Golden Gate National Recreation Area
California

National Park Service
U.S. Department of Interior

ALCATRAZ FERRY EMBARKATION
DRAFT ENVIRONMENTAL IMPACT STATEMENT

January 2015
Draft

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GOLDEN GATE NATIONAL RECREATION AREA
CALIFORNIA

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Alcatraz Ferry Embarkation
Draft Environmental Impact Statement
Golden Gate National Recreation Area, California

Lead Agency: National Park Service, U.S. Department of Interior
Cooperating Agency: Port of San Francisco

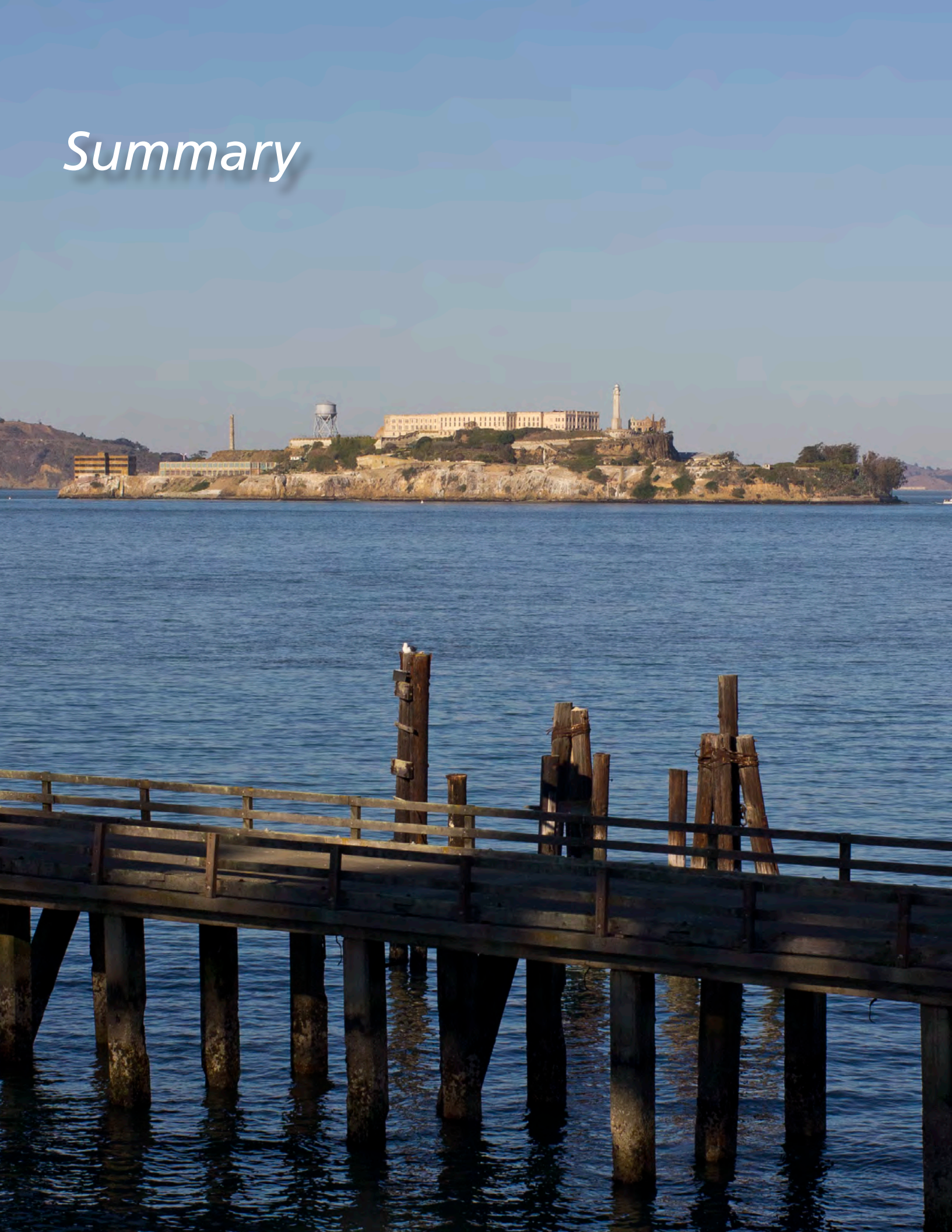
The National Park Service (NPS or Park Service) has prepared the Alcatraz Ferry Embarkation Draft Environmental Impact Statement (EIS) for establishing a long-term ferry embarkation site for passenger service between the northern San Francisco waterfront and Alcatraz Island, and special ferry service between the Alcatraz ferry embarkation site and the existing Fort Baker pier, as well as to and from Fort Mason (hereafter referred to as Project). The Project consists of a combination of indoor and outdoor spaces that serve to welcome, orient, and provide basic services for visitors. The Project also includes other administrative and operational spaces, and ramps and floats to support the berthing of up to three ferry boats at one time. The Draft EIS also programmatically evaluates the potential for ferry service linkages to other parklands in the San Francisco Bay. The purpose of this action is to create an identifiable, adequate, and quality visitor welcome and support area that connects visitors to the history of Alcatraz Island, other Golden Gate National Recreation Area sites, and orientation to the national park system in general. This action is needed because the NPS concession contract for water transportation services between San Francisco and Alcatraz Island has been subject to location changes every 10 years, which has led to visitor confusion, community concerns, and inconsistency in visitor support services, and the existing site is constrained by lease provisions. Selection of a specific ferry embarkation site is one step to addressing this need; however, that selection may also have to be coupled with agreements with the Port of San Francisco specifying the terms and conditions under which the site would be operated in the long-term.

This Draft EIS presents and analyzes the potential consequences of four alternatives: a No Action alternative, the environmentally preferred alternative at Pier 31½, and the Pier 3 and 41 alternatives. This document does not identify an NPS preferred alternative. Each of the action alternatives would fulfill the Project objectives. The Draft EIS also proposes mitigation measures to minimize the effects of adverse impacts from construction or operation of the alternatives where such impacts may occur.

How to Provide Comments: The 90-day public review period will begin upon the U.S. Environmental Protection Agency's (USEPA's) publication of a Notice of Availability (NOA) for the Draft EIS in the Federal Register; once confirmed, this date will be immediately posted on the Project website. The Draft EIS will be available for public review as follows: at http://parkplanning.nps.gov/AlcatrazFerry; in the Office of the Superintendent (Building 201 Fort Mason, San Francisco, California); and at local San Francisco Public Libraries (including the Marina, Main, North Beach, Eureka Valley/Harvey Milk Memorial, and Presidio branches) and the Sausalito Public Library. To conserve resources, the Park Service encourages readers to review the document online or where hardcopies are available. DVDs of the Draft EIS can be requested by email at goga_planning@nps.gov, by phone at (415) 561-4700, or by sending a written inquiry to: Superintendent, Golden Gate National Recreation Area; Attention: Alcatraz Ferry Embarkation Draft EIS; Fort Mason, Building 201; San Francisco, California 94123-0022.

Next Steps: The Park Service will record, categorize, and respond to all substantive public comments received on the Draft EIS. The Final EIS will incorporate text revisions, identify revisions corresponding to comments received, and identify the Park Service's preferred alternative. The Record of Decision will be issued a minimum of 30 days after USEPA's publication of the NOA for the Final EIS in the Federal Register.

Summary



INTRODUCTION

The National Park Service (NPS or Park Service) has prepared this draft environmental impact statement (EIS) for establishing a long-term ferry embarkation site at one of three possible locations (at Pier 3, Pier 31½, or Pier 41) along the northern San Francisco waterfront for passenger service to Alcatraz Island (hereafter referred to as Project). The Park Service also seeks to establish special ferry service (i.e., a service with no regular schedule and primarily used for special events) between the Alcatraz ferry embarkation site and the existing Fort Baker pier, implement special ferry service at Fort Mason, and programmatically evaluate the potential for future linkages to other parklands in the San Francisco Bay (Bay).

These sites are located on either NPS property (Pier 3 at Fort Mason and Fort Baker) or land owned by the Port of San Francisco (Port; Pier 31½ and Pier 41). The Park Service is the lead federal agency under the National Environmental Policy Act (NEPA) and has requested that the Port be a cooperating agency.

Each of the alternative sites are in dense, urban locations, directly adjacent to high-density residential and commercial districts. These sites are characterized by high visitation rates, high pedestrian and automobile traffic volumes, and intense recreational and commercial use. Fort Baker is slightly less developed and subject to high visitation rates associated with on-site features, including historic military structures, connections to the Golden Gate National Recreation Area's (GGNRA's) trail systems, and the Cavallo Point Lodge at the Golden Gate.

Piers 31½ and 41 are located along the Embarcadero and in Fisherman's Wharf, respectively. The Embarcadero, a roadway spanning the City's eastern waterfront, begins at the intersection of Second and King streets and continues north along the waterfront to Fisherman's Wharf. Fisherman's Wharf encompasses the City's northeastern waterfront, from Van Ness Avenue east to Pier 35. Fisherman's Wharf is one of the busiest and most popular tourist attractions in the western U.S.

Pier 3 is located on federal (NPS) property at Fort Mason, a former U.S. Army post that is a national historic landmark district and includes numerous structures of historic significance. Fort Mason comprises two distinct areas: Upper and Lower Fort Mason. Lower Fort Mason is northeast of Marina Boulevard and includes three historic piers and several other large buildings. Upper Fort Mason is located immediately east and uphill and includes the Great Meadow and GGNRA's administrative headquarters.

Fort Baker is another former U.S. Army post. It is located in Marin County at the foot of the Golden Gate Bridge and the entrance to the Bay and currently offers recreational and educational opportunities to visitors.

Alcatraz Island is located approximately 1 mile north of downtown San Francisco in the Bay. Alcatraz Island is a former military reservation and federal prison, and is now one of the most popular tourist destinations in the San Francisco Bay Area (Bay Area).

PROJECT PURPOSE AND NEED

PURPOSE OF THE PROJECT

The Park Service seeks to secure a site that will provide a long-term orientation and ferry embarkation facility for service to Alcatraz Island from the northern San Francisco waterfront. The Park Service desires an identifiable and well-functioning facility that will provide a quality welcome and support program for visitors, orient visitors to the history of Alcatraz Island, and provide a connection to other GGNRA parklands and orientation to the national park system in general. The Park Service also seeks to establish special ferry service between the primary Alcatraz ferry embarkation site and the existing Fort Baker pier, as well as special service to and from Fort Mason, as well as to programmatically address the potential for recreational ferry service linkages to other parklands in the Bay. These elements would improve cross-bay connectivity and accommodate existing and future visitor demand for recreational travel to Fort Baker and the Marin Headlands, thereby enhancing GGNRA's operational effectiveness. Many potential visitors are unable to obtain tickets to Alcatraz Island due to the high demand. Enhanced on-shore victor facilities would provide those visitors with interpretive information about the island and options for ferry access to other NPS destinations from San Francisco.

NEED FOR THE PROJECT

The need for the Project is driven by the following factors:

The Alcatraz ferry embarkation site and associated connections should be a consistent feature over time for visitors to the GGNRA. After operating out of Pier 41 for many years, the ferry embarkation site moved to Pier 31½ in 2006 when a new ferry service concessioner was selected, which led to inconsistencies in the delivery of visitor services and impacts on surrounding communities, business interests, and transit providers. Federal law generally limits the maximum term of concession contracts to 10 years, and requires that a competitive process be used to select new concessioners. An important objective for identifying a long-term site is to avoid having the site move again when NPS contracts are awarded in the future, producing stability for the Park Service and the City of San Francisco.

Selection of a more specific ferry embarkation site is one step to addressing this need. However, for any site at the Port, that selection would also need to be coupled with the execution of agreements with the Port specifying the long-term availability of and conditions under which the ferry embarkation sites would be made available to any ferry services concessioner, selected by the Park Service through the solicitation and award process mandated by federal law. Given the statutory limitations on extensions of the terms of NPS concession contracts, the risk of delay creates a significant risk of interrupting visitor services through the San Francisco waterfront to Alcatraz Island. The current ferry service concession contract is a 10-year contract scheduled to expire in 2016 and could only be extended by up to three years. The Project does not identify the future ferry concessioner.

The Alcatraz ferry embarkation site should allow for efficiency in making facility improvements when necessary and consistency in projecting facility costs. Under the current scenario, the lease between the Port and the concessioner hinders the ability for improvements to be made to the existing site. The Port has the authority to approve nearly all modifications made to leased pier facilities. Associated Port review and approval timelines can be unpredictable. At present, neither the Park Service nor its concessioner are motivated to make long-term investments in the site,

which could be abandoned in 2016. This arrangement hinders the ability to create an identifiable and quality visitor welcome area and a unique visitor experience that starts with the arrival at the ferry embarkation site. In addition, considerable revenues from Alcatraz Island ferry service operations are used to offset rent for the concessioner's pier leased from the Port, which reduces the amount available for improvements on Alcatraz Island or at other GGNRA parklands.

The Alcatraz ferry embarkation site and associated facilities should serve as a gateway to GGNRA, reflecting the Park Service's identity and providing a quality experience for visitors. Under the current scenario, the condition of the existing embarkation site reduces the quality of the visitor experience. The existing embarkation site is on property that the concessioner has leased from the Port and is outside of GGNRA boundaries. Nevertheless, that embarkation site is the beginning and end point of the transportation services provided to the visiting public, and therefore, is an integral part of the visitor services provided under the concession contract. Consequently, the Park Service has an interest in reviewing elements of the embarkation site facilities for purposes of considering their impact on the interpretation of GGNRA to the visiting public (including visitor appreciation and understanding of the resource). These elements include, for example, signs, logos, colors, or other means of demarcating the existing site as the Park Service's official Alcatraz Island departure location. Lack of formal authority, in combination with changing adjacent commercial uses and developments, hinders the Park Service's ability to create a clear sense of identity and quality visitor support services at the Alcatraz ferry embarkation site.

