



Executive Summary Final Program Environmental Impact Report

**Expansion of Ferry Transit Service in the
San Francisco Bay Area**

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Prepared for:
WATER TRANSIT AUTHORITY



ES.1 INTRODUCTION

This document is a Program Environmental Impact Report (EIR) addressing the San Francisco Water Transit Authority's (WTA) Proposed Project to implement expanded ferry service in the Bay Area. The WTA began operation as a new regional agency in 2000, with the directive of evaluating options to improve and expand Bay Area ferry service and to report back to the California Legislature with a recommended plan of action. As a result, the preparation of WTA's Implementation and Operations Plan (IOP) initiated a wide range of studies, consultation, and public outreach that provided input to the decision-making process of developing the plan. From August 2002 through January 2003, the WTA circulated a Draft Program EIR for public review and comment. That EIR did not identify a proposed project or preferred alternative; rather, it addressed a range of alternatives for expanding ferry service in the Bay Area. In March 2003, the WTA recirculated the Draft EIR in order to include analysis of the IOP Alternative, which is now identified as the Proposed Project, in accordance with CEQA Guidelines.

ES.2 PURPOSE AND OBJECTIVES/NEED

ES.2.1 Purpose and Objectives

The primary purpose of the WTA system IOP is to increase Bay Area regional mobility and transportation options by providing new and expanded water transit services and related ground transportation terminal access in the Bay Area.

ES.2.2 Need

The Bay Area is home to a highly diverse population and historically strong economy that is served by a complex transportation network. It is frequently overwhelmed at many locations, especially those routes and systems that cross the Bay. Several transportation factors can be partially addressed by an expanded ferry system:

- **Highway System Unable to Meet Current and Future Demand.** Economic expansion and increased population have steadily increased the demand for greater transportation efficiency and capacity. Bay Area travel delays have increased with congestion and are forecasted to worsen steadily over time.
- **Transbay BART and Bridges Are at Capacity.** Several of the worst congestion points involve approaches to Bay Area bridges, and transbay bridge trips are expected to substantially increase.
- **Accidents and Natural Disasters.** The failure of existing transbay crossings, such as shutdowns of BART and the temporary collapse of a segment of the Bay Bridge, have created significant transportation and economic problems in the Bay Area.
- **Increasing Transportation Options.** The existing ferry service provides a valuable transportation option for regional commuters, served by the current system of routes. Ferry transit can be a cost-effective mode that increases the range of options available to Bay Area travelers.

ES.3 ALTERNATIVES

The WTA is evaluating the implementation of a plan, as opposed to a specific project. The Proposed Project and three other system alternatives, each consisting of a set of ferry transit routes and terminals, were analyzed in the WTA's DEIR issued in August 2002. A fourth "No Project" Alternative was also analyzed. Together, the alternatives represent a range of investment in water transit service expansion. In the initial DEIR, Alternatives 1, 2, and 3 were all considered to be feasible alternatives. However, extensive public comments and other input provided to the WTA have made clear that Alternatives 1 and 2 as described in the initial DEIR could not be determined to be feasible without undertaking extensive further studies pertaining to their potential significant environmental impacts.

As a result of this public input, the WTA developed a reduced version of Alternative 2 that would essentially mitigate or avoid many of the potential environmental impacts identified for Alternative 2. This mitigated version of Alternative 2 became the Proposed Project described in the December 2002 IOP. The Proposed Project and the other four ferry alternatives are summarized below:

- **Proposed Project.** The Proposed Project consists of eight existing ferry terminals, with new service to nine planned or existing terminals that currently do not have operating ferry service. The terminals and routes represent ferry service that already successfully exists and could be expanded and improved, plus new terminals and service that show promise of cost-effective implementation. The proposed routes are shown in Figure 2.1.
- **Alternative 1 – Augmented Blue Ribbon System (Comprehensive) Alternative.** This alternative is the largest and most ambitious, representing potential buildout of a ferry transit service as envisioned in prior planning studies.
- **Alternative 2 – Expanded System Alternative.** This alternative represents promising routes that emerged from the Water Transit Initiative and Metropolitan Transportation Commission (MTC) ferry studies that could be implemented in a 10-year horizon.
- **Alternative 3 – Enhanced Existing Service Alternative.** This alternative focuses on limited expansion of the existing system. It would increase and improve service along existing routes by adding or substituting new vessels to increase the number of trips and decrease the time (headways) between trips. Routes with more than one destination may be split to provide direct connections.
- **Alternative 4 – No Project Alternative.** This alternative would involve minimal service improvements. Ferry service would continue to operate on existing routes at about the same frequency, as determined by each service provider.

ES.4 AREAS OF CONTROVERSY

Based on comments received during the public scoping meetings, areas of controversy for the Proposed Project include the following:

- Air Quality Impacts
- Biological Impacts

- Impacts to special status aquatic sites (wetlands, eelgrass, other sensitive habitat)
- Impacts to rafting birds
- Energy Impacts
- Localized Traffic Impacts

ES.5 IMPACT SUMMARY

Based on the California Environmental Quality Act (CEQA) Guidelines (Section 15125), assessment of potential impacts should be conducted against a baseline consisting of the existing environmental conditions. The purpose of this comparison is to isolate and identify specific impacts that could occur as a result of the Proposed Project. For this EIR, the alternatives included a “No Project” Alternative that reflects future conditions if none of the other alternatives were implemented. For this alternative, although the WTA project would not be implemented, other ferry service expansion would continue, as well as increases in other vessel traffic and vehicular traffic.

For the majority of the technical sections presented in Section 3.0 of this EIR, potential impacts are evaluated against the existing environmental conditions. For Air Quality (Section 3.6), Transportation (3.12), and Energy (Section 3.13), however, the analyses include projections for both the Proposed Project and the No Project Alternative. For these three issue areas, comparison of future (year 2025) levels of travel against existing conditions is not a useful evaluation as it would not show whether the project improves or impacts regional travel patterns, and consequently regional air quality emissions and energy consumption. Therefore, these sections include analysis of potential impacts compared to the No Project Alternative for the same study year.

Table ES.1 provides a complete listing of all impacts and mitigation measures addressed in this report. The table provides a summary of each impact, its significance by alternative, mitigation measures, and the impact’s significance after all potential mitigation has been applied. The following sections present a brief summary of each potential impact area for the Proposed Project.

