shipping port, San Francisco Bay has been the site of more invasions of exotic species than many other places in the United States as internationally traveling ships release ballast water into the Bay (Moyle 2002). Invasive species of clams, crustaceans, fish, birds, invertebrates, and plants can all be found thriving in San Francisco Bay. These species spread throughout the Bay as suitable habitat is available to be exploited. Construction and operation of ferry service to and from the Oyster Point Marina Park (Marina) will not contribute to the spread of invasive species. The species likely present within the Marina are probably also found at the other proposed terminal locations and within the Bay in general.

Construction of facilities would require disturbance of upland soils during demolition and grading. Many invasive plant terrestrial species thrive in recently disturbed soils. Long-term exposure of bare soils creates optimum conditions for these species. Smooth cordgrass (*Spartina alterniflora*) is of particular concern in the intertidal areas because it hybridizes with the native cordgrass and can rapidly colonize mud flats and salt marshes, out competing native species. Hybrids of the native and non-native cordgrass were mapped by the Invasive Spartina Project (2001) as occurring within the Marina. Construction vehicles, barges, and other equipment could transport seeds or roots of this or other invasive species into the Marina or from the Marina to other locations around the Bay. Operation of the project should not result in the spread of cordgrass or other species.

MM 3.1-5(a) *To prevent further introductions of nonnative cordgrass into the Oyster Point Marina Park (Marina) or the unintentional distribution of cordgrass into other areas of the Bay, all construction equipment, vehicles, and tools shall be thoroughly cleaned before being allowed to enter or leave the project area. Cleaning shall remove all soils, seeds, and plant material. If necessary, coordination with the San Francisco Estuary Institute's Invasive Spartina Project (www.spartina.org) shall occur to determine the most efficient method to prevent an unwanted introduction.*

CEQA Conclusion: The potentially significant impact of the introduction of invasive plants or wildlife would be reduced to less than significant with implementation of mitigation measure MM 3.1-5(a).

Threshold	Interfere substantially with the movement of resident or migratory fish or wildlife species.

Impact 3.1-6 Construction and operation of the project would not substantially interfere with the movement of resident or migratory animals.

The terminal structure would be located within the existing Marina. Upland facilities would replace existing structures and other development. The project does not fragment habitat or create barriers to movement of resident or migratory wildlife. Because of this, installation and operation of the ferry terminal would not have an impact on the movement of resident or migratory wildlife.

CEQA Conclusion: The potentially significant impact of the project on waterfowl would be reduced to less than significant with implementation of mitigation measures outlined in the 2003 WTA PEIR (URS 2003). No additional mitigation would be required.

Threshold	Cause substantial or sustained impact to spawning habitat of commercially important species (e.g., Pacific herring)

Impact 3.1-7 Construction and operation of the proposed ferry terminal would not cause substantial or sustained impact to Pacific herring spawning habitat.

San Francisco Bay supports a small yet productive commercial Pacific herring fishery. Pacific herring are not protected by either the state of California or the federal government. Because herring are harvested for their roe, they are an important species in the economy of the San Francisco Bay Area and their populations are closely monitored by CDFG. Pacific herring is also an important species in the ecology of San Francisco Bay because herring, along with sardines and anchovies, are a primary food source for salmon and other sport fish. Pacific herring generally enter the Bay from November 1 to March 30 of each year and spawn in intertidal and subtidal habitats (Barnhart 1988). The actual sites where Pacific herring spawn in San Francisco Bay changes from year to year and spawning may occur at numerous locations around the Bay. The North Bay is typically the preferred area although limited spawning has historically been observed at San Mateo Point (Miller and Schmidtke 1956). NOAA Fisheries does not map herring spawning habitat south of Hunters Point (NOAA 2005). Herring prefer to spawn over algae and eelgrass first; rocky substrates second; and flat surfaces such as marina pilings, retaining walls, and bulkheads occurring along the San Francisco Bay waterfront last (Barnhart 1988). The Marina does not support vegetative or rocky substrates which would be considered suitable spawning habitat. The Marina pilings and breakwaters may be used as a last resort, but are relatively poor habitat. Routine maintenance dredging of the Marina prevents establishment of any vegetation. Pacific herring are not expected to spawn in or around the Marina.

NOAA Fisheries maps the Alameda shipping channel as herring spawning habitat (NOAA 2005). The Port of Oakland is the fourth busiest seaport in the nation and in the top 20 busiest in the world (Port of Oakland 2005). The existing shipping traffic within this channel is very high. The Port of Oakland deals with

hundreds of sailings per month of major vessels. For each of those sailings, there are tugs and other support craft that routinely move up and down the channel. Further up the channel past the terminal location are extensive marinas. Because of this level of activity, the shipping channel walls are entirely armored and it is routinely dredged to maintain adequate service depth for large cargo ships. The spawning habitat within the channel can be characterized as relatively poor quality because herring prefer to spawn over vegetation like eelgrass and use bulkheads and other hard structures as a last resort. The threshold indicates that for an impact to be considered significant, the project must cause substantial or sustained impact to spawning habitat. Ferry service to and from Jack London Square or Harbor Bay that's attributable to the project is estimated to be about 640 trips per month. An additional 640 trips per month through the shipping channel will not have any effect on the existing channel banks because they are all armored. Additional wake wash will occur and could affect individual fish, but at a level that would not substantially alter habitat.

Operation of ferry service along the transit routes through the Bay could generate wakes that result in the movement of sediment from areas considered suitable spawning habitat for Pacific herring. Of particular concern is the eelgrass bed that has been mapped by NOAA Fisheries on the north and south sides of the Alameda shipping channel entrance (Merkel 2003). According to wake analysis conducted for this project, the result of focused wave energies in these areas will generate negligible movement of sediment.

Dredging required for the project is estimated to generate a total of about 13,496 cubic-meters (17,652 cubic-yards) of dredge spoils that will have to be disposed of. The most common method of disposal is at one of several in-Bay sites. Because a permit from the DMMO is required prior to dredging, and all dredging activities are restricted to the time of year when herring are not present (March 1 through the end of October), it is expected that all dredge spoils will be properly disposed of.

CEQA Conclusion: The impact of the project on Pacific herring and other sensitive fish species would be less than significant. No mitigation would be required.

Threshold	Cause underwater sound pressure levels during construction or operation that exceed NOAA Fisheries guidelines for protection of marine mammals (160 decibels referenced to 1 micropascal)

Impact 3.1-8 **Construction of the floating dock would require installation of between 20 and 60 piles. Installation of these piles would require use of some sort of hammer. This could create sound waves in excess of the criterion presented above and have an effect on fish and marine mammals.**

Installation of pilings requires the piles to be driven into the substrate. Depending on the type of pile to be installed (concrete, wood, hollow steel, H-beams, etc), the method of installation (impact or vibratory hammer), and energy delivered to the pile, pile driving can create large amounts of noise that travels through the water as a pressure wave. When pile driving generates a pressure wave of sufficient size, it can injure marine mammals and even kill fish. NOAA Fisheries has established a sound threshold for protection of marine resources that states when pile driving creates peak underwater sound pressure levels of over 180

decibels referenced to 1 micropascal it can physically injure fish (NOAA 2005a) and marine mammals (NOAA 2005b).

The precise number, length, size, and material of piles to be used to support the floating dock is unknown. Project engineers have estimated between 20 and 30, 61-cm (24-inch), solid, octagonal, concrete ~~60~~ piles ~~ranging in diameter from 48 to 92 cm (18 to 36 inches)~~ could be required. ~~To specify a particular pile, a much higher level of engineering and geotechnical investigation are required than are present in the conceptual design.~~ Nine or ten 92-cm (36-inch) diameter, hollow, steel piles will be installed as protection dolphins and to anchor the float. Final pile number and size will be determined during the final engineering. The concrete piles proposed for use, will be driven with an impact hammer and will not generate sound levels sufficient to surpass the threshold. If an impact hammer were to used to install the 92-cm (36-inch) diameter steel piles, resulting sound levels would exceed the threshold of 180 decibels referenced to 1 micropascal. Therefore, these piles will be driven with a vibratory hammer. Because the steel piles are not load-bearing, they should not need to be proofed with an impact hammer. Installation of the large-diameter steel piles with a vibratory hammer will not generate sound levels that exceed the threshold. If geotechnical studies indicate that substrate conditions will not allow for piles to be driven with a vibratory hammer an impact hammer will be used. If this occurs, a bubble curtain will be installed and operated when driving the steel piles. ~~The worst case scenario would be a 92 cm (36-inch diameter) hollow steel pile driven with a large impact hammer. However, consideration is being given to creating dock support by using more, shorter (maximum 50 ft.) piles which would be smaller in diameter. The total area of these piles would be equivalent to or less than the total area of the analyzed piles. The analysis of impacts associated with the piles uses the worst case scenario of 60 piles at 92 cm each which covers both possible scenarios. It is likely that this could create sound pressure levels in excess of the 180 decibels referenced to 1 micropascal.~~ The breakwaters that surround the Marina would attenuate the sound pressure to a degree; however, it is also possible that they could focus and actually amplify the sound. ~~It is considered unlikely that sound pressure waves would propagate outside of the Marina.~~ There is no evidence of marine mammals or sensitive fish species using the Marina, but they do pass by in the Bay. Pile driving that results in sound pressure waves outside the Marina that exceed the 180 decibel threshold, could injure nearby marine mammals and sensitive fish species.

MM 3.1-8 *The WTA shall monitor site-specific conditions during pile driving to ensure that aquatic species would not be impacted and that sound pressure measured outside of the Marina during pile driving would not exceed the 180 dB threshold.*

- *Measures could include the following:*
  - *When creating the final dock design, use fewer or smaller piles and preferably solid piles.*
  - *Drive piles with a vibratory device instead of an impact hammer if possible.*
  - *Utilize a cushioning block between the hammer head and pile.*
  - *Only drive piles during periods of minimal current (slack tide).*
  - *If marine mammals are observed within 1,000 feet of the project, allow them to completely exit the project area before pile driving resumes.*

- ~~*If piles will be installed during the seasons when Chinook or steelhead are in the Bay, restrict*~~ *Restrict pile driving to the June 1 to November 30 work window as recommended by NOAA Fisheries to protect herring and salmonids. Depending on the pile specifics (material, size, hammer, etc) it may be necessary to restrict pile driving to periods of low tide to minimize the in-water portion of the pile and therefore the sound created.*
- ~~*If seasonal or tidally-based work restrictions are not feasible, it may be necessary to*~~ *If steel piles must be installed with an impact hammer, install an air barrier between the pile and the surrounding water. This approach effectively disrupts the sound pressure as it travels from water to air then back to water. One way to do this is encase the new piles within a slightly larger hollow pile and pump air into the gap. Alternatively, bubble curtains created by pipes placed on the Marina seabed where the pile enters the ground also effectively disrupt pressure waves.*
- *If an impact hammer is used to install the steel piles, a qualified biologist shall monitor pile driving to ensure that the air curtain is functioning properly and project-generated sound waves do not exceed the established threshold.*

CEQA Conclusion: The potentially significant impact of underwater sound pressure levels during construction or operation on marine mammals would be reduced to less than significant with implementation of mitigation measure MM 3.1-8.

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9.2.13 APPENDIX B1 NATURAL ENVIRONMENT STUDY

As a result of consultation with other agencies, including the USFWS, Appendix B1 (Natural Environment Study) of the DEIR/EA has been substantially modified. As such, Appendix B1 (Natural Environment Study) has been reproduced in its entirety as follows (the figures associated with this appendix have not changed and have not been included in this Final EIR):

San Francisco Bay Area Water Transit Authority

Natural Environment Study

Draft

~~**November 15, 2005**~~**November 17, 2006**

Summary

The Federal Transit Administration (FTA) and the San Francisco Bay Area Water Transit Authority (WTA) are jointly proposing the South San Francisco Ferry Terminal Project (project) in South San Francisco, California. The City of South San Francisco and the San Mateo County Harbor District are collaborating in this effort. The purpose of the project is to develop a new ferry route between South San Francisco and the East Bay and construct a ferry terminal at the Oyster Point Marina and Park in South San Francisco.

The project is not expected to adversely impact special status plant species. The project would~~,~~ ~~however,~~ result in an adverse impact on one bird species, the Alameda song sparrow (*Melospiza melodia pusillula*). Implementation of avoidance and minimization efforts outlined in section 4.4.2.2 of this Natural Environment Study would minimize adverse impacts on this species. Construction of the terminal facilities within the Marina would adversely impact wetlands and open waters of San Francisco Bay. Implementation of avoidance and minimization efforts would minimize adverse impacts to jurisdictional waters and other sensitive habitats. These same construction activities have the potential to impact green sturgeon, a federally-threatened species. Implementation of avoidance and minimization measures (Section 4.4.2.2) including installation of hollow steel piles with a vibratory hammer, will prevent impacts to this species. Dredging and removal of docks could reduce the native oyster populations present in the harbor. Compensatory mitigation (Section 4.4.3.3) will reduce this level of impact and also contribute to the overall body of knowledge about native oysters.

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List of Abbreviated Terms

BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
cm	centimeter(s)
CNDDB	California Natural Diversity Database
Corps	US Army Corps of Engineers
EFH	Essential Fish Habitat
FESA	Federal Endangered Species Act
FTA	Federal Transit Authority
ha	hectare(s)
km	kilometer(s)
m	meter(s)
NES	Natural Environment Study
Project Area	The term project area shall apply to the actual project footprint or areas in which construction or construction related activities would occur. The project area is delineated in Figure 2.
Project Vicinity	The term project vicinity shall apply to the project area and the immediate surroundings, approximately 0.8 kilometers (0.5 miles) in any direction.
RM2	Regional Measure 2
RWQCB	Regional Water Quality Control Board
WTA	Water Transit Authority
USFWS	United States Fish and Wildlife Service

Chapter 1 Introduction

1.1 Background

The WTA is a regional agency authorized by the State of California to operate a comprehensive San Francisco Bay Area public water transit system. The WTA's Implementation & Operations Plan (IOP), adopted by the state of California in October 2003, includes new ferry service from South San Francisco to the East Bay. The purpose of this and other proposed new routes is to expand ferry service, help to reduce gridlock and provide alternative transportation for commuters and other travelers. The WTA is the lead local agency for the South San Francisco Ferry Terminal Project (project) while the Federal Transit Administration (FTA) is the lead federal agency for the project. The FTA provides financial assistance for capital and operating costs and also sponsors research, training, technical assistance and demonstration programs for public transit.

The City of South San Francisco owns the proposed terminal site, Oyster Point Marina and Park (Figure 1). The San Mateo County Harbor District has operated the Marina under a Joint Powers Agreement with the City since 1977. South San Francisco ferry service will require an investment of $12 million in capital funds for the construction of two vessels, plus another $19 million in capital funds for terminal and site construction. Funding for this project would come from federal, regional and local funds. Included in those sources is Regional Measure 2 (RM2), passed in March 2004, which raised the tolls on the Bay Area's state-owned bridges and allocates both capital and operating funds for South San Francisco ferry service - $12 million in capital funds for two vessels and $3 million/year in operating funds. Planning studies for South San Francisco ferry service also come from RM2 funds. The San Mateo County Measure A Sales Tax Extension, passed by voters in November 2004 and scheduled to take effect in January 2009, will generate $30 million over 25 years for San Mateo County ferry service, including new service from South San Francisco to the East Bay

1.2 Project Description

The project includes construction of a ferry terminal (passenger waiting area, gangway ramp and float), bus terminal, striping for 56 vehicles, and reconfigured circulation and access (Figure 2). About 124 berths, approximately 21 percent of current berths, would be removed to create a path for entering and exiting ferries. This includes all of the slips at Gates 9 and 10, as well as individual slips at the far end of Gates 11, 12 and 13. The occupants of the berths would be relocated to existing vacant berths within the Marina.

Dredging under the project would occur at the entrance channel and inner basin area to accommodate ferries. Within the channel and terminal area, dredging would be required to achieve a bottom elevation of -3.0 meters (–10 feet) relative to mean lower low water (MLLW), or an average of 0.9 meter (3 feet) lower than the current bottom elevation. In addition, within the area of the float, dredging would be required to achieve a bottom elevation of -3.7 meters (-12 feet) relative to MLLW. Approximately 12,997 cubic meters (17,000 cubic yards) of bottom material would be dredged, or

about 29 percent of the volume regularly dredged for maintenance [last dredging was 44,344 cubic meters (58,000 cubic yards)]. It is likely that the proposed dredging could be performed using the same dredging and disposal procedures as the past maintenance dredging. Conditions of the past maintenance dredging permit included: documentation requirements, operation outside of the dredging window (December 1 to March 1), and prevention of adverse impacts to tidal marsh or wetlands. Standard dredging environmental control measures, such as silt curtains, would be used during construction to minimize turbidity and reduce potential impacts to sensitive habitat.

It is anticipated that the ferry terminal would be cantilevered from the shoreline. About 76 meters (250 feet) of fixed pier would provide a waiting area for passengers, as well as the entrance to the gangway ramp and float. The fixed pier would be approximately 4.6 meters (15 feet) to the top of the deck with a 4.6-6.1 meter (15-20 foot) canopy above. The float would consist of a "T-shaped" float that could accommodate a ferry boat on either side of the float. The fixed pier would be supported by piles driven or vibrated beyond the landfill cap. The pier, gangway ramp, and float would have canopies. A security gate at the fixed pier would be open during operating hours.

The precise number, length, size, and material of piles to be used to support the floating dock is unknown. Project engineers have estimated between 20 and 60 piles ranging in diameter from 46 to 91 cm (18 to 36 inches) could be required. To specify a particular pile, a much higher level of engineering and geotechnical investigation are required than are present in the conceptual design. The worst case scenario would be a 91-cm (36-inch diameter) hollow steel pile driven with a large impact hammer.

The existing parking area in the project site would be reconfigured to include a 270-foot bus loading/unloading area for four buses, striped parking, pedestrian walkways, and curbs. The existing roundabout would be removed to allow for circulation of incoming traffic on Marina Boulevard traveling north at about Gate 10, leading to bus unloading or parking access exiting south around the yacht club and back onto Marina Boulevard. As the project site is already impervious surface, new circulation and parking would not add impervious area. The project would connect to existing utilities in the Marina.

The proposed ferry route would carry passengers to and from South San Francisco and the East Bay, either at Harbor Bay, Alameda Point, or at Jack London Square. The travel time between South San Francisco and Jack London Square would be 35 minutes, including slow channel passage through the Oakland Estuary, and docking time. The travel time between South San Francisco and Harbor Bay would be 27 minutes. The travel time between South San Francisco and Alameda Point would be 29 minutes.

Some minor improvements to Harbor Bay or Jack London Square ferry terminal marinas could be required as the existing docking facilities would be able to support service to and from the proposed South San Francisco facility. The Jack London Square terminal is located at the foot of Clay Street, two blocks west of Broadway. The average weekday ridership is 500 to 600 trips per day. Validated parking for ferry passengers is provided at the 7-story Washington Street garage, which is a short walk from the terminal. The parking lot currently operates at or near capacity, especially in the evenings and on weekends. This is not a constraint for ferry commuters, but can constrain midday and weekend

patronage. The Harbor Bay ferry terminal is located on the northwest side of Bay Farm Island in Alameda. Service runs between the Harbor Bay Ferry Terminal and San Francisco every 25 minutes on weekdays, providing about 6 daily trips. There are approximately 250 parking spaces in the ferry terminal lot. Parking is generally available for ferry passengers (WTA 2002; Harbor Bay Maritime 2004). The Alameda Point ferry terminal is located in the decommissioned Naval Air Station at Alameda Point, specifically in the Seaplane Lagoon at the end of Atlantic Avenue, the main entrance to Alameda Point. Ferries run about every 20 minutes on weekdays, providing about 13 daily trips. Weekend service is provided at a slightly reduced rate. Free parking is available adjacent to the ferry building on Main Street (WTA 2002).

The San Mateo County Harbor District has invested in planning, studies, and some initial site work necessary to build the ferry terminal at Oyster Point Marina and Park, including modification of the Marina's breakwater. The modification will include removing the wingwall and shortening the breakwater. An amended Army Corps Project Management Plan was approved in November 2004. Completion of the engineering and design phase is anticipated to occur at the beginning of 2006. Construction is anticipated to take one year or less, with completion by the end of 2006.

Figure 1 Project Location

Figure 2 Conceptual Site Plan

Chapter 2 Study Methods

2.1 Studies Required

The purpose of the Natural Environment Study (NES) is to evaluate the potential for impacts to the project area's biological resources to result from the project. In addition to the NES, a Wetland Delineation was prepared for this project (see Chapter 5.0, *Results: Permits & Technical Studies for Special Laws or Conditions*).

2.2 Personnel and Survey Dates

EIP biologists Demian Ebert and Ron Walker surveyed the project area on March 8, 2005. The purpose of this survey was to determine the presence of any sensitive species or sensitive habitat within the project area and to delineate the wetlands. Demian Ebert conducted a follow up survey on April 3, 2005.

A general wildlife survey was conducted simultaneously with the general plant survey. Taxonomy and nomenclature for generally follows American Ornithologist's Union (AOU 2003) for birds, Laudenslayer et al. (1991) for all other terrestrial vertebrates, Nelson et al. (2004) for fish, and Jepson (Hickman 1993) for plants. The surveys were conducted on foot with binoculars. A list of plant and wildlife species observed within the project area is included in Tables 1 and 2, respectively. No amphibians, reptiles, or mammals were observed during the site visit.

2.3 Agency Coordination and Professional Contacts

Letters were submitted to the California Department of Fish and Game (CDFG) and the US Fish and Wildlife Service (USFWS), soliciting the agencies concerns relating to the project. The USFWS responded with a species list for the USGS 7.5-minute San Francisco South, San Francisco North, Hunters Point, Montara Mountain, San Mateo, Oakland West, Oakland East, San Leandro and Redwood Point quadrangles (Appendix A). There was no response from CDFG. No special agreements or understandings have been developed with the agencies in relation to this project. Details of the Section 7 and Essential Fish Habitat (EFH) consultation with NOAA Fisheries is discussed in Section 5.2 and 5.3.

2.4 Limitations That May Influence Results

Visual inspection of the study area was conducted from the Marina shore. Physical inspection of the Bay waters or the sub-tidal areas within the project area was not possible.

Table 1
Plants Recorded on the South San Francisco Ferry Terminal Project Site

Scientific Name	Common Name
Baccharis pilularis	Coyote Bush
Brassica rapa	Field Mustard
Bromus hordeaceus	Soft Brome
Cotula coronopifolia	Brassbuttons
Cynodon dactylon	Bermuda Grass
Geranium dissectum	Cutleaf Geranium
Grindelia stricta	Marsh Gumplant
Limonium californicum	Western Marsh-Rosemary
Lolium perenne	Italian Ryegrass
Salicornia virginica	Pickleweed
Salsola Soda	Barilla Plant
Trifolium repens	White Clover

Source: EIP Associates, March 8, 2005 site visit.

Table 2
Animals Observed on the South San Francisco Ferry Terminal Project Site

Birds

Scientific Name	Common Name
Actitis macularia	Spotted Sandpiper
Aechmophorus occidentalis	Western Grebe
Agelaius phoeniceus	Red-winged Blackbird
Anas platyrhynchos	Mallard
Ardea herodias	Great Blue Heron
Aythya affinis	Lesser Scaup
Branta canadensis	Canada Goose
Bucephala albeola	Bufflehead
Calypte anna	Anna's Hummingbird
Carpodacus mexicanus	House Finch
Columba livia	Rock Pigeon
Corvus brachyrhynchos	American Crow
Dendroica dominica	Yellow-throated Warbler
Egretta thula	Snowy Egret
Euphagus cyanocephalus	Brewer's Blackbird
Felica americana	American Coot
Melanitta perspicillata	Surf Scoter
Mimus polyglottos	Northern Mockingbird
Phalacrocorax auritus	Double-crested Cormorant
Podiceps auritus	Horned Grebe
Podiceps nigricollis	Eared Grebe
Psaltriparus minimus	Bushtit
Sturnus vulgaris	European Starling
Turdus migratorius	American Robin

Source: EIP Associates, March 8, 2005 site visit.

Chapter 3 Results: Environmental Setting

3.1 Description of the Existing Biological and Physical Conditions

3.1.1 Project Area

For the purposes of the discussion within the NES, the project area is defined by the actual project footprint or areas in which construction or construction related activities would occur (Figure 2). The conceptual site design resulted in an in-water project area that encompasses all of Gates 9, 10 and the last one or two slips at the end of all the other docks in the east basin. The shoreward component of the project includes existing parking areas, streets, and landscaped areas near the center of the Oyster Point Marina and Park. The project vicinity is defined as the project area's immediate surroundings, approximately 0.5 miles in any direction from the boundary of the project area.

3.1.2 Physical Conditions

Habitat types within the Marina were delineated on a 1995 aerial photograph of the area (Figure 3). Seven different habitat types were mapped within the Marina accounting for approximately 33.2 hectares (ha) (82 acres). These include the waters of San Francisco Bay, developed (roads, surface parking lots, and structures), non-native grasslands, turf grass/landscaping, intertidal zone, bare dirt, and sandy beach. Table 3 lists the seven habitat types and their existing area. The biological community (coastal wetlands/northern coastal marsh) is discussed in Section 4.1.

Table 3
Habitat Types Occurring within the Marina

Habitat Type	Existing hectares (acres)	Impacted hectares (acres)
San Francisco Bay	13.66 (33.75)	0.15 (0.38)
Developed	11.2 (27.67)	0.89 (2.19)
Non-native Grassland	4.31 (10.66)	0
Turf Grass/Landscape	1.83 (4.51)	0
Intertidal Zone (Coastal Wetlands)	1.66 (4.11)	0.05 (0.12)
Bare Dirt	0.44 (1.08)	0.02 (0.03)
Sandy Beach	0.04 (0.1)	0
Total	**33.14 (81.89)**	**1.10 (2.72)**

Construction of the project would result in impacts to some habitat types. Table 3 lists the seven habitat types and quantifies permanent impacts to each type. These impacts are further described below (Section 4).

Figure 3 – Vegetation Communities

3.1.3 Biological Conditions in the Marina

3.1.3.1 Terrestrial Habitats

Most of the project area is developed and is primarily comprised of landscaped vegetation. However, wetland vegetation is present along the shore. The landscape vegetation consists of grasses, shrubs and trees. Much of the project site is planted with Bermuda grass (*Cynodon dactylon*). Bermuda grass is a popular lawn grass that spreads rapidly and can grow in almost any soil that is not too wet or shady. The landscape vegetation could provide shelter, foraging opportunity, and nesting sites for small birds (passerines), and rodents (e.g., rats, mice, voles, ground squirrels, and gophers).