The Alcatraz ferry embarkation site should provide the space, circulation, and interpretive materials to appropriately and effectively orient visitors to Alcatraz Island and GGNRA. NPS policy is to provide public access and opportunities for all to enjoy and to learn about park resources. In its current configuration, space is unavailable at Pier 31½ to provide appropriate interpretive exhibits or an orientation to Alcatraz Island and GGNRA for visitors prior to departing for the island. These interpretive and orientation opportunities are also key for visitors wishing to visit Alcatraz Island but unable to secure reservations. The visitor facility does not currently provide a genuine park portal to GGNRA and as such, many visitors or aspiring visitors to Alcatraz Island are unaware of the other recreational and educational opportunities provided by GGNRA.

The Alcatraz ferry embarkation site may provide a valuable opportunity for cross-bay ferry service to other GGNRA parklands. Convenient transit connections to other GGNRA parklands, such as Fort Baker, are currently unavailable from the existing ferry embarkation site. NPS policy promotes alternative transportation access that is energy conserving and convenient, and that provides multiple travel options for visitors. Increasing numbers of park visitors choose to use transit, do not have an automobile, and perceive travel by ferry as an enjoyable experience. The potential to add another (third) berth and promote additional special-event services to the ferry embarkation site would further enhance this opportunity. Special ferry service at Fort Mason could reduce traffic and congestion during peak use and enable program participants to experience the Bay in a manner that is consistent with the site's historic use.

PUBLIC REVIEW PROCESS

The Notice of Intent (NOI) for the Project was published in the Federal Register (FR) on June 1, 2012. The NOI announced the preparation of an EIS by the Park Service, as the federal lead agency. The NOI also included background information, potential alternatives, and methods for public comment. The comment period closed on July 31, 2012. The Park Service distributed a Project newsletter, announcing the scoping period and public meeting dates and location, through postal and electronic mail to existing GGNRA mailing lists. Scoping meetings were held on June 26 and 28, 2012, at Fort Mason Building 201 in San Francisco and the City Hall in Sausalito, respectively.

During the comment period, approximately 90 correspondences were collected from interested stakeholders, such as current ferry operators, tenants and users of Fort Mason Center, Marina District residents, Supervisor Farrell, merchants at Fisherman's Wharf, government agencies, and the Golden Gate Bridge Highway Transportation District. The Public Scoping Comment Summary is available for public review on the Project website. The primary environmental concerns focused on changes in traffic and parking, noise levels, impacts on community character, wind and wave impacts, and impacts to air and water quality. A number of commenters requested that the Park Service continue to operate ferry service from Port sites, specifically at piers 31½ and 41. Many commenters expressed concerns about locating the embarkation site at Fort Mason.

ALTERNATIVES

The alternatives analyzed in this Draft EIS include the No Action, Pier 31½, Pier 41, and Pier 3 alternatives.

NO ACTION ALTERNATIVE

The No Action Alternative is included as an alternative in this EIS for detailed analysis pursuant to 40 Code of Federal Regulations (CFR) 1502.14(d) of the Council on Environmental Quality regulations. The No Action Alternative, which represents no change from the Park Service's current management direction, provides a reference for comparing the other alternatives against, evaluating the magnitude of proposed changes, and measuring the effects of those changes. It assumes a continuation of existing conditions, where the location of the embarkation site would be determined through competition for future concession contracts subject to change every 10 years, and a permanent Alcatraz ferry embarkation site would not be established. There would be no construction costs, and no additional funding would be required to implement this alternative.

While any pier on the San Francisco waterfront that is within a reasonable crossing time from Alcatraz Island could feasibly become the ferry embarkation site under the No Action Alternative, the existing site at Pier 31½ is used as a surrogate (or representative set of conditions) for the No Action Alternative, for the purposes of analyzing impacts of this alternative in the EIS. The existing Alcatraz embarkation site program is located entirely outdoors, with the exception of a portable restroom facility and limited operations space located in the Pier 33 shed. There is currently one float at the existing embarkation site to accommodate two berths. The existing site's program does not meet the Project's basic program requirements and has deficiencies in providing the desired high-quality visitor experience. The presence of an Alcatraz-themed souvenir shop in the bulkhead building, separate from the NPS concession and not operated by the Park Service, further diminishes the ability of the Park Service to provide a clear sense of identity and quality experience.

PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would retain the current Alcatraz ferry embarkation site at Pier 31½ and would propose improvements to the existing facility. It would use the historic Pier 31 north and south bulkhead building on the Embarcadero, portions of the Pier 31 and Pier 33 sheds, and all of the outdoor space between piers 31 and 33 for embarkation services. The existing single dock and gangway would be replaced with two parallel floating docks (to accommodate three berths) and gangways accessed from the existing bulkhead. Improvements would include retrofit of the existing substructure, consisting of installation of a new gangway, float, and guide piles; repair or replacement of concrete and reinforcing bars; sealing asphalt cracks. Abandoned utilities would be removed and new utilities installed. The existing interior space plan of the bulkhead buildings would be extensively reconfigured on all floors.

This alternative would construct a third berth at Pier 31½, which would increase Pier 31½'s operational capacity and provide visitors the opportunity to visit other park sites within the Bay, as well as special ferry service to Fort Baker.

PIER 41 ALTERNATIVE

The Pier 41 Alternative returns the embarkation site to Pier 41, which served as the Alcatraz ferry embarkation site between the early 1980s and 2006. This alternative would replace the existing floating docks and gangways (currently accessed from the

existing Pier 41 bulkhead) with two parallel floating docks (to accommodate three berths) and gangways. The third berth would increase the site's operational capacity and provide visitors the opportunity to visit other park sites within the Bay, as well as special service to Fort Baker.

This alternative would involve an expansion of the existing building footprint, spanning both piers. Due to its age and condition, the old pier (and adjacent concrete bulkhead) would likely be demolished and replaced prior to major construction in the Pier 41 building. The timber bulkhead wall of the newer pier would be replaced, and piles under the existing building would be reinforced. A new gangway and float would be installed, including supporting guide piles. Abandoned utilities would be removed and replaced. The existing building, which was constructed in the 1980s, would be expanded, remodeled, and updated to be compliant with seismic, life safety, and accessibility codes and guidelines.

PIER 3 ALTERNATIVE

The Pier 3 Alternative would locate the ferry embarkation site in Fort Mason's historic Pier 3 shed, which was constructed between 1910 and 1915. Nearly all services and functions would be located in less than half of the rehabilitated Pier 3 shed building, leaving an opportunity for a compatible use to inhabit the remaining space. The Alcatraz embarkation program would be located in the front (southern) portion of the pier shed, and the compatible use space would be located in the back (northern) portion. A walkway along the eastern side of the building would provide direct and autonomous access to the compatible use space and would not overlap with the Alcatraz embarkation area. Retrofit of the existing Pier 3 substructure would be needed, including repair and installation of support piles; installation of two new gangways and floats (between piers 2 and 3 and piers 1 and 2, for a total of three berths like the other action alternatives); repair or replacement of damaged concrete and reinforcing bars; and replacement of fender piles, asphalt paving, and guardrails.

Abandoned utilities would be removed and replaced. The existing Pier 3 shed building would require architectural improvements for seismic retrofit, life safety, Architectural Barriers Act Accessibility Standards compliance, historic preservation, and interior design and remodeling upgrades.

ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Developing a ferry berth at Fort Baker for special service that could operate for special events, such as conferences, occasional excursions, or special occasional service between other parklands and the primary ferry embarkation site in San Francisco, is common to all action alternatives evaluated in this EIS. The construction necessary to establish ferry service at Fort Baker would primarily involve upgrades to the existing concrete pier, which was constructed in the late 1930s. Retrofit of the existing pier substructure would be needed. This would entail installation of a new gangway, float, and support piles; repair of existing piles; repair or replacement of damaged concrete and reinforcing bars; replacement of fender piles, asphalt paving, and the existing guardrails; and extension or relocation of utilities.

As part of enhancing the opportunities for visitors to Alcatraz and the GGNRA, the Park Service is also proposing an occasional special ferry service from Fort Mason separate from service provided to and from the primary embarkation site as an activity that is common to all action alternatives evaluated in this EIS.

The purpose of this additional, special service is to enhance Fort Mason Center programs through additional recreational opportunities, as well as to provide water-based demand management opportunities to

help reduce traffic and parking congestion during peak use.

This special service would utilize the same float and gangway design described and analyzed as the third berth located between piers 1 and 2 as part of the Fort Mason Pier 3 Alternative. If special ferry service at Fort Mason is added concurrent with locating the primary Alcatraz ferry embarkation site at piers 31½ or 41 (inclusive of all three berths), the float and gangway between piers 1 and 2 (otherwise referred to as the third berth in the Pier 3 Alternative) would be constructed at Fort Mason. If the Pier 3 Alternative is selected as the location of the primary Alcatraz ferry embarkation site, the special ferry service would be accommodated by transportation improvements associated with the full buildout of the Pier 3 Alternative.

The construction and operation of special ferry service at either Fort Baker or Fort Mason would not be tied to the primary Alcatraz Island ferry embarkation facility or site operator.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with Director's Order No. 12 and NEPA, the Park Service is required to identify the environmentally preferred alternative, or, "the alternative that will promote the national environmental policy as expressed in the NEPA's Section 101." The environmentally preferred alternative is not the same as the NPS preferred alternative for implementation, nor is the Park Service required to implement the environmentally preferred alternative. Continued discussion between the Park Service and Port is likely to determine the preferred alternative; however, public feedback on this Draft EIS will also be considered. As such, the preferred alternative for implementation is not identified in the Draft EIS, but will be identified in the Final EIS.

For each of the action alternatives, impacts by resource topic are generally consistent with the No Action Alternative, with major adverse impacts limited primarily to transportation, air quality, and noise. Major seismic impacts could occur associated with each action alternative (consistent across all alternatives), although these would be reduced compared to the No Action Alternative. The Pier 41 Alternative could result in major socioeconomic impacts. The magnitude of noise impacts would be consistent across the action alternatives, with major impacts limited to short-term construction effects. Transportation impacts would be least significant under the Pier 31½ Alternative, limited to long-term effects on transit. For the remaining resource topics, the magnitude of impacts would be similar among each of the action alternatives and less than major. Each of the action alternatives would fulfill the Project objectives, while the No Action Alternative would not meet all of the Project objectives.

For the remaining resource topics where impacts of all alternatives would be less than major, the Pier 31½ Alternative would result in the fewest impacts. The Pier 31½, Pier 41, and Pier 3 alternatives would result in equivalent negligible to minor adverse impacts in the categories of water quality and hydrology, aquatic biological resources, and visual resources. Compared to the Pier 3 Alternative, the Pier 31½ Alternative would have reduced impacts related to terrestrial biological resources, cultural resources, recreation (long-term), and socioeconomics. Compared to the Pier 41 Alternative, the Pier 31½ Alternative would have reduced impacts related to recreation (short-term) and socioeconomics. While the Pier 3 and Pier 41 alternatives would result in short-term, minor, beneficial socioeconomic impacts during construction and beneficial intersection traffic, increased impacts to other resource topics (including socioeconomics and transportation and circulation) outweigh these benefits.

Therefore, the Pier 31½ Alternative has been identified as the environmentally preferred alternative, as selection of this alternative would fulfill the Project objectives while incurring reduced major transportation impacts and similar or reduced impacts to remaining resource topics compared to the other action alternatives.

ENVIRONMENTAL CONSEQUENCES

The following topics were raised during the scoping process or were deemed relevant for evaluation by the Park Service and selected for detailed analysis in this Draft EIS: land use; transportation and circulation; air quality; noise and vibration; geology, soils, and seismicity; water quality and hydrology; aquatic biological resources; terrestrial biological resources; visual resources; cultural resources; recreation; socioeconomics; public services and utilities; and hazardous materials. The rationale for selection of each impact topic was based on potential for substantive impact; environmental statues, regulations, and executive orders; and/or NPS management policies and guidance. Table ES-1 summarizes the potential impacts of each of the alternatives evaluated in this Draft EIS, including the activities common to all action alternatives, as well as proposed mitigation measures.