ES.5.1 Dredging

The Proposed Project includes new dredging for terminal construction and new access channels for one new terminal (Hercules/Rodeo). The construction dredging volume would be approximately 49,830 cy. New maintenance dredging would also occur only at Hercules/Rodeo as all other new terminal sites are located in areas with existing channels.

All dredging would be performed in accordance to Dredged Material Management Office (DMMO) and Regional Water Quality Control Board (RWQCB) directives and would include Best Management Practices (BMPs), such as silt curtains, and appropriate dredging techniques in accordance with DMMO recommendations. No dredging is anticipated near known toxic hot spots.

Dredging is not anticipated to adversely impact threatened, endangered, or protected species. Hercules/Rodeo is not included as an area requiring restricted dredging for species of special

concern. However, consultation with the California Department of Fish and Game (CDFG) and/or site specific studies could be required as verification. If potential impacts to such species are identified during site specific studies, dredging plans would be developed in consultation with resource agencies to identify suitable practices such as use of physical barriers and/or restriction of dredging in shallow waters to certain seasonal periods. No dredging would be conducted in areas of identified herring spawning.

Dredging for the Proposed Project is not anticipated to impact wetlands. Hercules/Rodeo has not been identified as an area of wetland habitat.

ES.5.2 Navigation

With any expansion of water transit service there is a potential for an increase in incidents between vessels, such as collisions, allisions, and groundings. A comparison of recorded navigational incidents and vessel traffic statistics in the Bay and other heavily used harbor areas in the U.S. does not appear to associate an increase in trips with an increase in the probability of incidents. This suggests that other factors likely affect the occurrence of navigational incidents for any given volume of harbor transits. Possible factors include condition of equipment, navigational aids, safety procedures, and pilot training and experience. Implementation of best practices as recommended by the preliminary risk assessment prepared by ABS (2002) will serve to minimize navigation-related risk. Among others, these practices include design of terminals to facilitate docking under many conditions, licensed master familiarization training for routes, extensive preventive maintenance, backup radar, and assignment of a second person to the bridge watch under certain weather conditions.

Appropriate training of ferry crew in new terminals located near existing windsurfing launch sites could reduce the risk of incidents involving ferries and windsurfers. In addition, designation of specific ferry employees to stand watch on the bridge of ferries at select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) could reduce the risk of incidents involving ferries and windsurfers.

ES.5.3 Wake Wash

The Proposed Project would increase the frequency of ferry trips across the Bay and could increase the wake energy at some shorelines, causing increased erosion. Service to new areas of the Bay could lead to shoreline impacts from increased wave heights. For the Proposed Project, potentially impacted areas in the North Bay include the shorelines from Antioch to Martinez in New York Slough and Suisun Bay, areas in the Carquinez Strait near Martinez and Vallejo, and south of Point Pinole. In the Central Bay, potentially sensitive areas include shorelines near the terminal locations (Larkspur, Richmond, and Harbor Bay Isle). In the South Bay, the shoreline along the approach to Redwood City could potentially be impacted by wake wash. This is a potentially significant impact.

One or more of the following mitigation measures are proposed for potentially sensitive areas: 1) Maintain route alignments more than 1,500 m from sensitive shorelines; 2) Operate vessels to maintain maximum wake wave heights at 16 cm; 3) Operate vessels to maintain wake waves at shorelines at 50% of average sustained wind wave height; 4) Modify ferry routes to redirect

wave energy away from sensitive habitats; 5) Slow vessels near sensitive habitat; and 6) Use low-wake vessel technology, such as existing lighter-weight vessels. Successful implementation of the above mitigations (and/or other mitigations that may be identified during site specific study) would reduce impacts to less than significant levels.

Wake wash impacts from increased ferry service are not anticipated to impact surrounding marinas or interfere with recreational users.

Wake wash impacts from increased ferry service could have adverse effects on California clapper rail, a listed species, by inundating nests or degrading potential clapper rail nesting habitat. Habitat surveys would be conducted for marshland areas of shoreline within 1,500 m of proposed routes. If habitat is determined to be nesting habitat or potential nesting habitat, site specific measurements of wake attenuation would be performed. If required, operational changes such as adjusting routes or slowing vessels could be necessary. However, impacts to clapper rail, clapper rail nesting habitat and potential habitat, and other sensitive habitat could remain significant. This would have to be determined in site specific studies.

Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites. When possible, routes would remain at least 300 m from marine mammal areas, which exceeds recommended National Marine Fisheries Service guidelines. Potential impacts to marine mammals are discussed in more detail in the Biology section below.

ES.5.4 Water Quality

Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface area, causing increased storm water runoff. If runoff contained pollutants or eroded disturbed soil, discharge could impact receiving water quality. New terminals would be designed to control storm water runoff and discharge. During construction, BMPs would be adopted to prevent, minimize, and clean up spills and leaks. These measures would reduce potential impacts to less than significant levels. No terminals for the Proposed Project are located within 100-year floodplain; therefore, flooding is not anticipated to be an issue.

Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay. Although the probability of a spill is low, it still has the potential to occur. Safety issues identified by the Harbor Safety Committee would be incorporated into the annual review of the Harbor Safety Plan to minimize this potential. In addition, project proponents would assist or prompt ferry operators to update contingency plans and review emergency response services, review contingency plans, conduct drill exercises, review emergency response agreements, review spill response equipment availability, develop a program for training on fueling methods to minimize spills, require review of new vessels to include technological features to minimize spills, and adopt applicable measures recommended by the Ferry Safety Plan (ABS 2002).

ES.5.5 Biological Resources

Impacts to biological resources could potentially result from dredging, wake wash, water quality impacts, and noise impacts from project construction and operations. Potential impacts are summarized below.

Construction – Construction of terminals is not anticipated to result in increased potential for the spread of invasive nonnative plant species in disturbed habitats. Potential areas of cordgrass have been identified primarily near Oyster Point and Redwood City. Site specific surveys would be conducted to identify and map areas of cordgrass, and nonnative species would be removed as part of the project.

Disturbance of “Special Aquatic Sites,” including eelgrass beds, mudflats, and wetlands, would be avoided in the design of project features and routes. Specific areas of eelgrass beds and mudflats would be defined during site specific project planning. If impacts were unavoidable, the possibility of providing enhanced functions and values at equivalent sites could be investigated.

Dredging – New dredging for terminal construction and access channels is only anticipated for Hercules/Rodeo. This area has not been regionally identified as an area of wetland habitat. No eelgrass has been identified near the site and it is not a location used for Pacific herring spawning.