3.1.3.2 Aquatic Habitats

Wetlands are a transitional landscape occurring within a continuum that begins in aquatic habitats and ends in dry upland habitats. Because of their intermediate location, wetlands contain characteristics of both aquatic and terrestrial environments. Bacteria, protozoa, algae, vascular plants, invertebrates, amphibians, fish, birds, and mammals can all be found within the typical wetland. The wetland habitats in the project area are limited to the Marina shoreline (Section 5.4). The shoreline within the Marina supports some vegetation common to coastal wetlands. Specifically, brassbuttons (*Cotula coronopifolia*), marsh gumplant (*Grindelia stricta*), pickleweed (*Salicornia virginica*), and Italian ryegrass (*Lolium perenne*) grow within the project area, adjacent to Bay waters.

The true aquatic habitat within the project area is the San Francisco Bay water within the Marina. The Marina is maintained to depths of -2.44 m (-8 ft) in the east basin and -1.83 (-6 ft) in the west basin. The average tidal fluctuation is about 1.6 m (5.3 ft). A detailed biological investigation of the sub-tidal areas was not conducted. However, the Marina is dredged on a routine basis to maintain operational depth (Sullivan 2005); this last occurred in 1999 (Johnson 2006). Routine dredging prevents benthic vegetation from becoming established. Therefore, the Marina sea floor is likely comprised of Bay mud that has been colonized by small sessile invertebrates. Routine fish movement is likely to occur from the Bay into and out of the Marina.

3.2 Regional Species and Habitats of Concern

Information on sensitive species and sensitive habitats occurring in the vicinity of the project was obtained from the California Natural Diversity Database (CNDDB) (information dated January 5, 2005) for the US Geological Survey's 7.5-minute San Francisco South, San Francisco North, Hunters Point, Montara Mountain, San Mateo, Oakland West, Oakland East, San Leandro and Redwood Point quadrangles, and USFWS generated species lists for the above quadrangles (Appendix A and B). These sources have been compiled into a single list of special-status species and their potential to occur in the project area (Appendix C).

Information provided by USFWS indicates that critical habitat has been designated for several species included on the list in Appendix C. The project area does not contain lands designated as critical habitat for any threatened or endangered terrestrial species. The aquatic species with designated critical

habitat in the Bay Area are Chinook (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss)*. The critical habitat designation for the Central Valley Chinook population extends south only to the Bay Bridge and does not include the project area or travel routes. The project area and travel routes are within designated steelhead critical habitat; steelhead critical habitat is discussed further in Section 4.4.3.

Chapter 4 Results: Biological Resources, Discussion of Impacts and Mitigation

4.1 Sensitive Species Potentially in the Project Area

One hundred and ninety-two species are reported by the USFWS and CNDDB as potentially occurring within the US Geological Survey's 7.5-minute San Francisco South, San Francisco North, Hunters Point, Montara Mountain, San Mateo, Oakland West, Oakland East, San Leandro and Redwood Point quadrangles (Appendix C). To determine the potential for a species to occur in the project area the following criteria were applied:

- Habitat for the species has been identified within the project area; or
- The project has potential to effect the species; or
- The species is well known to the public and resource agencies, thereby garnering attention and concern.

Application of this criteria to the list of sensitive species reveals that habitat in the project vicinity is not suitable for most of these species. Plant and animal species are discussed further in Section 4.3 and 4.4, respectively. Species that warrant further detailed discussion are limited to nine animal species.

4.2 Natural Communities of Special Concern

Northern coastal marsh (wetlands) are unique among biologic communities because they are characterized by both aquatic and terrestrial features. Plants and animals that inhabit wetlands have successfully evolved morphological and physiological adaptations to the presence of high levels of salt and periodic inundation and desiccation as well as to low concentrations of dissolved oxygen in the saturated soils. Wetlands are present in the project area and could be adversely affected by the project.

4.2.1 Survey Results

In order to determine the extent of wetland habitats within the project area, EIP conducted a routine wetland delineation in accordance with methodology required by the Corps (EIP 2005). This resulted in the mapping of almost 13.6 ha (34 acres) of San Francisco Bay waters that would be subject to the Corps jurisdiction under Section 10 of the Rivers and Harbors Act. An additional 1.7 ha (4.1 acres) were mapped as tidal wetlands that would be subject to the Corps jurisdiction under Section 404 of the Clean Water Act. These acreages present the entire areas subject to the Corps jurisdiction. However, the area actually supporting vegetation that would allow it to be categorized as coastal salt marsh is relatively small. The bulk of the shoreline within the project area is either sandy beach or cobble fill that does not support substantial vegetation.

4.2.2 Avoidance and Minimization Efforts

The conceptual project designs indicate that the shore end of the new dock will be located above the upland-wetland boundary. It appears that the dock will actually free-span the wetland areas in a similar design to the existing docks. This will minimize effects on Section 404 waters of the US.

4.2.3 Project Impacts

4.2.3.1 Construction Related Impacts

The proposed installation of the ferry terminal facilities will include support pilings and a floating dock. Based on the conceptual design the dock will cover 0.05 ha (0.12 acre) of wetlands (Section 404 waters) and 0.15 ha (0.38 acre) of Section 10 waters. The floating dock would be anchored in place by pilings. Because site-specific designs are not available at this time, the following estimates of how much fill the new pilings would result in are based on an estimate of 20 to 60 piles used to anchor the floats each of which would be between 46 and 91 cm (18 and 36 inches) in diameter and 15.8-m (52-feet) long. These estimates were used to create two scenarios for discussion that should encompass the entire range of pile-generated fill potentially required. The least amount of fill would be generated by using 20, 46-cm (18-inch) diameter piles, which results in about ~~130~~ 52 cubic-meters (~~170~~ 68 cubic-yards) of fill. If 60, 91-cm (36-inch) diameter piles are used, the project would generate about ~~519~~ 625 cubic-meters (~~679~~ 817 cubic-yards) of fill. This fill of Waters of the US is partially offset by removal of existing pilings as discussed below. To create suitable depth for ferry operations of 3.0-3.7 m (10-12 feet) below mean lower low water, about 13,496 cubic-meters (17,652 cubic-yards) of sediment would have to be dredged from the east basin.

4.2.3.2 Operational Impacts

Operation of proposed ferry service within San Francisco Bay will generate wakes. Depending on their size and location, these wakes have the potential to generate sediment movement within sensitive habitats like tidal mudflats, eelgrass beds, and salt marshes. The wind blowing across the Bay also generates waves and the relationship between the ferry-generated waves and the wind-generated waves is an important comparison. A model was developed to compare the relationship between wind-generated waves, those resulting from existing vessel traffic, and those from the proposed ferry service (Section 5.5). The detailed analysis looked at conditions generated by wind-waves and existing marine traffic, and compared those to project-generated wakes. The modeling looked at the relationship between wind-generated and project-generated wave height, wave period, bottom velocity, energy, vertical run-up, and onshore and sediment transport. In general, for all of these parameters, modeling indicates that wave height, bottom velocity, energy, vertical run-up, and onshore and offshore transport of sediment from project-generated wakes are less than those generated by wind waves (CHE 2005). Modeling indicates that the wave period[1] generated by ferry operations will be greater than existing wind waves or vessel traffic. Increased wave periods do not necessarily increase impacts because most parameters, except wave run-up, are not affected by wave period (CHE 2005). Modeling also indicated

[1] Wave period is the time it takes for two successive wave crests or troughs to pass a point in space.

that ferry-generated waves were similar to those of existing vessel traffic and should also be less than wind-generated wave conditions.

The second step in this effort was to examine the effects of ferry-generated wakes over time. The preceding analysis assessed conditions resulting from a single trip. When multiple crossings per day were included along with changes in bathymetry and ferry course, it became clear that the project could result in sediment movement at four sites (Section 5.5). Although the modeling indicates that the project generates sediment movement, the amount predicted to be attributable to the project was less than 20 percent of sediment movement caused by wind waves and existing vessel traffic. This is not considered a substantial contribution to overall sediment movement.

4.2.4 Compensatory Mitigation

4.2.4.1 Construction

The project will require the removal of existing Gates 9 and 10 (about 0.15 ha or 0.37 acres) and the pilings associated with those docks. There are 24 pilings on Gates 9 and 23 on Gates 10 that would be removed. Each of these is 0.9-m (1-foot) square and between 15.8 and 17.7 m (52 and 58 feet) long. Using the shortest length to estimate the volume of material to be removed, this amounts to about 69 cubic-meters (90.5 cubic-yards) of piles. Additionally, the project would require the removal of the last slip or two on the remaining docks in the east basin (about 0.36 ha or 0.9 acres) and the three pilings located at the end of the existing docks. This amounts to 11 pilings that would be removed. If these are all 0.9-m (1-square) foot and 15.8 m (52 feet) long, they amount to an additional 16.2 cubic-meters (21.2 cubic-yards) of Bay fill that will be removed as part of this project.

4.2.4.2 Operational Impacts

Operational impacts associated with the project are related to ferry generated wakes. The modeling indicates that these impacts are not substantial. Because of this, no mitigation is proposed.

4.2.5 Cumulative Effects

The following cumulative analysis is based on the conceptual design of the ferry terminal, upland development, and Bay fill and dredging requirements associated with this conceptual design. The context for this cumulative discussion is the San Francisco Bay as a whole. Estimates of the Bay's size range from 1,036 to 4,144 square-kilometers (400 to 1,600 square-miles) depending on which sub-bays are included. The floating docks to be installed as part of the project will cover essentially the same area 0.154 ha (0.38 acres) as the ones being removed 0.149 (0.37 acres) thereby preventing the project from contributing to the overall fill (as defined by any of the responsible permitting agencies) of the Bay.

The long-term dredging and disposal needs for the entire Bay is estimated at about 229 million cubic-meters (mcm) [300 million cubic-yards (mcy)] over a 50-year period or an average of 4.6 mcm (6.0 mcy) per year (Corps 2001). The amount of material that may be dredged from the Oyster Point Marina to create sufficient operational depth required by this project is about 13,496 cubic-meters

(17,652 cubic-yards). This amounts to about 0.29 percent of the average annual dredge total for the entire Bay. This amount is not a considerable contribution to the overall dredge or disposal volumes.

4.3 Special Status Plant Species

The USFWS and CNDDB reported 89 plant species as potentially occurring within the US Geological Survey's 7.5-minute San Francisco South, San Francisco North, Hunters Point, Montara Mountain, San Mateo, Oakland West, Oakland East, San Leandro and Redwood Point quadrangles (Appendix C). The project area is essentially fully developed and most vegetation in the area has been introduced as landscape plants and turf grass. The entire Marina is an old landfill that has been capped with imported fill material (SCS 1991). No soils native to the site or serpentine soil occurs within the project area. Because the site is developed and does not have soils preferred by the plant species listed in Appendix C, there is no suitable habitat for these species. Furthermore, none of the plant species observed during the site visit are listed in Appendix C. Thus, the project would not impact endangered, threatened, and/or sensitive plant species.

4.4 Special Status Animal Species

4.4.1 Pacific Herring (*Clupea pallasi*)

San Francisco Bay supports a small yet productive commercial Pacific herring fishery. Pacific herring are not protected by either the State of California or the federal government. However, because herring are harvested for their roe, they are an important species in the economy of the San Francisco Bay Area and herring populations are closely monitored CDFG. Pacific herring is also an important species in the ecology of San Francisco Bay, because herring, along with sardines and anchovies, are a primary food source for salmon and other sport fish. Pacific herring generally enter the Bay from about November 1 to March 30 of each year and spawn in intertidal and subtidal habitats (Barnhart 1988). The actual sites where Pacific herring spawn in San Francisco Bay changes from year to year and spawning may occur at numerous locations around the Bay. The North Bay is typically the preferred area although limited spawning has historically been observed at San Mateo Point (Miller and Schmidtke 1956). National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) does not map herring spawning habitat south of Hunters Point (NOAA 2005). The Alameda shipping channel is mapped as herring spawning habitat (NOAA 2005). Herring prefer to spawn over algae and eelgrass first, rocky substrates second, and last on flat surfaces such as marina pilings, retaining walls, and bulkheads occurring along the San Francisco Bay waterfront (Barnhart 1988).

4.4.1.1 Survey Results

The Marina is not known to support spawning herring. The Marina does not support any vegetative habitat or rocky substrates suitable for herring spawning. The pilings and breakwaters may be used as a last resort, but are considered relatively poor habitat. The sub-surface habitats in the Marina were not surveyed, but routine dredging would prevent establishment of aquatic vegetation within the Marina.

4.4.1.2 Avoidance and Minimization Efforts

Construction

In order to minimize the potential effects of dredging on herring, all dredging activities should be confined to the time of year when herring are not spawning within the Bay. According to CDFG and the Corps Dredge Material Management Office (DMMO) dredging cannot occur between December 1 and the end of February without a waiver from CDFG (Corps 2004). All material removed from the seafloor within the Marina will be disposed of at an approved upland or open-water site as required by the DMMO.

Installation of pilings requires the piles to be driven into the substrate. Depending on the type of pile to be installed (concrete, wood, hollow steel, H-beams, etc.), the method of installation (impact or vibratory hammer), and energy delivered to the pile, this can create large amounts of noise that travels through the water as a pressure wave. When pile driving generates a pressure wave of sufficient size, it can injure and kill fish. NOAA Fisheries indicates that when pile driving creates peak underwater sound pressure levels of over 180 decibels referenced to 1 micropascal it can physically injure fish (NOAA 2005a). To minimize impacts on fish, the following measures are recommended:

1. Use fewer or smaller piles and preferably solid piles.
2. Drive piles with a vibratory device instead of an impact hammer if at all possible.
3. Only drive piles during periods of minimal current.
4. Drive piles when species of concern are absent (for herring avoid the December 1 through end of February period described above).
5. Restrict pile driving to the June 1 to November 30 work window as recommended by NOAA Fisheries and NOAA National Ocean Service (NOAA 2005a).
6. If steel piles must be driven with an impact hammer, an air curtain shall be installed to disrupt sound wave propagation. Additionally, a qualified biologist shall monitor pile driving to ensure that the air curtain is functioning properly and project-generated sound waves do not exceed the established threshold.

If piles will be installed during seasons when herring are in the Bay additional mitigation measures may be necessary. Depending on the pile specifics (material, size, hammer, etc.) it may be necessary to restrict pile driving to periods of low tide to minimize the in-water portion of the pile and therefore the sound created or to install a confined or unconfined bubble curtain. Bubble curtains work by disrupting the sound wave as it travels from water to air then back to the water.

4.4.1.3 Project Impacts

Construction

The project area that will be altered by construction is outside the area considered to support spawning herring. Phasing in-water construction, especially dredging and pile driving, to occur during the period when herring are not in the Bay would essentially prevent the project from adversely ~~effect~~affecting this species.

Operational

The only area traversed by the proposed travel routes that is designated as spawning habitat for Pacific herring is at the Bay entrance to the Alameda shipping channel (Merkel 2003; NOAA 2005b). The Port of Oakland is the fourth busiest seaport in the nation and in the top 20 busiest in the world (Port of Oakland 2005). The existing shipping traffic within this channel is very high. The Port of Oakland deals with hundreds of sailings per month of major vessels. For each of those sailings, there are tugs and other support craft that routinely move up and down the channel. Further up the channel past the terminal location, are numerous marinas harboring recreational boats. Because of a continuously high level of activity, the shipping channel walls are entirely armored and the channel is routinely dredged to maintain adequate service depth for large cargo ships. The spawning habitat within the channel can be characterized as relatively poor quality because herring prefer to spawn over vegetation like eelgrass and use bulkheads and other hard structures as a last resort. Ferry service to and from Jack London Square that's attributable to the project is estimated to be about 640 crossings per month. An additional 640 crossings per month through the shipping channel will not have any effect on the existing channel banks because they are all armored. Additional wake wash will occur and could affect individual fish, but at a level that would not substantially alter habitat. Because of this, operation of ferry service into and out of Jack London Square is not considered to adversely ~~effect~~affect Pacific herring spawning habitat within the Alameda shipping channel.

Operational effects on the eelgrass bed mapped in the marsh area at the western end of Alameda Island near the entrance to the shipping channel are described in Section 4.2.

4.4.1.4 Compensatory Mitigation

No compensatory mitigation is proposed because there is not a substantial adverse impact to herring spawning habitat.

4.4.1.5 Cumulative Effects

The project does not remove any existing spawning habitat or in any way prevent fish to access available habitat. Therefore, the project will not contribute to cumulative changes in spawning habitat for Pacific herring.

4.4.2 Green Sturgeon (*Acipenser medirostris*)

4.4.2.1 Survey Results

Green sturgeon are found from the Bearing Sea south to northern Mexico with the Sacramento River supporting the southern-most spawning population (Moyle 2002). The population of green sturgeon was estimated at less than 2,000 adults in the early 1990s (Moyle 2002). Green sturgeon were proposed

for listing under the FESA in April 2005 (70 FR 17386). This proposed rule was made final in April, 2006 (71 FR 17757). Adult sturgeon move into the Sacramento River presumably between February and May (USFWS 1995) and have been observed in the mainstem Sacramento River near Red Bluff (Moyle et. al 1995). Spawning takes place in March-July with peaks in April-June (70 FR 17386). The project site does not provide spawning or migratory habitat for green sturgeon. Juveniles spend 1-4 years in freshwater and estuarine habitats before moving to the ocean in the summer and fall (Moyle 2002). Juveniles have been captured in the Delta indicating that this area is used as rearing habitat. However, young sturgeon may also rear in San Francisco Bay for sometime after leaving the estuary. Because of this, the Marina could be considered foraging habitat. However, because it is routinely dredged to maintain operational depths (an activity that removes all the benthic organisms on which sturgeon feed), it the Marina would be considered poor quality foraging habitat.

4.4.2.2 Avoidance and Minimization Efforts

To minimize potential impacts to green sturgeon during construction of the proposed facilities, the measures described above (Section 4.4.1.2) that minimize impacts to Pacific herring will also minimize impacts to green sturgeon. These measures include seasonal restrictions on work, specific types of hammers for pile driving, and air curtains and monitoring if necessary.

4.4.2.3 Project Impacts

Construction

Construction of the proposed project will require dredging of the Marina and installation of piles to support and anchor the ferry dock. Dredging will occur before pile driving and will remove all benthic organisms within a portion of the Marina further reducing the quality of this already marginal foraging habitat. Because the Marina is considered poor quality foraging habitat to start with, it is not expected that dredging will directly impact sturgeon. All dredge material will be disposed of in an upland location.

Dredging will reduce habitat quality and generally disturb the benthic community within the Marina. Because of this, it is unlikely that sturgeon would be found within the Marina during pile driving. However, they can be found in the Bay throughout the year. Even through pile driving will occur during the windows specified above to minimize potential impacts to Pacific herring and salmonids (Section 4.4.1.2), sturgeon could still be exposed to project-generated noise. Currently, the large steel piles will be installed with a vibratory hammer which will minimize noise generated. If the geotechnical investigations indicate that site conditions do not allow for use of a vibratory hammer, an air curtain will be installed and operated during pile driving. Additionally, a biological monitor will be on-site to ensure that the project does not adversely affect fish. Because of these minimization efforts, potential impacts to green sturgeon will be avoided.

Operational

Operation of the proposed project will add about 640 crossings of the Bay per month to existing vessel traffic. The ferries proposed for use are relatively small compared to much of the vessel traffic on the

Bay. The surface disturbance generated by these crossings will not affect green sturgeon foraging on the bottom of the Bay.

4.4.2.4 Compensatory Mitigation

No compensatory mitigation is proposed because there is not a substantial adverse impact to green sturgeon.

4.4.2.5 Cumulative Effects

The project does not remove any existing spawning habitat, interrupt migratory pathways, or in any way prevent fish to access available habitat. A small amount of marginal quality foraging habitat will be modified by dredging and covered by the ferry dock. This area is very small, a combined total of 0.25 ha (0.5 acre) of wetlands (Section 404 waters) and 0.15 ha (0.38 acre) of Section 10 waters, therefore, the project will not contribute to cumulative changes in foraging habitat for green sturgeon.

4.4.3 California Native Oyster (*Ostreola conchaphila*)

4.4.3.1 Survey Results

Native oysters (*Ostreola conchaphila*) were historically abundant in San Francisco Bay. Oyster beds are a cornerstone in the benthic habitat, improving water quality, and habitat complexity that favors fish and vegetation. They also provide a important link between pelagic and benthic food webs. Native oyster populations were severely depressed by overharvest and the introduction of non-native oysters for the rapidly growing food market in the 19th Century. These same introductions also brought the non-native oyster drill, an oyster-predator not previously present in the Bay. These factors, combined with declines in water quality, reduced the native oyster population in San Francisco Bay to a point that it was unclear if a population even remained.

Recently, small populations of native oysters have been documented within the Bay including a population within the Marina (Harris 2004; Latta 2006; Johnson 2006). They have been reported colonizing the swim buoy lines near the western beach, on dock supports in the east basin, and other hard surfaces (Johnson 2006). They have also been reported adjacent to the Marina on the rocky shoreline of Oyster Point (Zabin 2006). Detailed surveys for native oysters were not conducted as part of this project. They are assumed to be present on suitable substrate throughout the Marina. Suitable substrate is solid surfaces to which the larvae can easily attach (Harris 2004).

4.4.3.2 Avoidance and Minimization Efforts

Native oysters are present within the Marina throughout the year and are attached to solid substrates. Because of this, it is not possible to select a construction window that would avoid affecting this species. The project has already been designed to minimize the required dredging and dock removal. Additional avoidance and minimization efforts are not proposed at this time.

4.4.3.3 Project Impacts

Construction

Construction related affects are related to either dredging or removal of portions of docks. Dredging is necessary to provide operational depth for the ferries at low tides, Most of the bottom within the east basin of the Marina is expected to be relatively soft sediments. These are not typically considered suitable substrates on which larval oysters settle. However, if there is a population of oysters within the area to be dredged, they would be removed along with the sediment. All dredge material will be disposed of in an upland location and therefore not result in sedimentation of oysters at some other location in the Bay. The project also requires the complete removal of all slips at Gates 9 and 10 and removal of one slip from the end of Gates 11, 12, and 13. It is likely that oysters have settled onto these substrates and therefore, the removal of these docks would reduce the oyster population within the Marina. The magnitude of this reduction is unknown and would depend on the density of oysters attached to the docks.

Operational

The re-suspension of fine Bay mud during ferry operations could suffocate oysters or decrease the efficiency with which they can filter water. The wake-wash model used for this project predicts the largest scour zone of about 53-feet wide to occur at water depths of 16 feet (CHE 2005). Depending on how long this material stays suspended and the distribution of oysters within the Marina, the project could reduce the productivity of the oysters over time. This could lead to reductions in the overall oyster population.

4.4.3.4 Compensatory Mitigation

The following measures were proposed by NOAA Fisheries during the EFH consultation. The FTA has agreed that these measures should be taken to minimize impacts to the native oyster population.

a) The FTA and WTA should collaborate with Save-the-Bay, UC Davis, and NOAA Fisheries to develop a native oyster survey protocol. Based on this protocol, FTA and WTA should conduct a survey of native oyster distribution at and near the project area during fall or summer months prior to ferry terminal construction and ferry operation. This survey should include the areas to be dredged for operational depth and the floating docks and pilings that will be removed. If no native oysters are found in any of these areas, no further mitigation is required. If native oysters are observed, Measures (b) through Measure (d) shall be implemented.

b) If the survey conducted in Measure (a) determines that oysters are present in the footprint of the area to be dredged for the ferry channel, within 53 feet adjacent to either side of the new ferry terminal, and/or on the underside of the floating docks that will be removed to complete the new ferry terminal, WTA should mitigate for the loss of native oysters with the placement of a NOAA Fisheries-approved substrate. Substrate should be placed in an area outside of direct impact by the project. NOAA Fisheries staff should be contacted to assist with substrate choice and site selection.

c) The FTA and WTA should collaborate with on-going oyster monitoring efforts in Oyster Point Marina with Save-the-Bay, Oyster Point Marina, and UC Davis to monitor subtidal oyster distribution, abundance, settlement, and functioning within Oyster Point Marina. Monitoring protocols should include water quality parameters, oyster density, and oyster settlement. NOAA Fisheries recommends monitoring occur on a monthly basis one year before the ferry project is in place (or as close to a year as possible) during the fall and winter months, and on a bi-monthly basis during spring and summer months in order to determine baseline conditions for live oysters at Oyster Point Marina. After the ferry project is in place, NOAA Fisheries recommends monitoring on a monthly basis during the fall and winter months, and on a bi-monthly basis during the spring and summer months for a one year period. Monitoring beyond the one-year pre-construction period and one year post-construction should continue for one additional year if adverse affects to live native oysters are discerned by NOAA Fisheries staff based on the results of the first 24 months of data.

d) The FTA and WTA should produce an annual report for NOAA Fisheries after a year of monitoring data has been collected. The report should include oyster monitoring data and analysis of the effects of dredging and scouring on oyster abundance, distribution, settlement, and functioning.

4.4.3.5 Cumulative Effects

There are two ways in which the project can contribute to cumulative effects on the native oyster populations. First, there is the direct loss resulting from dredging and removal of substrates (docks). Second, operation of ferry service could result in re-suspension of fine Bay mud which reduces the feeding capability of oysters and would presumably reduce oyster production. The direct loss of individuals and substrate will be more than offset by the installation of the appropriate amount of suitable habitat in an area that will not be affected by the project or future Marina operations (Measures a and b). The monitoring study required in Measures (c-d) would contribute valuable information on the effects of operations on native oysters. This effort will contribute to what is a relatively small body of knowledge on the oyster and be useful in other proposed ferry terminal throughout the greater San Francisco Bay. Overall, the proposed project is not expected to considerably contribute to a cumulative reduction in oyster populations of San Francisco Bay.

~~4.4.2~~4.4.4 Alameda Song Sparrow (*Melospiza melodia pusillula*)

~~4.4.2.1~~4.4.4.1 Survey Results

The Alameda song sparrow is a Federal and CDFG Species of Special Concern (Appendix C). The Alameda song sparrow occurs only in the marshlands of San Francisco Bay (Jurek 1974). The range of the Alameda song sparrow extends from Coyote Creek, at the southern extremity of the Bay, northward along the west shore of South San Francisco Bay to Belmont Slough and along the east shore to San Lorenzo. Song sparrows nest in dense riparian thickets, emergent wetlands (including salt marshes) and dense thickets in other moist situations (Madrone Audubon Society 1995). The Alameda song sparrow uses tidal salt marsh habitats along the edge of the Bay and streams where tidal flow affects the vegetation. The EIP field survey did not result in the direct observation or evidence of the Alameda song sparrow in the project area. The CNDDB does not report the occurrences of this bird in the project area. The project area contains marginal habitat for this species in several small areas of salt grass.