TABLE ES-1. POTENTIAL IMPACTS OF ALTERNATIVES

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Land Use			
No impacts	• No impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts	• No impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts	• Minor impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts
Transportation and Circulation			
• Construction: no impacts • Operation: short- and long-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities • Cumulative[1]: long-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities	• Construction: short-term, minor, adverse impacts • Operation: short-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities • Cumulative[1]: – Traffic, bicycle facilities, pedestrian facilities, and parking facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts • Mitigation measure: Transportation-MM-1 • Fort Mason special ferry service: consistent with impacts above with additional long-term, adverse transit impact • Fort Baker special ferry service: no impacts	• Construction: short-term, minor, adverse impacts • Operation: – Traffic, transit, bicycle facilities, and parking facilities: short-term, minor, adverse impacts – Pedestrian facilities: short-term, moderate, adverse impacts • Cumulative[1]: – Traffic and pedestrian facilities: long-term, moderate, adverse impacts – Transit: long-term, major, adverse impacts – Bicycle facilities and parking facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts • Mitigation measures: Transportation-MM-1, 2, and 3 • Fort Mason special ferry service: consistent with impacts above with additional long-term, adverse transit impacts • Fort Baker special ferry service: no impacts	• Construction: short-term, minor, adverse impacts • Operation: – Traffic, transit, pedestrian facilities, and parking facilities: short-term, minor, adverse impacts – Bicycle facilities and parking facilities: short-term, moderate, adverse impacts • Cumulative[1]: – Traffic and pedestrian facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts – Bicycle facilities and parking facilities: long-term, moderate, adverse impacts • Mitigation measures: Transportation-MM-4 and 5 • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: no impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Air Quality			
No impacts	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above
Noise and Vibration			
No impacts	• Construction: – Off-site receptors: short-term, negligible impacts – Pier 33 building: short-term, major, adverse impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts	Construction: • Off-site receptors: short-term, negligible impacts • Pier 41 building: short-term, major, adverse impacts • Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts	Construction: • Off-site receptors: short-term, negligible impacts • Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Geology, Soils, and Seismicity			
• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts • Fort Mason special ferry service: – Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Landslides: long-term, negligible impacts – Expansive soils and mineral resources: no impacts • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts • Fort Mason special ferry service: – Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Landslides: long-term, negligible impacts – Expansive soils and mineral resources: no impacts • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Landslides: long-term, negligible impacts • Expansive soils and mineral resources: no impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Water Quality and Hydrology			
• Water quality (construction): no impacts • Water quality (operations): long-term, negligible impacts • Flood risk, tsunamis, and seiches: long-term, negligible impacts	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above
Aquatic Biological Resources			
No impacts	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, essential fish habitat (EFH), and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass,

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
	vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2 • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2	and 2 • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2	submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Terrestrial Biological Resources			
No impacts	• No impacts • Fort Mason special ferry service: – Special status bird species: short-term, minor, adverse and long-term, negligible impacts – Common terrestrial wildlife species: long-term, negligible impacts – Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1	• No impacts • Fort Mason special ferry service: – Special status bird species: short-term, minor, adverse and long-term, negligible impacts – Common terrestrial wildlife species: long-term, negligible impacts – Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1	• Special status bird species: short-term, minor, adverse and long-term, negligible impacts • Common terrestrial wildlife species: long-term, negligible impacts • Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Visual Resources			
No impacts	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Addition of a third berth: long-term, negligible impacts • Increased lighting: long-term, minor, adverse impacts • Fort Mason special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial impacts – Addition of two gangways and floats: long-term, minor, adverse impacts – Increased lighting: long-term, moderate, adverse impacts • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measures: Visual-MM-1, 2, and 3	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Vegetation views: long-term, minor, adverse impacts • Shielded lighting: long-term, minor, beneficial impacts • Fort Mason special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial impacts – Addition of two gangways and floats: long-term, minor, adverse impacts – Increased lighting: long-term, moderate, adverse impacts • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measure: Visual-MM-4	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Addition of two gangways and floats: long-term, minor, adverse impacts • Increased lighting: long-term, moderate, adverse impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measures: Visual-MM-1, 2, and 3
Cultural Resources			
No impacts	• Minor impacts to historic structures • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures and cultural landscapes	• No impacts • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures and cultural landscapes • Fort Mason special ferry service special ferry service: no impacts	• Minor impacts to historic structures and cultural landscapes; potential beneficial impacts to historic structures and cultural landscapes • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
			and cultural landscapes
Recreation			
Long-term, moderate, adverse impacts	• Construction: short-term, minor, adverse impacts • Operation: long-term, major, beneficial impacts from enhanced recreational opportunities; and no impacts on recreational boating • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities	• Construction: short-term, minor, adverse impacts • Operation: long-term, major, beneficial impacts from enhanced recreational opportunities and short-term, moderate, adverse impacts on Water Emergency Transportation Authority (WETA) ferry services; and no impacts on recreational boating • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities	• Construction: short-term, minor, adverse impacts • Operation: long-term, minor, adverse impacts from loss of Pier 3 for large events; long-term, minor, adverse impacts from increased travel time from parking areas; long-term, major, beneficial impacts from enhanced recreational opportunities; and no impacts on recreational boating or swimming • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities • Mitigation measure: Transportation-MM-5

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Socioeconomics			
Long-term, negligible, beneficial impacts	• Construction: short-term, minor, adverse and beneficial impacts • Operation: long-term, minor, beneficial impacts on merchants near Pier 31½ • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts	• Construction: short-term, minor, beneficial impacts • Operation: long-term, minor, beneficial impacts on Fisherman's Wharf merchants; long-term, negligible impacts on merchants near Pier 31½; and long-term, major, adverse impacts associated with displacing WETA ferry service • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts	• Construction: short-term, minor, adverse and beneficial impacts • Operation: long-term, moderate, adverse impacts on parking for Fort Mason Center tenants; and long-term, moderate, adverse impacts from the loss of Pier 3 event space to the Fort Mason Center and users • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts • Mitigation measures: Transportation-MM-5
Public Services and Utilities			
No impacts	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Mitigation measure: Utilities-MM-1	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Mitigation measure: Utilities-MM-1

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
	during operation • Mitigation measure: Utilities-MM-1		
Hazardous Materials			
No impacts	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above

Note:
1 Due to the nature of the transportation analysis methodology, the cumulative and long-term operational transportation impacts of the alternatives under evaluation are equivalent. As such, cumulative impacts for transportation (but not other resource topics) are included in this summary table.

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Appendix C Calculations for Noise and Vibration

LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/m³	micrograms per cubic meter
AB	Assembly Bill
ABAAS	Architectural Barriers Act Accessibility Standards
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
AHPA	Archeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
AQI	Air Quality Index
ARG	Architecture Resources Group
ARPA	Archeological Resources Protection Act
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Basin Plan	San Francisco Bay Water Quality Control Plan
BASMAA	Bay Area Stormwater Management Agencies Association
Bay	San Francisco Bay
Bay Area	San Francisco Bay Area
Bay-Delta	San Francisco Bay-Delta
Bay Plan	*San Francisco Bay Plan*
Bay Trail	San Francisco Bay Trail
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice
BRT	bus rapid transit
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
Cal-OSHA	California Occupational Safety and Health Administration
CALTRANS	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCSF	City College of San Francisco
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDMG	California Department of Mines and Geology
Central Bay	Central San Francisco Bay
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane
CHP	California Highway Patrol

City	City of San Francisco
City/County	City and County of San Francisco
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DDT	dichlorodiphenyltrichloroethane
DEHP	di(2-ethylhexyl)phthalate
Delta	Sacramento-San Joaquin Delta
DO	dissolved oxygen
DO-12	Director's Order No. 12
DOF	California Department of Finance
DPH	San Francisco Department of Public Health
DPS	distinct population segment
DPW	San Francisco Department of Public Works
DTSC	California Department of Toxic Substances Control
E	endangered
EA	environmental assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
EIR	Environmental Impact Report
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FAS	Federal Accessibility Standards
FEMA	Federal Emergency Management Agency
FMP	Fisheries Management Plan
Fort Baker Plan	*Fort Baker Plan Environmental Impact Statement*
FR	Federal Register
FS	Feasibility Study
FSC	federal species of special concern
FTA	Federal Transit Administration
FUDS	Formerly Used Defense Site
General Plan	*San Francisco General Plan*
GGBHTD	Golden Gate Bridge Highway and Transportation District
GGNPC	Golden Gate National Parks Conservancy
GGNRA	Golden Gate National Recreation Area
GHG	greenhouse gas
GMP	General Management Plan
HAPC	Habitat Area of Particular Concern
HCM	*Highway Capacity Manual*

hp	horsepower
HVAC	heating, ventilation, and air conditioning
I-80	Interstate 80
I-280	Interstate 280
IEP	Interagency Ecological Program for San Francisco Bay Estuary
IHA	Incidental Harassment Authorization
in/s	inches per second
IPCC	Intergovernmental Panel on Climate Change
lb/day	pounds per day
L_{dn}	Day-Night Noise Level
LDVR	Light Duty Vehicle Rule
L_{eq}	Equivalent Noise Level
LiDAR	Light Detection and Range
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
LOS	level of service
MARPOL	International Convention for the Prevention of Pollution from Ships
MBTA	migratory bird treaty act
MCSD	Marin County Sheriff's Department
Metropolitan Division	San Francisco-San Mateo-Redwood City Metropolitan Division
MMPA	Marine Mammal Protection Act
MRZ	Mineral Resource Zone
MSD	marine sanitation devices
M-SFCMA	Magnuson-Stevens fishery conservation and management act
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System
mty	metric tons per year
Muni	San Francisco Municipal Railway
N_2O	nitrous oxide
N/A	not available
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
national register	National Register of Historic Places
NAVFACSW	Naval Facilities Engineering Command
N/D	insufficient data
NEPA	National Environmental Policy Act
NE Waterfront Plan	Northeastern Waterfront Plan
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NHTSA	Department of Transportation National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NMHC	nonmethane hydrocarbon
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration

NOI	Notice of Intent
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	National Resource Conservation Service
O_3	ozone
OEHHA	California Office of Environmental Health Hazard Assessment
ORCA	ORCA Consulting, LLC
ORCA Study	*America's Cup 34 Spectator Site on NPS Properties Visitation Estimates and Capacity Assessment Preliminary Report*
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
Park Service	National Park Service
PCB	polychlorinated biphenyl
PERP	Portable Equipment Registration Program
PG&E	Pacific Gas and Electric Company
PM	particulate matter
$PM_{2.5}$	particulate matter with particle diameter less than 2.5 microns
PM_{10}	particulate matter with particle diameter less than 10 microns
Port	Port of San Francisco
Porter-Cologne Act	Porter-Cologne water quality control act
ppm	parts per million
PPV	peak particle velocity
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act of 1976
RMP	Regional Monitoring Program
ROD	Record of Decision
ROG	reactive organic gas
RPP	Residential Parking Permit
RWQCB	Regional Water Quality Control Board
Samtrans	San Mateo County Transit
Sanborn	Sanborn Fire Insurance Company
Scoping Plan	California Climate Change Scoping Plan
SFBAAB	San Francisco Bay Area Air Basin
SF-CHAMP	San Francisco Chained Activity Modeling Process
SFEI	San Francisco Estuary Institute
SFEP	San Francisco Estuary Project
SFFD	San Francisco Fire Department
SFM	San Francisco Museum
SF Maritime NHP	San Francisco Maritime National Historical Park
SFMTA	San Francisco Metropolitan Transportation Authority
SFPD	San Francisco Police Department
SFPUC	San Francisco Public Utility Commission
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMCSD	Sausalito-Marin City Sanitary District

SMFPD	Southern Marin Fire Protection District
SO_2	sulfur dioxide
SOF	Statement of Findings
SPCC	Spill Prevention Control and Countermeasure Plan
Special Area Plan	San Francisco Waterfront Special Area Plan
SSC	state species of special concern
Standards	2013 Building Engineering Efficiency Standards
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	threatened
TAC	toxic air contaminant
TJPA	Transbay Joint Powers Authority
TMDL	total maximum daily load
tpy	tons per year
TRB	Transportation Research Board
URS	URS Corporation
U.S. 101	United States Highway 101
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPP	U.S. Park Police
VA	Value Analysis
VCR	Visual Resource Contrast Rating
VdB	vibration decibel
VGP	vessel general permit
VOC	volatile organic compound
Waterfront Plan	Waterfront Land Use Plan
WD&A	Waterfront Design & Access Element
WETA	Water Emergency Transportation Authority
WPA	Works Progress Administration

Glossary of Terms

GLOSSARY OF TERMS

100-year flood—A flood event that has a 1% probability of occurring in any given year.

Alternative—An option that can accomplish an agency's objectives.

anadromous—Ascending rivers from the sea for breeding.

angiosperm—A plant that has flowers and produces seeds enclosed within a carpel.

benthic—Relating to or occurring on the seafloor.

berth—A space allotted for the mooring of a ship.

bulkhead—An armoring structure typically used along shorelines to prevent erosion.

capacity—The maximum sustained traffic flow of a transportation facility under prevailing traffic and roadway conditions in a specified direction.

catch basin—A receptacle or reservoir that collects surface drainage or runoff.

compatible use space—A use separate from that of the primary embarkation facility that would coexist with and/or complement ferry service operations.

concessioner—An individual or business entity that holds a concession contract with the Park Service for the provision of approved visitor services within a unit of the national park system.

cultural resource—An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture.

cumulative impact—Two or more environmental effects that, when considered together, are considerable or that compound or increase other environmental impacts.

diatoms—Any of the various microscopic single-celled or colonial algae of the class Bacillariophyceae.

direct impact—An impact that occurs as a result of the proposal or alternative in the same place and at the same time as the action.

endangered species—Any species that are likely to become extinct.

Environmental Impact Statement (EIS)—A detailed NEPA document that is prepared when a proposal or alternatives have the potential for significant impact on the human environment.

environmentally preferred alternative—Of the alternatives analyzed, the one that would best promote the policies in NEPA section 101. This is usually selected by the Project team members. It is presented in the NPS NEPA document (Draft and Final EIS or EA) for public review and comment.

essential fish habitat (EFH)—Aquatic habitat used by fish to spawn, breed, feed, or grow to maturity.

expansive soils—Soils that expand when water is added and shrink when water is removed.

feasibility study (FS)—An analysis and evaluation conducted to determine the practicability (both technically and financially) of a proposed project.

fender pile—An upright pile driven into the seabed or a riverbed beside ferry slips, wharves, berths, or other structures, designed to yield slightly when struck, in order to lessen the shock of contact.

Finding of No Significant Impact—A determination based on an EA/EIS and other factors in the public planning record for a proposal that, if implemented, would have no significant impact on the human environment.

floodplain—Land on either side of a stream or river that is submerged during floods.

footprint—The area impacted by Project activities.

General Agreement (See Director's Order-20)—A document that formalizes a relationship or agreement between the Park Service and federal or nonfederal entities.