Wetlands are present near proposed new terminal sites at Pittsburg/Antioch and Martinez. Site specific studies would be required to determine whether wetlands could be impacted and to identify appropriate mitigation measures.

Indirect impacts to sensitive receptors would be avoided through the use of silt curtains or other appropriate methods. Special aquatic sites have been identified on a regional level at Berkeley, Martinez, Richmond, and Hercules/Rodeo.

Pile Driving – Underwater noise from pile driving and other construction activities could affect nearby fish. Mitigation will need to be evaluated on a site specific basis. Underwater pile driving noise could disturb marine mammals. The Redwood City location is near a seal haul-out site. Incidental harassment permits may be required from the National Marine Fisheries Service (NMFS). As appropriate, preconstruction surveys would be conducted for the presence of mammals, monitoring would be conducted, and safety zones would be established.

Ferry Traffic – Ferry traffic could disturb roosting, rafting, and foraging water waterfowl. Ferry routes would be consolidated, especially in the South Bay, to leave as much undisturbed shallow open water as possible. Large portions of habitat in San Pablo Bay in the North and the South Bays would remain undisturbed. Potential impacts to waterfowl along new ferry routes would require evaluation. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).

Transiting ferries could disturb marine mammals resting at haul-out sites. Ferry routes would be at least 100 to 250 meters from haul-out sites. The Redwood City terminal location is near a haul-out site and maintaining the recommended distance may not be possible. Potential impacts would require site specific study.

High-speed ferries could potentially strike gray whales. Operators would receive whale sighting reports and exercise diligence. Dedicated lookouts could be warranted and/or ferries could be equipped with whale-detection systems.

ES.5.6 Air Quality

As a result of the Proposed Project, regional cumulative emissions of NO_x, PM₁₀, and CO would decrease. Emissions of SO₂ and ROG would increase by 0.3% and 0.02%, respectively. While the Proposed Project would result in ferries emitting toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel, PM_{2.5} emissions from ferries would be less than for the No Project Alternative. The Proposed Project would result in a net increase in emissions of CO₂.

Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water. Deposition of nitrates would decrease, but sulfate deposition would increase. Use of a fuel technology that lowers SO₂ emissions would reduce sulfate emissions and subsequent deposition. However, this impact would still be potentially significant.

Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard. Cold-start emissions could be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

Local concentrations of NO₂ and particulate matter could exceed state and federal standards at the Ferry Building. This impact would be reduced to less than significant levels by locating engine exhaust pipes at least 20 feet above the water line and minimizing dockside idling time at the Ferry Building.

Dredging at Hercules/Rodeo for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM₁₀ listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years.

ES.5.7 Land Use

The Proposed Project includes nine new ferry terminals located within South San Francisco and Treasure Island, the Peninsula, and the East Bay. With the exception of one terminal (Hercules/Rodeo), all are within existing ports or maritime areas. Therefore, disruption to existing neighborhoods should be avoidable or minimal. At a regional level, the implementation of these terminals is not considered a significant impact to existing communities. Specific community impacts may occur at a local level related to some necessary property acquisition and land use changes, depending on each terminal site. These effects would be evaluated when each of the terminal plans is advanced for further review. Based on the terminals included in the Proposed Project, these impacts are not anticipated to be significant, but would be considered at the time each route and terminal are advanced for implementation.

The development of new ferry terminals in urban locations could result in the displacement of existing land uses. Site specific projects would be designed to avoid or minimize the displacement of homes or businesses. If displacement is unavoidable, project proponents would execute a relocation assistance plan or its equivalent.

Construction could disrupt existing neighborhoods due to noise, dust, and traffic. These potentially disruptive impacts will be analyzed on a project-by-project basis as part of the environmental review under CEQA, but are most often minimized to a less than significant level through project design features and best management practices. Furthermore, construction-related impacts are temporary and would not result in permanent changes in an established community.

Implementation of the Proposed Project could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods. Site specific evaluation would be necessary to avoid these potentially significant impacts.

ES.5.8 Aesthetics

Only one of the nine new terminals would be located in an area without existing maritime character (Hercules/Rodeo). The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay. When possible, terminal facilities would be located so as not to obstruct or detract from views of the Bay from nearby public thoroughfares. They would be designed to provide new or enhanced point access areas or view areas such as piers, platforms, and walkways.

Ferry terminal designs will require site specific lighting plans. Outdoor lighting design and placement would be directed to the specific facility to be lit, to avoid excess light and glare impacts.

ES.5.9 Cultural Resources

Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related activities for buoy placement could impact submerged and sub-bottom cultural resources in the Bay. New terminal construction and channel dredging is anticipated only at Hercules/Rodeo, but retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources, and historic built environment resources. Site specific projects would be evaluated for presence and significance of resources, and avoidance procedures in compliance with established procedures. Identified resources that cannot be avoided would be subject to further recordation and or data recovery.

ES.5.10 Geology

No impacts to geologic resources are anticipated as a result of the Proposed Project. Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at improperly designed or constructed facilities. New facilities would be designed and constructed to applicable seismic requirements and codes. Site specific ground motion studies would be completed for proposed project sites. Exploratory investigations would be performed to

determine susceptibility to liquefaction, and potential locations removed or engineered to reduce this risk.

ES.5.11 Noise

It is unlikely that the Proposed Project would cause significant noise impacts to noise-sensitive land uses along new ferry routes. Measured fast ferry pass-by noise levels indicate that a maximum stand-off distance of 130 feet for a fast ferry at service power and speed avoids the FTA's "impact" designation at residential-type land use on the shoreline. Service-speed operations would not occur within 130 feet of the shoreline for safety, wake wash and other considerations.

Siting and planning of new ferry terminals would include planning to locate terminal areas away from noise-sensitive land uses. Compliance with existing zoning ordinances should be sufficient to avoid potential impacts of ferry terminal operations on noise-sensitive land uses, such as adjacent residential areas.

Implementation of the Proposed Project would be unlikely to impact small mammals, such as the salt marsh harvest mouse. No noise impacts to gray whales are expected. No impact is expected for sea lions and sea otters from ferry operations. There is a potential for impacts to seals at the haul-out site on the eastern side of Treasure Island and near Redwood City. The exact routes from San Francisco to Treasure Island and Redwood City would be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-outs or to other wildlife (birds and fish), could be significant.