~~4.4.2.2~~4.4.4.2 Avoidance and Minimization Efforts

The key to avoiding project-related impacts to the Alameda song sparrow is to prevent disturbance of vegetation in which this species could be nesting. The WTA shall incorporate the following measures in order to ensure that the project would not adversely impact the Alameda song sparrow:

- The removal or disturbance of vegetation should avoid the February 1 through August 31 bird nesting period to the extent possible. If no vegetation or tree removal is proposed during the nesting period, no surveys are required. If it is not feasible to avoid the nesting period, a survey for nesting birds should be conducted by a qualified wildlife biologist no earlier than seven days prior to the removal of trees, shrubs, grassland vegetation, buildings, or other construction activity. Survey results shall be valid for 21 days following the survey. The area surveyed should include all construction areas as well as areas within 150 feet outside the boundaries of the areas to be cleared and/or disturbed or as otherwise determined by the biologist.
- In the event that an active nest is discovered in the areas to be cleared and/or disturbed, or in other habitats within 150 feet of construction boundaries, clearing and construction shall be postponed for at least two weeks or until a wildlife biologist has determined that the young have fledged (left the nest), the nest is vacated, and there is no evidence of second nesting attempts.

~~4.4.2.3~~4.4.4.3 Project Impacts

Any project activities, such as removal of vegetation, which results in the loss of young birds or the abandonment of an active bird nest could be a violation of Fish and Game Code Section 3503 and the federal Migratory Bird Treaty Act, depending on the bird species (house sparrows and European starlings are not protected by these regulations). Without proper planning, construction activities could result in the disturbance of Alameda song sparrow or it's habitat. However, implementation of the above-described avoidance and minimization efforts would minimize adverse impacts to this species.

~~4.4.2.4~~4.4.4.4 Compensatory Mitigation

The avoidance and minimization efforts discussed above would be adequate to prevent adverse impacts to the Alameda song sparrow. No compensatory mitigation is proposed.

~~4.4.2.5~~4.4.4.5 Cumulative Effects

The project involves modification of an area that is highly developed and as such, does not contain high quality Alameda song sparrow habitat. Additionally, implementation of the avoidance and minimization efforts would ensure that this species is not adversely impacted. Therefore, the project would not contribute to cumulative impacts on the Alameda song sparrow.

~~4.4.3~~4.4.5 Central California Coast Steelhead (*Oncorhynchus mykiss*)

The central California coast population of steelhead are a federally threatened species (62 FR 43937). Critical habitat has been proposed for this species and the project site is within proposed Habitat Unit 6 (69 FR 74572). The primary constituent elements of critical habitat for this species are freshwater spawning, rearing, and migration areas; estuarine areas free of obstructions and of sufficient quality to support adult and juvenile rearing; and nearshore and offshore marine areas. The Oyster Point Marina

is closest to the estuarine classification, but the Marina does not contain any natural cover, large woody debris, side channels, and other features that would make it productive rearing habitat for steelhead. Therefore, the site does not support any of the primary constituent elements to be considered critical habitat.

Adult steelhead spend two to three years in the ocean before returning to their natal streams to spawn. Juveniles spend one to two years in freshwater before migrating to the ocean. The closest known population of this species to the project area is in San Francisquito Creek. Although quite some distance south of the project area, it is possible that the adults and juveniles could move through the Bay adjacent to the project site on their way to and from San Francisquito Creek. Although unlikely to be directly affected by the project, following the allowed work window as outlined by the DMMO and NOAA Fisheries of June 1 through November 30 for dredging and pile driving will ensure that construction of the project will not affect this sensitive species.

~~4.4.4~~4.4.6 Black Skimmer (*Rynchops niger*)

The black skimmer is a Federal and CDFG Species of Special Concern when nesting (Appendix C). The black skimmer requires shallow, calm water for foraging, and sand bars, beaches, or dikes for roosting and nesting. The EIP field survey did not result in the direct observation or evidence of a black skimmer in the project area. The CNDDB does not report the occurrences of black skimmer within the project vicinity. The only nesting records in the CNDDB for the San Francisco Bay are from East Bay Regional Parks District lands south of San Leandro in the East Bay (CNDDB 2005). The breakwaters surrounding the Marina could provide perching habitat but the Marina does not support any nesting habitat. The project would not alter the breakwaters. In light of this, the very few numbers of this bird within the Bay, and the fact that the project area does not support nesting habitat, the project is not expected to impact this species.

~~4.4.5~~4.4.7 Black Turnstone (*Arenaria melanocephala*)

The black turnstone is a Federal Species of Special Concern (Appendix C). Black turnstone is strictly a coastal species, migrating and wintering along the rocky shorelines of the Pacific Coast and breeding in western Alaska. The black turnstone prefers rocky coasts and beaches. The EIP field survey did not result in the direct observation or evidence of suitable habitat for black turnstone in the study area. The CNDDB does not report the occurrences of black turnstones within the state (CNDDB 2005). Since the study area is highly developed, suitable foraging habitat is not present. Therefore, the project is not expected to impact this species.

~~4.4.6~~4.4.8 California Brown Pelican (*Pelecanus occidentalis californicus*)

The California brown pelican is a Federal and State endangered species. It is fully protected by California Fish and Game Code (Section 3511) and impacts to nesting colonies or communal roosting sites are of particular concern. The brown pelican is found in estuarine, marine subtidal, and marine pelagic waters along the California coast. The pelicans nest from the Channel Islands of southern California southward along the Baja California coast and in the Gulf of California to coastal southern Mexico. The pelican builds nests of sticks on the ground, typically on islands or offshore rocks. The

EIP field survey did not result in the direct observation or evidence of California brown pelicans in the project area. Even though they are routinely observed within the Bay, the CNDDB does not report the occurrences of nesting or roosting California brown pelicans in San Francisco Bay. Foraging habitat for the California brown pelican is present in the project area. However, the project will not alter this habitat. Also, the project is not anticipated to adversely impact this species because it would not affect nesting sites. The project would not alter the breakwaters, which could be used by this species as communal roosting areas. Accordingly, the project would not result in potentially adverse effects to the California brown pelican.

~~4.4.7~~4.4.9 California Clapper Rail (*Rallus longirostris obsoletus*)

The California clapper rail is an inhabitant of tidal salt marshes of the greater San Francisco Bay, although some individuals use brackish marshes during the spring breeding season. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, rails typically inhabit salt marshes dominated by pickleweed and Pacific cordgrass (*Spartina foliosa*) (USFWS 2005). The California clapper rail was listed as endangered by the USFWS in 1970 and by the CDFG in 1971. The nearest known clapper rail populations are along Colma Creek between Utah Avenue and Navigable Slough approximately 1.5 miles away and near Belmont Slough, approximately 12 miles south of the project site (EIP 2002). The shoreline within the Oyster Point Marina is mostly lacking in vegetation. There are a few areas of the shoreline that support relatively small stands of salt grasses. These areas tend to be isolated from each other with extensive unvegetated areas between them. This fragmentation of vegetated shoreline creates patches of salt grass that are too small and too far apart to support clapper rails. No clapper rails were observed within the project area. Clapper rails were heard calling from near Colma Creek south of the project area indicating that birds were active during the survey period. Because the project area does not support suitable habitat for this species, the project would not impact this species. Additionally, the site is not adjacent to occupied territory that could be affected by project construction or operation.

~~4.4.8~~4.4.10 Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The western snowy plover is a Federally threatened species and a CDFG species of concern. The USFWS has proposed critical habitats for this species; however, the project area is not within proposed critical habitat (69 FR 75607). The western snowy plover nests on sandy beaches of the ocean, bays, salt ponds, and larger lakes. The EIP field survey did not result in the direct observation or evidence of this species. The CNDDB does not report the occurrences of western snowy plover in the project vicinity. The Marina contains marginal nesting habitat along the shoreline of the mole and on the sandy beach. However, it is unlikely that the western snowy plover would nest in these areas because of the high level of human disturbance and activity (i.e., boats docking, recreational use of the beach by people and dogs, etc.). Therefore, the project would not disturb western snowy plover nesting sites and as such, would not impact this species.

~~4.4.9~~4.4.11 Salt Marsh Vagrant Shrew (*Sorex vagrans halicoetes*) and Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)

The salt marsh vagrant shrew is a Federal and CDFG Species of Special Concern (Appendix C). This species is found in dense, low cover, primarily pickleweed, above high tide line in tidal marshes of the South San Francisco Bay. The salt marsh harvest mouse is a Federal and State endangered species and is fully protected by CDFG. This species is found only in emergent salt marsh habitats of San Francisco Bay where pickleweed is the primary vegetation. The CNDDB does not report the occurrences of either of these species in the project vicinity. The EIP field survey did not result in the observation of habitat suitable for either of these species within the project area. There are a few stands of salt grass, but pickleweed is almost entirely absent from the project area. The pickleweed plants that are present, are separate individuals and do not form any marsh dense habitat.

Both the salt marsh vagrant shrew and harvest mouse prefer dense vegetation that is primarily comprised of pickleweed; a habitat not present within the project area. Therefore, because required habitat for these species is not present, the project would not impact these species.

Chapter 5 Results: Permits and Technical Studies for Special Laws or Conditions

5.1 Regulatory Requirements

Permits from state and federal agencies that will be required for this project include permits from the Corps (Section 10 of the Rivers Harbors Act, Section 404 of the Clean Water Act, and dredging authorization), the San Francisco Bay Conservation and Development Commission (BCDC) (major permit), and the San Francisco Bay Regional Water Quality Control Board (RWQCB) (Section 401 of the Clean Water Act – Clean Water Certification). However, most of these relate to the fill of wetland habitats or dredging activities rather than biological resources. At this time, it does not appear that the project will impact federally-listed species or their designated critical habitat.

5.2 Federal Endangered Species Act Consultation Summary

Under Section 7 of the Federal Endangered Species Act (FESA), all Federal agencies are required to consult with USFWS to ensure that their actions do not jeopardize the continued existence of a listed species or destroy or adversely modify designated critical habitat. In general, the project does not result in modifications of designated critical habitat or impacts to listed species. Federally-listed species such as the California brown pelican, western snowy plover, and California clapper rail may require the lead federal agency (the FTA or the Corps in this case) to consult with USFWS under Section 7 of the FESA. Following informal discussions and review of the project, the USFWS concluded that the proposed project was not likely to result in take of any federally listed species under their jurisdiction (Olah 2006).

The federally-listed fish species are under the jurisdiction of NOAA Fisheries. It is expected that dredging activity will fall within the guidelines of the Long Term Management Strategy (LTMS). The LTMS is managed by the Corps and has already been subject to a Section 7 consultation by the USFWS and NOAA Fisheries. The installation of pilings to support the new ferry dock could require consultation with NOAA Fisheries to ensure that fish or marine mammals are not impacted by project construction. On June 6, 2006, FTA requested an informal consultation with NOAA Fisheries under Section 7 of the FESA. Following discussions with NOAA Fisheries via conference call on July 13, 2006, this NES was modified to include additional avoidance and minimization measures designed to specifically protect green sturgeon. As part of the consultation process, a site visit with NOAA Fisheries staff was conducted on August 8, 2006. NOAA Fisheries responded to FTA's consultation request with a letter dated September 25, 2006. In this letter NOAA Fisheries concluded that the project was not likely to adversely affect listed anadromous salmonids or the southern distinct population segment of North American green sturgeon. This determination completed the Section 7 consultation with FTA. ~~A Biological Assessment may be required to support this process.~~

5.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan (FMP). Section 305(b)(2) of the Magnuson-Stevens Act requires Federal action agencies to consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)). The Oyster Point Marina is within an area that is managed with the Pacific Groundfish FMP (starry flounder, leopard shark), the Coastal Pelagics FMP (northern anchovy), and the Pacific Coast Salmon FMP (Chinook). Additionally a population of native oysters exists within the Marina. Native oysters are included as EFH because they increase the quality of EFH for groundfish, pelagic, and salmon species. The FTA initiated consultation under the Magnuson-Stevens Act with the same June 6, 2006 letter that initiated the Section 7 consultation. NOAA Fisheries concluded that the project may result in adverse effects to EFH and made conservation recommendations in their September 25 letter to reduce the level of adverse effect. A meeting was held at NOAA Fisheries offices in Santa Rosa on October 18, 2006 to discuss these conservation recommendations, evaluate options, and discuss possible methods for implementation. In a letter dated November 13, 2006 FTA agreed with NOAA Fisheries' conservation recommendations relating to native oysters. These recommendations have been incorporated into this NES as compensatory mitigation measures (Section 4.4.3.3).

~~5.3~~5.4 California Endangered Species Act Consultation Summary

Under Fish and Game Code Section 2080.1, an applicant is allowed to obtain a consistency determination for their project once they have a Biological Opinion or incidental take permit from the USFWS. In this process, CDFG is notified in writing and provided a copy of the Biological Opinion and incidental take statement. The CDFG will then make a determination about the consistency of the Biological Opinion and incidental take statement with the CESA. Because the only State-listed species potentially occurring in the area are the California brown pelican and the California clapper rail, and the project will not affect these species, obtaining a consistency determination should be a straightforward process if it is required. If for some reason, CDFG determines that the federal incidental take statement is not consistent with CESA, the applicant must apply for a State Incidental Take Permit under Section 2081(b) of the Fish and Game Code.

~~5.4~~5.5 Wetlands and Other Waters Coordination Summary

The Corps has jurisdiction over the open water of the Marina under Section 10 of the Rivers and Harbors Act up to the mean tide line. The area between the mean tide line and ordinary high water is subject to the Corps jurisdiction under Section 404 of the Clean Water Act. The field work necessary to determine the area subject to the Corps jurisdiction under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act has been conducted and submitted to the Corps for verification

(EIP 2005). An official jurisdictional determination was received from the Corps in late October 2005 (Hicks 2005) . Within the project area approximately 13.7 ha (33.8 acres) are subject to Section 10 of the Rivers and Harbors Act and 1.7 ha (4.1 acres) are subject to Section 404 of the Clean Water Act. The project itself will only affect a relatively small portion of this area, but it would still require Section 10 of the Rivers and Harbors Act and 404 of the Clean Water Act permits from the Corps.

Within San Francisco Bay, projects that result in fill of Bay water, including floating structures or structures that span the Bay, are required to obtain a permit from the BCDC. In addition to the Bay waters, BCDC also regulates activities for 30.5 m (100 feet) inland of the shoreline. The shoreline is defined as the mean high tide line (also called the mean high water line). Because most of the project is within their jurisdiction, the project will likely require a major permit from the BCDC.

The RWQCB is tasked with protecting the water quality of San Francisco Bay through implementation of Section 401 of the Clean Water Act and the State's Porter-Cologne Water Quality Control Act. As such, the project will require a clean water certification from the RWQCB. This certification will make sure that the required measures are taken to ensure that construction and operation of the project would not impact the water quality of San Francisco Bay.

~~5.~~55.6 Coastal Engineering Study

Operation of the ferry both within and to and from the Marina could result in increased suspension of Bay mud, wave wash, localized re-suspension of sediments, and potentially deposition or erosion in sensitive habitats. A detailed modeling exercise was conducted by Coast & Harbor Engineering (CHE 2005) to evaluate the potential for the project to impact sensitive resources at various points along transit routes. The first step in this process was to identify potentially sensitive receptors along the ferry route. Overall, ten locations were identified on the main north-south route (mostly tidal mudflats or tidal marsh) and five on the east-west route into Jack London Square (eelgrass beds, sandy shoreline, and a marine mammal haul-out area). The detailed analysis looked at conditions generated by wind-waves and existing marine traffic, and compared those to project-generated waves. The modeling looked at the relationship between wind-generated and project-generated wave height, wave period, bottom velocity, energy, vertical run-up, and sediment transport. In general, for all of these parameters, modeling indicates that wave height, bottom velocity, energy, vertical run-up, and sediment transport of from project-generated wakes are less than those generated by wind waves (CHE 2005). Modeling indicates that the wave period generated by ferry operations will be greater than existing wind waves or vessel traffic. Increased wave periods do not necessarily increase levels of impact because most parameters, except wave run-up, are not affected by wave period (CHE 2005). Modeling also indicated that ferry-generated waves were similar to those of existing vessel traffic. These results indicate that ferry operations should not create wave conditions substantially different than existing vessel traffic. Project-generated wave conditions should also be less than wind-generated wave conditions.

The preceding analysis considers the wake generated by passage of a single ferry. The second step in this analysis was to look at the potential effects of long-term operation of ferry service. This effort focused on the relationship between wind waves and the wakes generated by the proposed ferry service

but used existing vessel data when it was available. To study this relationship, the previous parameters of sediment transport were first modeled in relation to wake refraction and reflection. This was necessary because seafloor features and turns in ferry routes can lead to situations where wakes complement each other creating substantially higher wakes of greater energy than those generated by the project alone.

This analysis focused on the wave-related impacts on the San Francisco peninsula and shoreline. Using the same sensitive receptors identified previously, modeling was conducted that looked at significant waves in relation to tidal elevation and long-term movement of sediment at these sites. When considering wave wash on the north to south route, one area of tidal mudflat (site 2) may be exposed to increased wave heights of 0.20 m (7.9 in.), depending on the tide, as a result of the project (Figure 4 and Figure 11, Appendix D) (CHE 2005). When considering the south to the north route from Oyster Point, two other areas of tidal mudflat (1 and 3) may be exposed to increased wave heights of 0.20 m (7.9 in.), depending on the tide, as a result of the project (Figure 4 and Figure 12, Appendix D) (CHE 2005). The route towards Jack London Square will result in wave heights over 0.24 m (9.4 in.) higher at the eelgrass habitat at the western end of Alameda Island (Figure 4 and Figure 14, Appendix D) (CHE 2005).

To better understand the potential long-term impacts of this increase, an additional modeling step was taken that evaluated gross sediment movement at all fifteen locations identified as sensitive receptors based on the number of monthly crossings. To evaluate the potential impacts, an estimate of 1,560 crossings per month on the main north-south route and 640 crossings along the east-west route into Jack London Square was applied to the site-specific sediment transport rates previously modeled. The result of this effort was estimated monthly sediment transport rates that were not differentiable from existing conditions at most sites (CHE 2005). The results of the model indicate that there are three sites along the south bay route and one site along the central bay route where the project could contribute to sediment movement. However, this contribution is less than 20 percent of existing transport generated by wind waves (Table 4).

Table 4.
Monthly Sediment Transport at Three South Bay (SB) Sites and Two Central Bay (CB) Sites

	Gross Monthly Sediment Transport (north to south route)		Gross Monthly Sediment Transport (south to north route)	
Site	Wind Waves	Wake Wash	Wind Waves	Wake Wash
SB-1	7	Negligible	16	1
SB-2	25	3	39	7
SB-3	7	Negligible	26	3
CB-5	Negligible	Negligible	35	5

Note: All units are in cubic-meters of sediment per meter of beach.

Source: Based on Tables 3 and 4 of CHE 2005.

All estimates are based on units of cubic-meters of material that could move per meter of resource area (beach, eelgrass bed, mudflat, etc.). One thing that the model is not capable of predicting is the net direction of sediment movement. What this means is that it is possible for the model to estimate sediment movement, but not to predict if that movement is a net gain, loss, or if material is moving along the beach. Because the net direction of sediment cannot be predicted, the material may move onshore, offshore, or up or down the beach. Sediment movement along beaches and mudflats is a natural part of coastal processes. However, if the project results in a net movement offshore, areas could face a loss of sediment and eventually erode to a point that it would no longer be considered tidal mudflats. Conversely, net movement of material into a location could bury eelgrass beds or salt marsh habitats below sediment effectively removing this important habitat or altering it such that it no longer functions. Alternatively, material could simply move laterally along the beach and not alter local conditions.

Tidal mudflats, eelgrass beds, and salt marshes are all considered sensitive habitat. Modeling indicates that the project could result in sediment movement but predicts that this movement will not be a substantial amount. Although project operations could result in sediment movement, the magnitude of this effect is not a substantial portion of sediment movement generated by wind waves and vessel traffic. Therefore, the project will not adversely effect these habitats.

When the ferry is holding at the dock while loading and unloading, the jets are run at high speed to help hold the ferry steady. Modeling of these operations while at the terminal indicates that the jets will likely cause the suspension of Bay mud from the area below the dock (CHE 2005). The total area affected depends on the water depth and ranges between 12 and 16 m across (40 to 53 ft) (CHE 2005). This material will likely settle out within the Marina. Sensitive aquatic resources within the Marina are limited to small areas of wetlands and associated vegetation along the margins of the open water. These habitats are unlikely to accumulate substantial amounts of sediment as a result of vessel operations. Therefore, vessel operations within the Marina will not adversely effect sensitive resources by re-suspending Bay mud.

~~5.6~~5.7 Other

The South San Francisco Municipal Code, Chapter 13.30 Tree Preservation, was created to protect certain large trees with unique characteristics. A protected tree is defined as follows:

- Any tree with a circumference of 48 inches or more where measured 54 inches above natural grade; or
- A tree or stand of trees so designated by the Planning Director based upon findings that it is unique and of importance to the public due to its unusual appearance, location, historical significance or other factor; or
- A stand of trees in which the director has determined each tree is dependent upon the others for survival.

A protected tree cannot be removed, pruned, or otherwise materially altered without a permit (except as provided in Section 13.30.030 of the Municipal Code).

The project area does not include any trees large enough to qualify as protected trees, as defined in Section 13.30.020 of the South San Francisco Municipal Code. Therefore, the project would not result in the removal or otherwise effect protected trees.

Chapter 6 References

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9.2.14 APPENDIX C OF THE NATURAL ENVIRONMENT STUDY

As a result of consultation with other agencies, including the USFWS, Appendix C (List of Special-status Species and Their Potential to Occur in the Project Area) of the Natural Environment Study has been modified. As such, Appendix C of Appendix B1 (Natural Environment Study) has been reproduced in its entirety as follows:

Appendix C
Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Invertebrates								
Bay Checkerspot Butterfly *Euphydryas editha bayensis*	Threatened Critical Habitat	None	None	N/A	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay.	No No Critical Habitat present.	No	None
Black Abalone (NMFS) *Haliotes cracherodii*	Candidate	None	None	N/A	Pelagic.	No	No	None
Bridges' Coast Range Shoulderband Snail *Helminthoglypta nickliniana bridgesi*	Species of Concern	None	None	N/A	Known from open, west slope hillsides in Alameda and Contra Costa counties in a variety of habitats.[1,2]	No	No	None
Bumblebee Scarab Beetle *Lichnanthe ursina*	Species of Concern	None	None	N/A	Coastal sand dunes, crest of sand dunes.	No	No	None

[1] Roth, B. Rare and Endangered Land Mollusks in California. California Department of Fish and Game, Inland Fisheries Administrative report No 72-10. 1972.
[2] Eng, L.L., Native Land Gastropods of Calinfornia. California Department of Fish and Game. No Date.

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Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
California Linderiella Fairy Shrimp *Linderiella occidentalis*	Species of Concern	None	None	N/A	Large, fairly clear vernal pools and lakes. [3]	No	No	None
Callippe Silverspot Butterfly *Speyeria callippe callippe*	Endangered	None	None	N/A	Northern coastal scrub of the San Francisco Peninsula.	No	No	None
Edgewood Blind Harvestman *Calicina minor*	Species of Concern	None	None	N/A	Open grasslands in areas of serpentine bedrock where permanent springs create moist habitat underneath rocks.	No	No	None
Globose Dune Beetle *Coelus globosus*	Species of Concern	None	None	N/A	Coastal sand dunes; with dune vegetation	No	No	None
Leech's Skyline Diving Beetle *Hydroporus leechi*	Species of Concern	None	None	N/A	Previously considered limited to the San Francisco Bay Area. Now believed to be disturbed widely throughout the western United States.[4] Known only from freshwater ponds.	No	No	None

[3] USFWS, http://sacramento.fws.gov/es/animal_spp_acct/linderiella.htm, Accessed April 6, 2005.
[4] National Park Service, Yosemite Lodge Area Redevelopment Environmental Assessment, Appendix D – Special-status Species Evaluation, http://www.nps.gov/yose/planning/lodge/html/ylarpapdx_d.htm, Accessed April 6, 2005.

Appendix C
Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Mission Blue Butterfly *Icaricia icarioides missionensis*	Endangered	None	None	N/A	Grasslands of the San Francisco Peninsula.	No	No	None
Monarch Butterfly *Danaus plexippus*	None	None	None	N/A	Winter roosts in wind-protected tree groves along the coast with nearby nectar and water sources.	No – very few trees onsite and monarchs tend to winter further south.	No	None
Opler's longhorn moth *Adela oplerella*	Species of Concern	None	None	N/A	Serpentine soils and open grasslands with sandy soils and the host plant, cream cups (*Platystemon californicus*)	No	No	None
Ricksecker's Water Scavenger Beetle *Hydrochara rickseckeri*	Species of Concern	None	None	N/A	Freshwater ponds, vernal pools, and shallow quiet areas of streams within the Bay Area.	No	No	None
San Bruno Elfin Butterfly *Incisalia mossii bayensis*	Endangered	None	None	N/A	Coastal mountainous areas with grassy slopes, steep north facing slopes.	No - Suitable habitat not present within the project area.	No	None
San Francisco Lacewing *Nothochrysa californica*	Species of Concern	None	None	N/A	Freshwater streams.	No	No	None

Appendix C
Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Sandy Beach Tiger Beetle *Cicindela hirticollis gravida*	Species of Concern	None	None	N/A	Found in dry sandy areas adjacent to freshwater water along coast	No	No	None
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened Critical Habitat	None	None	N/A	Vernal pools and depressions in grassy swales, earth slumps, and sandstone outcrops.[5]	No No Critical Habitat present.	No	None
California Native Oyster *Ostreola conchaphila*	EFH Species	None	None	N/A	Hard substrates of San Francisco Bay from intertidal to 30-feet deep.	Yes	Present	Moderate
White Abalone *Haliotis sorenseni*	Endangered	None	None	N/A	Pelagic	No	No	None
Fish								
Chinook Salmon – Central Valley fall/late fall-run *Oncorhynchus tshawytscha*	Species of Concern	None	Special Concern	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None

[5] Central Coast Water Authority, http://www.essexenv.com/endangered_species/vshrimp.pdf#search='habitat%20of%20vernal%20pool%20fairy%20shrimp', Accessed April 6, 2005.