General Management Plan (GMP)—A plan that clearly defines direction for resource preservation and visitor use in a park, and serves as the basic foundation for decisionmaking. GMPs are developed with broad public involvement.

gravity sewer system—A system used to collect wastewater from multiple sources and transport the wastewater by gravity to a central location.

ground subsidence—The downward displacement (or sinking) caused by the removal of underground fluids, natural consolidation, or dissolution of underground minerals.

guide piles—Anchored pile holders that allow for vertical movement of a floating launch while maintaining its connection to another structure or shoreline anchor

Habitat Area of Particular Concern (HAPC)—Subsets of essential fish habitat that are rare or particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area.

haulout—Behavior associated with pinnipeds when temporarily leaving the water between periods of foraging activity for sites on land or ice.

human environment—Defined by the Council on Environmental Quality as the natural and physical environment, and the relationship of people with that environment (1508.14). Although the socioeconomic environment receives less emphasis than the physical or natural environment in the Council on Environmental Quality regulations, the Park Service considers it to be an integral part of the human environment.

impact—An adverse impact is assumed negatively affect the human environment, while a beneficial impact is assumed to have a positive effect on the human environment.

impact hammer—A hammer operated using hydraulics or compressed air.

indirect impact—Reasonably foreseeable impacts that occur removed in time or space from the proposed action. These are “downstream” impacts, future impacts, or the impacts of reasonably expected connected actions (e.g., growth of an area after a highway to it is complete).

interpretive—Used to describe an exhibit or rest area which hosts a variety of cues (i.e., visual and auditory) that engage the visitor for a desired effect or experience.

jurisdiction—A municipal government agency, such as a city or county, and as appropriate, federal and state agencies and federally recognized tribes. The term can mean "to have authority over."

light pollution—The introduction of artificial light, either directly or indirectly, into the natural environment.

Mineral Resource Zone (MRZ)—An area designated to indicate the significance of mineral deposits.

minimization—Taking measures to reduce potential effects to the smallest practical amount, extent, size, or degree.

mitigation measure—A modification of the proposal or alternative that lessens the intensity of its impacts on a particular resource.

National Register of Historic Places (national register)—The comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state, and local significance in U.S. history, architecture, archeology, engineering, and culture. This list is maintained by the Park Service under authority of the national historic preservation act of 1966.

No Action Alternative—Project alternative that would result in no project being implemented.

noise muffler—A device or technique used to absorb noise.

Notice of Availability (NOA)—Separate notices submitted to the Federal Register that the Draft EIS and the Final EIS are ready for distribution.

Notice of Intent (NOI)—The notice submitted to the federal register indicating that an EIS will be prepared. It describes the proposed action and alternatives, identifies a contact person at the Park Service, and gives time, place, and descriptive details of the agency’s scoping process.

off-peak season—Time period during which a recreational or tourist area received the least number of visitors.

peak season—Time period during which a recreational or tourist area received the greatest number of visitors.

programmatic evaluation—A comprehensive evaluation that can be used in place of individual evaluations.

public scoping—The procedure by which an agency identifies important issues and determines the extent of analysis necessary for an informed decision on a proposed action.

Record of Decision—The document that is prepared to substantiate a decision based on an EIS. When applicable, it includes a detailed discussion of rationale and reasons for not adopting all mitigation measures analyzed.

riprap—A foundation or retaining wall made of rock or other materials used to armor shorelines, streambeds, pilings, and other shoreline structures against damage and erosion.

ruderal vegetation—Disturbed or modified varieties of natural plant types.

scoping—An integral part of environmental analysis, which includes early involvement of interested and affected public, as well as internal and external agency contacts.

sensitive receptor—Land uses that are considered to have an increased susceptibility to noise effects, such as residences and schools.

soffit—The underside of an architectural structure such as an arch, balcony, or overhanging eaves.

special-status species—For purposes of this EIS, any species listed or proposed for listing under the state or federal endangered species acts, or considered locally rare by recognized authorities.

species of special concern—A species, subspecies, or distinct population of an animal native to California that has been extirpated from the state; can be considered threatened or endangered (but may not be formally listed); has experienced population declines or range retractions; or has naturally small populations that exhibit high susceptibility to risk.

stakeholder—An individual, group, or other entity that has a strong interest in decisions concerning park resources and values. Stakeholders may include, for example, recreational user groups, permittees, and concessioners. In the broadest sense, all Americans are stakeholders in the national parks.

strike-slip fault—A fault in which surfaces on opposite sides of the fault plane have moved horizontally and parallel to the strike of the fault.

study area—The area specifically evaluated for environmental effects.

subduction zone—Linear zone along which a plate of lithosphere sinks down into the asthenosphere.

subject matter expert—An individual who specializes in a particular area or topic.

take—Harm to a species, including harassment, pursuit, hunting, shooting, wounding, killing, trapping, capturing, or collecting.

total maximum daily load (TMDL)—A regulatory term used in the Clean Water Act to describe the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.

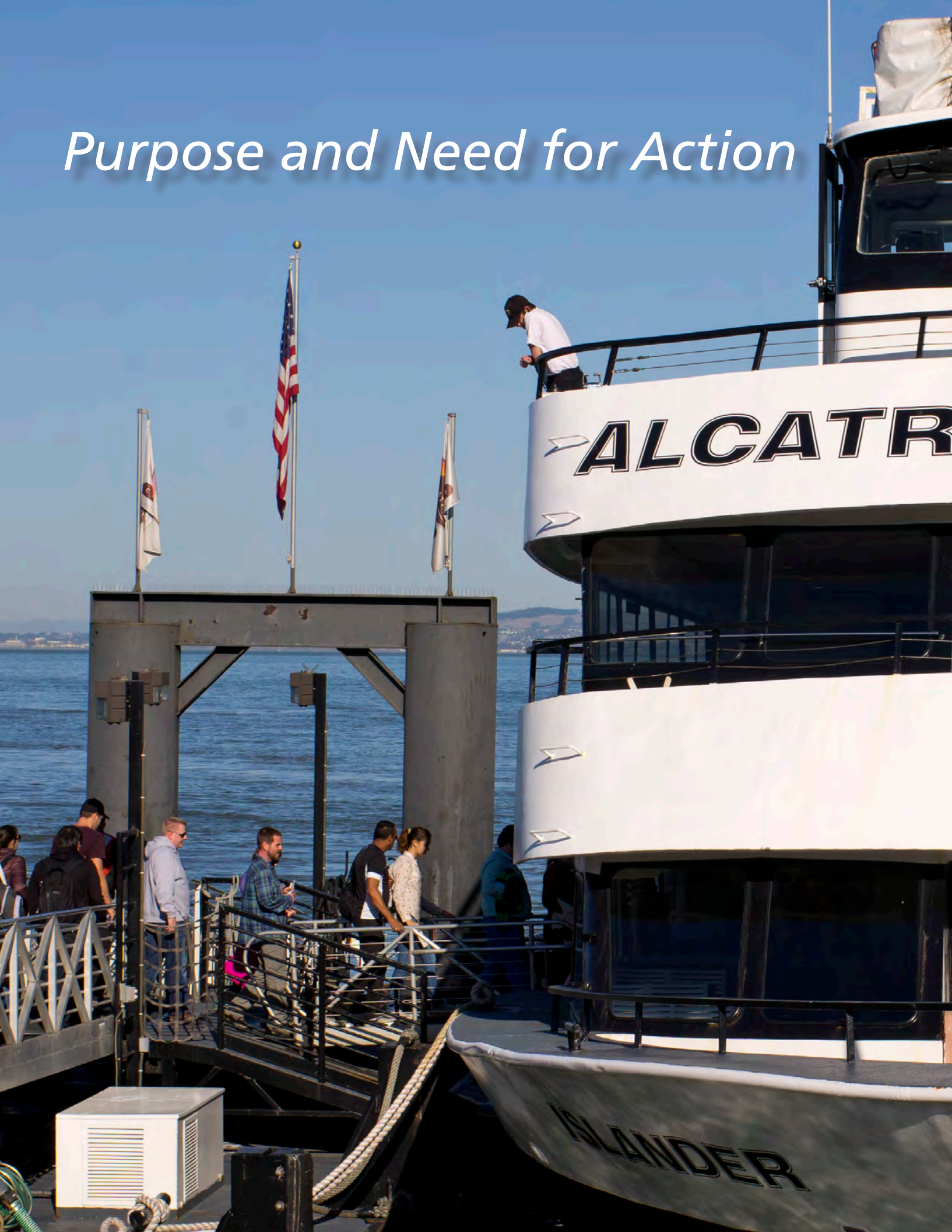
Value Analysis—An organized multidiscipline team effort that analyzes the functions of facilities, processes, systems, equipment, services, and supplies for the purpose of achieving essential functions at the lowest lifecycle cost consistent with required performance, reliability, quality, and safety.

value-added—Circumstance in which the economic value of NPS activities and programs has increased.

water column—A conceptual column of water from surface to bottom sediments.

wayfinding—Ways in which people and animals orient themselves in a physical space and navigate from place to place, including signage and maps.

Purpose and Need for Action



INTRODUCTION

The National Park Service (NPS or Park Service) proposes to establish a long-term ferry embarkation site for passenger service between the northern San Francisco (City) waterfront and Alcatraz Island. The Park Service also seeks to establish special ferry service (i.e., a service with no regular schedule and primarily used for special events) between the Alcatraz ferry embarkation site and the existing Fort Baker pier, implement special ferry service at Fort Mason, and programmatically evaluate the potential for future ferry service linkages to other parklands in the San Francisco Bay (Bay). The selection of a primary embarkation site (including construction and operations at the site), construction required to berth a ferry at Fort Baker, and programmatic evaluation of potential future services, is hereafter referred to as the Project.

The Park Service prepared this Environmental Impact Statement (EIS) in accordance with the requirements of the National Environmental Policy Act (NEPA; 42 United States Code [USC] sections 4321 et seq.) and Director's Order No. 12 (DO-12), "Conservation Planning, Environmental Impact Analysis, and Decision-Making" (NPS 2011a). The Park Service is the lead federal agency under NEPA and has requested that the Port of San Francisco (Port) be a cooperating agency. Additional relevant guidance documents used for resource-specific impact analyses are described in the "Affected Environment" chapter of this document. In the event that a site on Port property is ultimately selected as the preferred embarkation site, environmental review of the Project pursuant to the California Environmental Quality Act (CEQA) would be required.

Alcatraz Island, the site of pre-Civil War fortifications, was the nation's first military prison. It later became the most notorious maximum security penitentiary in the U.S. and subsequently was the site of the occupation that helped ignite the movement for American Indian self-determination. Alcatraz Island is now managed by the Golden Gate National Recreation Area (GGNRA), an NPS unit that includes Fort Mason and Fort Baker (Figure 1). Approximately 1.4 million people visit Alcatraz Island annually from the existing ferry embarkation site at Pier 31½.

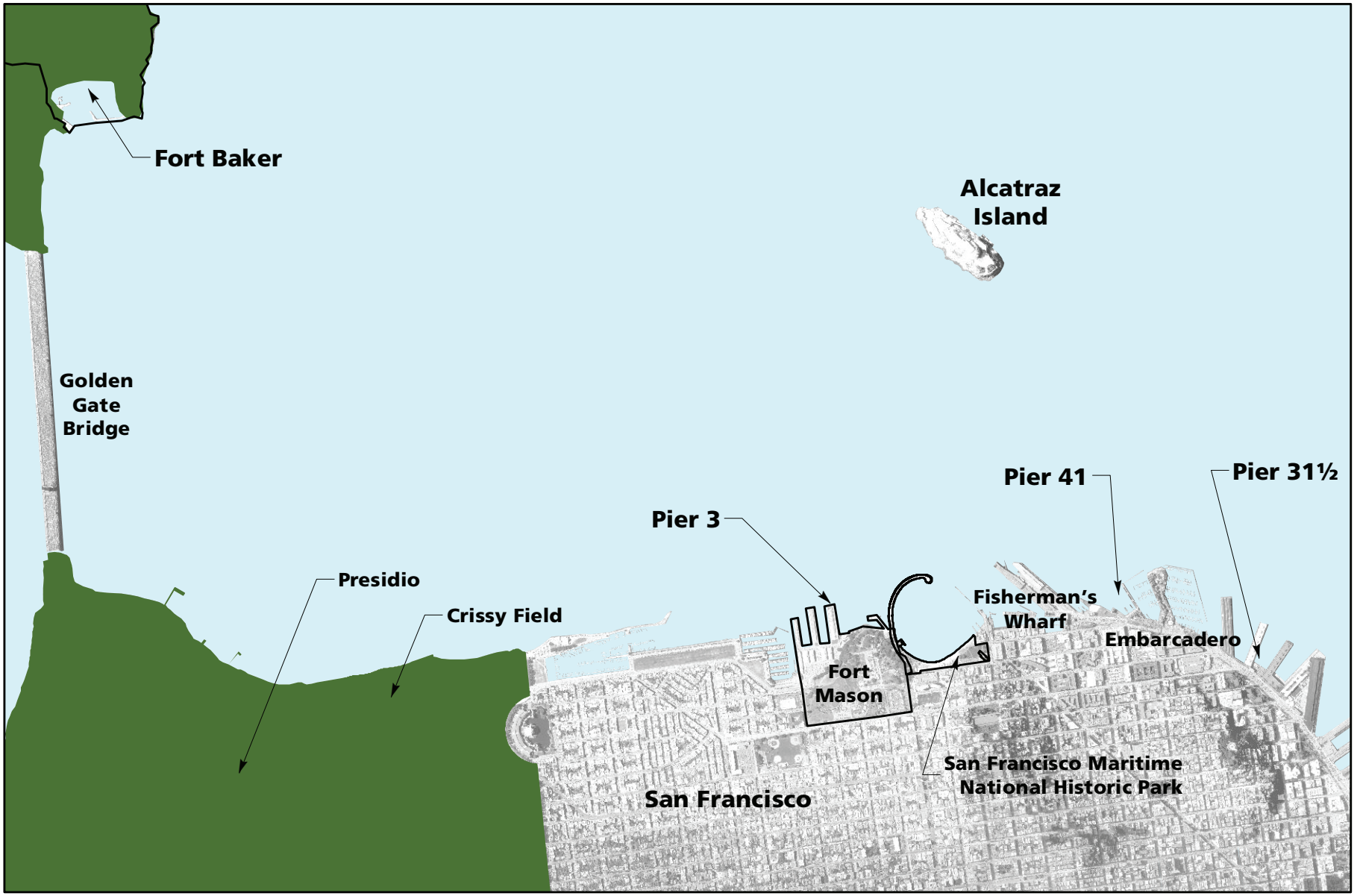
As part of the preferred alternative for Alcatraz Island identified in the 2014 General Management Plan (GMP)/EIS for GGNRA, the Alcatraz ferry embarkation site would remain within the northern San Francisco waterfront, which includes Fort Mason and the Embarcadero (NPS 2014a). The preferred alternative for the embarkation site should include enhancing the visitor experience starting at the ferry embarkation site and potentially providing additional ferry connections to other park sites throughout the Bay. A transportation management strategy identified in the GMP/EIS is focused on providing additional ferry connections between GGNRA parklands, including Fort Baker and Fort Mason.