Noise impacts to birds are difficult to determine because of the variety of habitats birds use within San Francisco Bay. There is a potential for impacts if noise levels exceed 60 dBA CNEL at the edge of sensitive habitat.

Although it is unlikely that fish would completely abandon ferry transit areas, available data preclude determination of impact. Therefore, impacts to fish could be potentially significant for some routes.

ES.5.12 Transportation

At a regional level, expansion of the ferry service would result in a decrease of the total automobile Vehicle Miles Traveled (VMT). At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals. Traffic mitigation measures would depend on local, site specific conditions. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.

Additional car access to terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals. Specific project proponents and terminal authorities/planners should study and develop terminal specific plans in conjunction with local and regional transit agencies. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.

ES.5.13 Energy

The Proposed Project would result in higher energy per passenger miles traveled (0.41% increase) than the No Project Alternative. The WTA would continue to investigate the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. Alternative energy sources and engine technologies would be incorporated as they become feasible.

ES.6.1 GROWTH INDUCEMENT

The Proposed Project would expand ferry service at existing terminals and add new ferry terminals primarily at developed waterfront areas. This could be growth inducing for areas near the terminals. The Proposed Project includes expansion of service at existing terminal locations and at new sites selected because they have attributes and public support that indicate ferry service would be successful in terms of ridership and cost effectiveness. All of the new terminal locations, with the exception of Hercules/Rodeo, would serve areas that are already generally developed with maritime or urban uses. The Hercules/Rodeo site is forecast (in their General Plan) for urban uses.

Growth can be considered negative or positive, depending on the objectives of the local government and the community. Local governments have the responsibility to make land use decisions. Potential growth inducement impacts should be considered by planning staffs at the local level to ensure that specific projects do not induce unplanned or unwanted growth. For these reasons, the Proposed Project is not anticipated to have a significant effect on unplanned growth. However, until site-specific analyses are performed, this impact remains potentially significant.

ES.6.2 CUMULATIVE IMPACTS

CEQA requires analysis of cumulative impacts of the Proposed Project and other projects that are planned and that could produce related cumulative impacts. The Proposed Project is treated as a program, and therefore the impact analyses evaluate the whole of the action. This allows for consideration of cumulative project impacts for each subject area. Cumulative impacts could potentially occur regionally or locally. Local cumulative impacts cannot be evaluated in a program EIR as the analyses are not site specific. Site specific analyses of cumulative impacts (such as site specific traffic impacts, noise, light/glare, etc.) may be required when specific locations and routes are determined.

Regionally, cumulative impacts are included in the analyses for several potential impact areas. Section 3.1 describes dredge management for the entire San Francisco Bay area, including existing dredge and disposal activities, current dredging projects, and the Long Term Management Strategy (LTMS) program for dredge management in future years. This includes estimates from the LTMS (USACE 1998) for future baywide (cumulative) dredging volumes. The LTMS program was used as a basis for comparison in the impact assessment, to provide an understanding of the quantity of dredge volumes against the anticipated regional quantities. The WTA Proposed Project would not affect achievement of the LTMS goals.

The navigation analysis (Section 3.2) includes projected increases in other vessel traffic on the Bay. Cumulative growth in regional vessel traffic was estimated using two extreme scenarios,

one low and one high, to which the proposed ferry transits were added. These cumulative scenarios were then used to evaluate the increase in potential ferry interactions between ferries, and between non-ferry vessels.

The air quality analysis includes projections of Bay Area-wide emissions for cars, busses, and ferries for the pollutants NO_x, PM₁₀, CO, SO₂, and ROG. The total estimated Proposed Project emissions were then compared against the no project alternative, providing an indication of how the cumulative regional pollutant emission ‘burden’ changes with and without the Proposed Project.

The transportation analysis includes transit forecasts from the Regional Transportation Plan (MTC 2001) and projections from ABAG.

The energy analysis is based on the same region-wide travel forecasts used for the air quality assessment, and evaluated in terms of energy consumption per passenger mile traveled (PMT) for vehicles and vessels. The total emissions for the Proposed Project were also compared against the No Project Alternative, to show the change in cumulative regional transportation energy consumption with and without the Proposed Project in place.

Table ES.1
Summary of Impacts and Mitigation Measures

Impact ¹		Level of Significance Prior to Mitigation ^{2,3}					Mitigation Measures	Level of Sig. After Mitig. ²	Notes on Proposed Project
		Prop Proj	1	2	3	4			
3.1 Dredging									
D-1	Dredging of new channels and maintenance dredging would add to the total annual volume of dredged materials in the Bay.	L	PS	PS	N	N	D-1.1: The total amount of dredging required could be minimized by avoiding dredging in those proposed channels that would require removal of the largest sediment volumes. No mitigation is required for the Proposed Project.	L	The Proposed Project only includes new channel dredging at Hercules/Rodeo.
D-2	Dredging of new channels could locally reduce water quality by exposing and suspending contaminated sediment.	PS	PS	PS	N	N	D-2.1: Sample potential dredge locations and test for contamination. Minimize dredging. Develop and require specifications and allocation responsibility to the entities implementing new dredging to adopt the techniques and Best Management Practices (BMPs). Comply with DMMO and RWQCB directives.	L	New channel dredging only at Hercules/Rodeo.
D-3	Dredging new channels could remove bottom sediments that could result in a salinity intrusion into groundwater basins.	L	L	L	N	N	No mitigation is required.	L	New channel dredging only at Hercules/Rodeo.
D-4	Dredging could adversely impact threatened, endangered, or protected species.	PS	PS	PS	N	N	D-4.1: Implement Mitigation D-2.1. Use BMPs (such as silt curtains) and appropriate dredging techniques in accordance with DMMO recommendations. D-4.2: In consultation with resource agencies, identify suitable practices such as use of physical barriers and/or restriction of dredging in shallow waters to certain seasonal periods.	L	New channel dredging only at Hercules/Rodeo.
D-5	Dredging for construction of access channels to new ferry terminals could result in loss or disturbance of jurisdictional wetlands.	PS	PS	PS	N	N	Implement Mitigation Measure B-1.1 and B-1.2	L	New channel dredging only at Hercules/Rodeo, which has not been identified as an area of wetland habitat

¹ Impact numbers refer to impacts described in Section 3 for the Proposed Project. While the impact numbers correspond to those in Section 5 (analysis of Alternatives 1 to 4) for most impacts, due to more in-depth analysis of the Proposed Project and edits based on public comments on the DEIR, some Impact numbers in Section 5 may not be the same.