Appendix C
Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Chinook Salmon – Central Valley spring-run *Oncorhynchus tshawytscha*	Threatened Proposed Critical Habtiat	Threatened	Special Concern	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Chinook Salmon – winter-run *Oncorhynchus tshawytscha*	Threatened Proposed Critical Habitat	Endangered	None	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Coho Salmon – Central California coast *Oncorhynchus kisutch*	Endangered Proposed Critical Habitat	Endangered	None	N/A	Coastal streams with stable water supply abundant woody debris, and high quality riparian habitat.	No	No	None
Delta Smelt *Hypomesus transpacificus*	Threatened Critical Habitat	Threatened	None	N/A	Sacramento-San Joaquin Delta as salinities less than 2 PPM. Generally not found in smaller freshwater streams.	No No Critical Habitat within the project area.	No	None
Longfin Smelt *Spirinchus thaleichthys*	Species of Concern	None	Species of Concern	N/A	Sacramento-San Joaquin Delta at salinities less than 2 PPM. Generally not found in smaller freshwater streams. Historically present in the southern portions of San Francisco Bay.	No	No	None
Pacific Lamprey *Lampetra tridentata*	Species of Concern	None	None	N/A	Coastal streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Green Sturgeon *Acipenser medirostris*	Threatened	None	Species of Concern	N/A	Adults spawn in the Sacramento River and some of its major tributaries. Juveniles move into the estuary and likely rear in San Francisco Bay after leaving the estuary.	Limited foraging habitat within and adjacent to Marina.	No	Low, primarily during construction
Sacramento Splittail *Pogonichthys macrolepidotus*	Species of Concern	None	Special Concern	N/A	Slow moving rivers and sloughs often associated with flooded vegetation.	No	No	None
Steelhead – Central California Coast *Oncorhynchus mykiss*	Threatened Proposed Critical Habitat	None	None	N/A	Coastal streams with stable water supply, clean gravels, and good quality riparian habitat.	No Project is within critical habitat unit 6, but does not support any of the primary elements to be considered critical habitat.	No	None
Steelhead – Central Valley *Oncorhynchus mykiss*	Threatened	None	None	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Tidewater Goby *Eucyclogobius newberryi*	Endangered	None	Species of Concern	N/A	Brackish water habitats along coast, fairly still but not stagnant water and high oxygen levels.	No – Too much tidal flushing at the project site.	No	None
Amphibians and Reptiles								

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Alameda Whipsnake *Masticophis lateralis euryxanthus*	Threatened	Threatened	None	N/A	Found from sea level to 1835 m (6,020 ft). Prefers mixed chaparral, chamise-redshank chaparral and valley-foothill riparian habitats. Also occurs in a variety of other habitats, including valley-foothill hardwood and hardwood-conifer as well as various coniferous habitats.	No	No	None
California Horned Lizard *Phrynosoma coronatum frontale*	Species of Concern	None	Species of Concern	N/A	Scattered shrubs over exposed sandy substrates, annual grasslands, and riparian woodlands (Jennings and Hayes 1994).	No	No	None
California Red-legged Frog *Rana aurora draytonii*	Threatened Proposed Critical Habitat	None	Species of Concern (Fully Protected)	N/A	Pools in slow-moving streams and ponds with well-developed emergent freshwater marsh vegetation (Jennings and Hayes 1994).	No No Critical Habitat present.	No	None
California Tiger Salamander *Ambystoma californiense*	Threatened Proposed Critical Habitat	None	Species of Concern (Fully Protected)	N/A	Annual grasslands and understory of hardwood habitats. Breeding typically associated with temporary pools and ponds (Jennings and Hayes 1994).	No No Critical Habitat present or proposed for project area.	No	None
Foothill Yellow-legged Frog *Rana boylii*	Species of Concern	None	Species of Concern (Fully Protected)	N/A	Generally prefer shallow water in flowing streams and rivers with some cobble substrate (Jennings and Hayes 1994).	No	No	None

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Green Turtle (NMFS) *Chelonia mydas* (incl. *Agassizi)*	Threatened	None	None	N/A	Pelagic.	No	No	None
Leatherback Turtle (NMFS) *Dermochelys coriacea*	Endangered	None	None	N/A	Pelagic.	No	No	None
Loggerhead Turtle (NMFS) *Caretta caretta*	Threatened	None	None	N/A	Pelagic.	No	No	None
Olive (=Pacific) Ridley Sea Turtle (NMFS) *Lepidochelys olivacea*	Threatened	None	None	N/A	Pelagic.	No	No	None
San Francisco Garter Snake *Thamnophis sirtalis tetrataenia*	Endangered	Endangered	Fully Protected	N/A	Found in a vicinity of freshwater marshes, ponds and slow moving streams in San Mateo County. Upland habitat that provides suitable hibernation and estivation burrows.	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Western Pond Turtle includes Northwestern and Southwestern subspecies. *Emys (=Clemmys) marmorata*	Species of Concern	None	Species of Concern	N/A	Ponds, lakes, slow moving streams, areas with multiple aerial and aquatic basking sites are preferred (Jennings and Hayes 1994).	No	No	None
Western Spadefoot Toad *Spea hammondii*	Species of Concern	None	Special Concern, Fully Protected	N/A	Grasslands with shallow temporary pools.	No	No	None
Birds								
Alameda (South Bay) song sparrow *Melospiza melodia pusillula*	Species of Concern	None	Species of Concern	N/A	Tidal salt marsh habitats along the edge of the Bay and streams where tidal flow affects the vegetation (Johnston 1956).	Marginal habitat present in several small areas of salt grass	No	Low
Allen's Hummingbird (nesting) *Selasphorus sasin*	Species of Concern	None	None	N/A	Chaparral, thickets, brushy slopes, and open coniferous forest.	No nesting habitat onsite.	No	None
American Peregrine Falcon (nesting) *Falco peregrinus anatum*	Delisted	Endangered	Fully Protected	N/A	Frequents bodies of water in open areas with cliffs and canyons nearby for cover and nesting.	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Ashy Storm-petrel (rookery) *Oceanodroma homochroa*	Species of Concern	None	Species of Concern	N/A	Pelagic.	No	No	None
Bald Eagle (nesting and wintering) *Haliaeetus leucocephalus*	Threatened (Proposed for de-listing)	Endangered	Sensitive Species (Fully Protected)	N/A	Shorelines, lakes, large rivers. Nests in large open trees. No nesting habitat onsite.	No	No	None
Bank Swallow (nesting) *Riparia riparia*	Special Concern	Threatened	None	N/A	Nests in steep river banks.	No	No	None
Bell's Sage Sparrow *Amphispiza belli belli*	Species of Concern	None	Species of Concern	N/A	Though restricted to shrubby habitats, Bell's Sage Sparrow tolerates a fairly broad range of shrublands, from coastal sage scrub to various types of chaparral.[6]	No	No	None
Black Oystercatcher (nesting) *Haematopus bachmani*	Species of Concern	None	None	N/A	Rocky seacoasts.[7]	No	No	None

[6] http://www.sdnhm.org/research/birdatlas/wrenderings/99spring-reports.html#sage, Accessed April 6, 2005.
[7] http:://www.enature.com/fieldguide/showSpeciesRECNUM.asp?recnum=BD0161, Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Black Rail *Laterallus jamaicensis coturniculus*	None	Threatened	Fully Protected	N/A	Found in tidal salt marshes where pickleweed is the primary vegetation. Also found in fresh water and brackish marshes at low elevations.	No	No	None
Black Skimmer (nesting colony) *Rynchops niger*	Species of Concern	None	Species of Concern	N/A	Requires shallow, calm water for foraging, and sand bars, beaches, or dikes for roosting and nesting.[8] Nesting sites very sensitive to human disturbance.	Yes – perching habitat on breakwaters and nearby Bay is calm enough at times for foraging.	No	Low – Very few skimmers reported from the Bay on a regular basis.
Black Swift (nesting) *Cypseloides niger*	Species of Concern	None	Species of Concern	N/A	Nests on cliffs near water.	No	No	None
Black Turnstone *Arenaria melanocephala*	Species of Concern	None	None	N/A	Winter resident on rocky coastlines through out California. Breeds in western Alaska.	Wintering habitat only.	No	Low
California Brown Pelican (rookery and communal roosts) *Pelecanus occidentalis californicus*	Endangered	Endangered	Fully Protected	N/A	Estuarine, marine subtidal, and marine pelagic waters along the California coast. Nests typically on islands or offshore rocks.[9]	Yes – Foraging habitat only.	No	Low

[8] http://www.dfg.ca.gov/whdab/html/B236.html, Accessed April 6, 2005.
[9] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=birds&idNum=13, Accessed April 6, 2005.

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
California Clapper Rail *Rallus longirostris obsoletus*	Endangered	Endangered	Fully Protected	N/A	Saltwater and brackish marshes often crossed by tidal sloughs in the San Francisco Bay. Closely associated with pickleweed.	No habitat onsite, but there are nearby records.	No	None
California Least Tern (nesting colony) *Sterna antillarum (=albifrons) browni*	Endangered	Endangered	Fully Protected	N/A	Nesting colonies found along the coast and in San Francisco Bay. Uses bare or sparsely vegetated flat beaches, alkali flats and other relatively open areas for nesting.	Very poor quality nesting habitat at the sandy beach. Likely too much human related disturbance.	No	None
Cooper's Hawk (nesting) *Accipiter cooperii*	None	None	Species of Concern	N/A	Dense stands of live oak, riparian, deciduous, or other forest habitats near water used most frequently.[10]	No	No	None
Costa's Hummingbird (nesting) *Calypte costae*	Species of Concern	None	None	N/A	Chaparral and low desert regions.	No	No	None
Double-crested Cormorant (nesting) *Phalacrocorax auritus*	None	None	Species of Concern	N/A	Nests in trees along lake margins and on coastal cliffs.	No	No	None

[10] http://www.dfg.ca.gov/whdab/html/B116.html, Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Elegant Tern (nesting colony) *Sterna elegans*	Species of Concern	None	Species of Concern	N/A	Inshore coastal waters, bays, estuaries, and harbors; rarely occurs far offshore, and never inland. Generally does not breed in the Bay.	No breeding habitat present within project area.	No	None
Ferruginous Hawk (wintering) *Buteo regalis*	Species of Concern	None	Species of Concern	N/A	Winters in a variety of habitats in California. Fairly common winter resident of grasslands and agricultural areas in southwestern California (Garrett and Dunn 1981).	No	No	None
Golden Eagle (nesting and winterig) *Aquila chrysaetos*	None	None	Species of Concern (Fully Protected)	N/A	Rolling foothills, mountain areas, sage-juniper flats, desert. Ranges from sea level up to 3833 m (0-11,500 ft).	No	No	None
Harlequin Duck (nesting) *Histrionicus histrionicus*	Species of Concern	None	Species of Concern	N/A	Usually nests along shores of shallow, swift rivers with plentiful aquatic invertebrates.[11]	No	No	None
Lawrence's Goldfinch (nesting) *Carduelis lawrencei*	Species of Concern	None	None	N/A	Oak and riparian woodland, chaparral, pinion/juniper woodland, and weedy areas near water.	No	No	None

[11] http://www.dfg.ca.gov/whdab/html/B096.html, Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Lewis' Woodpecker (nesting) *Melanerpes lewis*	Species of Concern	None	None	N/A	Breeds in tree cavities in inner coast range.	No	No	None
Little Willow Flycatcher (nesting) *Empidonax traillii brewsteri*	None	Endangered[12]	None	N/A	Summer resident in wet meadow and montane riparian habitats at 600-2500 m (2000-8000 ft) in the Sierra Nevada and Cascade Range. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows (Serena 1982).[13]	No	No	None
Loggerhead Shrike (nesting) *Lanius ludovicianus*	Species of Concern	None	Species of Concern	N/A	Grasslands for foraging and associated riparian and scrub for nesting.	No	No	None
Long-billed Curlew (nesting) *Numenius americanus*	Species of Concern	None	Species of Concern	N/A	Upland short-grass prairies and wet meadows are used for nesting; coastal estuaries, open grasslands, and croplands are used in winter.	No	No	None
Marbled Godwit *Limosa fedoa*	Species of Concern	None	None	N/A	Winter resident along the coast. Uses primarily mudflat and estuarine habitats. Breeds in central Canada.	No	No	None

[12] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=birds&idNum=75, Accessed April 6, 2005.
[13] http://www.dfg.ca.gov/whdab/html/B315.html, Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Marbled Murrelet *Brachyramphus marmoratus*	Threatened Critical Habitat	Endangered	None	N/A	Occurs year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal, Santa Barbara Co. (Sowls et al. 1980).[14] Breeds in mature coniferous forests.	No Critical Habitat not present within the project area.	No	None
Northern Harrier (nesting) *Circus cyaneus*	None	None	Species of Concern	N/A	Occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 3000 m (10,000 ft). Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas.[15]	No	No	None
Red Knot *Calidris canutus*	Species of Concern	None	None	N/A	Migrant shorebird. Present in very low numbers during migration, especially in the fall.	No	No	None
Rufous Hummingbird (nesting) *Selasphorus rufus*	Species of Concern	None	None	N/A	Coniferous forest, thickets and brushy slopes, forages in adjacent meadows.	No	No	None
Saltmarsh Common Yellowthroat *Geothlypis trichas sinuosa*	Species of Concern	None	Species of Concern	N/A	Fresh and saltwater marshes, thick continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	No	No	None

[14] http://www.dfg.ca.gov/whdab/html/B240.html, Accessed April 6, 2005.
[15] http://www.dfg.ca.gov/whdab/html/B114.html, Accessed April 6, 2005.

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Short-eared Owl (nesting) *Asio flammeus*	None	None	Species of Concern	N/A	Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Occasionally breeds in northern California (McCaskie et al. 1988).	No	No	None
Short-tailed Albatross *Diomedea albatrus*	Endangered	None	None	N/A	Pelagic.	No	No	None
Tricolored Blackbird (nesting colony) *Agelaius tricolor*	Species of Concern	None	Special Concern	N/A	Colonial nester that uses tules or bulrush for nesting. Also requires open water and nearby source of insects to prey on.	No suitable nesting habitat within the project site	No	None
Vaux's Swift (nesting) *Chaetura vauxi*	Species of Concern	None	Species of Concern	N/A	Prefers redwood and Douglas fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs.	No	No	None
Western Burrowing Owl *Athene cunicularia hypugaea*	Species of Concern	None	Species of Concern	N/A	Habitats with low-growing vegetation (grasslands, scrub, deserts). Dependent on burrowing mammals, especially California ground squirrels.	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Western Snowy Plover (nesting) *Charadrius alexandrinus nivosus*	Threatened Critical Habitat Proposed	None	Species of Concern	N/A	Nests on sandy beaches of the ocean, bays, salt ponds, and larger lakes.	Marginal nesting habitat along shoreline of the Mole and sandy beach. Project is not within a proposed Critical Habitat unit.	No	Low
White-tailed Kite (nesting) *Elanus leucurus*	Species of Concern	None	Fully Protected	N/A	Grasslands, agriculture, wetlands, oak-woodland and savannah habitats, and riparian areas associated with open areas.	No	No	None
Whimbrel *Numenius phaeopus*	Species of Concern	None	None	N/A	Common winter resident. Uses mudflat and sandy shoreline habitats. Breeds in eastern Alaska and along Hudson Bay.	Yes	No	None
Mammals								
Alameda Island Mole *Scapanus latimanus parvus*	Species of Concern	None	Species of Concern	N/A	Soft soil in valleys and mountain meadows in several biotic communities.[16]	No	No	None

[16] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000. http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
American Badger *Taxidea taxus*	None	None	Species of Concern	N/A	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.[17]	No	No	None
Berkeley Kangaroo Rat *Dipodomys heermanni berkeleyensis*	Species of Concern	None	None	N/A	Found in Briones Valley and east Oakland.[18] No records for the peninsula.	No	No	None
Blue Whale (NMFS) *Balaenoptera musculus*	Endangered			N/A	Pelagic.	No	No	None
Finback (=fin) Whale (NMFS) *Balaenoptera physalus*	Endangered			N/A	Pelagic.	No	No	None
Fringed Myotis Bat *Myotis thysanodes*	Species of Concern	None	None	N/A	Pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 4000-7000 ft. Most common roosts are in caves, mines, buildings, and crevices (CDFG 1999a).	No	No	None

[17] http://www.dfg.ca.gov/whdab/html/M160.html, Accessed April 6, 2005.
[18] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000. http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Southern Sea Otter *Enhydra lutris nereis*	Threatened	None	Fully Protected	N/A	Pelagic.	No	No	None
Western Mastiff-bat *Eumops perotis californicus*	Species of Concern	None	Species of Concern	N/A	Roost in cracks on cliff faces and buildings. They may forage quite some distance from roosting locations (Williams 1986).	Foraging habitat only.	No	None
Grey Whale (NMFS) *Eschrichtius robustus*	Delisted			N/A	Pelagic.	No	No	None
Guadalupe Fur Seal (NMFS) *Arctocephalus townsendi*	Threatened	Threatened	Fully Protected	N/A	Pelagic.	No	No	None
Long-eared Myotis Bat *Myotis evotis*	Species of Concern	None	None	N/A	Found in all brush, woodland, and forest habitats from sea-level to 9000 feet.	No	No	None
Long-legged Myotis Bat *Myotis volans*	Species of Concern	None	None	N/A	Woodland and forest habitats above 4000 ft. Forages in chaparral, and coastal scrub habitats, and in early successional stages of woodlands and forests. Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves. (CDFG 1999b)	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Pacific Western Big-eared Bat *Corynorhinus (=Plecotus) townsendii*	Species of Concern	None	Species of Concern	N/A	Well distributed throughout a variety of habitats (coniferous forests, oak woodlands, broad-leaf forests, grasslands, etc). Roosts in caves, buildings, tunnels, and other human structures (Williams 1986).	Foraging habitat only. No roosting habitat onsite.	No	None
Point Reyes Jumping Mouse *Zapus trinotatus orarius*	Species of Concern	None	Species of Concern	N/A	Bunch grass marshes on the uplands of Point Reyes.[19]	No	No	None
Right Whale (NMFS) *Eubalaena glacialis*	Endangered			N/A	Pelagic.	No	No	None
Riparian (San Joaquin Valley) Woodrat *Neotoma fuscipes riparia*	Endangered	None	Species of Concern	N/A	Builds nests of debris in riparian corridors, scrub and woodland habitats throughout the San Joaquin River system.	No	No	None
Salt Marsh Harvest Mouse *Reithrodontomys raviventris*	Endangered	Endangered	Fully Protected	N/A	Found only in emergent salt marsh habitats of San Francisco Bay where pickleweed is the primary vegetation.	No – essentially no pickleweed present on site.	No	None

[19] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=mammals&idNum=66, Accessed April 6, 2005.

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	Federal	State	CDFG[2]	CNPS[3]				
Salt Marsh Vagrant Shrew *Sorex vagrans halicoetes*	Species of Concern	None	Species of Concern	N/A	Found in dense, low cover above high tide line of tidal marshes of South of San Francisco Bay.	Low quality habitat in salt grass patches.	No	Low
San Francisco Dusky-footed Woodrat *Neotoma fuscipes annectens*	Species of Concern	None	Species of Concern	N/A	Builds nests out of debris in riparian corridors, scrub and woodland habitats.	No	No	None
San Joaquin Pocket Mouse *Perognathus inornatus*	Species of Concern	Non	None	N/A	Grassy or weedy fine-textured soil in the Lower and Upper Sonoran life zones of the San Joaquin and Salinas valleys.[20]	No	No	None
Sei Whale (NMFS) *Balaenoptera borealis*	Endangered			N/A	Pelagic.	No	No	None
Sperm Whale (NMFS) *Physeter catodon (=macrocephalus)*	Endangered			N/A	Pelagic.	No	No	None

[20] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000. http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Steller (=northern) Sea-lion (NMFS) *Eumetopias jubatus*	Threatened Critical Habitat	None	None	N/A	Pelagic. Critical habitat pertains to rookeries and haul out areas and foraging habitat in Alaska.	No No Critical Habitat present.	No	None
Yuma Myotis Bat *Myotis yumanensis*	Species of Concern	None	None	N/A	Optimal habitats are open forest and woodlands with sources of water for feeding.	No	No	None
Plants								
Adobe Sanicle *Sanicula Maritima*	Species of Concern	Rare	None	1B	Meadow and seep; valley and foothill grassland.	No	No	None
Alkali Milk-Vetch *Astragalus tener var. tener*	Species of Concern	None	None	1B	Valley and foothill grasslands and vernal pools.	No	No	None
Arcuate Bush Mallow *Malacothamnus arcutatus (=M. fasciculat)*	Species of Local Concern	None	None	1B	Chaparral.	No	No	None
Beach Layia *Layia Carnosa*	Endangered	Endangered	None	1B	Coastal Dunes, on sparsely vegetated semi-stabilized dunes.	No	No	None
Bent-flowered Fiddleneck *Amsinckia lunaris*	Species of Local Concern	None	None	1B	Cismontane woodlands, valley and foothill grassland, 50-500 meters above sea level.	No	No	None

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Big-scale (=California) Balsamroot *Balsamorhiza macrolepis var. macrolepis*	Species of Local Concern	None	None	1B	Valley and foothill grasslands and cismontane woodlands, often associated with serpentine soils.	No	No	None
California Broomrape *Orobanche californica ssp. californica*	Species of Local Concern				Dry washes, mountain slopes and flats[21]	No	No	None
California Croton *Croton californicus*	Species of Local Concern				Coastal sage scrub, chaparral, desert scrub, and coastal strand.[22]	No	No	None
California Goosefoot *Chenopodium californicum*	Species of Local Concern				Dryish plains and slopes below 5000', cismontane to desert edge.[23]	No	No	None
California Saltbush *Atriplex californica*	Species of Local Concern	None	None	None	Coastal areas over sandy soils.			
California Sea Blite *Suaeda californica*	Endangered	None	None	1B	Coastal salt marshes.	No	No	None

[21] http://www.calflora.net/bloomingplants/index.html, Accessed April 6, 2005.
[22] California Native Plant Society, Yerba Buena Chapter, http://www.cnps-yerbabuena.org/rare_croton.html, Accessed April 6, 2005.
[23] http://www.calflora.net/bloomingplants/californiagoosefoot.html, Accessed April 6, 2005.

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
California Seablite *Suaeda californica*	Endangered	None	None	1B	Coastal salt marshes.	No	No	None
Choris's (=artist's popcorn-flower *Plagiobothrys chorisianus var chorisianus*	Species of Local Concern	None	None	1B	Chaparral and coastal prairie. Blooms Mar-Jun.			
Coast (=elegant) Rein-orchid (=piperia) *Piperia elegans*	Species of Local Concern	None	None		Open sites in shrublands and coniferous forests.[24]	No	No	None
Coast Indian Paintbrush *Castilleja affinis spp. affinis*	Species of Local Concern				Valley and foothill grasslands	No	No	None
Coast Lily *Lilium maritimum*	Species of Concern	None	None	1B	Forest, prairie, coastal scrub, marshes and swamps.[25]	No	No	None
Coast Rock-cress *Arabis blepharophylla*	Species of Local Concern	None	None	4	Coastal bluff scrub, coastal prairie, coastal scrub.[26]	No	No	None

[24] http://www.enature.com/fieldguide/showSpeciesRECNUM.asp?recnum=WF1553, Accessed April 6, 2005.
[25] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.
[26] National Park Service, Marine Mammal Center Site and Facilities Improvements Environmental Assessment and FONSI, Appendix B, 2004, http://www.nps.gov/goga/admin/planning/pdf/appendixb.pdf, Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Coast Yellow Leptosiphon *Leptosiphon croceus*	None	None	None	1B	Coastal bluff scrub, coastal prairie.	No	No	None
Coastal Triquetrella *Triquetrella californica*	None	None	None	1B	Coastal bluff scrub, coastal scrub.[27]	No	No	None
Compact Cobweb Thistle *Cirsium occidentale var. compactum*	Species of Concern	None	None	1B	Chaparral, coastal dunes, coastal prairie, coastal scrub.[28]	No	No	None
Congdon's tarplant *Hemizonia parryi ssp. congdonii*	Species of Concern	None	None	1B	Grassland.[29]	No	No	None

[27] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[28] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[29] City of Palo Alto, Stanford EIR.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Contra Costa Goldfields *Lasthenia conjugens*	Endangered	None	None	1B	Open grassy depressions in valley and foothill grassland and vernal pools.	No	No	None
Crystal Springs Lessingia *Lessingia arachnoidea*	Species of Concern	None	None	1B	Grassy slopes on serpentine soils through coastal sage scrub, valley and foothill grasslands and woodlands.	No	No	None
Curly-leaved (=curlyleaf) monardella *Monardella undulata*	Species of Concern	None	None	4	Chaparral.[30]	No	No	None
Davy's Clarkia *Clarkia davyi*	Species of Local Concern	None	None	None	Coastal scrub and valley and foothill grasslands.	No	No	None
Diablo Helianthella (=rock-rose) *Helianthella castanea*	Species of Concern	None	None	1B	Broadleaved upland forest, cismontane woodland. Usually in chaparral/oak woodland interface in rocky, azonal soils often in partial shade.	No	No	None
Dune (=Camphor) tansy *Tanacetum camphoratum*	Species of Concern	None	None	None	Stable or semi-mobile coastal sand dunes.	No	No	None

[30] City of Palo Alto, Stanford EIR.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Fountain Thistle *Cirsium fontinale var. fontinale*	Endangered	Endangered	None	1B	Drainages through serpentine soils in woodland, chaparral, and grassland habitats.	No	No	None
Fragrant Fritillary (=prairie bells) *Fritillaria liliacea*	Species of Concern	None	None	1B	Valley and foothill grasslands, typically over serpentine soils although the soil type varies.	No	No	None
Franciscan Manzanita *Arctostaphylos hookeri ssp. franciscana*	Species of Concern	None	None	1A	Chaparral, formally endemic to San Francisco, now only exists in cultivation. Coastal scrub (serpentinite).	No	No	None
Franciscan Onion *Allium peninsulare var. franciscanum*	Species of Local Concern	None	None	1B	Clay and serpentine soils on dry hillsides in woodlands and valley and foothill grasslands.	No	No	None
Franciscan Thistle *Cirsium andrewsii*	Species of Concern	None	None	1B	Forest, coastal bluff scrub, prairie, and coastal scrub.[31]	No	No	None
Greene's popcorn flower *Plagiobothrys reticulates var. rossianorum*	Species of Concern	None	None	None	Grasslands and forest.	No	No	None