The alternatives considered for this EIS build upon past feasibility studies, as well as other studies completed by the Park Service, the Port, the City and County of San Francisco (City/County), the State of California, and the California Water Emergency Transportation Authority (WETA; formerly the Water Transit Authority). Based on these studies, conceptual site plans for a range of sites on Port and NPS property along the northern San Francisco waterfront were developed and evaluated against the purpose and need of the Project, park management objectives, and operability constraints. The evaluations included a series of technical investigations, public and stakeholder outreach, and a Value Analysis (VA) process. At the conclusion of this process, three action alternatives (Figure 2) and the No Action Alternative were identified to be carried forward for detailed evaluation in this EIS. These alternatives are described in detail in the "Alternatives" chapter of this

document, which also describes alternatives eliminated from further study.

0 2 Miles

FIGURE 1
VICINITY MAP
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



Source: NPS 2014

0 2,500 Feet

FIGURE 2
LOCATION OF ALTERNATIVE EMBARKATION SITES
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

PURPOSE OF THE PROJECT

The Park Service seeks to secure a site that will provide for a long-term orientation and ferry embarkation facility for service to Alcatraz Island from the northern San Francisco waterfront. The Park Service desires an identifiable and well-functioning facility that will provide a quality welcome and support program for visitors, orient visitors to the history of Alcatraz Island, and provide a connection to other GGNRA parklands and orientation to the national park system in general. The Park Service also seeks to establish special ferry service between the primary Alcatraz ferry embarkation site and the existing Fort Baker pier, special service to and from Fort Mason, and to programmatically address the potential for recreational ferry service linkages to other parklands in the Bay. The action alternatives for providing primary ferry service to Alcatraz Island have been designed to accommodate ferry service to other parklands in the Bay. All primary action alternatives include the development of a third berth, which could be used for providing additional ferry service in the future.

The impact analyses presented in this EIS assume an increase in visitor numbers at the primary embarkation site due to forecasted increases in tourism-driven demand, improvements in visitor management, improvements to Alcatraz Island (creating additional space for visitors), and the ability to provide additional ferry service to other parklands in the Bay.

These additional elements would improve cross-bay connectivity and accommodate existing and future visitor demand for recreational travel to Fort Baker and the Marin Headlands, thereby enhancing GGNRA's operational effectiveness. Many potential visitors are unable to obtain tickets to Alcatraz Island due to the high demand. Enhanced on-shore visitor facilities would provide those visitors with interpretive information about the island and options for ferry access to other NPS destinations from San Francisco.

NEED FOR THE PROJECT

The need for the Project is driven by the following factors:

- **The Alcatraz ferry embarkation site and associated connections should be a consistent feature for visitors to GGNRA.** After operating out of Pier 41 for many years, the ferry embarkation site moved to Pier 31½ in 2006, when a new ferry service concessioner was selected. This change led to confusion and inconsistencies in the delivery of visitor services, and had some impact on surrounding communities, business interests, and transit providers. Federal law generally limits the maximum term of concession contracts to 10 years, and requires that a competitive process be used to select new concessioners. Identifying a long-term site is intended to avoid having the site move again. For any site at the Port, that selection would also need to be coupled with the execution of agreements with the Port specifying the long-term availability of and conditions under which the ferry embarkation sites would be made available to any ferry services concessioner, selected by the Park Service through the solicitation and award process mandated by federal law. Given the statutory limitations on extensions of the terms of NPS concession contracts, the risk of delay creates a significant risk of interrupting visitor services through the San Francisco waterfront to Alcatraz Island. The current ferry service concession contract is a 10-year contract that is scheduled to expire in 2016 and could only be extended by up to three years. The Project does not identify the future ferry concessioner.
- **The Alcatraz ferry embarkation site should allow for efficiency in making facility improvements when necessary, and consistency in projecting facility costs.** At present, neither the Park Service nor its concessioner is motivated to make long-term investments in the site, which could be abandoned in 2016. This arrangement hinders the ability for improvements to be made to the existing site. The Port has the authority to approve nearly all modifications made to leased pier facilities. Associated Port review and approval timelines can be unpredictable, and the Park Service has an interest in how Port-initiated improvements to the site affect visitor use and enjoyment.
- **The Alcatraz ferry embarkation site and associated facilities should serve as a gateway to GGNRA, reflecting the Park Service's identity and providing a quality experience for recreational visitors.** Under the current scenario, the condition of the existing embarkation site reduces the quality of the visitor experience. The existing embarkation site is on property that the concessioner has leased from the Port and is outside GGNRA boundaries. Nevertheless, that embarkation site is the beginning and end point of the transportation services provided to the visiting public, and therefore, is an integral part of the visitor services provided under the concession contract. Consequently, the Park Service has an interest in reviewing certain elements of the embarkation site facilities for purposes of considering their impact on interpretation of GGNRA to the visiting public (including visitor appreciation and understanding of the resource). These elements include, for example, signs, logos, colors, or other means of demarcating the existing site as the Park Service's official Alcatraz Island departure location. Lack of formal authority, in combination with changing adjacent commercial uses and developments, hinders the Park Service's ability to create a clear sense of identity and quality visitor support

services at the Alcatraz ferry embarkation site. It is also important that the embarkation site be compatible with adjacent land uses.

- **The Alcatraz ferry embarkation site should provide the space, circulation, and interpretive materials to appropriately and effectively orient recreational visitors to Alcatraz Island and GGNRA.** Park Service policy is to provide public access and opportunities for all to enjoy and to learn about park resources. In its current configuration, space is unavailable at Pier 31½ to provide appropriate interpretive exhibits or an orientation to Alcatraz Island and GGNRA for visitors prior to departing for the island. These interpretive and orientation opportunities are also key for visitors wishing to visit Alcatraz Island but who are unable to secure reservations. The visitor facility does not currently provide a genuine park portal or orientation to GGNRA, and as such, many visitors or aspiring visitors to Alcatraz Island are unaware of the other recreational and educational opportunities provided by GGNRA.
- **The Alcatraz ferry embarkation site may provide a valuable opportunity for cross-bay recreational ferry service to other GGNRA parklands.** Convenient transit connections to other GGNRA parklands, such as Fort Baker or Muir Woods, are currently unavailable from the existing ferry embarkation site. Park Service policy promotes alternative transportation access that is energy conserving and convenient, and that provides multiple travel options for visitors. Increasing numbers of park visitors choose to use public transit, do not have an automobile, and perceive travel by ferry as an enjoyable experience. The potential to add another (third) berth to the ferry embarkation site would further enhance this opportunity.

PROJECT OBJECTIVES

Based on the needs for the Project listed above, the following objectives have been identified for evaluating alternatives:

- Establishes a long-term (50 years or more) primary location that is economically feasible and sustainable, and enables substantial reinvestment in Alcatraz Island and other park facilities and visitor programs
- Provides visitor access to Alcatraz Island that is compatible with nearby land uses, including neighborhoods, businesses, and transportation services.
- Accommodates the critical facilities and programs needed for the safety and comfort of visitors and staff, and provides for efficient ferry operations.
- The embarkation site should be within a reasonable crossing time from Alcatraz Island and meet specific basic program element requirements for logistics.
- Provides an identifiable area for a quality welcome, orientation, and interpretation of the natural, cultural, scenic, and recreational resources of Alcatraz Island, other GGNRA parklands, and the larger national park system.
- Provides facilities for expanded ferry service to accommodate existing and future visitor demand for travel to Alcatraz Island and other GGNRA sites and NPS units.

PARK PURPOSE AND SIGNIFICANCE

Congress established GGNRA under public law 92-589 in October 27, 1972, with the primary purpose of ensuring that park resources and values are preserved, maintained, and protected for public use and enjoyment (16 USC 460bb). Congress intended for GGNRA to provide national park experiences to urban populations. The park's extensive collection of natural, historic, and scenic resources and diverse recreational and educational opportunities fulfill the purpose of bringing "parks to the people" (NPS 2014a). GGNRA includes former city, state, and federal military lands, and more than 59,000 acres have been added to its boundaries since its establishment (NPS 2009a).

NPS strategies for management of GGNRA are founded on the provisions of the organic act of 1916 (16 USC section 1) and the general authorities act of 1970 (16 USC section 1a-1 et seq.), with major federal actions subject to NEPA review, per the policies and procedures established through DO-12 (NPS 2011a). These policies and guidance, described in the "Relevant Overarching Policies and Plans" section, provide the Park Service the authority to carry out the Project and conduct the NEPA evaluation.

NATIONAL PARK SITES IN THE STUDY AREA

Two national park system units—GGNRA and San Francisco Maritime National Historical Park (SF Maritime NHP)—are located within the study area. These parks and other public lands located within the vicinity are shown on Figure 1.

GGNRA

As previously discussed, GGNRA was established in 1972, with the purpose of preserving park resources for public use. The parklands within GGNRA are not all contiguous; GGNRA comprises a collection of properties in three counties (San Francisco, Marin, and San Mateo) that range from Bay and ocean shoreline to historic sites, such as Alcatraz Island (NPS 2012a). Table 1 lists notable GGNRA parklands.

GGNRA parklands relevant to the Project are described in more detail below.

TABLE 1. GGNRA PARKLANDS

San Francisco County	Marin County	San Mateo County
• Alcatraz Island • Cliff House • China Beach • Crissy Field • Fort Funston • Fort Mason • Fort Miley • Lands' End • Ocean Beach • Sutro Baths • Sutro Heights	• Fort Baker • Marin Headlands • Muir Beach Muir Woods National Monument • Olema Valley • Point Bonita Lighthouse • Stinson Beach • Tennessee Valley	• Milagra Ridge • Mori Point • Phleger Estate • Rancho Corral de Tierra • Sweeney Ridge

Alcatraz Island. Alcatraz Island is located approximately 1 mile north of downtown San Francisco in the Bay. The island served as a military reservation from 1850 to 1934 and is best known for serving as a federal prison from 1934 to 1963. In 1972, Congress made Alcatraz Island a part of the national park system. The following year, the site was opened to the public (NPS n.d. a). It was designated a national historic landmark in 1986. The Park Service preserves extensive cultural resources on Alcatraz Island including structures, archeology, and a complex cultural landscape. The Park Service provides a rich variety of educational opportunities, vistas, programs, and exhibits, including complex historic structures, archeology, and many cultural landscape

features for visitors that interpret its history and natural resources. Today, it is one of the most popular tourist destinations in the San Francisco Bay Area (Bay Area). Each year more than 1.4 million visitors make the trip to the island by ferry, which is operated from Pier 31½ at the Embarcadero, along the northeast San Francisco waterfront (NPS 2012b). Service carries upwards of 5,000 passengers per day from San Francisco to Alcatraz Island and back. Ferry service to Alcatraz Island has been provided from this location since 2006. From 1972 to 2005, ferry service to Alcatraz Island was provided from Fisherman's Wharf.

Visitor demand at Alcatraz Island is projected to grow based on general increases in San Francisco tourism levels and population growth. This growth is attributed to the Park Service's opening of additional areas on Alcatraz Island for visitor use, and improving visitor management techniques on the island that would allow for increased visitation; these actions are not associated with this Project. Future capacity is based on the forecasted 20% growth in visitors to the site through 2036 (ORCA 2011a).

Fort Mason. Fort Mason originally served as a U.S. Army post (Post at Point San Jose), acting as a coastal defense site and later as a military port facility serving the U.S. Army in the Pacific. It was incorporated into the national park system in 1972 as part of GGNRA. Fort Mason is a national historic landmark district that includes numerous buildings and structures of historic significance within approximately 1,200 acres. Fort Mason comprises two areas: Upper and Lower Fort Mason (Figure 3). Upper Fort Mason is situated at higher elevation and includes the Great Meadow and GGNRA headquarters. A steep slope and staircase separates central Upper and Lower Fort Mason (Photo 1). Lower Fort Mason is situated closer to water level and to the west of Upper Fort Mason. It encompasses three historic piers and several support buildings from the former Army port of embarkation. Many of those buildings are managed by the Fort Mason Center under a long-term lease from the Park Service (GGNPC n.d. a; Photo 2).