² L: Less than significant; N: No impact; PS: Potentially Significant; S: Significant.

³ Impacts identified as Potentially Significant (PS) may be Significant based on further project definition and future analysis

⁴ Note that the Proposed Project includes use of SCRs and PM traps and elimination of low ridership routes, which are mitigations for Alternatives 1 through 3.

Impact ¹		Level of Significance Prior to Mitigation ^{2,3}					Mitigation Measures	Level of Sig. After Mitig. ²	Notes on Proposed Project
Alternative:		Prop Proj	1	2	3	4			
3.2 Navigation									
NAV-1	With expansion of water transit service there is a potential for an increase in incidents such as collisions, allisions, and groundings.	PS	PS	PS	PS	N	NAV-1.1: Implement ABS (2002) best practices to minimize navigation-related risks.	PS	
NAV-2	Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between windsurfers and ferries.	PS	PS	PS	PS	N	NAV-2.1: Train ferry crew regarding hazards at new terminals near windsurfing launch sites. NAV-2.2: Designate specific ferry employees to stand watch on select routes.	PS	
NAV-3	Increased ferry transits may lead to an increased risk of collision between recreational boaters and ferries.	PS	PS	PS	PS	N	NAV-3.1: Work with Harbor Safety Committees and potentially fund or sponsor new education and advisory training programs regarding boater safety. NAV-3.2: Designate ferry employees to stand watch for navigational hazards.	PS	
3.3 Wake Analysis									
WW-1	Increased frequency of ferry trips across the Bay could increase the wake energy at some shorelines, causing increased erosion. Service to new areas of the Bay could lead to shoreline impacts from increased wave heights.	PS	PS	PS	L	N	WW-1.1: 1) Maintain route alignments more than 1,500 m from sensitive shorelines; 2) Operate vessels to maintain maximum wake wave heights at 16 cm; 3) Operate vessels to maintain wake waves at shorelines at 50% of average sustained wind wave height. WW-1.2: Modify ferry routes to redirect wave energy away from sensitive habitats. WW-1.3: Use low-wake vessel technology, such as existing lighter-weight vessels. WW-1.4: Implement operational adjustments such as slowing of vessels near sensitive habitat. If speed limits are set, the mitigation shall include monitoring and enforcement to ensure compliance.	L	

¹ Impact numbers refer to impacts described in Section 3 for the Proposed Project. While the impact numbers correspond to those in Section 5 (analysis of Alternatives 1 to 4) for most impacts, due to more in-depth analysis of the Proposed Project and edits based on public comments on the DEIR, some Impact numbers in Section 5 may not be the same.

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Impact ¹		Level of Significance Prior to Mitigation ^{2,3}					Mitigation Measures	Level of Sig. After Mitig. ²	Notes on Proposed Project
		Prop Proj	1	2	3	4			
WW-2	Increased ferry service could impact surrounding marinas, potentially damaging moored vessels and interfering with recreational users.	PS	PS	PS	L	N	WW-2.1: Implement Mitigations WW-1.1 through WW-1.4.	L	
WW-3	Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.	PS	PS	PS	L	N	WW-3.1: Conduct habitat surveys of shoreline within 50 m of the marshland edge along proposed routes. If habitat is potential nesting habitat, perform site specific measurements of wake attenuation. For nesting sites or suitable nesting habitat more than 50 m from the edge of a marshland, no significant impacts or need for mitigation are anticipated. WW-3.2 Use existing low-wake vessel technology to reduce both the total wake wash energy and height of individual waves. WW-3.3 Adjust routes to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. WW-3.4 Adjust operations (e.g., slow vessel near sensitive areas).	PS	Mitigation for any final specific routing that may cause a potentially significant impact shall require a Biological Opinion from the U.S. Fish and Wildlife Service under the federal Endangered Species Act.
WW-4	Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites.	PS	PS	PS	L	N	WW-4.1: Refer to Apply Mitigation B-14.1, which is to avoid marine mammal areas by 100 to 250 m.	L	
3.4 Water Resources									
W-1	Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface area, causing increased storm water runoff. If runoff contained pollutants or eroded disturbed soil, discharge could impact receiving water quality.	PS	PS	PS	N	N	W-1.1: Adopt measures for construction to prevent, minimize, and clean up spills and leaks. Require containment measures for equipment that could potentially release fuels. W-1.2: Design new terminals to control storm water runoff and discharge. Develop and apply BMPs.	L	

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Alternative:		Prop Proj	1	2	3	4			
W-2	Some areas where terminals may be planned, could be within 100-year floodplains. Construction of new terminal facilities within a 100-yr floodplain could expose people and terminal facilities to flood hazard.	N	PS	PS	N	N	W-2.1: Verify base flood elevations in the areas where new terminals are proposed. If 100-yr floodplain cannot be avoided, design facilities to minimize flooding hazards, post flood hazard warnings, and develop flood evacuation plans. No mitigation required for the Proposed Project.	N	No terminals for the Proposed Project are located within 100-yr floodplain.
W-3	Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay. Although the probability of a spill is low, it still has the potential to occur.	PS	PS	PS	PS	N	W-3.1: Incorporate safety issues identified by the Harbor Safety Committee into the annual review of the Harbor Safety Plan. W-3.2: Assist or prompt ferry operators to update contingency plans and reviews of emergency response services. Review contingency plans, conduct drill exercises, and review emergency response agreements. Review spill response equipment availability. W-3.3: Develop a program for training on fueling methods to minimize spills. W-3.4: Require review of new vessels to include technological features to minimize spills. W-3.5: Adopt applicable measures recommended by the Ferry Safety Plan (ABS 2002).	L	
3.5 Biology									
B-1	Loss of jurisdictional wetland habitat could occur as a result of dredging and construction of terminal facilities.	PS	PS	PS	N	N	B-1.1: Impacts to wetlands shall be avoided if possible. B-1.2: In the event that impacts are unavoidable, mitigation measures would be developed for specific projects.	PS	Wetlands present near Pittsburg/Antioch and Martinez terminals. New terminal construction and channel dredging only at Hercules/Rodeo, which has not been regionally identified as an area of wetland habitat