[31] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Hairless Popcorn-flower *Plagiobothrys glaber*	Species of Concern	None	None	1A	Coastal salt marshes and alkali meadows.	No	No	None
Hickman's Potentilla (=cinquefoil) *Potentilla hickmanii*	Endangered	Endangered	None	1B	Coastal bluff scrub, closed cone coniferous forest, freshwater marshes, seep, and small streams in open or forested areas along coast.	No	No	None
Hillsborough Chocolate Lily (=Gray's fritillary) *Fritillaria biflora var. ineziana (=F. grayana)*	Species of Concern	None	None	1B	Through valley and foothill grasslands and woodlands, likely restricted to serpentine soils.	No	No	None
Kellogg's Horkelia *Horkelia cuneata ssp. Sericea*	Species of Concern	None	None	1B	Closed cone coniferous forests, coastal scrub, old dunes, coastal sandhills, 10-220 meters above sea level.	No	No	None
King's Mountain Manzanita *Arctostaphylos regismontana*	Species of Local Concern	None	None	1B	Broadleaved upland forest, chaparral, and north coast coniferous forest.	No	No	None
Large-flowered (=flower) linanthus *Linanthus grandiflorus*	Species of Concern	None	None	4	Coastal bluff scrub, closed-cone coniferous forest, valley and foothill grasslands.	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Loma Prieta Hoita *Hoita strobilina*	None	None	None	1B	Chaparral and riparian woodlands, usually serpentine soils.	No	No	None
Marin dwarf-flax (=western flax) *Hesperolinon congestum*	Threatened	Threatened	None	1B	Found on serpentine barrens, grasslands, and chaparral.	No	No	None
Marsh Microseris (=marsh silverpuffs) *Microseris paludosa*	Species of Local Concern	None	None	1B	Forest, woodland, coastal scrub, and grassland.[32]	No	No	None
Marsh Milk-vetch (=brine milk-vetch) *Astragalus pycnostachyus var. pycnostachyus*	Species of Local Concern	None	None	1B	Coastal dune or salt marsh.	No	No	None
Marsh Sandwort *Arenaria paludicola*	Endangered	Endangered	None	1B	Swamps, freshwater marshes, and other wet areas.	No	No	None
Mission Delores (=San Francisco) Campion *Silene verecunda ssp. Verecunda*	Species of Concern	None	None	1B	Often on mudstone or shale, coastal scrub, valley and foothill grassland, coastal bluff scrub.	No	No	None

[32] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Montara Manzanita *Arctostaphylos montaraensis*	Species of Concern	None	None	1B	Coastal Scrub, chaparral, endemic to San Mateo county, slopes and ridges.	No	No	None
Most Beautiful (uncommon) Jewelflower *Streptanthus albidus ssp. peramoenus*	Species of Concern	None	None	1B	Grasslands and upland scrub.	No	No	None
Northcoast (=Point Reyes) Bird's-beak *Cordylanthus maritimus ssp. palustris*	Species of Concern	None	None	1B	Coastal salt marsh, dunes.	No	No	None
Nuttall's Milk-vetch *Astragalus nuttallii var. virgatus*	Species of Local Concern	None	None	4	Coastal dunes and bluff scrub	No	No	None
Oregon Meconella (=white fairypoppy) *Meconella oregano*	Species of Concern	None	None	1B	Coastal prairie and coastal scrub.	No	No	None

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Pacific Cordgrass (=California cordgrass) *Spartina foliosa*	Species of Local Concern	None	None	None	Marsh and swamp.[33]	No	No	None
Pallid Manzanita (=Alameda or Oakland Hills manzanita) *Arctostaphylos pallida*	Threatened	Endangered	None	1B	Endemic to broadleaved upland forest, closed-cone coniferous forest, coastal scrub, grows on uplifted marine terraces, on siliceous shale or thin chert.[34]	No	No	None
Pappose Tarplant *Centromadia parryi ssp. parryi*	None	None	None	1B	Coastal prairie, meadows and seeps, coastal marsh, valley and foothill grasslands.	No	No	None
Pink Sand-verbena *Abronia umbellata ssp. umbellata*	Species of Local Concern	None	None	1B	Coastal dunes and sand.	No	No	None
Point Reyes Rein Orchid *Piperia elegans ssp. Decurtata*	None	None	None	1B	Coastal bluff scrub only from Point Reyes National Seashore.[35]	No	No	None

[33] City of Palo Alto, Stanford EIR.
[34] City of El Cerrito, El Cerrito Plaza Mixed-Use Development Project Draft SEIR, 2004.
[35] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Presidio (=Raven's) Manzanita *Arctostaphylos hookeri ssp ravenii*	Endangered	Endangered	None	1B	Coastal prairie, coastal scrub, open rocky serpentine slopes, 20-215 meters above sea level.	No	No	None
Presidio Clarkia *Clarkia franciscana*	Endangered	Endangered	None	1B	Coastal scrub, serpentinite valley and foothill grassland.[36]	No	No	None
Purple Owl's-clover (=wideleaf Indian paintbrush) *Castilleja exserrta* ssp *latifolia*	Species of Local Concern	None	None	None	Fields, deserts, and open, wooded areas.[37]	No	No	None
Robust Monardella (=robust coyote mint) *Monardella villosa* ssp *globosa*	Species of Local Concern	None	None	1B	Chaparral.	No	No	None

[36] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[37] Marin County Open Space District, http://enature.marinopenspace.org/openspace/mcosd/showSpeciesRECNUM.asp?recnum=WF1688, Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Robust Spineflower *Chorizanthe robusta* var *robusta*	Endangered	None	None	1B	Sandy terraces, bluffs, and loose sand of coastal dunes, coastal scrub and foothill woodlands.	No	No	None
Rose Leptosiphon *Leptosiphon rosaceus*	None	None	None	1B	Coastal bluff scrub.[38]	No	No	None
Rose Linanthus *Linanthus rosaceus*	Species of Concern	None	None	1B	Coastal bluff scrub.	No	No	None
Round-headed Chinese Houses *Collinsia corymbosa*	Species of Concern	None	None	1B	Coastal dunes. [39]	No	No	None
Round-leaved Filaree *Erodium macrophyllum*	None	None	None	2	Cismontane woodland, valley and foothill grassland.[40]	No	No	None

[38] CNDDB.
[39] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[40] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Salt Marsh Owl's Clover (=Johnny-nip) *Castilleja ambigua ssp. Palustris*	Species of Local Concern	None	None	None	Coastal salt marshes.	No	No	None
San Bruno Mountain Manzanita *Arctostaphylos imbricata*	Species of Concern	Endangered	None	1B	Coastal scrub, sandstone outcrops in chaparral.	No	No	None
San Francisco (=bluehead, Chamisso's, dune) gilia *Gilia capitata ssp. Chamissonis*	Species of Concern	None	None	1B	Coastal dunes, coastal scrub.[41]	No	No	None
San Francisco Bay Spineflower *Chorizanthe cospidata var. cospidata*	Species of Concern	None	None	1B	Found on sandy slopes and terraces of coastal scrub, dune, and prairie habitats.	No	No	None
San Francisco Collinsia *Collinsia multicolor*	None	None	None	1B	Closed-cone coniferous forest, coastal scrub.	No	No	None

[41] CNDDB.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
San Francisco gumplant *Grindelia hirsutula var. ▯eticula*	Species of Concern	None	None	1B	Found in coastal scrub, coastal bluff scrub, valley and foothill grasslands, sandy or serpentine slopes or sea bluffs.	No	No	None
San Francisco Lessingia *Lessingia germanorum*	Endangered	Endangered	None	1B	Coastal scrub, remnant dunes, open sandy soils relatively free from competing plants.	No	No	None
San Francisco Owl's-clover *Triphysaria floribunda*	Species of Concern	None	None	1B	Coastal prairie, valley and foothill grassland, on serpentine and non-serpentine substrate.	No	No	None
San Francisco Popcornflower *Plagiobothrys diffuses*	Species of Concern	Endangered	None	1B	Coastal prairie, valley and foothill grassland.[42]	No	No	None
San Francisco Wallflower *Erysimum franciscanum*	Species of Concern	None	None	4	Found in dune hills, ocean bluffs, and open grassy or brushy slopes near the coast. This species prefers rocky, gravely or sandy soils, often of disintegrated serpentinite.	No	No	None

[42] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
San Mateo Thornmint *Acanthomintha duttonii*	Endangered	Endangered	None	1B	Chaparral, valley and foothill grasslands, coastal scrub, extant populations only known from very uncommon serpentine vertisol clays; in relatively open areas.	No	No	None
San Mateo Tree Lupine *Lupinus arboreus var. eximius*	Species of Local Concern	None	None	3	Chaparral and coastal scrub communities.	No	No	None
San Mateo Woolly Sunflower *Eriophyllum latilobum*	Endangered	Endangered	None	1B	Often found on roadcuts through woodlands both on and off serpentine soils in San Mateo County.	No	No	None
Santa Cruz Manzanita *Arctostaphylos andersonii*	Species of Local Concern	None	None	1B	Broadleaved upland forest, chaparral, and north coast coniferous forest.	No	No	None
Santa Cruz Microseris *Stebbinsoseris decipiens*	Species of Concern	None	None	1B	Broadleaved upland forest, closed-coned coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/open areas, sometimes on serpentine.[43]	No	No	None

[43] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Santa Cruz Tarplant *Holocarpha macradenia*	Threatened	Endangered	None	1B	Coastal prairie, coastal scrub, valley and foothill grassland/often clay and sandy.[44]	No	No	None
Short-leaved Evax *Hesperevax sparsiflora var. brevifolia*	Species of Concern	None	None	2	Coastal bluffs, coastal dunes.[45]	No	No	None
Skunkbush *Navarretia squarrosa*	Species of Local Concern				Open wet gravelly flats, slopes.[46]	No	No	None
Slender-leaved Pondweed *Potamogeton filiformis*	None	None	None	2	Freshwater marsh.[47]	No	No	None
Tiburon Buckwheat *Eriogonum caninum*	Species of Local Concern	None	None	3	Chaparral, coastal prairie, valley and foothill grasslands, often in serpentine soils.	No	No	None

[44] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County*, http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[45] Sonoma County, Canyon Rock Quarry Expansion Project Draft EIR, http://www.sonoma-county.org/prmd/docs/eir/CanyonRockDEIR/AppG.pdf#search='habitat%20of%20navarretia%20squarrosa', Accessed April 7, 2005.
[46] California Department of Fish and Game, *California Vernal Pool Assessment Preliminary Report, Appendix C*, 1998. http://www.dfg.ca.gov/whdab/wetlands/vp_asses_rept/app_c_plnt.htm, Accessed April 7, 2005.
[47] City of Palo Alto, Stanford EIR.

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Species Name	Status[1]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG[2]	CNPS[3]				
Water Sack (=saline) Clover *Trifolim depauperatum var. hydrophilum*	Species of Concern	None	None	1B	Marshes, swamps, valley/foothill grasslands, and vernal pools.	No	No	None
Wedgeleaf Horkelia *Horkelia cuneata ssp cuneata*	Species of Local Concern	None	None	None	Open sandy fields and chaparral, old dunes, southern oak woodland, coastal sage scrub.[48]	No	No	None
Western Leatherwood *Dirca occidentalis*	Species of Local Concern	None	None	1B	Broadleaved upland forest, closed cone coniferous forest, chaparral, riparian scrub, and riparian woodland.	No	No	None
White-rayed Pentachaeta *Pentachaeta bellidiflora*	Endangered	Endangered	None	1B	Open dry rocky slopes and grassy areas often on soils derived from serpentine bedrock.	No	No	None
Yarrow-leaf (manyleaf, dark-eyed) gilia *Gilia millefoliata*	Species of Local Concern	None	None	1B	Coastal Dunes.[49]	No	No	None
Habitats								
Northern Coastal Marsh		S3.2		N/A		Habitat present in small areas.	Yes	Moderate

[48] http://www.calflora.net/bloomingplants/wedgeleafhorkelia.html, Accessed April 7, 2005.
[49] CNDDB.

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Species Name	Status[1] Federal	State	CDFG[2]	CNPS[3]	Habitat	Habitat Present	Observed	Potential Project Effect
Northern Maritime Chaparral		S1.2		N/A		Not present in project area.		
Serpentine Bunchgrass		S2.2		N/A		Not present in project area.		
Valley Needlegrass Grassland		S3.1		N/A		Not present in project area.		

Footnotes:

[1] Endangered and threatened are species statuses under the California or Federal Endangered Species Act. Federal Species of Concern and candidate species do not receive any statutory protection under the Federal ESA.

[2] California Department of Fish and Game. Species designated as Species of Special Concern by CDFG are to be mitigated for under CEQA. A fully protected designation indicates that these species are fully protected under the Fish and Game Code and cannot be taken or possessed without a permit from the Fish and Game Commission or CDFG.

[3] California Native Plant Society. Species on List 1A are believed to be extinct within California. Species on List 1B are rare or endangered in California and elsewhere in their range.

Element Rankings, California Department of Fish and Game, 1993:

S2.1 Very Threatened in California

S3.1 Very Threatened in California

S3.2 Threatened in California

References:

CNDDB (California Natural Diversity Data Base), 2005. Commercial version 3.0.5, information dated 01/05/2005. California Department of Fish and Game.

Jennings, M.R. and M.P. Hayes, 1994. Amphibian and Reptile Species of Special Concern in California. Final Report, Inland Fisheries Division, California Department of Fish and Game. 255 pp.

Williams, D.F., 1986. Mammal Species of Special Concern in California. Administrative Report 86-1, Wildlife Management Division, California Department of Fish and Game. 112 pp.

9.2.15 APPENDIX B2 SPECIAL-STATUS SPECIES TABLE

As a result of consultation with other agencies, including the USFWS, Appendix B2 (Special-Status Species Table) of the DEIR/EA has been modified. As such, Appendix B2 has been reproduced in its entirety as follows:

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Invertebrates								
Bay Checkerspot Butterfly *Euphydryas editha bayensis*	Threatened Critical Habitat	None	None	N/A	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay.	No No Critical Habitat present.	No	None
Bridges' Coast Range Shoulderband Snail *Helminthoglypta nickliniana bridgesi*	Species of Concern	None	None	N/A	Known from open, west slope hillsides in Alameda and Contra Costa counties in a variety of habitats.[1,2]	No	No	None
Bumblebee Scarab Beetle *Lichnanthe ursina*	Species of Concern	None	None	N/A	Coastal sand dunes, crest of sand dunes.	No	No	None
California Linderiella Fairy Shrimp *Linderiella occidentalis*	Species of Concern	None	None	N/A	Large, fairly clear vernal pools and lakes.[3]	No	No	None
Callippe Silverspot Butterfly *Speyeria callippe callippe*	Endangered	None	None	N/A	Northern coastal scrub of the San Francisco Peninsula.	No	No	None
Edgewood Blind Harvestman *Calicina minor*	Species of Concern	None	None	N/A	Open grasslands in areas of serpentine bedrock where permanent springs create moist habitat underneath rocks.	No	No	None
Globose Dune Beetle *Coelus globosus*	Species of Concern	None	None	N/A	Coastal sand dunes; with dune vegetation	No	No	None

[1] Roth, B. Rare and Endangered Land Mollusks in California. California Department of Fish and Game, Inland Fisheries Administrative report No 72-10. 1972.
[2] Eng, L.L., Native Land Gastropods of California. California Department of Fish and Game. No Date.
[3] USFWS, http://sacramento.fws.gov/es/animal_spp_acct/linderiella.htm, Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Leech's Skyline Diving Beetle *Hydroporus leechi*	Species of Concern	None	None	N/A	Previously considered limited to the San Francisco Bay Area. Now believed to be disturbed widely throughout the western United States.[4] Known only from freshwater ponds.	No	No	None
Mission Blue Butterfly *Icaricia icarioides missionensis*	Endangered	None	None	N/A	Grasslands of the San Francisco Peninsula.	No	No	None
Monarch Butterfly *Danaus plexippus*	None	None	None	N/A	Winter roosts in wind-protected tree groves along the coast with nearby nectar and water sources.	No—very few trees onsite and monarchs tend to winter further south.	No	None
Opler's longhorn moth *Adela oplerella*	Species of Concern	None	None	N/A	Serpentine soils and open grasslands with sandy soils and the host plant, cream cups (*Platystemon californicus*)	No	No	None
Ricksecker's Water Scavenger Beetle *Hydrochara rickseckeri*	Species of Concern	None	None	N/A	Freshwater ponds, vernal pools, and shallow quiet areas of streams within the Bay Area.	No	No	None
San Bruno Elfin Butterfly *Incisalia mossii bayensis*	Endangered	None	None	N/A	Coastal mountainous areas with grassy slopes, steep north facing slopes.	No—Suitable habitat not present within the project area.	No	None
San Francisco Lacewing *Nothochrysa californica*	Species of Concern	None	None	N/A	Freshwater streams.	No	No	None

[4] National Park Service, Yosemite Lodge Area Redevelopment Environmental Assessment, Appendix D – Special-status Species Evaluation, http://www.nps.gov/yose/planning/lodge/html/ylarpapdx_d.htm, Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Sandy Beach Tiger Beetle *Cicindela hirticollis gravida*	Species of Concern	None	None	N/A	Found in dry sandy areas adjacent to freshwater water along coast	No	No	None
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened Critical Habitat	None	None	N/A	Vernal pools and depressions in grassy swales, earth slumps, and sandstone outcrops.[5]	No No Critical Habitat present.	No	None
Mollusk								
California Native Oyster *Ostreola conchaphila*	EFH Species	None	None	N/A	Hard substrates of San Francisco Bay from intertidal to 30-feet deep	Yes	Present	Moderate
Black Abalone *Haliotes cracherodii*	Candidate	None	None	N/A	Found in marine subtidal rocky habitats only.	No	No	None
White Abalone *Haliotis sorenseni*	Endangered	None	None	N/A	Found in marine subtidal rocky habitats only.	No	No	None
Fish								
Chinook Salmon—Central Valley fall/late fall-run *Oncorhynchus tshawytscha*	Species of Concern	None	Special Concern	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Chinook Salmon—Central Valley spring-run *Oncorhynchus tshawytscha*	Threatened Proposed Critical Habtiat	Threatened	Special Concern	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None

[5] Central Coast Water Authority, http://www.essexenv.com/endangered_species/vshrimp.pdf#search='habitat%20of%20vernal%20pool%20fairy%20shrimp', Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Chinook Salmon—winter-run *Oncorhynchus tshawytscha*	Threatened Proposed Critical Habitat	Endangered	None	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Coho Salmon—Central California coast *Oncorhynchus kisutch*	Endangered Proposed Critical Habitat	Endangered	None	N/A	Coastal streams with stable water supply abundant woody debris, and high quality riparian habitat.	No	No	None
Delta Smelt *Hypomesus transpacificus*	Threatened Critical Habitat	Threatened	None	N/A	Sacramento-San Joaquin Delta as salinities less than 2 PPM. Generally not found in smaller freshwater streams.	No No Critical Habitat within the project area.	No	None
Green Sturgeon *Acipenser medirostris*	Threatened	None	Species of Concern	N/A	Adults spawn in the Sacramento River and some of its major tributaries. Juveniles move into the estuary and likely rear in San Francisco Bay after leaving the estuary.	Limited foraging habitat within and adjacent to Marina.	No	Low, primarily during construction
Longfin Smelt *Spirinchus thaleichthys*	Species of Concern	None	Species of Concern	N/A	Sacramento-San Joaquin Delta at salinities less than 2 PPM. Generally not found in smaller freshwater streams. Historically present in the southern portions of San Francisco Bay.	No	No	None
Pacific Lamprey *Lampetra tridentata*	Species of Concern	None	None	N/A	Coastal streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Sacramento Splittail *Pogonichthys macrolepidotus*	Species of Concern	None	Special Concern	N/A	Slow moving rivers and sloughs often associated with flooded vegetation.	No	No	None

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Steelhead—Central California Coast *Oncorhynchus mykiss*	Threatened Proposed Critical Habitat	None	None	N/A	Coastal streams with stable water supply, clean gravels, and good quality riparian habitat.	No Project is within critical habitat unit 6, but does not support any of the primary elements to be considered critical habitat.	No	None
Steelhead—Central Valley *Oncorhynchus mykiss*	Threatened	None	None	N/A	Central Valley streams with stable water supply, clean gravels, and good quality riparian habitat.	No	No	None
Tidewater Goby *Eucyclogobius newberryi*	Endangered	None	Species of Concern	N/A	Brackish water habitats along coast, fairly still but not stagnant water and high oxygen levels.	No—Too much tidal flushing at the project site.	No	None
Amphibians and Reptiles								
Alameda Whipsnake *Masticophis lateralis euryxanthus*	Threatened	Threatened	None	N/A	Found from sea level to 1,835 m (6,020 ft). Prefers mixed chaparral, chamise-redshank chaparral and valley-foothill riparian habitats. Also occurs in a variety of other habitats, including valley-foothill hardwood and hardwood-conifer as well as various coniferous habitats.	No	No	None
California Horned Lizard *Phrynosoma coronatum frontale*	Species of Concern	None	Species of Concern	N/A	Scattered shrubs over exposed sandy substrates, annual grasslands, and riparian woodlands.[6]	No	No	None
California Red-legged Frog *Rana aurora draytonii*	Threatened Proposed Critical Habitat	None	Species of Concern (Fully Protected)	N/A	Pools in slow-moving streams and ponds with well-developed emergent freshwater marsh vegetation.[7]	No No Critical Habitat present.	No	None

[6] Jennings, M.R. and M.P. Hayes, 1994. Amphibian and Reptile Species of Special Concern in California. Final Report, Inland Fisheries Division, California Department of Fish and Game. 255 pp.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
California Tiger Salamander *Ambystoma californiense*	Threatened Proposed Critical Habitat	None	Species of Concern (Fully Protected)	N/A	Annual grasslands and understory of hardwood habitats. Breeding typically associated with temporary pools and ponds.[8]	No No Critical Habitat present or proposed for project area.	No	None
Foothill Yellow-legged Frog *Rana boylii*	Species of Concern	None	Species of Concern (Fully Protected)	N/A	Generally prefer shallow water in flowing streams and rivers with some cobble substrate.[9]	No	No	None
Green Turtle *Chelonia mydas (*incl. *Agassizi)*	Threatened	None	None	N/A	Pelagic.	No	No	None
Leatherback Turtle *Dermochelys coriacea*	Endangered	None	None	N/A	Pelagic.	No	No	None
Loggerhead Turtle *Caretta caretta*	Threatened	None	None	N/A	Pelagic.	No	No	None
Olive (=Pacific) Ridley Sea Turtle *Lepidochelys olivacea*	Threatened	None	None	N/A	Pelagic.	No	No	None

[7] Ibid.
[8] Ibid.
[9] Ibid.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
San Francisco Garter Snake *Thamnophis sirtalis tetrataenia*	Endangered	Endangered	Fully Protected	N/A	Found in a vicinity of freshwater marshes, ponds, and slow moving streams in San Mateo County. Upland habitat that provides suitable hibernation and estivation burrows.	No	No	None
Western Pond Turtle includes Northwestern and Southwestern subspecies. *Emys (=Clemmys) marmorata*	Species of Concern	None	Species of Concern	N/A	Ponds, lakes, slow moving streams, areas with multiple aerial and aquatic basking sites are preferred.[10]	No	No	None
Western Spadefoot Toad *Spea hammondii*	Species of Concern	None	Special Concern (Fully Protected)	N/A	Grasslands with shallow temporary pools.	No	No	None
Birds								
Alameda (South Bay) song sparrow *Melospiza melodia pusillula*	Species of Concern	None	Species of Concern	N/A	Tidal salt marsh habitats along the edge of the Bay and streams where tidal flow affects the vegetation.	Marginal habitat present in several small areas of salt grass	No	Low
Allen's Hummingbird (nesting) *Selasphorus sasin*	Species of Concern	None	None	N/A	Chaparral, thickets, brushy slopes, and open coniferous forest.	No nesting habitat on site.	No	None
American Peregrine Falcon (nesting) *Falco peregrinus anatum*	Delisted	Endangered	Fully Protected	N/A	Frequents bodies of water in open areas with cliffs and canyons nearby for cover and nesting.	No	No	None

[10] Ibid.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Ashy Storm-petrel (rookery) *Oceanodroma homochroa*	Species of Concern	None	Species of Concern	N/A	Pelagic, nests on offshore islands.	No	No	None
Bald Eagle (nesting and wintering) *Haliaeetus leucocephalus*	Threatened (Proposed for de-listing)	Endangered	Sensitive Species (Fully Protected)	N/A	Shorelines, lakes, large rivers. Nests in large open trees. No nesting habitat onsite.	No	No	None
Bank Swallow (nesting) *Riparia riparia*	Special Concern	Threatened	None	N/A	Nests in steep river banks.	No	No	None
Bell's Sage Sparrow *Amphispiza belli belli*	Species of Concern	None	Species of Concern	N/A	Though restricted to shrubby habitats, Bell's Sage Sparrow tolerates a fairly broad range of shrublands, from coastal sage scrub to various types of chaparral.[11]	No	No	None
Black Oystercatcher (nesting) *Haematopus bachmani*	Species of Concern	None	None	N/A	Rocky seacoasts.[12]	No	No	None
Black Rail *Laterallus jamaicensis coturniculus*	None	Threatened	Fully Protected	N/A	Found in tidal salt marshes where pickleweed is the primary vegetation. Also found in fresh water and brackish marshes at low elevations.	No	No	None
Black Skimmer (nesting colony) *Rynchops niger*	Species of Concern	None	Species of Concern	N/A	Requires shallow, calm water for foraging, and sand bars, beaches, or dikes for roosting and nesting.[13] Nesting sites very sensitive to human disturbance.	Yes—perching habitat on breakwaters and nearby Bay is calm enough at times for foraging.	No	Low—Very few skimmers reported from the Bay on a regular basis.

[11] http://www.sdnhm.org/research/birdatlas/wrenderings/99spring-reports.html#sage, Accessed April 6, 2005.
[12] http://www.enature.com/fieldguide/showSpeciesRECNUM.asp?recnum=BD0161, Accessed April 6, 2005.
[13] http://www.dfg.ca.gov/whdab/html/B236.html, Accessed April 6, 2005.