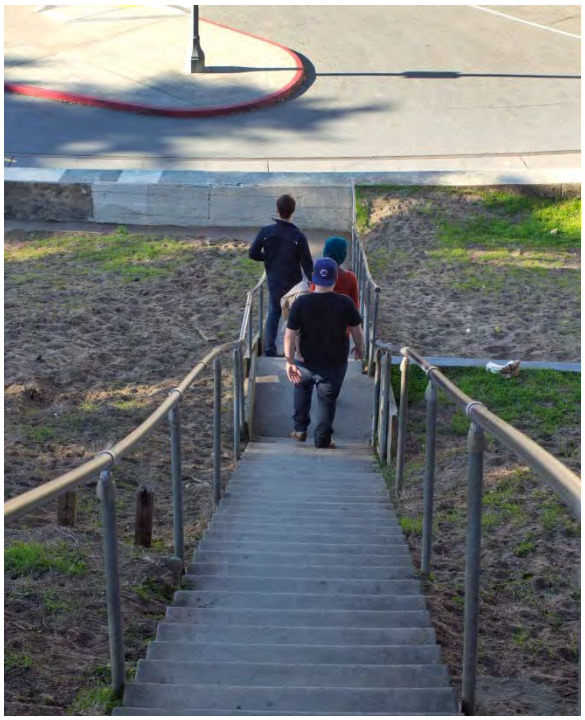
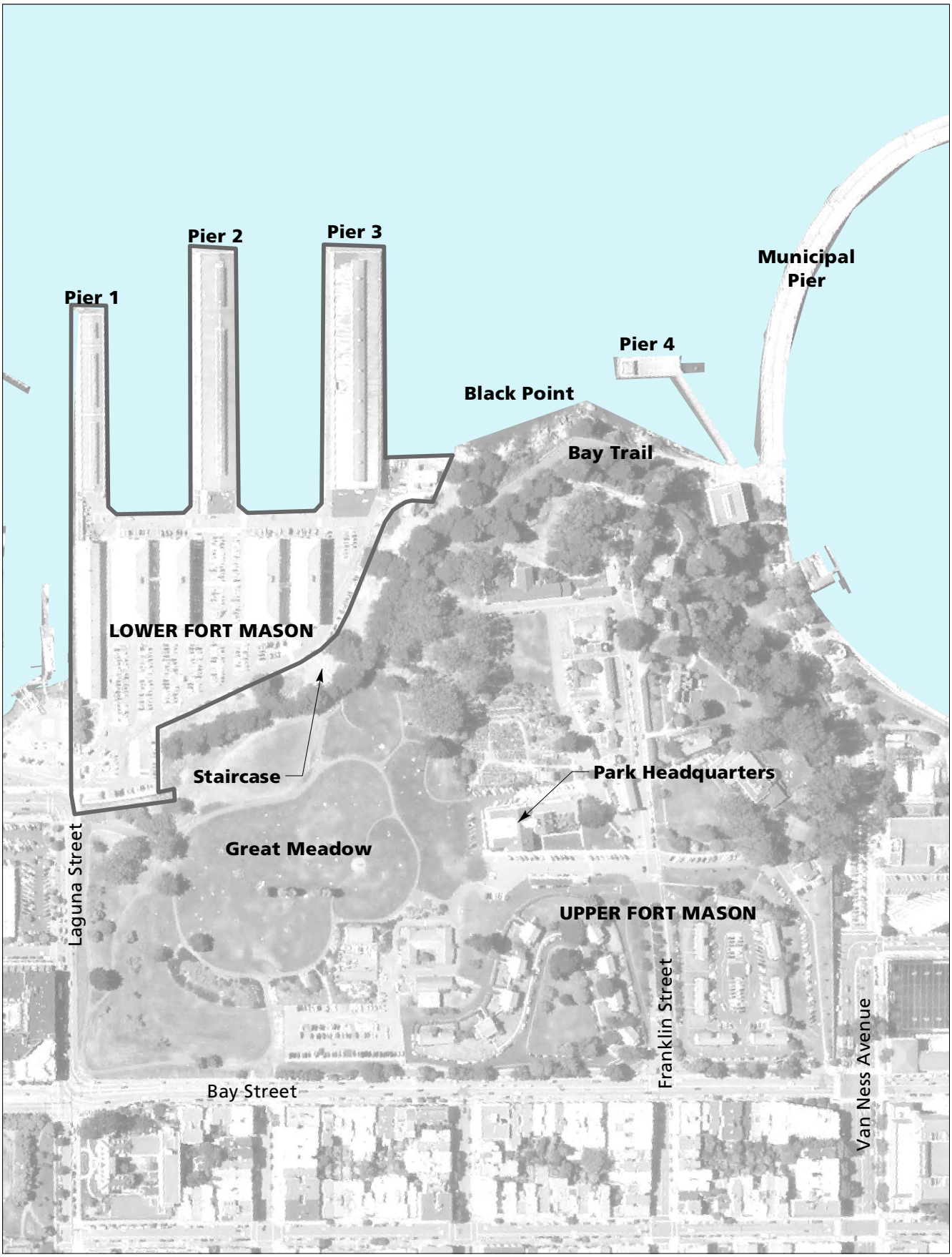


Photo 1.
View of people on the staircase from Upper Fort Mason to Lower Fort Mason.

Lower Fort Mason is northeast of Marina Boulevard and the Great Meadow. Its vehicular entrance is at the intersection of Marina Boulevard and Buchanan Street. Upper Fort Mason is located immediately east and uphill. Its vehicular entrance is located at the intersection of Bay and Franklin streets. Fort Mason is separated from SF Maritime NHP and Fisherman's Wharf by a steep bluff that forms the eastern edge of Fort Mason and limits access between SF Maritime NHP and Fort Mason. The Golden Gate Promenade (along the San Francisco Bay Trail [Bay Trail]) provides access to Fort Mason for many bicyclists and pedestrians (Photo 3).

1



0 400 Feet

FIGURE 3
FORT MASON
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Photo 2.
View of Lower Fort Mason and beyond from Upper Fort Mason. The historic piers are just outside the photo on the right.

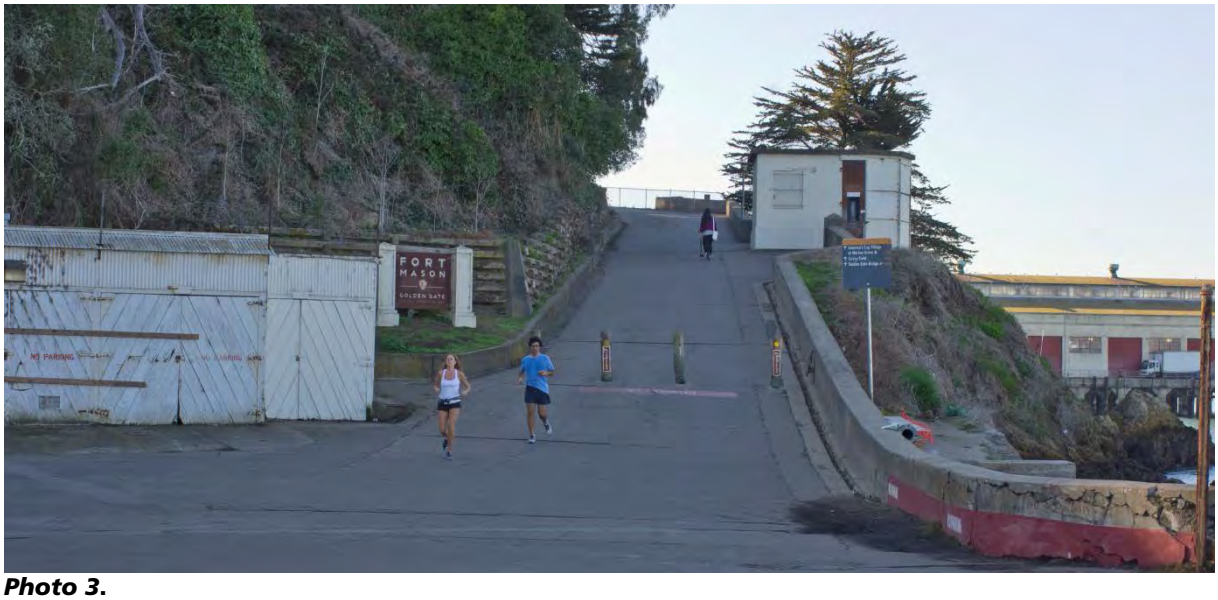


Photo 3.
View of the steeper portion of the Bay Trail along the northeastern edge of Fort Mason. Pier 3 is visible on the right.

Photo 4.
View of Horseshoe Cove at Fort Baker with U.S. Coast Guard Station Golden Gate and the Cavallo Point Lodge in the background. The historic pier is just outside the photo on the left.

Fort Baker. Fort Baker is another former U.S. Army post. It is located in Marin County at the foot of the Golden Gate Bridge, and the entrance to the Bay and currently offers recreational and educational opportunities to visitors. Fort Baker comprises approximately 335 acres, including a core zone of 91 acres surrounding a parade ground and 24 historic military buildings dating from the late nineteenth century. The site also includes the historic pier, historic batteries, open space, and rocky shoreline, and is connected to GGNRA's trail system (NPS 2008a). The site is managed according to the policies and decisions set forth in the Park Service's *Fort Baker Plan Environmental Impact Statement* (Fort Baker Plan; NPS 1999).

Within Fort Baker is the Cavallo Point Lodge at the Golden Gate, the newest retreat and conference center in the national park system, which provides historic and contemporary guest rooms and associated amenities to visitors (Photo 4). The lodge is also used by the Institute at the Golden Gate, a new program of the Golden Gate National Parks Conservancy (GGNPC), in partnership with the Park Service; dedicated to advancing environmental preservation and global sustainability. The Bay Area Discovery Museum and the Travis Sailing Center are also located on-site (NPS 2008a).

For visitors arriving via U.S. Highway 101 (U.S. 101), Fort Baker is accessible from West Bunker Road. The site can also be accessed from the City of Sausalito via East Road.

Marin Headlands. The Marin Headlands are composed of open space (Rodeo Valley, Gerbode Valley, Hawk Hill, Tennessee Valley, and Rodeo Beach) and historic sites (Point Bonita Lighthouse, Fort Barry, Fort Cronkhite, and Battery Townsley) situated along the southwestern coast of the Marin peninsula, extending from the north anchorage of the Golden Gate Bridge to Mount Tamalpais State Park (GGNPC n.d. b). In 1851, lands around the Golden Gate Bridge, including the Marin Headlands, were set aside as sites for coastal defense guns. Due in large part to the lobbying efforts of local citizens,

the California Department of Parks and Recreation took possession of these sites following their decommissioning after World War II. Portions of the remaining land that now compose the Marin Headlands were planned for private development in the 1960s, but after intense public pressure and legal action, the land was eventually incorporated into GGNRA.

The Marin Headlands are accessible from U.S. 101/Highway 1. For visitors arriving from San Francisco, the southern portion of the Marin Headlands is accessible from Bunker Road near the Alexander Avenue exit.

SF Maritime NHP

Congress established SF Maritime NHP under public law 100-348 on June 27, 1988, as a national park, consisting of the Aquatic Park Bathhouse, Hyde Street Pier and historic vessels, building E at Fort Mason, and 35 acres of urban parkland. The Aquatic Park Bathhouse is home to the Maritime Museum, which includes seafaring archives and books, more than 100 traditional and small crafts, and more than 35,000 objects reflecting our nation's maritime history (Photo 5). The Park Service's ship collection includes a variety of historic vessels dating from the turn of the twentieth century. The park boundary also includes Victorian Park, an urban open-space development, and a swimming lagoon maintained by GGNRA (NPS 2007a). Aquatic Park was listed in the National Register of Historic Places (national register) in 1984, and was designated a national historic landmark in 1987.

SF Maritime NHP's boundaries abut Upper Fort Mason and include portions of Van Ness Avenue, Jefferson Street, and Hyde Street. It is located at the west end of Fisherman's Wharf and is well-served by public transit.

Photo 5.
View of the SF Maritime NHP's Maritime Museum and Aquatic Park.

OTHER SITES IN THE STUDY AREA

The Embarcadero

The Embarcadero is a roadway spanning San Francisco's eastern waterfront. The roadway sits atop an engineered seawall constructed between the 1860s and 1920s. The Embarcadero was historically home to a short line freight railroad that connected the numerous piers extending off the roadway into the Bay. During World War II, nearly all piers along the Embarcadero were used for military activities. The Embarcadero District was listed in the national register in 2002. The piers along the Embarcadero remain owned and leased by the Port, and are currently home to the Alcatraz ferry embarkation site at Pier 31½ and the Alcatraz Café and Grill at Pier 33 (Photos 6 and 7), James R. Herman Cruise Terminal (Pier 27), and the Exploratorium (Pier 15), among other establishments.

The Embarcadero begins at the intersection of Second and King Streets and continues north along the waterfront to Fisherman's Wharf. It is well-served by public transit (Photo 8).

Photo 6.
View of the Alcatraz Café and Grill, not operated by the Park Service, located in the Pier 33 bulkhead building.

Photo 7.
View of the Alcatraz Landing entrance at Pier 31½, immediately north of the Pier 31 bulkhead building.

Photo 8.
View of historic street cars running along The Embarcadero at Pier 3.

Fisherman's Wharf

Fisherman's Wharf is one of the busiest and most popular tourist attractions in the western U.S. It is home to a small fishing fleet, Pier 39, Ghirardelli Square, the Musée Mécanique, several other museums, and numerous restaurants and shops. Ferry and/or boat tour service is provided at several Fisherman's Wharf locations, including piers 41 and 43—both of which are former Alcatraz ferry embarkation sites (Photo 9).

Fisherman's Wharf encompasses San Francisco's northeastern waterfront, from Van Ness Avenue east to Pier 35. Its westernmost extent directly abuts SF Maritime NHP. It is well-served by public transit (Photo 10).

Photo 9.
View of the Pier 41 building (right), Pier 43 Ferry Arch, and the Golden Gate Bridge and SS Jeremiah O'Brien at Pier 45 in the background.

Photo 10.
View of a historic streetcar operating in front of Pier 41 in Fisherman's Wharf.

RELEVANT POLICIES AND PLANS

This section describes the relevant overarching policies and plans that guided or influenced the development of this EIS. Additional resource-specific policies, regulations, and plans are described in the relevant resource topic sections of the "Affected Environment" chapter.

ORGANIC ACT OF 1916

Signed into law on August 25, 1916 (16 USC section 1), the organic act established the Park Service and provides direction for the management of NPS resources. The organic act directs the Park Service to "promote and regulate the use of the Federal areas known as national parks, monuments, and reservations... to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC section 1). Management of NPS resources, including GGNRA, is guided by these principles.