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B-2	Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.	PS	PS	PS	N	N	B-2.1: Surveys shall be conducted to identify and map areas of cordgrass, and nonnative species shall be removed.	L	Potential areas of cordgrass primarily near Oyster Point and Redwood City locations
B-3	Project construction could result in the disturbance of "Special Aquatic Sites," including eelgrass beds, mudflats, and wetlands.	PS	PS	PS	N	N	B-3.1: Disturbance of eelgrass beds and mudflats shall be avoided in the design of project features and routes. Site specific sidescan sonar surveys would be required prior to implementation of new routes or construction of new terminals to verify that eelgrass is not present. B-3.2: Define specific areas of eelgrass beds and mudflats. If unavoidable, provide enhanced functions and values at equivalent sites. B-3.3: Avoid indirect impacts through the use of silt curtains or methods to protect from disturbance.	PS	Special aquatic sites identified on a regional level at Berkeley, Martinez, Richmond, and Hercules/Rodeo. New terminal construction and channel dredging only at Hercules/Rodeo
B-4	Turbidity caused by dredging would reduce light penetration in the water column and could locally reduce phytoplankton production.	L	L	L	N	N	No mitigation is required.	L	New terminal construction and channel dredging only at Hercules/Rodeo
B-5	Disturbance of benthic habitat from dredging could result in the loss of benthic (bottom dwelling) organisms.	L	L	L	N	N	No mitigation is required.	L	New terminal construction and channel dredging only at Hercules/Rodeo
B-6	Disturbance of habitat from dredging may result in the spread of nonnative benthic invertebrate species.	L	L	L	N	N	No mitigation is required.	L	New terminal construction and channel dredging only at Hercules/Rodeo
B-7	Dredging could adversely affect fish species near the construction activities.	PS	PS	PS	N	N	B-7.1: Implement Mitigations D-4.1 and D-4.2	L	New terminal construction and channel dredging only at Hercules/Rodeo

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B-8	Dredging and associated turbidity could affect spawning by Pacific herring.	L	PS	PS	N	N	B-8.1: Avoid dredging in known herring spawning grounds during spawning season. If dredging must occur during this period, monitors would be necessary, and activities might be halted. B-8.2: Use silt curtains while dredging to reduce turbidity, on a site-by-site basis. No mitigation is required for the Proposed Project	L	No dredging required at locations in the Bay used by herring to spawn.
B-9	Underwater noise from pile driving and other construction activities could affect nearby fish.	PS	PS	PS	N	N	B-9.1: Mitigation will be evaluated on a site specific basis. Measures to reduce sound pressure levels in surrounding waters could be deployed.	L	
B-10	Construction could result in loss of habitat for waterfowl, shorebirds and other birds.	PS	PS	PS	N	N	B-10.1: Implement Mitigations B-1.1 and B-3.1 through B-3.3.	L	New terminal construction and channel dredging only at Hercules/Rodeo – which has not regionally identified as an area of wetland habitat
B-11	Ferry traffic could disturb roosting, rafting, and foraging waterfowl in shallow areas.	PS	PS	PS	L	N	B-11.1: Consolidate ferry routes to leave as much undisturbed shallow open water as possible. B-11.2: Response of waterfowl to new ferry routes in shallow North and South Bay roosting, rafting, and foraging habitat shall be evaluated. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).	L	

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		Prop Proj	1	2	3	4			
B-12	Increased turbidity and activity from dredging operations could affect marine mammal foraging.	L	L	L	N	N	No mitigation is required.	L	New terminal construction and channel dredging only at Hercules/Rodeo, which is not near known haul-out or feeding locations.
B-13	Underwater pile driving noise could disturb marine mammals.	PS	PS	PS	N	N	B-13.1: Incidental harassment permit may be required from NMFS. As appropriate, conduct preconstruction surveys for presence of mammals, conduct monitoring, and establish safety zones.	L	Redwood City location near a haul-out site
B-14	Transiting ferries could disturb marine mammals resting at haul-out sites.	PS	PS	PS	PS	N	B-14.1: Avoid marine mammal areas by at least 100 to 250 m, which exceeds recommended National Marine Fisheries Service guidelines.	L	Redwood City location near a haul-out site
B-15	High-speed ferries could potentially strike gray whales.	PS	PS	PS	PS	N	B-15.1: Ferry operators shall be aware of potential for whales and know how to spot whales at the surface. Operators shall receive USCG whale sighting reports and exercise due diligence. WTA shall implement a program of informing ferry operators of sightings, and reminders made during seasonal presence. Dedicated lookouts could be warranted. B-15.2: Ferries could be equipped with whale-detection systems.	PS	

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B-16	Project construction and/or operation could result in the “take” of state or federally listed species or loss or degradation of these species’ habitat.	PS	PS	PS	PS	N	B-16.1: Review project construction sites for potential presence of species and institute measures to avoid sites with presence. Consultation with federal and state agencies shall be initiated and recommended measures followed. B-16.2: Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Proposed terminals and routes would be designed or located to avoid take of these species.	PS	Known distributions of salt marsh harvest mouse and/or suitable habitat include locations near the following proposed terminal locations: Antioch, Pittsburg, Martinez, and Redwood City. Black rail occur near Martinez. Clapper rail have known distributions near Martinez, Richmond, and Redwood City.
B-17	Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality, which could in turn, affect local biological resources.	PS	PS	PS	N	N	B-17.1: Implement Mitigations W-1.1 and W-1.2.	L	
B-18	Contaminated sediments could potentially become resuspended during construction and dredging operations and could potentially cause toxicity to Bay organisms.	PS	PS	PS	N	N	B-18.1: Implement Mitigation D-2.1.	L	
B-19	Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.	PS	PS	PS	PS	N	B-19.1: Implement Mitigations W-3.1 through W-3.5.	L	
B-20	Vessel wakes could potentially cause erosion and loss of wetland habitats, potentially impact special status species such as the clapper rail and salt marsh harvest mouse, and potentially impact marine mammals through disturbance at seal haul-out sites.	PS	PS	PS	PS	N	B-20.1: Refer to potential impacts and mitigations under Section 3.3, Wake Analysis.	PS	

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Alternative:		Prop Proj	1	2	3	4			
B-21	Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from terminal facilities and associated vehicle parking areas.	PS	PS	PS	N	N	B-21.1: New lighting shall be directed on intended project areas and avoid surrounding wildlife habitat.	L	With the exception of Hercules/Rodeo, all are within existing ports or developed maritime areas.
3.6 Air Quality									
A-1	Regional cumulative emissions of NO _x , PM ₁₀ , CO, SO ₂ , CO ₂ , and ROG could increase as a result of the implementation of the Proposed Project.	S	S	S	S	N		S	Regional cumulative emissions of NO _x , PM ₁₀ , and CO would decrease. Emissions of SO ₂ and ROG would increase by 0.3% and 0.02% respectively. Net CO ₂ emissions would increase.
A-2	Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard.	PS	PS	PS	PS	N	A-2.1: Cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access. In addition, feeder shuttle buses could be equipped with zero emission or ultra-low emission engines.	PS	
A-3	Ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel.	L	S	S	S	N	A-3.1: Eliminate routes with low ridership and utilize PM traps and SCRs. No mitigation is required for the Proposed Project ⁴ .	L	The Proposed Project includes the mitigations. PM _{2.5} emissions from ferries would be less than those for the No Project Alternative.