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Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Black Swift (nesting) *Cypseloides niger*	Species of Concern	None	Species of Concern	N/A	Nests on cliffs near water.	No	No	None
Black Turnstone *Arenaria melanocephala*	Species of Concern	None	None	N/A	Winter resident on rocky coastlines throughout California. Breeds in western Alaska.	Wintering habitat only.	No	Low
California Brown Pelican (rookery and communal roosts) *Pelecanus occidentalis californicus*	Endangered	Endangered	Fully Protected	N/A	Estuarine, marine subtidal, and marine pelagic waters along the California coast. Nests typically on islands or offshore rocks.[14]	Yes—Foraging habitat only.	No	Low
California Clapper Rail *Rallus longirostris obsoletus*	Endangered	Endangered	Fully Protected	N/A	Saltwater and brackish marshes often crossed by tidal sloughs in the San Francisco Bay. Closely associated with pickleweed.	No habitat onsite, but there are nearby records.	No	None
California Least Tern (nesting colony) *Sterna antillarum (=albifrons) browni*	Endangered	Endangered	Fully Protected	N/A	Nesting colonies found along the coast and in San Francisco Bay. Uses bare or sparsely vegetated flat beaches, alkali flats and other relatively open areas for nesting.	Very poor quality nesting habitat at the sandy beach. Likely too much human related disturbance.	No	None
Cooper's Hawk (nesting) *Accipiter cooperii*	None	None	Species of Concern	N/A	Dense stands of live oak, riparian, deciduous, or other forest habitats near water used most frequently.[15]	No	No	None
Costa's Hummingbird (nesting) *Calypte costae*	Species of Concern	None	None	N/A	Chaparral and low desert regions.	No	No	None
Double-crested Cormorant (nesting) *Phalacrocorax auritus*	None	None	Species of Concern	N/A	Nests in trees along lake margins and on coastal cliffs.	No	No	None

[14] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=birds&idNum=13, Accessed April 6, 2005.
[15] http://www.dfg.ca.gov/whdab/html/B116.html, Accessed April 6, 2005.

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Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Elegant Tern (nesting colony) *Sterna elegans*	Species of Concern	None	Species of Concern	N/A	Inshore coastal waters, bays, estuaries, and harbors; rarely occurs far offshore, and never inland. Generally does not breed in the Bay.	No breeding habitat present within project area.	No	None
Ferruginous Hawk (wintering) *Buteo regalis*	Species of Concern	None	Species of Concern	N/A	Winters in a variety of habitats in California. Fairly common winter resident of grasslands and agricultural areas in southwestern California (Garrett and Dunn 1981).	No	No	None
Golden Eagle (nesting and winterig) *Aquila chrysaetos*	None	None	Species of Concern (Fully Protected)	N/A	Rolling foothills, mountain areas, sage-juniper flats, desert. Ranges from sea level up to 3833 m (0-11,500 ft).	No	No	None
Harlequin Duck (nesting) *Histrionicus histrionicus*	Species of Concern	None	Species of Concern	N/A	Usually nests along shores of shallow, swift rivers with plentiful aquatic invertebrates.[16]	No	No	None
Lawrence's Goldfinch (nesting) *Carduelis lawrencei*	Species of Concern	None	None	N/A	Oak and riparian woodland, chaparral, pinion/juniper woodland, and weedy areas near water.	No	No	None
Lewis' Woodpecker (nesting) *Melanerpes lewis*	Species of Concern	None	None	N/A	Breeds in tree cavities in inner coast range.	No	No	None
Little Willow Flycatcher (nesting) *Empidonax traillii brewsteri*	None	Endangered[17]	None	N/A	Summer resident in wet meadow and montane riparian habitats at 600-2500 m (2000-8000 ft) in the Sierra Nevada and Cascade Range. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows (Serena 1982).[18]	No	No	None

[16] http://www.dfg.ca.gov/whdab/html/B096.html, Accessed April 6, 2005.

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Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Loggerhead Shrike (nesting) *Lanius ludovicianus*	Species of Concern	None	Species of Concern	N/A	Grasslands for foraging and associated riparian and scrub for nesting.	No	No	None
Long-billed Curlew (nesting) *Numenius americanus*	Species of Concern	None	Species of Concern	N/A	Upland short-grass prairies and wet meadows are used for nesting; coastal estuaries, open grasslands, and croplands are used in winter.	No	No	None
Marbled Godwit *Limosa fedoa*	Species of Concern	None	None	N/A	Winter resident along the coast. Uses primarily mudflat and estuarine habitats. Breeds in central Canada.	No	No	None
Marbled Murrelet *Brachyramphus marmoratus*	Threatened Critical Habitat	Endangered	None	N/A	Occurs year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal, Santa Barbara Co. (Sowls et al. 1980).[19] Breeds in mature coniferous forests.	No Critical Habitat not present within the project area.	No	None
Northern Harrier (nesting) *Circus cyaneus*	None	None	Species of Concern	N/A	Occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 3000 m (10,000 ft). Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas.[20]	No	No	None
Red Knot *Calidris canutus*	Species of Concern	None	None	N/A	Migrant shorebird. Present in very low numbers during migration, especially in the fall.	No	No	None
Rufous Hummingbird (nesting) *Selasphorus rufus*	Species of Concern	None	None	N/A	Coniferous forest, thickets and brushy slopes, forages in adjacent meadows.	No	No	None

[17] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=birds&idNum=75, Accessed April 6, 2005.
[18] http://www.dfg.ca.gov/whdab/html/B315.html, Accessed April 6, 2005.
[19] http://www.dfg.ca.gov/whdab/html/B240.html, Accessed April 6, 2005.
[20] http://www.dfg.ca.gov/whdab/html/B114.html, Accessed April 6, 2005.

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Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Saltmarsh Common Yellowthroat *Geothlypis trichas sinuosa*	Species of Concern	None	Species of Concern	N/A	Fresh and saltwater marshes, thick continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	No	No	None
Short-eared Owl (nesting) *Asio flammeus*	None	None	Species of Concern	N/A	Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Occasionally breeds in northern California (McCaskie et al. 1988).	No	No	None
Short-tailed Albatross *Diomedea albatrus*	Endangered	None	None	N/A	Pelagic.	No	No	None
Tricolored Blackbird (nesting colony) *Agelaius tricolor*	Species of Concern	None	Special Concern	N/A	Colonial nester that uses tules or bulrush for nesting. Also requires open water and nearby source of insects to prey on.	No suitable nesting habitat within the project site	No	None
Vaux's Swift (nesting) *Chaetura vauxi*	Species of Concern	None	Species of Concern	N/A	Prefers redwood and Douglas fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs.	No	No	None
Western Burrowing Owl *Athene cunicularia hypugaea*	Species of Concern	None	Species of Concern	N/A	Habitats with low-growing vegetation (grasslands, scrub, deserts). Dependent on burrowing mammals, especially California ground squirrels.	No	No	None
Western Snowy Plover (nesting) *Charadrius alexandrinus nivosus*	Threatened Critical Habitat Proposed	None	Species of Concern	N/A	Nests on sandy beaches of the ocean, bays, salt ponds, and larger lakes.	Marginal nesting habitat along shoreline of the Mole and sandy beach. Project is not within a proposed Critical Habitat unit.	No	Low

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
White-tailed Kite (nesting) *Elanus leucurus*	Species of Concern	None	Fully Protected	N/A	Grasslands, agriculture, wetlands, oak-woodland and savannah habitats, and riparian areas associated with open areas.	No	No	None
Whimbrel *Numenius phaeopus*	Species of Concern	None	None	N/A	Common winter resident. Uses mudflat and sandy shoreline habitats. Breeds in eastern Alaska and along Hudson Bay.	Yes	No	None
Mammals								
Alameda Island Mole *Scapanus latimanus parvus*	Species of Concern	None	Species of Concern	N/A	Soft soil in valleys and mountain meadows in several biotic communities.[21]	No	No	None
American Badger *Taxidea taxus*	None	None	Species of Concern	N/A	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.[22]	No	No	None
Berkeley Kangaroo Rat *Dipodomys heermanni berkeleyensis*	Species of Concern	None	None	N/A	Found in Briones Valley and east Oakland.[23] No records for the peninsula.	No	No	None
Blue Whale *Balaenoptera musculus*	Endangered			N/A	Pelagic.	No	No	None
Finback (=fin) Whale *Balaenoptera physalus*	Endangered			N/A	Pelagic.	No	No	None

[21] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000.
http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.
[22] http://www.dfg.ca.gov/whdab/html/M160.html, Accessed April 6, 2005.
[23] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000.
http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Fringed Myotis Bat *Myotis thysanodes*	Species of Concern	None	None	N/A	Pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 4000-7000 ft. Most common roosts are in caves, mines, buildings, and crevices (CDFG 1999a).	No	No	None
Southern Sea Otter *Enhydra lutris nereis*	Threatened	None	Fully Protected	N/A	Pelagic.	No	No	None
Western Mastiff-bat *Eumops perotis californicus*	Species of Concern	None	Species of Concern	N/A	Roost in cracks on cliff faces and buildings. They may forage quite some distance from roosting locations.[24]	Foraging habitat only.	No	None
Grey Whale *Eschrichtius robustus*	Delisted			N/A	Pelagic.	No	No	None
Guadalupe Fur Seal *Arctocephalus townsendi*	Threatened	Threatened	Fully Protected	N/A	Pelagic.	No	No	None
Long-eared Myotis Bat *Myotis evotis*	Species of Concern	None	None	N/A	Found in all brush, woodland, and forest habitats from sea-level to 9000 feet.	No	No	None
Long-legged Myotis Bat *Myotis volans*	Species of Concern	None	None	N/A	Woodland and forest habitats above 4000 ft. Forages in chaparral, and coastal scrub habitats, and in early successional stages of woodlands and forests. Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves. (CDFG 1999b)	No	No	None

[24] Williams, D.F., 1986. Mammal Species of Special Concern in California. Administrative Report 86-1, Wildlife Management Division, California Department of Fish and Game. 112 pp.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Pacific Western Big-eared Bat *Corynorhinus (=Plecotus) townsendii*	Species of Concern	None	Species of Concern	N/A	Well distributed throughout a variety of habitats (coniferous forests, oak woodlands, broad-leaf forests, grasslands, etc). Roosts in caves, buildings, tunnels, and other human structures.[25]	Foraging habitat only. No roosting habitat on site.	No	None
Point Reyes Jumping Mouse *Zapus trinotatus orarius*	Species of Concern	None	Species of Concern	N/A	Bunch grass marshes on the uplands of Point Reyes.[26]	No	No	None
Right Whale *Eubalaena glacialis*	Endangered			N/A	Pelagic.	No	No	None
Riparian (San Joaquin Valley) Woodrat *Neotoma fuscipes riparia*	Endangered	None	Species of Concern	N/A	Builds nests of debris in riparian corridors, scrub and woodland habitats throughout the San Joaquin River system.	No	No	None
Salt Marsh Harvest Mouse *Reithrodontomys raviventris*	Endangered	Endangered	Fully Protected	N/A	Found only in emergent salt marsh habitats of San Francisco Bay where pickleweed is the primary vegetation.	No—essentially no pickleweed present on site.	No	None
Salt Marsh Vagrant Shrew *Sorex vagrans halicoetes*	Species of Concern	None	Species of Concern	N/A	Found in dense, low cover above high tide line of tidal marshes of South of San Francisco Bay.	Low quality habitat in salt grass patches.	No	Low
San Francisco Dusky-footed Woodrat *Neotoma fuscipes annectens*	Species of Concern	None	Species of Concern	N/A	Builds nests out of debris in riparian corridors, scrub and woodland habitats.	No	No	None

[25] Ibid.

[26] http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=mammals&idNum=66, Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
San Joaquin Pocket Mouse *Perognathus inornatus*	Species of Concern	Non	None	N/A	Grassy or weedy fine-textured soil in the Lower and Upper Sonoran life zones of the San Joaquin and Salinas valleys.[27]	No	No	None
Sei Whale *Balaenoptera borealis*	Endangered			N/A	Pelagic.	No	No	None
Sperm Whale *Physeter catodon (=macrocephalus)*	Endangered			N/A	Pelagic.	No	No	None
Steller (=northern) Sea-lion *Eumetopias jubatus*	Threatened Critical Habitat	None	None	N/A	Pelagic. Critical habitat pertains to rookeries and haul-out areas and foraging habitat in Alaska.	No No Critical Habitat present.	No	None
Yuma Myotis Bat *Myotis yumanensis*	Species of Concern	None	None	N/A	Optimal habitats are open forest and woodlands with sources of water for feeding.	No	No	None
Plants								
Adobe Sanicle *Sanicula Maritima*	Species of Concern	Rare	None	1B	Meadow and seep; valley and foothill grassland.	No	No	None
Alkali Milk-Vetch *Astragalus tener* var. *tener*	Species of Concern	None	None	1B	Valley and foothill grasslands and vernal pools.	No	No	None
Arcuate Bush Mallow *Malacothamnus arcutatus (=M. fasciculat)*	Species of Local Concern	None	None	1B	Chaparral.	No	No	None

[27] U.S. Army Corps of Engineers, *Long Term Management Strategy Program*, June 2000.
http://www.spn.usace.army.mil/draftmgtplan/table4.pdf#search='habitat%20of%20alameda%20Island%20mole', Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Beach Layia *Layia Carnosa*	Endangered	Endangered	None	1B	Coastal Dunes, on sparsely vegetated semi-stabilized dunes.	No	No	None
Bent-flowered Fiddleneck *Amsinckia lunaris*	Species of Local Concern	None	None	1B	Cismontane woodlands, valley and foothill grassland, 50-500 meters above sea level.	No	No	None
Big-scale (=California) Balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	Species of Local Concern	None	None	1B	Valley and foothill grasslands and cismontane woodlands, often associated with serpentine soils.	No	No	None
California Broomrape *Orobanche californica* ssp. *californica*	Species of Local Concern				Dry washes, mountain slopes and flats[28]	No	No	None
California Croton *Croton californicus*	Species of Local Concern				Coastal sage scrub, chaparral, desert scrub, and coastal strand.[29]	No	No	None
California Goosefoot *Chenopodium californicum*	Species of Local Concern				Dryish plains and slopes below 5000', cismontane to desert edge.[30]	No	No	None
California Saltbush *Atriplex californica*	Species of Local Concern	None	None	None	Coastal areas over sandy soils.			
California Sea Blite *Suaeda californica*	Endangered	None	None	1B	Coastal salt marshes.	No	No	None
California Seablite *Suaeda californica*	Endangered	None	None	1B	Coastal salt marshes.	No	No	None

[28] http://www.calflora.net/bloomingplants/index.html, Accessed April 6, 2005.
[29] California Native Plant Society, Yerba Buena Chapter, http://www.cnps-yerbabuena.org/rare_croton.html, Accessed April 6, 2005.
[30] http://www.calflora.net/bloomingplants/californiagoosefoot.html, Accessed April 6, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Choris's (=artist's popcorn-flower *Plagiobothrys chorisianus* var. *chorisianus*	Species of Local Concern	None	None	1B	Chaparral and coastal prairie. Blooms Mar–Jun.			
Coast (=elegant) Rein-orchid (=piperia) *Piperia elegans*	Species of Local Concern	None	None		Open sites in shrublands and coniferous forests.[31]	No	No	None
Coast Indian Paintbrush *Castilleja affinis* spp. *affinis*	Species of Local Concern				Valley and foothill grasslands	No	No	None
Coast Lily *Lilium maritimum*	Species of Concern	None	None	1B	Forest, prairie, coastal scrub, marshes, and swamps.[32]	No	No	None
Coast Rock-cress *Arabis blepharophylla*	Species of Local Concern	None	None	4	Coastal bluff scrub, coastal prairie, coastal scrub.[33]	No	No	None
Coast Yellow Leptosiphon *Leptosiphon croceus*	None	None	None	1B	Coastal bluff scrub, coastal prairie.	No	No	None
Coastal Triquetrella *Triquetrella californica*	None	None	None	1B	Coastal bluff scrub, coastal scrub.[34]	No	No	None

[31] http://www.enature.com/fieldguide/showSpeciesRECNUM.asp?recnum=WF1553, Accessed April 6, 2005.

[32] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

[33] National Park Service, Marine Mammal Center Site and Facilities Improvements Environmental Assessment and FONSI, Appendix B, 2004, http://www.nps.gov/goga/admin/planning/pdf/appendixb.pdf, Accessed April 7, 2005.

[34] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Compact Cobweb Thistle *Cirsium occidentale* var. *compactum*	Species of Concern	None	None	1B	Chaparral, coastal dunes, coastal prairie, coastal scrub.[35]	No	No	None
Congdon's tarplant *Hemizonia parryi* ssp. *congdonii*	Species of Concern	None	None	1B	Grassland.[36]	No	No	None
Contra Costa Goldfields *Lasthenia conjugens*	Endangered	None	None	1B	Open grassy depressions in valley and foothill grassland and vernal pools.	No	No	None
Crystal Springs Lessingia *Lessingia arachnoidea*	Species of Concern	None	None	1B	Grassy slopes on serpentine soils through coastal sage scrub, valley and foothill grasslands and woodlands.	No	No	None
Curly-leaved (=curlyleaf) monardella *Monardella undulata*	Species of Concern	None	None	4	Chaparral.[37]	No	No	None
Davy's Clarkia *Clarkia davyi*	Species of Local Concern	None	None	None	Coastal scrub and valley and foothill grasslands.	No	No	None
Diablo Helianthella (=rock-rose) *Helianthella castanea*	Species of Concern	None	None	1B	Broadleaved upland forest, cismontane woodland. Usually in chaparral/oak woodland interface in rocky, azonal soils often in partial shade.	No	No	None

[35] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[36] City of Palo Alto, Stanford EIR.
[37] City of Palo Alto, Stanford EIR.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Dune (=Camphor) tansy *Tanacetum camphoratum*	Species of Concern	None	None	None	Stable or semi-mobile coastal sand dunes.	No	No	None
Fountain Thistle *Cirsium fontinale* var. *fontinale*	Endangered	Endangered	None	1B	Drainages through serpentine soils in woodland, chaparral, and grassland habitats.	No	No	None
Fragrant Fritillary (=prairie bells) *Fritillaria liliacea*	Species of Concern	None	None	1B	Valley and foothill grasslands, typically over serpentine soils although the soil type varies.	No	No	None
Franciscan Manzanita *Arctostaphylos hookeri* ssp. *franciscana*	Species of Concern	None	None	1A	Chaparral, formally endemic to San Francisco, now only exists in cultivation. Coastal scrub (serpentinite).	No	No	None
Franciscan Onion *Allium peninsulare* var. *franciscanum*	Species of Local Concern	None	None	1B	Clay and serpentine soils on dry hillsides in woodlands and valley and foothill grasslands.	No	No	None
Franciscan Thistle *Cirsium andrewsii*	Species of Concern	None	None	1B	Forest, coastal bluff scrub, prairie, and coastal scrub.[38]	No	No	None
Greene's popcorn flower *Plagiobothrys eticulates* var. *rossianorum*	Species of Concern	None	None	None	Grasslands and forest.	No	No	None
Hairless Popcorn-flower *Plagiobothrys glaber*	Species of Concern	None	None	1A	Coastal salt marshes and alkali meadows.	No	No	None

[38] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Hickman's Potentilla (=cinquefoil) *Potentilla hickmanii*	Endangered	Endangered	None	1B	Coastal bluff scrub, closed cone coniferous forest, freshwater marshes, seep, and small streams in open or forested areas along coast.	No	No	None
Hillsborough Chocolate Lily (=Gray's fritillary) *Fritillaria biflora* var. *ineziana (=F. grayana)*	Species of Concern	None	None	1B	Through valley and foothill grasslands and woodlands, likely restricted to serpentine soils.	No	No	None
Kellogg's Horkelia *Horkelia cuneata* ssp. *Sericea*	Species of Concern	None	None	1B	Closed cone coniferous forests, coastal scrub, old dunes, coastal sandhills, 10-220 meters above sea level.	No	No	None
King's Mountain Manzanita *Arctostaphylos regismontana*	Species of Local Concern	None	None	1B	Broadleaved upland forest, chaparral, and north coast coniferous forest.	No	No	None
Large-flowered (=flower) linanthus *Linanthus grandiflorus*	Species of Concern	None	None	4	Coastal bluff scrub, closed-cone coniferous forest, valley and foothill grasslands.	No	No	None
Loma Prieta Hoita *Hoita strobilina*	None	None	None	1B	Chaparral and riparian woodlands, usually serpentine soils.	No	No	None
Marin dwarf-flax (=western flax) *Hesperolinon congestum*	Threatened	Threatened	None	1B	Found on serpentine barrens, grasslands, and chaparral.	No	No	None
Marsh Microseris (=marsh silverpuffs) *Microseris paludosa*	Species of Local Concern	None	None	1B	Forest, woodland, coastal scrub, and grassland.[39]	No	No	None

[39] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Marsh Milk-vetch (=brine milk-vetch) *Astragalus pycnostachyus* var. *pycnostachyus*	Species of Local Concern	None	None	1B	Coastal dune or salt marsh.	No	No	None
Marsh Sandwort *Arenaria paludicola*	Endangered	Endangered	None	1B	Swamps, freshwater marshes, and other wet areas.	No	No	None
Mission Delores (=San Francisco) Campion *Silene verecunda* ssp. *Verecunda*	Species of Concern	None	None	1B	Often on mudstone or shale, coastal scrub, valley and foothill grassland, coastal bluff scrub.	No	No	None
Montara Manzanita *Arctostaphylos montaraensis*	Species of Concern	None	None	1B	Coastal Scrub, chaparral, endemic to San Mateo county, slopes and ridges.	No	No	None
Most Beautiful (uncommon) Jewelflower *Streptanthus albidus* ssp. *peramoenus*	Species of Concern	None	None	1B	Grasslands and upland scrub.	No	No	None
Northcoast (=Point Reyes) Bird's-beak *Cordylanthus maritimus* ssp. *palustris*	Species of Concern	None	None	1B	Coastal salt marsh, dunes.	No	No	None
Nuttall's Milk-vetch *Astragalus nuttallii* var. *virgatus*	Species of Local Concern	None	None	4	Coastal dunes and bluff scrub.	No	No	None

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	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Oregon Meconella (=white fairypoppy) *Meconella oregano*	Species of Concern	None	None	1B	Coastal prairie and coastal scrub.	No	No	None
Pacific Cordgrass (=California cordgrass) *Spartina foliosa*	Species of Local Concern	None	None	None	Marsh and swamp.[40]	No	No	None
Pallid Manzanita (=Alameda or Oakland Hills manzanita) *Arctostaphylos pallida*	Threatened	Endangered	None	1B	Endemic to broadleaved upland forest, closed-cone coniferous forest, coastal scrub, grows on uplifted marine terraces, on siliceous shale or thin chert.[41]	No	No	None
Pappose Tarplant *Centromadia parryi* ssp. *parryi*	None	None	None	1B	Coastal prairie, meadows and seeps, coastal marsh, valley, and foothill grasslands.	No	No	None
Pink Sand-verbena *Abronia umbellata* ssp. *umbellata*	Species of Local Concern	None	None	1B	Coastal dunes and sand.	No	No	None
Point Reyes Rein Orchid *Piperia elegans* ssp. *Decurtata*	None	None	None	1B	Coastal bluff scrub only from Point Reyes National Seashore.[42]	No	No	None
Presidio (=Raven's) Manzanita *Arctostaphylos hookeri* ssp. *ravenii*	Endangered	Endangered	None	1B	Coastal prairie, coastal scrub, open rocky serpentine slopes, 20-215 meters above sea level.	No	No	None

[40] City of Palo Alto, Stanford EIR.

[41] City of El Cerrito, El Cerrito Plaza Mixed-Use Development Project Draft SEIR, 2004.

[42] Marin County, *Biological and Wetland Protection Technical Background Report*, 2002, http://www.co.marin.ca.us/depts/CD/main/pdf/planning/BioticresourcesBR.pdf, Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Presidio Clarkia *Clarkia franciscana*	Endangered	Endangered	None	1B	Coastal scrub, serpentinite valley and foothill grassland.[43]	No	No	None
Purple Owl's-clover (=wideleaf Indian paintbrush) *Castilleja exserrta* ssp. *latifolia*	Species of Local Concern	None	None	None	Fields, deserts, and open, wooded areas.[44]	No	No	None
Robust Monardella (=robust coyote mint) *Monardella villosa* ssp. *globosa*	Species of Local Concern	None	None	1B	Chaparral.	No	No	None
Robust Spineflower *Chorizanthe robusta* var. *robusta*	Endangered	None	None	1B	Sandy terraces, bluffs, and loose sand of coastal dunes, coastal scrub and foothill woodlands.	No	No	None
Rose Leptosiphon *Leptosiphon rosaceus*	None	None	None	1B	Coastal bluff scrub.[45]	No	No	None
Rose Linanthus *Linanthus rosaceus*	Species of Concern	None	None	1B	Coastal bluff scrub.	No	No	None
Round-headed Chinese Houses *Collinsia corymbosa*	Species of Concern	None	None	1B	Coastal dunes.[46]	No	No	None

[43] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

[44] Marin County Open Space District, http://enature.marinopenspace.org/openspace/mcosd/showSpeciesRECNUM.asp?recnum=WF1688, Accessed April 7, 2005.