NEPA, AS AMENDED

NEPA (42 USC Section 4321 et seq.; 40 Code of Federal Regulations [CFR] Section 1500.1) was enacted by Congress in 1969 to ensure evaluation of the probable environmental consequences of proposals before decisions are made by federal agencies. When a federal agency determines that a preferred alternative could result in significant environmental effects, an EIS is prepared. The Department of the Interior has its own regulations for implementing NEPA (43 CFR Section 46). The Park Service also has its own procedures for implementing NEPA, which are outlined in DO-12 (NPS 2011a). An EIS informs decisionmakers and the public of reasonable alternatives that avoid or minimize significant impacts on, or enhance the quality of, the environment, while accomplishing the purpose and need of the proposal. An EIS is not only a disclosure document, it is a tool for federal agencies to plan actions and make decisions. NEPA also requires federal agencies to diligently attempt to involve the interested and affected public before any decision affecting the environment is made. This Project constitutes a major federal action requiring NEPA review.

GENERAL AUTHORITIES ACT OF 1970

The general authorities act, in combination with the 1978 redwood amendment, supplemented and clarified the provisions of the organic act. It states that, "the authorization of activities shall be construed and the protection, management, and administration of national park areas shall be conducted in light of high public value and integrity of the national park system and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress." (16 USC section 1a-1 et seq.). As mandated by the organic act and reaffirmed by the general authorities act, management of NPS resources is guided by the fundamental principal of conserving park resources and values. In addition, these laws require the Park Service to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values.

PUBLIC LAW 92-589

Public law 92-589, issued on October 27, 1972, established the GGNRA to preserve certain areas of Marin and San Francisco counties that possess outstanding natural, historic, scenic, and recreational values for public use and enjoyment. The law calls for park management to utilize the park's resources in a manner that will provide for recreation and educational opportunities, and to preserve the

recreation area, as far as possible, in its natural setting, and protect it from development and uses that would destroy the scenic beauty and natural character of the area.

NPS MANAGEMENT POLICIES 2006

Considered the first level of policy guidance within the NPS directives system, this document states that the Park Service has, "the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values" (NPS 2006). When considering the use of park resources, NPS decisionmakers must investigate potential conflicts with the national park system's "fundamental purpose" of conserving park resources and values. An action constitutes an impairment when its impacts, "harm the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006). NPS decisionmakers must use any environmental assessments (EAs) or EISs required by NEPA, relevant consultations and completed studies, advice or insights offered by subject matter experts and others who have relevant knowledge or experience, the results of civic engagement and public involvement activities relating to the decision, and best professional judgment to determine whether an action would cause impairment (NPS 2006). At the time that a decision is made, a nonimpairment determination would be prepared for the proposed project and appended to the Record of Decision (ROD).

DIRECTOR'S ORDER NO. 12

DO-12, "Conservation Planning, Environmental Impact Analysis, and Decision-Making," revised and effective as of October 5, 2011, sets forth the policies and procedures by which the Park Service will comply with NEPA. The provisions of NEPA and the organic act jointly commit the Park Service to make informed decisions that conserve and preserve park resources for the unimpaired benefit and enjoyment of future generations. Policies and procedures described in DO-12 center on completing environmental review and management decisions informed through scientific and interdisciplinary analysis, with resource preservation as the highest of many priorities (NPS 2011a).

NPS CONCESSIONS MANAGEMENT IMPROVEMENT ACT OF 1998

Commercial services may take place within a unit of the National Park System only under certain defined and limited circumstances. The 1998 Concessions Act (16 USC §5951 et seq.) allows the Park Service to authorize persons other than the Park Service to offer public accommodations, facilities, and services to park visitors, provided that these are necessary and appropriate for public use and enjoyment of the park unit in which they are located and are consistent to the highest practicable degree with the preservation and conservation of the resources and values of the unit. Allowable commercial services may be authorized through concession contracts. Authorized accommodations, facilities, and services are provided for a fee or charge to the visitor by the concessioner, and the concessioner's rates and charges to the public are subject to approval by NPS. The concessioner pays the government, through the vehicle of a franchise fee, for the privilege of operating the concession business. A competitive selection process is mandated by the 1998 Concessions Act for concession contracts, with criteria for selection of the best proposal set out in the law, itself. The act also generally limits the maximum term of concession contracts to 10 years.

GGNRA AND MUIR WOODS NATIONAL MONUMENT GMP/EIS

This GMP/EIS is a 20-year plan intended to guide management of GGNRA and Muir Woods National Monument. It contains strategies for future park management

developed through resource analysis, collaboration with public and park partners and built upon earlier successes and findings from day-to-day management of the park per the 1980 GMP (NPS 1980). The GMP/EIS for GGNRA and Muir Woods National Monument was released in April 2014. As part of the preferred alternative for Alcatraz Island identified in the GMP/EIS for GGNRA, the Alcatraz ferry embarkation site should remain within the northern San Francisco waterfront, which includes Fort Mason and the Embarcadero (NPS 2014a). The preferred alternative includes enhancement of the visitor experience starting at the ferry embarkation site and potentially providing additional ferry connections to other park sites throughout the Bay. A transportation management strategy identified in the GMP/EIS is focused on providing additional ferry connections between GGNRA parklands, including Fort Baker and Fort Mason (NPS 2014a).

NPS CLIMATE CHANGE ACTION PLAN 2012-2014

The NPS Climate Change Action Plan provides guidance to help park managers and staff effectively plan for and respond to climate change. The plan identifies the regulatory context for climate change-related action, outlines near-term priorities, and describes how park and program managers might consider additional actions in anticipation of future actions. The plan was prepared in consideration of Executive Order 13514, which requires federal agencies to a) evaluate risks and vulnerabilities to manage short- and long-term effects of climate change on agency mission, programs, and operations, and (b) integrate climate change adaptation into agency planning, operations, policies, and programs; as well as Secretarial Order 3289 which requires bureaus to consider and analyze climate change impacts in planning and decision making, and in designing research agendas. Climate change is addressed in the Affected Environment and Environmental Consequences sections for Air Quality and Water Quality and Hydrology.

FORT MASON CENTER LONG-TERM LEASE

The Park Service approved this lease in March 2004 (NPS 2004a) following the completion of the Fort Mason Center Long-Term Lease EA in August 2003. The lease allows for the continued operation of the Fort Mason Center to meet the objectives identified in the Fort Mason Foundation's mission statement and the GMP. The objectives are to create and preserve a cultural, educational, and recreation center, which reflects the unique history, talents, and interests of the people of the Bay Area in partnership with the Park Service (EIP Associates and Wilbur Smith Associates 2003). All of the buildings located in Lower Fort Mason are covered under the lease, with the exception of the substructures of the piers and Building E. This lease is relevant to the Project because Pier 3 is currently used as an event space by the Fort Mason Center.

SAN FRANCISCO GENERAL PLAN

California law requires that every city and county adopt a, "comprehensive, long-term general plan for the physical development," of the community that addresses the following issues: land use, circulation, housing, conservation, open space, noise, and safety. These issues and others are addressed in the *San Francisco General Plan* (General Plan). The plan currently contains the following elements: Residence, Commerce and Industry, Recreation and Open Space, Community Facilities, Transportation, Community Safety, Environmental Protection, and Urban Design and Arts that set forth goals, policies, and objectives for the physical development of the city (City/County 2012).

The General Plan is considered a policy document rather than a formal regulation, though many elements are based on existing regulations. The element policies established by the General Plan are pertinent to many of the resource topics evaluated in this EIS, and should be considered accordingly. The

"Affected Environment" chapter presents specific General Plan policies as they apply to various resource topics.

MARIN COUNTY COUNTYWIDE PLAN

The *Marin County Countywide Plan* guides the conservation and development of Marin County, consistent with California law requiring cities and counties to adopt a comprehensive long-range general plan for physical development. The plan currently contains the following elements: Natural Systems and Agriculture, Built Environment, and Socioeconomic (Marin County 2007a). These plan elements include policies that are pertinent to project actions that would affect Marin County. Specific policies as they apply to resource topics evaluated in this EIS are presented in the "Affected Environment" chapter.

FORT BAKER PLAN

Completed in 1999, the Fort Baker Plan established the Park Service's plan for preserving the post and developing a conference and retreat center at Fort Baker. The Cavallo Point Lodge at Golden Gate opened in 2008 and uses both historic and new buildings throughout Fort Baker. The plan also called for expanding and rehabilitating portions of the Bay Area Discovery Museum, creating potential minor additions to the U.S. Coast Guard (USCG) station, converting the marina and historic boat shop to fully serve the public, removing bulkheads and roadways along the waterfront to improve its connectivity with the Cavallo Point Lodge, and improving the fishing pier by installing fish-cleaning stations, new railings, and benches. The plan also noted the potential for the fishing pier to provide water-based connections to other park sites in the future. The Fort Baker Plan is relevant because the Project would include establishment of ferry service to and from Fort Baker, including associated improvements as detailed in the "Alternatives" chapter of this document.

SCOPING FOR THE EIS

Scoping is an early and open process to determine the scope of environmental issues and alternatives to be addressed in an EIS, in accordance with NEPA and DO-12. NEPA requires a 30-day minimum public scoping period, during which time input is sought from the public, agencies, and state and local governments about the scope of the EIS, alternatives, and analyses. To ensure that stakeholders had sufficient time to provide comments, the Park Service elected to conduct a 60-day public scoping period for the Project. The public scoping period began on June 1, 2012, with publication of a Notice of Intent (NOI) in the Federal Register (FR). The NOI included background information, potential alternatives, and methods for public comment. The comment period closed on July 31, 2012.

Additional information on public and agency involvement is presented in the "Consultation and Coordination" chapter.

PUBLIC INVOLVEMENT

The Park Service distributed a Project newsletter, announcing the scoping period and public meeting dates and location, through postal and electronic mail to existing GGNRA mailing lists. Scoping meetings were held on June 26 and 28, 2012, at Fort Mason Building 201 in San Francisco and the City Hall in Sausalito, respectively. A Public Scoping Comment Analysis Report, summarizing the comments received during scoping, was published in November 2012 (NPS 2012c).

Over the comment period, approximately 90 correspondences were collected from interested stakeholders. For example, comments were received from current ferry operators, tenants and users of Fort Mason Center, Marina District residents, District 2 Supervisor Mark Farrell, and merchants at Fisherman's Wharf. The public scoping report contains a summary of the comments received (NPS 2012c).

CONCERNS AND ISSUES

A number of commenters requested that the Park Service continue to operate ferry service from Port sites, specifically at piers 31½ and 41. Reasons included supporting the current symbiotic relationship between the Park Service and local area tourism; better overall access to existing public transportation, parking, and mass transit; closer proximity to other major San Francisco attractions; and the capacity of Fisherman's Wharf to manage drop-off/pick-up areas for tour groups. Specific to Pier 45, commenters noted the site's rough sea conditions, which could affect operations, and the need for a breakwater; the permanent displacement of the Musée Mécanique, a private museum currently housed on Pier 45; and potential logistical issues with moving the *USS Pampanito*, if required.

Many commenters expressed concerns about locating the embarkation site at Fort Mason, emphasizing that the local population would be overwhelmed by visitors to Alcatraz Island from increases in traffic congestion, noise levels, and lack of available parking. Some commenters stressed that a Fort Mason alternative would add to congestion levels in the area and noted additional concerns with the potential increases in light of the proposed F-Line extension. Merchants were concerned that current businesses catering to the local population would be displaced by shops catering to tourists (i.e., souvenir shops). Other concerns with a potential Fort Mason site included community safety and loss of community character, and impacted water quality due to increased vessel traffic in Aquatic Park. Two comments were received requesting that the Park Service carry out a concurrent CEQA analysis for the Project, if

Fort Mason were selected as the preferred alternative.

Two focused letters from government agencies were received during the scoping period requesting that the Park Service review the current effective countywide *Flood Insurance Rate Maps for the City and County of San Francisco* and analyze the following: wave mitigation measures to protect the San Francisco Marina East Harbor, ferry impacts on boaters, ferry passenger parking needs and management, and traffic and circulation that ensures safe and convenient access to the San Francisco Marina East Harbor and Moscone Recreation Center. A number of comments requested specific analysis related to perceived negative effects to an existing resource, including air quality, water quality and safety, stormwater capacity and controls, trash and the ability for the facility to be zero waste, contaminated sediments, energy use of vessels, bicycle and pedestrian access, infrastructure that accommodates a new ferry dock at Fort Mason, historic resources, ferry wake on existing marinas in the Marina District, climate change, and light pollution in the Fort Mason area.

The Golden Gate Bridge Highway and Transportation District (GGBHTD) expressed concerns regarding introduction of additional private operators at the Sausalito ferry terminal, because of a lack of GGBHTD control over operator schedules and activities. GGBHTD expressed the need to maintain some degree of control over arrivals and departures so that the core Golden Gate Ferry services are not adversely affected. Therefore, GGBHTD asserts that any additional ferry service at this location be provided by GGBHTD.

IMPACT TOPICS SELECTED FOR DETAILED ANALYSIS

The following issues and concerns were either raised during the scoping process or were deemed relevant for evaluation by the Park Service and selected for detailed analysis in the EIS. Rationale for selecting the impact topics was based on the potential for substantive impacts; environmental statues, regulations, and executive orders; and NPS Management Policies and guidance.

Land Use

While the majority of the study area is urbanized, the Project could result in overcrowding, or the conversion of open space or park and recreational areas to another use.

Transportation and Circulation

Traffic circulation, parking availability, existing bicycle and pedestrian paths, and vessel navigation within the study area may be affected by the Project.

Air Quality

Since direct and indirect activities within the study area would result in air emissions, the Project's air quality and greenhouse gas (GHG) emissions must be analyzed.