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Alternative:		Prop Proj	1	2	3	4			
A-4	Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water.	PS	PS	PS	PS	N	A-4.1: Use of a fuel technology that lowers SO ₂ emissions would reduce sulfate emissions and subsequent deposition.	PS	Deposition of nitrates would decrease, but sulfate deposition would increase.
A-5	Construction of ferry terminals could create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO _x , CO, SO ₂ , and PM ₁₀ from construction equipment exhaust.	PS	PS	PS	PS	N	A-5.1: Follow BAAQMD Guidelines to control fugitive dust emissions from construction activities. Measures include activities such as watering and covering exposed soil surfaces to minimize dust emissions. A-5.2: Measures to reduce emissions from vehicles and heavy equipment could include: 1) Use alternative fueled construction equipment when possible; 2) Minimize idling time; 3) Properly maintain equipment; and 4) Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.	L	
A-6	Local concentrations of nitrogen dioxide and particulate matter could exceed state and federal standards at the Ferry Building.	PS	PS	PS	PS	N	A-6.1: Locate engine exhaust pipes at least 20 feet above the waterline. A-6.2: Minimize dockside idling time at the Ferry Building.	L	
A-7	Increased ferry service could result in increases of pollutants from ferry exhaust deposited directly into the Bay.	PS	PS	PS	N	N	A-7.1: Implement Mitigation A-6.1.	L	
A-8	Dredging for increased ferry service would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO _x , ROG, and PM ₁₀ listed in the BAAQMD CEQA Guidelines. Exceedences would occur for approximately 12 days every 3 to 6 years.	PS	PS	PS	N	N	A-8.1: Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval. A-8.2: Utilize dredging contractors with the best available emission controls on their equipment.	L	Dredging only at Hercules/Rodeo

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Alternative:									
3.7 Land Use and Community Issues									
LU-1	Increased ferry service could include terminal locations in developed urban areas that do not currently have ferry terminal facilities. Development of new ferry terminals could result in the displacement of existing land uses.	PS	PS	PS	PS	N	LU-1.1: Projects shall consider alternatives to avoid displacement of homes or businesses. Displacement impacts shall be addressed in the site selection process and avoided through design measures. If displacement is unavoidable, project proponents must execute a relocation assistance plan or its equivalent.	L	
LU-2	Installation of new ferry terminals could disrupt or divide established neighborhoods. This impact has the potential to be significantly negative or positive, depending on how much the community supports or opposes the location of the terminal.	PS	PS	PS	L	N	LU-2.1: Local agencies desiring ferry service shall identify parcels along waterfronts for potential ferry terminal planning, considering surrounding land use compatibility. Project design elements that improve accessibility and maintain community cohesion shall be incorporated.	L	
LU-3	Increased ferry service could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods.	PS	PS	PS	PS	N	LU-3.1: Site specific evaluation is necessary to avoid these potential impacts. LU-3.2: Implement Mitigations LU-1.1 and LU-2.1.	PS	

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LU-4	New or modified ferry terminals would be located along the shoreline, and could affect and/or enhance existing public use and access to and along the Bay shoreline.	PS	PS	PS	N	N	LU-4.1: Incorporate public access to and/or along the Bay shoreline in the planning for terminal locations or expansion. This may include trails, parking set aside for shoreline users, viewpoints, disabled access, etc. LU-4.2: Incorporate the shoreline access guidelines described in: <i>Terminal Architecture and Engineering – Terminal Design Guidelines</i> prepared for the WTA (Parsons Brinckerhoff 2002). The guidelines include Shoreline Access for pedestrians and bicycles, and viewpoints to provide views of the shore, bay, and the loading/unloading of the ferries	L	
3.8 Aesthetics									
V-1	The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay.	PS	PS	PS	L	N	V-1.1: When feasible, the following shall be included in ferry terminal design: <ul style="list-style-type: none"> • Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares; • Design terminals and layout to integrate with the surrounding landscape and historical structures to preserve, and take advantage of, existing views of the Bay and shoreline; • Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways; • Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay; 	PS	Only one of the nine new terminals would be located in an area without existing maritime character.

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V-1 (cont.)							<ul style="list-style-type: none"> Vessels shall be standardized to support system-wide operations and to work interchangeably at all terminals. Vessel berthing shall be configured so as to allow maximum feasible visual access to the Bay. V-1.2: WTA-established Intermodal and Architectural Guidelines shall be considered for the planning and design of new and enhanced ferry terminals (WTA 2002). Design objectives shall focus on use by pedestrians, bicycles, and other transit modes. 		
V-2	An increase in the number of ferries operating on the Bay could impact views or degrade the visual character of waterfront areas.	L	PS	PS	L	N	V-2.1: This impact is partially minimized by the concentration of routes along some common alignments. No mitigation is required for the Proposed Project.	L	The Proposed Project includes common alignments
V-3	Increased ferry operations could increase the amount of visible exhaust.	L	L	L	L	N	No mitigation is required.	L	
V-4	Expanded ferry service, including new terminals and additional ferries, would not impact scenic resources within a State Scenic Highway.	N	N	N	N	N	No mitigation is required.	N	
V-5	Expanded ferry service, including new terminals and additional ferries, could result in light and glare impacts.	PS	PS	PS	L	N	V-5.1: Ferry terminal designs will require site specific lighting plans. Outdoor lighting design and placement shall be directed to the specific location to be shielded.	PS	Only one of the nine new terminals would be located in an area without existing maritime character.
3.9 Cultural									
CUL-1	Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related activities for buoy placement could impact submerged and sub-bottom cultural resources in the Bay.	PS	PS	PS	PS	N	CUL-1.1: Site specific projects would have to be evaluated for presence and significance of resources, and avoidance procedures in compliance with established procedures. Identified resources that cannot be avoided would be subject to further recordation and or data recovery.	PS	New terminal construction and channel dredging only at Hercules/Rodeo.