[45] CNDDB (California Natural Diversity Database) 2005. Natural Diversity Data Base, Information dated January 18, 2005. Commercial Version 3.0.5. Published by the California Department of Fish and Game.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Round-leaved Filaree *Erodium macrophyllum*	None	None	None	2	Cismontane woodland, valley and foothill grassland.[47]	No	No	None
Salt Marsh Owl's Clover (=Johnny-nip) *Castilleja ambigua* ssp. *Palustris*	Species of Local Concern	None	None	None	Coastal salt marshes.	No	No	None
San Bruno Mountain Manzanita *Arctostaphylos imbricata*	Species of Concern	Endangered	None	1B	Coastal scrub, sandstone outcrops in chaparral.	No	No	None
San Francisco (=bluehead, Chamisso's, dune) gilia *Gilia capitata* ssp. *Chamissonis*	Species of Concern	None	None	1B	Coastal dunes, coastal scrub.[48]	No	No	None
San Francisco Bay Spineflower *Chorizanthe cospidata* var. *cospidata*	Species of Concern	None	None	1B	Found on sandy slopes and terraces of coastal scrub, dune, and prairie habitats.	No	No	None
San Francisco Collinsia *Collinsia multicolor*	None	None	None	1B	Closed-cone coniferous forest, coastal scrub.	No	No	None

[46] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[47] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.
[48] CNDDB. op. cit.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
San Francisco gumplant *Grindelia hirsutula* var. *eticula*	Species of Concern	None	None	1B	Found in coastal scrub, coastal bluff scrub, valley and foothill grasslands, sandy or serpentine slopes or sea bluffs.	No	No	None
San Francisco Lessingia *Lessingia germanorum*	Endangered	Endangered	None	1B	Coastal scrub, remnant dunes, open sandy soils relatively free from competing plants.	No	No	None
San Francisco Owl's-clover *Triphysaria floribunda*	Species of Concern	None	None	1B	Coastal prairie, valley and foothill grassland, on serpentine and non-serpentine substrate.	No	No	None
San Francisco Popcornflower *Plagiobothrys diffuses*	Species of Concern	Endangered	None	1B	Coastal prairie, valley and foothill grassland.[49]	No	No	None
San Francisco Wallflower *Erysimum franciscanum*	Species of Concern	None	None	4	Found in dune hills, ocean bluffs, and open grassy or brushy slopes near the coast. This species prefers rocky, gravely or sandy soils, often of disintegrated serpentinite.	No	No	None
San Mateo Thornmint *Acanthomintha duttonii*	Endangered	Endangered	None	1B	Chaparral, valley and foothill grasslands, coastal scrub, extant populations only known from very uncommon serpentine vertisol clays; in relatively open areas.	No	No	None
San Mateo Tree Lupine *Lupinus arboreus* var. *eximius*	Species of Local Concern	None	None	3	Chaparral and coastal scrub communities.	No	No	None

[49] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
San Mateo Woolly Sunflower *Eriophyllum latilobum*	Endangered	Endangered	None	1B	Often found on roadcuts through woodlands both on and off serpentine soils in San Mateo County.	No	No	None
Santa Cruz Manzanita *Arctostaphylos andersonii*	Species of Local Concern	None	None	1B	Broadleaved upland forest, chaparral, and north coast coniferous forest.	No	No	None
Santa Cruz Microseris *Stebbinsoseris decipiens*	Species of Concern	None	None	1B	Broadleaved upland forest, closed-coned coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/open areas, sometimes on serpentine.[50]	No	No	None
Santa Cruz Tarplant *Holocarpha macradenia*	Threatened	Endangered	None	1B	Coastal prairie, coastal scrub, valley and foothill grassland/often clay and sandy.[51]	No	No	None
Short-leaved Evax *Hesperevax sparsiflora* var. *brevifolia*	Species of Concern	None	None	2	Coastal bluffs, coastal dunes.[52]	No	No	None
Skunkbush *Navarretia squarrosa*	Species of Local Concern				Open wet gravelly flats, slopes.[53]	No	No	None

[50] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County,* http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

[51] San Francisco Public Utilities Commission, *CNDDB Species Lists, CNPS Electronic Inventory, USFWS Species List for San Francisco County*, http://www.energy.ca.gov/sitingcases/sanfrancisco/documents/applicant/AFC_CD-ROM/Vol_II/Appendix_8.2A_B.pdf#search='CNDDB%20Species%20Lists,%20CNPS%20Electronic', Accessed April 7, 2005.

[52] Sonoma County, Canyon Rock Quarry Expansion Project Draft EIR, http://www.sonoma-county.org/prmd/docs/eir/CanyonRockDEIR/AppG.pdf#search='habitat%20of%20navarretia%20squarrosa', Accessed April 7, 2005.

[53] California Department of Fish and Game, *California Vernal Pool Assessment Preliminary Report, Appendix C*, 1998. http://www.dfg.ca.gov/whdab/wetlands/vp_asses_rept/app_c_plnt.htm, Accessed April 7, 2005.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area								
	Status [a]							
Species Name	Federal	State	CDFG [b]	CNPS [c]	Habitat	Habitat Present	Observed	Potential Project Effect
Slender-leaved Pondweed *Potamogeton filiformis*	None	None	None	2	Freshwater marsh.[54]	No	No	None
Tiburon Buckwheat *Eriogonum caninum*	Species of Local Concern	None	None	3	Chaparral, coastal prairie, valley and foothill grasslands, often in serpentine soils.	No	No	None
Water Sack (=saline) Clover *Trifolim depauperatum* var. *hydrophilum*	Species of Concern	None	None	1B	Marshes, swamps, valley/foothill grasslands, and vernal pools.	No	No	None
Wedgeleaf Horkelia *Horkelia cuneata* ssp. *cuneata*	Species of Local Concern	None	None	None	Open sandy fields and chaparral, old dunes, southern oak woodland, coastal sage scrub.[55]	No	No	None
Western Leatherwood *Dirca occidentalis*	Species of Local Concern	None	None	1B	Broadleaved upland forest, closed cone coniferous forest, chaparral, riparian scrub, and riparian woodland.	No	No	None
White-rayed Pentachaeta *Pentachaeta bellidiflora*	Endangered	Endangered	None	1B	Open dry rocky slopes and grassy areas often on soils derived from serpentine bedrock.	No	No	None
Yarrow-leaf (manyleaf, dark-eyed) gilia *Gilia millefoliata*	Species of Local Concern	None	None	1B	Coastal Dunes.[56]	No	No	None
Habitats								
Northern Coastal Marsh		S3.2		N/A		Habitat present in small areas.	Yes	Moderate

[54] City of Palo Alto, Stanford EIR.
[55] http://www.calflora.net/bloomingplants/wedgeleafhorkelia.html, Accessed April 7, 2005.
[56] CNDDB. op. cit.

Special-Status Species Potentially Occurring within the WTA Ferry Terminal Project Area

Species Name	Status [a]				Habitat	Habitat Present	Observed	Potential Project Effect
	Federal	State	CDFG [b]	CNPS [c]				
Northern Maritime Chaparral		S1.2		N/A		Not present in project area.		
Serpentine Bunchgrass		S2.2		N/A		Not present in project area.		
Valley Needlegrass Grassland		S3.1		N/A		Not present in project area.		

[a] Endangered and threatened are species statuses under the California or Federal Endangered Species Act. Federal Species of Concern and candidate species do not receive any statutory protection under the Federal ESA.

[b] California Department of Fish and Game. Species designated as Species of Special Concern by CDFG are to be mitigated for under CEQA. A fully protected designation indicates that these species are fully protected under the Fish and Game Code and cannot be taken or possessed without a permit from the Fish and Game Commission or CDFG.

[c] California Native Plant Society. Species on List 1A are believed to be extinct within California. Species on List 1B are rare or endangered in California and elsewhere in their range.

Element Rankings, California Department of Fish and Game, 1993:

S2.1—Very Threatened in California

S3.1—Very Threatened in California

S3.2—Threatened in California

9.2.16 APPENDIX F: TRANSPORTATION REPORT

The following changes have been added to the Appendices of the *Oyster Point Ferry Terminal Transportation Report*

Oyster Point Ferry Terminal Transportation Study

Table 1
Comparison of Freeway Segment Volumes - Year 2025 Conditions

Freeway Segment	Freeway Segment Volumes Year 2025 Baseline	Year 2025 plus Project Alternative I	% Difference
AM Peak			
North of Oyster Point Boulevard			
Northbound Segment	7,637	7,640	0.04%
Southbound Segment	9,445	9,422	-0.24%
South of Oyster Point Boulevard			
Northbound Segment	8,109	8,024	-1.05%
Southbound Segment	9,794	9,807	0.13%
PM Peak			
North of Oyster Point Boulevard			
Northbound Segment	9,010	8,995	-0.17%
Southbound Segment	7,835	7,836	0.01%
South of Oyster Point Boulevard			
Northbound Segment	8,664	8,670	0.07%
Southbound Segment	9,807	9,744	-0.64%

Oyster Point Ferry Terminal Transportation Study

Table 2
Comparison of Intersection Approach Volumes - Year 2025 AM Peak Hour Conditions

#	Intersection	Intersection Approach Volumes Year 2025 Baseline	Intersection Approach Volumes Year 2025 plus Project Alternative I	% Difference
1	Oyster Point Blvd./ Marina Blvd.	1,098	1,157	5.37%
	Northbound	*110*	*134*	*21.82%*
	Eastbound	*860*	*895*	*4.07%*
	Westbound	*128*	*128*	*0.00%*
2	Oyster Point Blvd./ Gull Blvd.	2,363	2,422	2.50%
	Northbound	*491*	*491*	*0.00%*
	Southbound	*54*	*54*	*0.00%*
	Eastbound	*1590*	*1,625*	*2.20%*
	Westbound	*228*	*252*	*10.53%*
3	Oyster Point Blvd./ Gateway Blvd.	6,109	6,139	0.49%
	Northbound	*430*	*430*	*0.00%*
	Southbound	*71*	*71*	*0.00%*
	Northeastbound	*1,542*	*1,542*	*0.00%*
	Eastbound	*2,908*	*2,928*	*0.69%*
	Westbound	*1,158*	*1,168*	*0.86%*
4	Dubuque Ave./ U.S. 101 Ramps	3,780	3,792	0.32%
	Northeastbound	*212*	*212*	*0.00%*
	Southwestbound	*1,217*	*1,220*	*0.25%*
	Eastbound	*2,346*	*2,355*	*0.38%*
	Westbound	*5*	*5*	*0.00%*
5	Oyster Point Blvd./ Dubuque Ave.	6,140	6,180	0.65%
	Northeastbound	*2,049*	*2,068*	*0.93%*
	Eastbound	*2,714*	*2,725*	*0.41%*
	Westbound	*1,377*	*1,387*	*0.73%*
6	E Grand Ave./ Industrial Way	1,769	1,769	0.00%
	Northbound	*1,717*	*1,717*	*0.00%*
	Southbound	*0*	*0*	*0.00%*
	Westbound	*52*	*52*	*0.00%*

Oyster Point Ferry Terminal Transportation Study

Table 3
Comparison of Intersection Approach Volumes - Year 2025 PM Peak Hour Conditions

#	Intersection	Intersection Approach Volumes Year 2025 Baseline	Intersection Approach Volumes Year 2025 plus Project Alternative I	% Difference
1	Oyster Point Blvd./ Marina Blvd.	1,006	1,052	4.57%
	Northbound	*200*	*227*	*13.50%*
	Eastbound	*251*	*266*	*5.98%*
	Westbound	*555*	*559*	*0.72%*
2	Oyster Point Blvd./ Gull Blvd.	2,458	2,500	1.71%
	Northbound	*733*	*733*	*0.00%*
	Southbound	*290*	*290*	*0.00%*
	Eastbound	*706*	*721*	*2.12%*
	Westbound	*729*	*756*	*3.70%*
3	Oyster Point Blvd./ Gateway Blvd.	7,269	7,309	0.55%
	Northbound	*1,545*	*1,545*	*0.00%*
	Southbound	*411*	*411*	*0.00%*
	Northeastbound	*572*	*572*	*0.00%*
	Eastbound	*799*	*814*	*1.88%*
	Westbound	*3,942*	*3,967*	*0.63%*
4	Dubuque Ave./ U.S. 101 Ramps	4,128	4,158	0.73%
	Northeastbound	*948*	*948*	*0.00%*
	Southwestbound	*1,990*	*2,005*	*0.75%*
	Eastbound	*1,181*	*1,196*	*1.27%*
	Westbound	*9*	*9*	*0.00%*
5	Oyster Point Blvd./ Dubuque Ave.	8,588	8,628	0.47%
	Northeastbound	*1,622*	*1,637*	*0.92%*
	Eastbound	*1,351*	*1,351*	*0.00%*
	Westbound	*5,615*	*5,640*	*0.45%*
6	E Grand Ave./ Industrial Way	585	585	0.00%
	Northbound	*576*	*576*	*0.00%*
	Southbound	*0*	*0*	*0.00%*
	Westbound	*9*	*9*	*0.00%*

Table 1
Intersection Operating Conditions – Year 2025 (Baseline and Alternative 1)

#	*Intersection*	*Traffic Control*	*Year 2025 Baseline*		*Year 2025 plus Project Alternative 1*	
			LOS	*Delay*	*LOS*	*Delay*
AM Peak Hour						
1	Oyster Point Blvd./ Marina Blvd.	S	A	6.4	A	6.9
2	Oyster Point Blvd./ Gull Road	S	C	27.4	C	29.0
3	Oyster Point Blvd./ Gateway Blvd.	S	**F**	**>80**	**F**	**>80**
4	Dubuque Ave./ U.S. 101 Ramps	S	D	46.9	D	47.7
5	Dubuque Ave./ Oyster Point Blvd.	S	E	65.5	E	64.0
6	E Grand Ave./ Executive Drive	U	C	22.0 (WB)	C	22.0 (WB)
PM Peak Hour						
1	Oyster Point Blvd./ Marina Blvd.	S	A	7.0	A	7.4
2	Oyster Point Blvd./ Gull Road	S	C	31.9	C	31.1
3	Oyster Point Blvd./ Gateway Blvd.	S	**F**	**>80**	**F**	**>80**
4	Dubuque Ave./ U.S. 101 Ramps	S	D	38.6	D	42.0
5	Dubuque Ave./ Oyster Point Blvd.	S	**F**	**>80**	**F**	**>80**
6	E Grand Ave./ Executive Drive	U	B	10.3 (WB)	B	10.3 (WB)

Source: Wilbur Smith Associates, April 2006.

NOTES:
S – Signalized, U – Unsignalized (Yield Control)
LOS – Level of Service
Delay indicates Average Vehicle Delay in seconds.
Bold indicates intersection LOS exceeds acceptable value.

Intersection: 1: Oyster Point & Marina Blvd

Movement	EB	WB	WB	WB	NB
Directions Served	T	L	T	T	LR
Maximum Queue (ft)	151	30	54	31	115
Average Queue (ft)	66	2	11	4	61
95th Queue (ft)	132	14	38	21	109
Link Distance (ft)	344		128	128	1256
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		56			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 1: Oyster Point & Marina Blvd

Movement	EB	WB	WB	WB	NB
Directions Served	T	L	T	T	LR
Maximum Queue (ft)	118	81	113	119	187
Average Queue (ft)	23	12	46	38	95
95th Queue (ft)	67	49	86	80	153
Link Distance (ft)	344		128	128	1256
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)		56			
Storage Blk Time (%)		0	4		
Queuing Penalty (veh)		1	1		

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101N
From/To:	N/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 AM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	7511	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2041	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1674	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1674	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.0	mi/h
Number of lanes, N	5	
Density, D	24.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101N
From/To:	S/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 AM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	7689	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2089	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1705	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1705	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101S
From/To:	N/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 AM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8686	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2360	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2419	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	68.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2419	pc/h/ln
Free-flow speed, FFS	68.5	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	4	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101S
From/To:	S/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 AM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	9416	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2559	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2088	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2088	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	63.0	mi/h
Number of lanes, N	5	
Density, D	33.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101N
From/To:	N/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 PM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8861	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2408	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1974	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1974	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	65.3	mi/h
Number of lanes, N	5	
Density, D	30.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101N
From/To:	S/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 PM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8215	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2232	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1822	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1822	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.6	mi/h
Number of lanes, N	5	
Density, D	27.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101S
From/To:	N/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 PM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	7198	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1956	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2005	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	68.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2005	pc/h/ln
Free-flow speed, FFS	68.5	mi/h
Average passenger-car speed, S	63.7	mi/h
Number of lanes, N	4	
Density, D	31.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

EXISTING

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	3/25/2005
Analysis Time Period:	
Freeway/Direction:	US 101S
From/To:	S/O Oyster Point
Jurisdiction:	SM County
Analysis Year:	2005 PM Peak
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	9428	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2562	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2091	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2091	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	62.9	mi/h
Number of lanes, N	5	
Density, D	33.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	AM Peak
Freeway/Direction:	**US 101N**
From/To:	**N/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	7640	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2076	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1702	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1702	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	24.7	pc/mi/ln
Level of service, LOS	**C**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	AM Peak
Freeway/Direction:	**US 101N**
From/To:	**S/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8024	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2180	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1779	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1779	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	5	
Density, D	26.1	pc/mi/ln
Level of service, LOS	**D**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	AM Peak
Freeway/Direction:	**US 101S**
From/To:	**N/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	9422	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2560	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2624	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	68.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2624	pc/h/ln
Free-flow speed, FFS	68.5	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	4	
Density, D		pc/mi/ln
Level of service, LOS	**F**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	AM Peak
Freeway/Direction:	**US 101S**
From/To:	**S/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	9807	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2665	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2175	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2175	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	60.8	mi/h
Number of lanes, N	5	
Density, D	35.8	pc/mi/ln
Level of service, LOS	**E**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	PM Peak
Freeway/Direction:	**US 101N**
From/To:	**N/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8995	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2444	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2004	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2004	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	5	
Density, D	30.9	pc/mi/ln
Level of service, LOS	**D**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	PM Peak
Freeway/Direction:	**US 101N**
From/To:	**S/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	8670	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2356	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1922	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1922	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	66.2	mi/h
Number of lanes, N	5	
Density, D	29.0	pc/mi/ln
Level of service, LOS	**D**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	PM Peak
Freeway/Direction:	**US 101S**
From/To:	**N/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	7836	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2129	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2183	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	68.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2183	pc/h/ln
Free-flow speed, FFS	68.5	mi/h
Average passenger-car speed, S	59.7	mi/h
Number of lanes, N	4	
Density, D	36.6	pc/mi/ln
Level of service, LOS	**E**	

Overall results are not computed when free-flow speed is less than 55 mph.

YEAR 2025 + PROJECT (ALT 1)

HCS2000: Basic Freeway Segments Release 4.1d

Operational Analysis

Analyst:	BPK
Agency or Company:	WSA
Date Performed:	5/19/2005
Analysis Time Period:	PM Peak
Freeway/Direction:	**US 101S**
From/To:	**S/O Oyster Point**
Jurisdiction:	SM County
Analysis Year:	2025 Plus Project (ALT 1)
Description:	S SF WTA Ferry Traffic

Flow Inputs and Adjustments

Volume, V	9744	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	2648	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2161	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

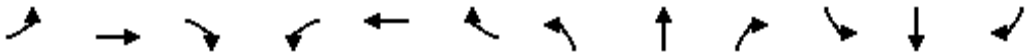
LOS and Performance Measures

Flow rate, vp	2161	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	61.2	mi/h
Number of lanes, N	5	
Density, D	35.3	pc/mi/ln
Level of service, LOS	**E**	

Overall results are not computed when free-flow speed is less than 55 mph.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	3539	1771	
Flt Permitted	1.00	1.00	0.30	1.00	0.95	
Satd. Flow (perm)	1863	1583	557	3539	1771	
Volume (vph)	677	218	3	125	131	3
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	736	237	3	136	142	3
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	736	237	3	136	143	0
Turn Type		pm+ov	Perm			
Protected Phases	4	2		8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	37.3	47.2	37.3	37.3	9.9	
Effective Green, g (s)	37.3	47.2	37.3	37.3	9.9	
Actuated g/C Ratio	0.68	0.86	0.68	0.68	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1259	1583	376	2391	318	
v/s Ratio Prot	c0.40	0.03		0.04	c0.08	
v/s Ratio Perm		0.12	0.01			
v/c Ratio	0.58	0.15	0.01	0.06	0.45	
Uniform Delay, d1	4.8	0.7	2.9	3.0	20.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	0.0	0.0	0.0	1.0	
Delay (s)	6.8	0.7	3.0	3.1	21.2	
Level of Service	A	A	A	A	C	
Approach Delay (s)	5.3			3.1	21.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	3524		3433	1621			1623	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	1770	1863	1583	1770	3524		3433	1621			1623	
Volume (vph)	333	833	459	33	213	6	437	7	47	1	2	51
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	362	905	499	36	232	7	475	8	51	1	2	55
RTOR Reduction (vph)	0	0	200	0	2	0	0	42	0	0	52	0
Lane Group Flow (vph)	362	905	299	36	237	0	475	17	0	0	6	0
Turn Type	Prot		Perm	Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									
Actuated Green, G (s)	18.5	39.2	39.2	2.1	22.8		13.8	13.8			3.8	
Effective Green, g (s)	18.5	39.2	39.2	2.1	22.8		13.8	13.8			3.8	
Actuated g/C Ratio	0.25	0.52	0.52	0.03	0.30		0.18	0.18			0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	437	975	828	50	1073		633	299			82	
v/s Ratio Prot	c0.20	c0.49		0.02	0.07		c0.14	0.01			c0.00	
v/s Ratio Perm			0.19									
v/c Ratio	0.83	0.93	0.36	0.72	0.22		0.75	0.06			0.07	
Uniform Delay, d1	26.7	16.5	10.5	36.1	19.4		28.9	25.2			33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	12.2	16.0	1.2	39.1	0.5		5.0	0.1			0.4	
Delay (s)	38.9	32.5	11.7	75.2	19.9		33.9	25.3			34.2	
Level of Service	D	C	B	E	B		C	C			C	
Approach Delay (s)		28.0			27.1			33.0			34.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBT	SBR2	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.91	1.00	1.00	0.88	0.88	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85	0.85	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3221	1661	1583	1863	2787	2787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	3221	1661	1583	1863	2787	2787	1583
Volume (vph)	247	2242	439	64	1104	221	56	153	9	62	1166	376
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	2437	477	70	1200	240	61	166	10	67	1267	409
RTOR Reduction (vph)	0	0	0	0	0	0	0	149	0	64	0	144
Lane Group Flow (vph)	268	2437	477	70	1200	197	104	17	10	3	1267	265
Turn Type	Prot		pm+ov	Prot		Split		Perm		Perm	custom	custom
Protected Phases	5	2	8	1	6	8	8		4			
Permitted Phases			2					8		4	10	10
Actuated Green, G (s)	14.0	46.2	60.7	7.8	40.0	14.5	14.5	14.5	5.2	5.2	45.1	45.1
Effective Green, g (s)	14.0	46.2	60.7	7.8	40.0	14.5	14.5	14.5	5.2	5.2	45.1	45.1
Actuated g/C Ratio	0.10	0.33	0.44	0.06	0.29	0.10	0.10	0.10	0.04	0.04	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	1693	692	99	1465	336	174	165	70	104	906	514
v/s Ratio Prot	0.15	c0.48	c0.07	0.04	c0.24	0.06	0.06		c0.01			
v/s Ratio Perm			0.23					0.01		0.00	c0.45	0.17
v/c Ratio	1.50	1.44	0.69	0.71	0.82	0.59	0.60	0.11	0.14	0.02	1.40	0.51
Uniform Delay, d1	62.4	46.3	31.5	64.4	46.0	59.3	59.4	56.3	64.6	64.4	46.9	38.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	250.8	201.2	2.9	20.5	5.2	2.6	5.4	0.3	0.9	0.1	186.0	0.9
Delay (s)	313.2	247.5	34.3	84.9	51.3	61.9	64.8	56.6	65.6	64.4	232.9	38.9
Level of Service	F	F	C	F	D	E	E	E	E	E	F	D
Approach Delay (s)		221.1			53.1		60.6		64.6			
Approach LOS		F			D		E		E			

Intersection Summary			
HCM Average Control Delay	167.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	138.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1685	1583		1762		1770	1863		1770	1863	2787
Flt Permitted	0.95	0.95	1.00		1.00		0.95	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1681	1685	1583		1762		1770	1863		1245	1863	2787
Volume (vph)	1928	2	425	0	3	2	84	128	0	1	356	863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2096	2	462	0	3	2	91	139	0	1	387	938
RTOR Reduction (vph)	0	0	101	0	2	0	0	0	0	0	0	161
Lane Group Flow (vph)	1048	1050	361	0	3	0	91	139	0	1	387	777
Turn Type	Split		Perm	Split			Prot			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases			4							6		6
Actuated Green, G (s)	82.1	82.1	82.1		1.3		6.0	40.0		30.0	30.0	112.1
Effective Green, g (s)	82.1	82.1	82.1		1.3		6.0	40.0		30.0	30.0	112.1
Actuated g/C Ratio	0.61	0.61	0.61		0.01		0.04	0.30		0.22	0.22	0.83
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1019	1022	960		17		78	550		276	413	2390
v/s Ratio Prot	c0.62	0.62			c0.00		c0.05	0.07			c0.21	0.20
v/s Ratio Perm			0.23							0.00		0.08
v/c Ratio	1.03	1.03	0.38		0.18		1.17	0.25		0.00	0.94	0.32
Uniform Delay, d1	26.7	26.7	13.6		66.5		64.7	36.3		41.1	51.8	2.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	35.7	35.4	1.1		5.0		153.8	0.2		0.0	28.6	0.1
Delay (s)	62.4	62.0	14.7		71.5		218.5	36.6		41.1	80.4	2.8
Level of Service	E	E	B		E		F	D		D	F	A
Approach Delay (s)		53.6			71.5			108.5			25.5	
Approach LOS		D			E			F			C	

Intersection Summary			
HCM Average Control Delay	47.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	135.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	0.88	0.95	0.95	0.88			
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (prot)	3433	3390	1441	3433	3539	2787	1681	1698	2787			
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (perm)	3433	3390	1441	3433	3539	2787	1681	1698	2787			
Volume (vph)	673	1431	621	599	247	541	515	46	1497	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	732	1555	675	651	268	588	560	50	1627	0	0	0
RTOR Reduction (vph)	0	0	339	0	0	494	0	0	5	0	0	0
Lane Group Flow (vph)	732	1555	336	651	268	94	297	313	1622	0	0	0
Turn Type	Prot		Perm	Prot		Perm	Split		pm+ov			
Protected Phases	7	4		3	8		2	2	3			
Permitted Phases			4			8			2			
Actuated Green, G (s)	34.2	30.0	30.0	16.0	11.8	11.8	16.1	16.1	32.1			
Effective Green, g (s)	34.2	30.0	30.0	16.0	11.8	11.8	16.1	16.1	32.1			
Actuated g/C Ratio	0.46	0.40	0.40	0.22	0.16	0.16	0.22	0.22	0.43			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	1584	1372	583	741	564	444	365	369	1358			
v/s Ratio Prot	0.21	c0.46		0.19	0.08		0.18	0.18	c0.26			
v/s Ratio Perm			0.23			0.03			0.32			
v/c Ratio	0.46	1.13	0.58	0.88	0.48	0.21	0.81	0.85	1.19			
Uniform Delay, d1	13.7	22.0	17.1	28.1	28.3	27.1	27.6	27.8	21.0			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.2	69.6	1.4	11.5	0.6	0.2	13.0	16.4	95.0			
Delay (s)	13.9	91.7	18.5	39.6	29.0	27.3	40.6	44.2	116.0			
Level of Service	B	F	B	D	C	C	D	D	F			
Approach Delay (s)		55.8			32.9			95.9			0.0	
Approach LOS		E			C			F			A	

Intersection Summary			
HCM Average Control Delay	64.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

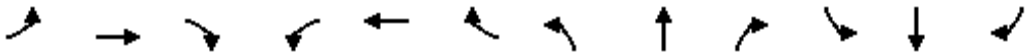
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	52	613	1104	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	57	666	1200	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1266	933			1866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1266	933			1866	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	79			100	
cM capacity (veh/h)	161	268			319	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	57	444	1422
Volume Left	0	0	0
Volume Right	57	0	1200
cSH	268	1700	1700
Volume to Capacity	0.21	0.26	0.84
Queue Length 95th (ft)	20	0	0
Control Delay (s)	22.0	0.0	0.0
Lane LOS	C		
Approach Delay (s)	22.0	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	3539	1770	
Flt Permitted	1.00	1.00	0.31	1.00	0.95	
Satd. Flow (perm)	1863	1583	576	3539	1770	
Volume (vph)	677	183	3	125	107	3
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	736	199	3	136	116	3
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	736	199	3	136	117	0
Turn Type		pm+ov	Perm			
Protected Phases	4	2		8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	40.1	49.4	40.1	40.1	9.3	
Effective Green, g (s)	40.1	49.4	40.1	40.1	9.3	
Actuated g/C Ratio	0.70	0.86	0.70	0.70	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1302	1583	402	2472	287	
v/s Ratio Prot	c0.40	0.02		0.04	c0.07	
v/s Ratio Perm		0.11	0.01			
v/c Ratio	0.57	0.13	0.01	0.06	0.41	
Uniform Delay, d1	4.3	0.6	2.6	2.7	21.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.0	0.0	0.0	1.0	
Delay (s)	6.1	0.7	2.7	2.8	22.5	
Level of Service	A	A	A	A	C	
Approach Delay (s)	4.9			2.8	22.5	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	3522		3433	1621			1623	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	1770	1863	1583	1770	3522		3433	1621			1623	
Volume (vph)	333	798	459	27	195	6	437	7	47	1	2	51
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	362	867	499	29	212	7	475	8	51	1	2	55
RTOR Reduction (vph)	0	0	203	0	2	0	0	42	0	0	52	0
Lane Group Flow (vph)	362	867	296	29	217	0	475	17	0	0	6	0
Turn Type	Prot		Perm	Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									
Actuated Green, G (s)	18.5	40.4	40.4	1.4	23.3		13.8	13.8			3.8	
Effective Green, g (s)	18.5	40.4	40.4	1.4	23.3		13.8	13.8			3.8	
Actuated g/C Ratio	0.25	0.54	0.54	0.02	0.31		0.18	0.18			0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	434	998	848	33	1088		628	297			82	
v/s Ratio Prot	c0.20	c0.47		0.02	0.06		c0.14	0.01			c0.00	
v/s Ratio Perm			0.19									
v/c Ratio	0.83	0.87	0.35	0.88	0.20		0.76	0.06			0.07	
Uniform Delay, d1	27.0	15.2	10.0	36.9	19.2		29.2	25.4			34.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	12.9	10.2	1.1	106.2	0.4		5.2	0.1			0.4	
Delay (s)	39.9	25.4	11.1	143.2	19.6		34.4	25.5			34.5	
Level of Service	D	C	B	F	B		C	C			C	
Approach Delay (s)		24.3			34.0			33.4			34.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBT	SBR2	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.91	1.00	1.00	0.88	0.88	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85	0.85	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3221	1661	1583	1863	2787	2787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	3221	1661	1583	1863	2787	2787	1583
Volume (vph)	247	2222	439	64	1094	221	56	153	9	62	1166	376
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	2415	477	70	1189	240	61	166	10	67	1267	409
RTOR Reduction (vph)	0	0	0	0	0	0	0	149	0	64	0	144
Lane Group Flow (vph)	268	2415	477	70	1189	197	104	17	10	3	1267	265
Turn Type	Prot		pm+ov	Prot		Split		Perm		Perm	custom	custom
Protected Phases	5	2	8	1	6	8	8		4			
Permitted Phases			2					8		4	10	10
Actuated Green, G (s)	14.0	48.1	62.0	5.0	39.1	13.9	13.9	13.9	5.2	5.2	45.1	45.1
Effective Green, g (s)	14.0	48.1	62.0	5.0	39.1	13.9	13.9	13.9	5.2	5.2	45.1	45.1
Actuated g/C Ratio	0.10	0.35	0.45	0.04	0.28	0.10	0.10	0.10	0.04	0.04	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	1781	715	64	1448	326	168	160	71	106	915	520
v/s Ratio Prot	c0.15	c0.47	c0.07	0.04	0.23	0.06	0.06		c0.01			
v/s Ratio Perm			0.23					0.01		0.00	c0.45	0.17
v/c Ratio	1.49	1.36	0.67	1.09	0.82	0.60	0.62	0.11	0.14	0.02	1.38	0.51
Uniform Delay, d1	61.7	44.6	29.6	66.2	45.8	59.1	59.2	56.0	63.9	63.6	46.1	37.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	247.1	164.0	2.4	140.6	5.4	3.1	6.6	0.3	0.9	0.1	179.9	0.8
Delay (s)	308.8	208.6	31.9	206.8	51.2	62.2	65.8	56.3	64.8	63.7	226.0	38.0
Level of Service	F	F	C	F	D	E	E	E	E	E	F	D
Approach Delay (s)		190.4			59.8		60.9		63.8			
Approach LOS		F			E		E		E			

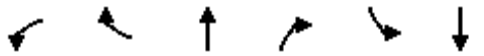
Intersection Summary			
HCM Average Control Delay	152.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	137.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1685	1583		1762		1770	1863		1770	1863	2787
Flt Permitted	0.95	0.95	1.00		1.00		0.95	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1681	1685	1583		1762		1770	1863		1245	1863	2787
Volume (vph)	1919	2	425	0	3	2	84	128	0	1	356	860
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2086	2	462	0	3	2	91	139	0	1	387	935
RTOR Reduction (vph)	0	0	101	0	2	0	0	0	0	0	0	161
Lane Group Flow (vph)	1043	1045	361	0	3	0	91	139	0	1	387	774
Turn Type	Split		Perm	Split			Prot			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases			4							6		6
Actuated Green, G (s)	82.1	82.1	82.1		1.3		6.0	40.0		30.0	30.0	112.1
Effective Green, g (s)	82.1	82.1	82.1		1.3		6.0	40.0		30.0	30.0	112.1
Actuated g/C Ratio	0.61	0.61	0.61		0.01		0.04	0.30		0.22	0.22	0.83
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1019	1022	960		17		78	550		276	413	2390
v/s Ratio Prot	c0.62	0.62			c0.00		c0.05	0.07			c0.21	0.20
v/s Ratio Perm			0.23							0.00		0.08
v/c Ratio	1.02	1.02	0.38		0.18		1.17	0.25		0.00	0.94	0.32
Uniform Delay, d1	26.7	26.7	13.6		66.5		64.7	36.3		41.1	51.8	2.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	34.3	34.0	1.1		5.0		153.8	0.2		0.0	28.6	0.1
Delay (s)	61.0	60.6	14.7		71.5		218.5	36.6		41.1	80.4	2.8
Level of Service	E	E	B		E		F	D		D	F	A
Approach Delay (s)		52.4			71.5			108.5			25.5	
Approach LOS		D			E			F			C	

Intersection Summary			
HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	135.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	0.88	0.95	0.95	0.88			
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (prot)	3433	3390	1441	3433	3539	2787	1681	1698	2787			
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (perm)	3433	3390	1441	3433	3539	2787	1681	1698	2787			
Volume (vph)	673	1420	621	596	247	534	515	46	1488	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	732	1543	675	648	268	580	560	50	1617	0	0	0
RTOR Reduction (vph)	0	0	342	0	0	491	0	0	8	0	0	0
Lane Group Flow (vph)	732	1543	333	648	268	89	297	313	1609	0	0	0
Turn Type	Prot		Perm	Prot		Perm	Split		pm+ov			
Protected Phases	7	4		3	8		2	2	3			
Permitted Phases			4			8			2			
Actuated Green, G (s)	34.6	32.0	32.0	14.0	11.4	11.4	16.1	16.1	30.1			
Effective Green, g (s)	34.6	32.0	32.0	14.0	11.4	11.4	16.1	16.1	30.1			
Actuated g/C Ratio	0.47	0.43	0.43	0.19	0.15	0.15	0.22	0.22	0.41			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	1603	1464	622	649	544	429	365	369	1283			
v/s Ratio Prot	c0.21	c0.46		0.19	0.08		0.18	0.18	c0.24			
v/s Ratio Perm			0.23			0.03			0.34			
v/c Ratio	0.46	1.05	0.54	1.00	0.49	0.21	0.81	0.85	1.25			
Uniform Delay, d1	13.4	21.0	15.6	30.0	28.7	27.4	27.6	27.8	22.0			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.2	39.2	0.9	34.7	0.7	0.2	13.0	16.4	121.0			
Delay (s)	13.6	60.2	16.4	64.7	29.4	27.6	40.6	44.2	143.0			
Level of Service	B	E	B	E	C	C	D	D	F			
Approach Delay (s)		38.6			44.0			115.4			0.0	
Approach LOS		D			D			F			A	

Intersection Summary			
HCM Average Control Delay	65.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



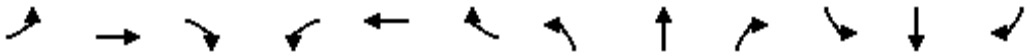
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	52	613	1104	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	57	666	1200	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1266	933			1866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1266	933			1866	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	79			100	
cM capacity (veh/h)	161	268			319	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	57	444	1422
Volume Left	0	0	0
Volume Right	57	0	1200
cSH	268	1700	1700
Volume to Capacity	0.21	0.26	0.84
Queue Length 95th (ft)	20	0	0
Control Delay (s)	22.0	0.0	0.0
Lane LOS	C		
Approach Delay (s)	22.0	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	3539	1772	
Flt Permitted	1.00	1.00	0.66	1.00	0.95	
Satd. Flow (perm)	1863	1583	1231	3539	1772	
Volume (vph)	139	127	22	537	223	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	138	24	584	242	4
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	151	138	24	584	244	0
Turn Type		pm+ov	Perm			
Protected Phases	4	2		8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	29.9	42.0	29.9	29.9	12.1	
Effective Green, g (s)	29.9	42.0	29.9	29.9	12.1	
Actuated g/C Ratio	0.60	0.84	0.60	0.60	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1114	1583	736	2116	429	
v/s Ratio Prot	0.08	0.02		c0.17	c0.14	
v/s Ratio Perm		0.07	0.02			
v/c Ratio	0.14	0.09	0.03	0.28	0.57	
Uniform Delay, d1	4.4	0.7	4.1	4.8	16.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.0	0.1	0.3	1.7	
Delay (s)	4.6	0.7	4.2	5.2	18.4	
Level of Service	A	A	A	A	B	
Approach Delay (s)	2.8			5.1	18.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	3539		3433	1607			1618	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	1770	1863	1583	1770	3539		3433	1607			1618	
Volume (vph)	66	256	399	25	730	1	700	3	30	3	6	281
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	278	434	27	793	1	761	3	33	3	7	305
RTOR Reduction (vph)	0	0	279	0	0	0	0	24	0	0	125	0
Lane Group Flow (vph)	72	278	155	27	794	0	761	12	0	0	190	0
Turn Type	Prot		Perm	Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									
Actuated Green, G (s)	4.5	29.4	29.4	1.8	26.7		21.9	21.9			13.1	
Effective Green, g (s)	4.5	29.4	29.4	1.8	26.7		21.9	21.9			13.1	
Actuated g/C Ratio	0.05	0.36	0.36	0.02	0.32		0.27	0.27			0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	97	666	566	39	1150		915	428			258	
v/s Ratio Prot	c0.04	0.15		0.02	c0.22		c0.22	0.01			c0.12	
v/s Ratio Perm			0.10									
v/c Ratio	0.74	0.42	0.27	0.69	0.69		0.83	0.03			0.74	
Uniform Delay, d1	38.3	19.9	18.8	39.9	24.2		28.4	22.3			32.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	26.0	1.9	1.2	41.8	3.4		6.5	0.0			10.4	
Delay (s)	64.3	21.9	20.0	81.7	27.6		34.9	22.3			43.3	
Level of Service	E	C	B	F	C		C	C			D	
Approach Delay (s)		24.7			29.3			34.4			43.3	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBT	SBR2	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.91	1.00	1.00	0.88	0.88	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85	0.85	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3221	1616	1583	1863	2787	2787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	3221	1616	1583	1863	2787	2787	1583
Volume (vph)	59	698	57	162	3805	1475	13	57	51	360	511	61
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	759	62	176	4136	1603	14	62	55	391	555	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	30	0	364	0	55
Lane Group Flow (vph)	64	759	62	176	4136	1069	548	32	55	27	555	11
Turn Type	Prot		pm+ov	Prot		Split		Perm		Perm	custom	custom
Protected Phases	5	2	8	1	6	8	8		4			
Permitted Phases			2					8		4	10	10
Actuated Green, G (s)	4.0	45.2	74.2	18.9	60.1	29.0	29.0	29.0	9.8	9.8	21.0	21.0
Effective Green, g (s)	4.0	45.2	74.2	18.9	60.1	29.0	29.0	29.0	9.8	9.8	21.0	21.0
Actuated g/C Ratio	0.03	0.31	0.52	0.13	0.42	0.20	0.20	0.20	0.07	0.07	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	49	1597	816	232	2124	649	326	319	127	190	407	231
v/s Ratio Prot	c0.04	0.15	0.02	0.10	c0.81	0.33	c0.34		c0.03			
v/s Ratio Perm			0.02					0.02		0.01	c0.20	0.01
v/c Ratio	1.31	0.48	0.08	0.76	1.95	1.65	1.68	0.10	0.43	0.14	1.36	0.05
Uniform Delay, d1	70.0	39.8	17.6	60.3	41.9	57.5	57.5	46.8	64.4	63.1	61.5	52.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	231.2	1.0	0.0	13.3	428.0	298.1	319.5	0.1	2.4	0.3	178.8	0.1
Delay (s)	301.1	40.8	17.6	73.6	469.9	355.6	377.0	47.0	66.7	63.4	240.3	52.9
Level of Service	F	D	B	E	F	F	F	D	E	E	F	D
Approach Delay (s)		58.0			453.7		351.2		63.8			
Approach LOS		E			F		F		E			

Intersection Summary			
HCM Average Control Delay	347.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.65		
Actuated Cycle Length (s)	143.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	1583		1714		1770	1863		1770	1863	2787
Flt Permitted	0.95	0.95	1.00		0.99		0.95	1.00		0.20	1.00	1.00
Satd. Flow (perm)	1681	1686	1583		1714		1770	1863		376	1863	2787
Volume (vph)	1060	3	133	1	3	5	376	572	0	5	218	1782
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1152	3	145	1	3	5	409	622	0	5	237	1937
RTOR Reduction (vph)	0	0	60	0	5	0	0	0	0	0	0	251
Lane Group Flow (vph)	576	579	85	0	4	0	409	622	0	5	237	1686
Turn Type	Split		Perm	Split			Prot			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases			4							6		6
Actuated Green, G (s)	69.1	69.1	69.1		1.4		29.0	52.8		19.8	19.8	88.9
Effective Green, g (s)	69.1	69.1	69.1		1.4		29.0	52.8		19.8	19.8	88.9
Actuated g/C Ratio	0.51	0.51	0.51		0.01		0.21	0.39		0.15	0.15	0.66
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	859	861	808		18		379	727		55	273	1831
v/s Ratio Prot	0.34	0.34			c0.00		c0.23	0.33			0.13	c0.47
v/s Ratio Perm			0.05							0.01		0.13
v/c Ratio	0.67	0.67	0.11		0.23		1.08	0.86		0.09	0.87	0.92
Uniform Delay, d1	24.6	24.7	17.1		66.4		53.2	37.8		50.0	56.5	20.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	4.2	0.3		6.3		69.0	9.7		0.7	24.0	8.1
Delay (s)	28.8	28.8	17.4		72.7		122.2	47.5		50.7	80.5	28.3
Level of Service	C	C	B		E		F	D		D	F	C
Approach Delay (s)		27.5			72.7			77.1			34.0	
Approach LOS		C			E			E			C	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	135.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	0.88	0.95	0.95	0.88			
Frt	1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (prot)	3433	3369	1441	3433	3539	2787	1681	1701	2787			
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (perm)	3433	3369	1441	3433	3539	2787	1681	1701	2787			
Volume (vph)	584	443	324	1700	1404	2536	1137	129	371	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	635	482	352	1848	1526	2757	1236	140	403	0	0	0
RTOR Reduction (vph)	0	4	234	0	0	428	0	0	100	0	0	0
Lane Group Flow (vph)	635	499	97	1848	1526	2329	670	706	303	0	0	0
Turn Type	Prot		Perm	Prot		Perm	Split		pm+ov			
Protected Phases	1	6		5	2		4	4	5			
Permitted Phases			6			2			4			
Actuated Green, G (s)	8.0	22.0	22.0	19.0	33.0	33.0	22.0	22.0	41.0			
Effective Green, g (s)	8.0	22.0	22.0	19.0	33.0	33.0	22.0	22.0	41.0			
Actuated g/C Ratio	0.11	0.29	0.29	0.25	0.44	0.44	0.29	0.29	0.55			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	366	988	423	870	1557	1226	493	499	1672			
v/s Ratio Prot	0.18	0.15		c0.54	0.43		0.40	c0.41	0.05			
v/s Ratio Perm			0.07			c0.84			0.06			
v/c Ratio	1.73	0.50	0.23	2.12	0.98	1.90	1.36	1.41	0.18			
Uniform Delay, d1	33.5	22.0	20.1	28.0	20.7	21.0	26.5	26.5	8.6			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	342.0	0.4	0.3	509.7	18.2	407.8	174.4	198.3	0.1			
Delay (s)	375.5	22.4	20.4	537.7	38.9	428.8	200.9	224.8	8.6			
Level of Service	F	C	C	F	D	F	F	F	A			
Approach Delay (s)		174.6			364.6			166.8			0.0	
Approach LOS		F			F			F			A	

Intersection Summary			
HCM Average Control Delay	297.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	150.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

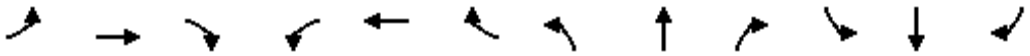
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	9	73	503	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	79	547	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	353	313			626	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353	313			626	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	619	683			951	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	10	53	573
Volume Left	0	0	0
Volume Right	10	0	547
cSH	683	1700	1700
Volume to Capacity	0.01	0.03	0.34
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.3	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	3539	1771	
Flt Permitted	1.00	1.00	0.66	1.00	0.95	
Satd. Flow (perm)	1863	1583	1231	3539	1771	
Volume (vph)	139	112	18	537	196	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	122	20	584	213	4
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	151	122	20	584	215	0
Turn Type		pm+ov	Perm			
Protected Phases	4	2		8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	30.6	42.0	30.6	30.6	11.4	
Effective Green, g (s)	30.6	42.0	30.6	30.6	11.4	
Actuated g/C Ratio	0.61	0.84	0.61	0.61	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1140	1583	753	2166	404	
v/s Ratio Prot	0.08	0.02		c0.17	c0.12	
v/s Ratio Perm		0.06	0.02			
v/c Ratio	0.13	0.08	0.03	0.27	0.53	
Uniform Delay, d1	4.1	0.7	3.8	4.5	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0	0.1	0.3	1.4	
Delay (s)	4.3	0.7	3.9	4.8	18.3	
Level of Service	A	A	A	A	B	
Approach Delay (s)	2.7			4.8	18.3	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	3539		3433	1607			1618	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	1770	1863	1583	1770	3539		3433	1607			1618	
Volume (vph)	66	241	399	23	705	1	700	3	30	3	6	281
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	262	434	25	766	1	761	3	33	3	7	305
RTOR Reduction (vph)	0	0	281	0	0	0	0	24	0	0	102	0
Lane Group Flow (vph)	72	262	153	25	767	0	761	12	0	0	213	0
Turn Type	Prot		Perm	Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									
Actuated Green, G (s)	4.5	29.3	29.3	1.8	26.6		22.1	22.1			14.0	
Effective Green, g (s)	4.5	29.3	29.3	1.8	26.6		22.1	22.1			14.0	
Actuated g/C Ratio	0.05	0.35	0.35	0.02	0.32		0.27	0.27			0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	96	656	557	38	1131		912	427			272	
v/s Ratio Prot	c0.04	c0.14		0.01	c0.22		c0.22	0.01			c0.13	
v/s Ratio Perm			0.10									
v/c Ratio	0.75	0.40	0.27	0.66	0.68		0.83	0.03			0.78	
Uniform Delay, d1	38.8	20.3	19.3	40.4	24.6		28.8	22.6			33.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	27.6	1.8	1.2	34.3	3.3		6.6	0.0			13.6	
Delay (s)	66.4	22.1	20.5	74.7	27.9		35.5	22.6			46.7	
Level of Service	E	C	C	E	C		D	C			D	
Approach Delay (s)		25.4			29.3			34.9			46.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBT	SBR2	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.91	1.00	1.00	0.88	0.88	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85	0.85	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3221	1616	1583	1863	2787	2787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	3221	1616	1583	1863	2787	2787	1583
Volume (vph)	59	683	57	162	3780	1475	13	57	51	360	511	61
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	742	62	176	4109	1603	14	62	55	391	555	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	30	0	364	0	55
Lane Group Flow (vph)	64	742	62	176	4109	1069	548	32	55	27	555	11
Turn Type	Prot		pm+ov	Prot		Split		Perm		Perm	custom	custom
Protected Phases	5	2	8	1	6	8	8		4			
Permitted Phases			2					8		4	10	10
Actuated Green, G (s)	4.0	45.2	74.2	18.9	60.1	29.0	29.0	29.0	9.8	9.8	21.0	21.0
Effective Green, g (s)	4.0	45.2	74.2	18.9	60.1	29.0	29.0	29.0	9.8	9.8	21.0	21.0
Actuated g/C Ratio	0.03	0.31	0.52	0.13	0.42	0.20	0.20	0.20	0.07	0.07	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	49	1597	816	232	2124	649	326	319	127	190	407	231
v/s Ratio Prot	c0.04	0.15	0.02	0.10	c0.81	0.33	c0.34		c0.03			
v/s Ratio Perm			0.02					0.02		0.01	c0.20	0.01
v/c Ratio	1.31	0.46	0.08	0.76	1.93	1.65	1.68	0.10	0.43	0.14	1.36	0.05
Uniform Delay, d1	70.0	39.6	17.6	60.3	41.9	57.5	57.5	46.8	64.4	63.1	61.5	52.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	231.2	1.0	0.0	13.3	422.3	298.1	319.5	0.1	2.4	0.3	178.8	0.1
Delay (s)	301.1	40.6	17.6	73.6	464.2	355.6	377.0	47.0	66.7	63.4	240.3	52.9
Level of Service	F	D	B	E	F	F	F	D	E	E	F	D
Approach Delay (s)		58.2			448.2		351.2		63.8			
Approach LOS		E			F		F		E			

Intersection Summary			
HCM Average Control Delay	345.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.64		
Actuated Cycle Length (s)	143.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	1583		1714		1770	1863		1770	1863	2787
Flt Permitted	0.95	0.95	1.00		0.99		0.95	1.00		0.43	1.00	1.00
Satd. Flow (perm)	1681	1686	1583		1714		1770	1863		799	1863	2787
Volume (vph)	1045	3	133	1	3	5	376	572	0	5	218	1767
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1136	3	145	1	3	5	409	622	0	5	237	1921
RTOR Reduction (vph)	0	0	62	0	5	0	0	0	0	0	0	275
Lane Group Flow (vph)	568	571	83	0	4	0	409	622	0	5	237	1646
Turn Type	Split		Perm	Split			Prot			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases			4							6		6
Actuated Green, G (s)	63.1	63.1	63.1		1.4		34.8	58.6		19.8	19.8	82.9
Effective Green, g (s)	63.1	63.1	63.1		1.4		34.8	58.6		19.8	19.8	82.9
Actuated g/C Ratio	0.47	0.47	0.47		0.01		0.26	0.43		0.15	0.15	0.61
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	785	787	739		18		456	808		117	273	1793
v/s Ratio Prot	0.34	0.34			c0.00		c0.23	0.33			0.13	c0.43
v/s Ratio Perm			0.05							0.01		0.16
v/c Ratio	0.72	0.73	0.11		0.23		0.90	0.77		0.04	0.87	0.92
Uniform Delay, d1	29.0	29.0	20.3		66.3		48.4	32.5		49.5	56.4	23.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.7	5.8	0.3		6.3		19.8	4.5		0.2	24.0	7.9
Delay (s)	34.7	34.8	20.6		72.6		68.2	37.0		49.7	80.4	31.0
Level of Service	C	C	C		E		E	D		D	F	C
Approach Delay (s)		33.2			72.6			49.4			36.5	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	135.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	0.88	0.95	0.95	0.88			
Frt	1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (prot)	3433	3363	1441	3433	3539	2787	1681	1701	2787			
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00			
Satd. Flow (perm)	3433	3363	1441	3433	3539	2787	1681	1701	2787			
Volume (vph)	584	443	324	1685	1404	2526	1137	129	356	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	635	482	352	1832	1526	2746	1236	140	387	0	0	0
RTOR Reduction (vph)	0	5	225	0	0	401	0	0	113	0	0	0
Lane Group Flow (vph)	635	504	100	1832	1526	2345	670	706	274	0	0	0
Turn Type	Prot		Perm	Prot		Perm	Split		pm+ov			
Protected Phases	1	6		5	2		4	4	5			
Permitted Phases			6			2			4			
Actuated Green, G (s)	8.0	23.0	23.0	19.0	34.0	34.0	21.0	21.0	40.0			
Effective Green, g (s)	8.0	23.0	23.0	19.0	34.0	34.0	21.0	21.0	40.0			
Actuated g/C Ratio	0.11	0.31	0.31	0.25	0.45	0.45	0.28	0.28	0.53			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	366	1031	442	870	1604	1263	471	476	1635			
v/s Ratio Prot	0.18	0.15		c0.53	0.43		0.40	c0.41	0.04			
v/s Ratio Perm			0.07			c0.84			0.06			
v/c Ratio	1.73	0.49	0.23	2.11	0.95	1.86	1.42	1.48	0.17			
Uniform Delay, d1	33.5	21.2	19.4	28.0	19.7	20.5	27.0	27.0	9.0			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	342.0	0.4	0.3	501.5	12.8	388.7	202.2	228.5	0.0			
Delay (s)	375.5	21.6	19.6	529.5	32.5	409.2	229.2	255.5	9.0			
Level of Service	F	C	B	F	C	F	F	F	A			
Approach Delay (s)		174.1			351.1			191.4			0.0	
Approach LOS		F			F			F			A	

Intersection Summary			
HCM Average Control Delay	293.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	149.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	9	73	503	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	79	547	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	353	313			626	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353	313			626	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	619	683			951	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	10	53	573
Volume Left	0	0	0
Volume Right	10	0	547
cSH	683	1700	1700
Volume to Capacity	0.01	0.03	0.34
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.3	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		