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CUL-2	Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.	PS	PS	PS	PS	N	CUL-2.1: Implement Mitigation CUL-1.1. CUL-2.2: Avoid the disposal site.	L	
CUL-3	Project actions such as retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources, and historic built environment resources.	PS	PS	PS	PS	N	CUL-3.1: Implement Mitigation CUL-1.1.	L	
CUL-4	Project actions such as construction and related activities could impact previously unknown resources.	PS	PS	PS	L	N	CUL-4.1: Implement Mitigation CUL-1.1.	PS	
3.10 Geology									
G-1	Potential new terminals and facilities could be exposed to surface faulting. There is a potential for substantial damage and risk of injury or loss of life at facilities located on or near active faults.	L	PS	L	N	N	G-1.1: Significant risk of exposure to surface faulting for Alternative 1 can be avoided if the Half Moon Bay terminal location is dropped from further consideration. G-1.2: Any potential development at Half Moon Bay would have to be carried out in accordance with the regulations detailed in the Alquist-Priolo Act. No mitigation is required for the Proposed Project.	L	No terminals for the Proposed Project are located within an AP Zone
G-2	Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.	PS	PS	PS	PS	N	G-2.1: New facilities would be designed and constructed to seismic requirements and code. Site specific ground motion studies shall be completed for proposed project sites.	L	
G-3	Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.	PS	PS	PS	PS	N	G-3.1: Exploratory investigations shall be performed to determine susceptibility to liquefaction, and potential locations removed or engineered to reduce this risk.	L	

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Impact ¹		Level of Significance Prior to Mitigation ^{2,3}					Mitigation Measures	Level of Sig. After Mitig. ²	Notes on Proposed Project
		Prop Proj	1	2	3	4			
G-4	Subsidence is ongoing in portions of the Bay Area. The potential geohazard presented by subsidence to potential new terminals is low to moderate.	L	L	L	N	N	No mitigation is required.	L	
G-5	Expansive soil behavior is associated with wetting and drying of soils containing mixed-layer clays. Expansive soils can lead to structural damage.	L	L	L	L	N	No mitigation is required.	L	
G-6	Slope movements have the potential to cause a range of impacts from minor structural damage (building impacts from rock fall) to major damage and injury/loss of life from building collapse.	L	PS	PS	PS	N	G-6.1: The hazard from mass wasting could be reduced by siting facilities away from steep and unstable slopes. For sites located adjacent to areas of steep topography, site specific geologic and geotechnical investigations and laboratory testing will determine the stability of slopes and their parent material. Using these data, appropriate slope strengthening and stabilizing designs could be developed. No mitigation is required for the Proposed Project.	L	All terminal location for the Proposed Project are located on relatively flat topography.
G-7	Erosion due to wind and water action could lead to the deterioration of terminal structures.	PS	PS	PS	PS	N	G-7.1: Determine erosion potential at each site through site specific studies, and adopt recommended measures to reduce or avoid this impact.	L	
G-8	Tsunami- and seiche-generated waves have the potential to inundate shoreline sites and damage terminal facilities. This potential impact would range from potentially significant at oceanside terminals (Half Moon Bay) to low or not significant at most of the Bay terminals.	L	PS	N	N	N	G-8.1: Potential impacts of tsunamis could be lessened or mitigated by appropriate engineering design. Detailed hydrodynamic modeling could be necessary for coastal locations to determine the potential extent of inundation. No mitigation is required for the Proposed Project.	L	The Proposed Project does not include any oceanside terminals

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Alternative:		Prop Proj	1	2	3	4			
G-9	The WTA ferry expansion program could potentially impact the geologic environment, including energy or mineral resources.	L	PS	PS	N	N	G-9.1: The presence of geologic, energy, or mineral resources would be identified in the course of site investigations for specific projects. Mitigations would be defined at that time. No mitigation is required for the Proposed Project	L	
3.11 Noise									
NOI-1	Passengers and crew would be exposed to shipboard noise from proposed enroute ferry operations.	L	L	L	L	N	No mitigation is required.	L	Vessels would comply with USCG guidelines and Cal/OSHA limits and would be designed to minimize exposure of passengers to excessive noise levels.
NOI-2	Noise-sensitive human receptors could be exposed to significant noise from proposed enroute ferry operations.	L	L	L	L	N	No mitigation is required.	L	
NOI-3	Noise-sensitive human receptors could be exposed to significant increases in ambient noise from proposed ferry terminal operations.	PS	PS	PS	PS	N	NOI-3.1: Compliance of existing and proposed ferry terminals with zoning ordinances and local requirements.	L	
NOI-4	Wildlife could be exposed to noise from proposed ferry operations.	PS	PS	PS	PS	N	NOI-4.1: The exact routes from San Francisco to Treasure Island and to Redwood City shall be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-outs or to other wildlife (birds and fish), could be significant.	PS	Impacts at the seal haul-out at T.I. and RWC. could remain potentially significant

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Alternative:		Prop Proj	1	2	3	4			
3.12 Transportation									
T-1	At a regional level, expansion of the ferry service would result in a decrease of the total automobile VMT. At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals.	PS	PS	PS	PS	N	T-1.1: Traffic mitigation measures would depend on local, site specific conditions. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.	PS	
T-2	Additional car access to terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.	PS	PS	PS	PS	N	T-2.1: WTA and terminal authorities/planners should study and develop terminal-specific plans in conjunction with local and regional transit agencies. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed. T-2.2: Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.	PS	
3.13 Energy									
E-1	The Proposed Project could result in more transportation-related energy consumed.	L	L	L	L	N	No mitigation is required.	L	
E-2	The Proposed Project could result in higher energy per passenger miles traveled value than other transit modes.	PS	PS	PS	PS	N	E-2.1: Continue to investigate the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. Incorporate alternative energy sources and engine technologies as they become feasible.	PS	
3.14 Growth Inducement									
GRO-1	The Proposed Project includes expanded ferry service at existing terminals and addition of new ferry terminals primarily at already developed waterfront areas. The Proposed Project is not expected to be growth inducing at a regional level.	PS	PS	PS	N	N	GRO-1.1: Implement Mitigation LU-1.1.	L	

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