Noise and Vibration

The study area includes natural, cultural, residential, and commercial uses; therefore, noise impacts on park visitors, local residents, and business owners from increased traffic or site operations must be assessed.

Geology, Soils, and Seismicity

While all alternatives would involve reusing an existing facility, because the study area lies within the right-lateral San Andreas Fault system, reuse of historic infrastructure may require seismic retrofitting.

Water Quality and Hydrology

The impacts on water quality from in- and above-water construction, as well as vessel traffic associated with the Project, must be assessed. Additionally, the impacts of sea level rise and wind and wave action in the study area must be addressed.

Biological Resources

Due to its location on the Bay, the Project's potential effects on threatened or endangered terrestrial or aquatic species, or designated critical habitat, must be assessed.

Visual Resources

Visual resources within the study area could be affected by facilities—including temporary and concessioner's facilities— that are constructed, altered, or removed. Certain alternatives may offer superior views to Alcatraz Island.

Cultural Resources

The study area includes four National Historic Districts: Fort Mason, Fort Baker, Aquatic Park, and the Port of San Francisco Embarcadero; the latter two districts are also National Historic Landmarks (NHLs). Projects implemented in these districts must consider the preservation of their historic sites, structures, and other resources. Numerous recorded individual historic properties are also present in the study area, and unrecorded properties may also be present. The Park Service must avoid or minimize adverse effects to these properties.

Recreation and Visitor Experience

Implementation of the Project could affect land- and aquatic-based recreational activities like swimming and sport fishing, as well as visitor experience. Conversely, the Project would have a positive impact on recreation and visitor use in that it would enhance visitor access to NPS facilities in the GGNRA

Socioeconomics

The Project could affect existing economic activity within the Fisherman's Wharf area and along the Embarcadero, as well as within the Fort Mason Center and Marina District neighborhood.

Public Services and Utilities

The facilities' water, energy, and other public utilities services needed to support operation of the Project must be assessed. The Council on Environmental Quality (CEQ) requires that EISs assess the effects of proposed activities on energy consumption and conservation potential.

Hazardous Materials

The potential presence of hazardous materials in the study area that may be encountered during construction or operation, and associated potential health and safety risks for construction workers, the public, and the environment, must be assessed.

IMPACT TOPICS DISMISSED FROM DETAILED ANALYSIS

The following issues and concerns would not be affected, or would be affected negligibly by the Project; therefore, these topics have been dismissed from detailed analysis.

Environmental Justice

Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations") requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or

environmental effects of their programs and policies on minorities and low-income populations and communities. According to the U.S. Environmental Protection Agency (USEPA), environmental justice is defined as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, or commercial operations, or the execution of federal, state, local, and tribal programs and policies. Given this definition, the Project would not have disproportionate health or environmental effects on minorities or low income populations or communities.

Prime and Unique Agricultural Land

The farmland protection policy act was established to minimize the conversion of prime and unique farmland, and farmland of statewide or local importance, to nonagricultural uses, and to ensure that federal programs are compatible with state, local, and private programs and policies to protect farmland. This act does not apply to projects already in urban development; therefore, because the National Resources Conservation Service has classified all soils within the study area as urban land; there is no prime or unique agricultural land within the study area.

Wetlands

Wetlands are not expected to be adversely affected by the Project because there are no wetlands located within or adjacent to the study area.

Wilderness Values

The wilderness act of 1964 established the national wilderness preservation system to protect certain federally managed natural and undisturbed wilderness areas. Based on this system and its current database, there are no designated wilderness areas within the study area.

Wild and Scenic Rivers, Ecologically Critical Areas

The wild and scenic rivers act of 1968 established the national wild and scenic river system to preserve certain rivers with outstanding cultural, natural, or recreational values. Based on this system and its current database, there are no designated wild, scenic, or recreational rivers or other designated ecologically critical areas within the study area.

Water Resources

With the exception of the Bay, no other surface waterways are present in the study area. As noted above, no fill or adverse modification of wetlands or non-wetland waters of the U.S. by the Project are expected. The study area is not subject to flooding of natural waterways. None of the alternatives would result in any change to water rights. Therefore, this topic was dismissed.

Indian Trust Resources

Department of Interior Environmental Compliance Memorandum 95-2 requires the Park Service to address environmental impacts of its proposed actions on Indian Trust resources. Indian Trust resources are those assets owned by Native Americans but held in trust by the United States. Although Native Americans have an association with Alcatraz Island, there are no Indian Trust resources in the San Francisco study area, so this topic was dismissed.

PROJECT PARTNERS

The Park Service is the lead federal agency for this EIS. The Park Service has requested that the Port be a cooperating agency under NEPA. A cooperating agency is responsible for assisting the lead agency by participating in the NEPA process and bringing its special expertise or jurisdiction to the attention of the lead agency and other stakeholders. A cooperating agency neither enlarges nor diminishes any agency's authority in the NEPA process, but is an important part of stakeholder involvement.

PLANNING PROCESS

A description of NEPA and how it guides development of the Project is presented in the "Relevant Policies and Plans" section of this chapter.

HOW TO PROVIDE COMMENTS

The formal public comment period for this Draft EIS begins upon USEPA's publication of a Notice of Availability (NOA) for the Draft EIS in the FR. Once confirmed, this date will be immediately posted on the Project website. Agencies and the general public have the opportunity to review and comment on this Draft EIS during a comment period spanning a minimum of 90 days. Copies of the Draft EIS are available at the offices and libraries noted in the "Consultation and Coordination" chapter. Public meetings will also be held during the comment period. For specific public comment period start and end dates, please visit the Project's website: http://parkplanning.nps.gov/alcatrazferry.

NEXT STEPS

The Park Service will record, categorize, and respond to all substantive public comments received on this Draft EIS, though responses may be grouped and generally addressed rather than addressed individually.

The Final EIS will incorporate text revisions as appropriate, identify revisions corresponding to comments received, and indicate the Park Service's reasons for identifying the preferred alternative. The release of the Final EIS will be announced through publishing an NOA in the FR and posting updates on the Project website. Release of the Final EIS will be followed by a 30-day no action period, as directed by CEQ regulations.

The ROD will document and discuss the selected alternative, the environmentally preferable alternative (if different from the selected alternative), and any accompanying mitigation measures. The ROD will be issued a minimum of 30 days after the USEPA's publication of the NOA for the Final EIS in the FR.

Alternatives

INTRODUCTION

NEPA requires that federal agencies considering actions that could affect the quality of the human or natural environment, "study, develop, and describe appropriate alternatives to recommended courses of action," for any proposal that includes, "unresolved conflicts concerning alternative uses of available resources." The CEQ's NEPA implementing regulations (CFR Title 40 Parts 1500-1508) further require federal agencies to, "rigorously explore and objectively evaluate all reasonable alternatives," to the federal action under consideration.

This chapter provides information on the range of alternatives considered for the Project, including a discussion of the alternatives development process and a brief explanation of those alternatives considered and dismissed from further study. Descriptions of the No Action Alternative and the three action alternatives (including the environmentally preferred alternative) selected for detailed analysis are provided, including discussions of how each alternative meets the purpose, need, and objectives of the Project. Finally, a summary comparison of the alternatives is provided, highlighting potential impacts and mitigation measures.

ALTERNATIVES DEVELOPMENT PROCESS

ALTERNATIVES SCREENING PROCESS UNDER NEPA

The goal of the NEPA alternatives screening process is to identify and evaluate alternatives developed during Project development and scoping against a standard set of criteria, and to eliminate alternatives that are found to be unreasonable. Unreasonable alternatives are those that meet one or more of the following criteria:

1) Are unreasonably expensive
2) Cannot be implemented for technical or logistic reasons
3) Do not meet NPS mandates
4) Are inconsistent with NPS statements of purpose and significance

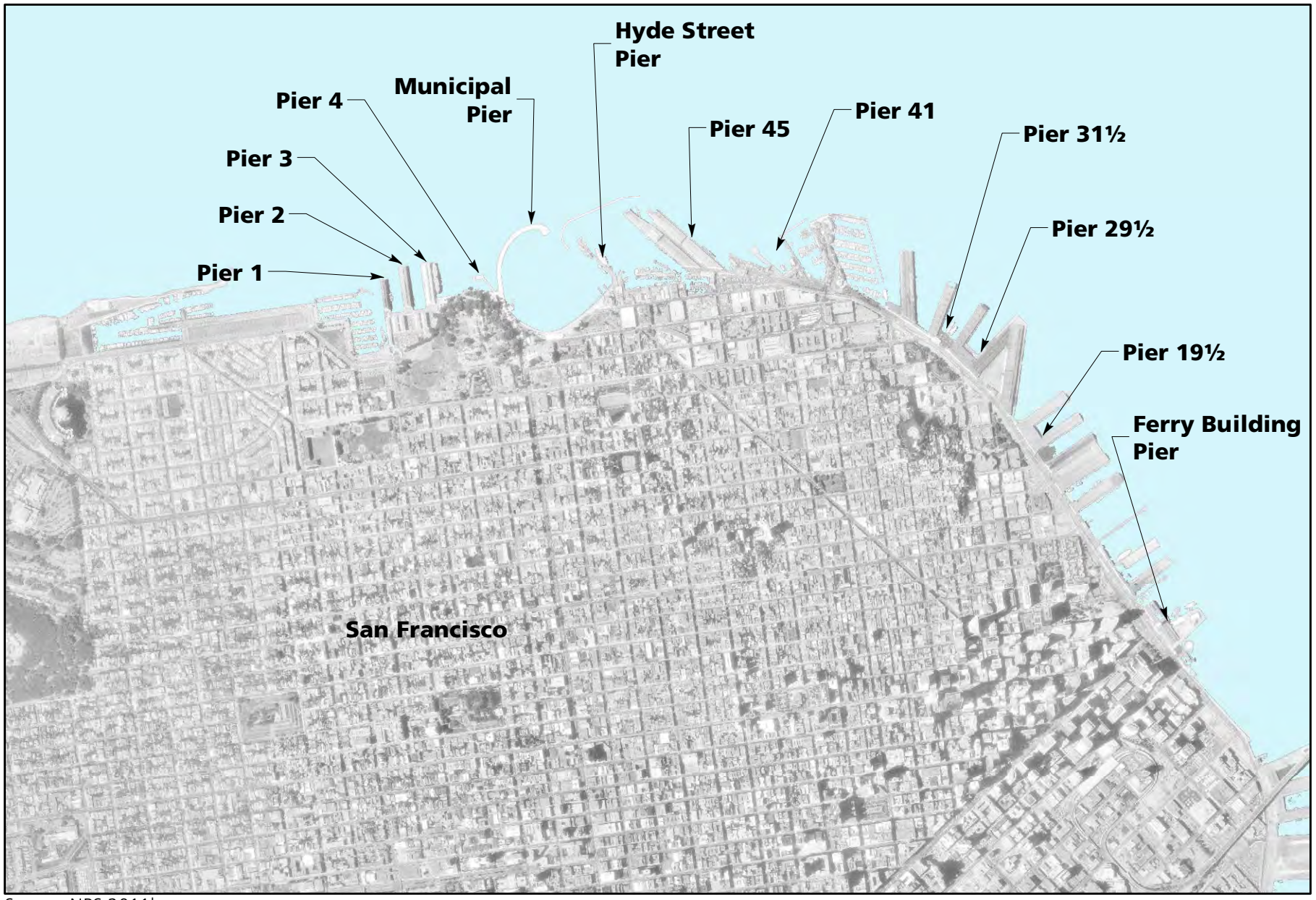
The CEQ defines reasonable alternatives as those that are technically and economically feasible and that show evidence of common sense. They also meet Project objectives, resolve needs, and alleviate potentially significant impacts to important resources.

ALTERNATIVES DEVELOPMENT

The alternatives development process for this Project began in 2008, when the Park Service developed the core program for the embarkation facility. The core program characterized a number of needs and objectives, including location and proximity to Alcatraz Island, embarkation site functions (both current functions that needed to be maintained as well as improvements), and the spatial arrangements and relationships of the interior and exterior spaces and facilities to accommodate site functions. Using those parameters, and the standard NEPA screening process discussed above, a number of locations along the northern San Francisco waterfront that have the potential to accommodate the Alcatraz embarkation site (NPS 2011b) were identified for consideration. The locations that were initially considered were the following: the Ferry Building Pier, Pier 19½, Pier 29½, Pier 31½, Pier 41, Pier 45, Hyde Street Pier, Municipal Pier, and at Fort Mason between piers 3 and 4, between piers 2 and 3, between piers 1 and 2, and at Pier 4 (Figure 4). Since then, the Park Service has reviewed the potential locations more closely in relation to the core program and conducted a series of studies and stakeholder and public outreach efforts focused on developing and screening the range of alternatives. The alternatives that resulted from these internal planning and external scoping processes are presented in this chapter. Key studies and outreach efforts are outlined in Table 2 and described in more detail in the paragraphs following Figure 4.

TABLE 2. ALTERNATIVES DEVELOPMENT PROCESS

Event	Date	Highlights
Draft Feasibility Study (FS)	Spring 2011	Evaluated 12 potential alternatives; eliminated three from further consideration
Site Planning Workshop	Fall 2011	Evaluated nine potential alternatives; eliminated four from further study and refined remaining alternatives, which resulted in six alternatives to be carried forward
Public and Agency Scoping	Spring/ Summer 2012	Identified key issues and concerns; did not result in the elimination of any alternatives from further consideration; no additional alternatives identified to be carried forward
VA Process	Summer/ Fall 2012	Evaluated, screened, and refined the remaining six alternatives through a series of meetings and workshops; eliminated three alternatives and carried forward three alternatives for analysis in the EIS



Source: NPS 2011b

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FIGURE 4
EMBARKATION SITES INITIALLY CONSIDERED
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

DRAFT FEASIBILITY STUDY—SPRING 2011

In 2011, the Park Service prepared a *Draft Final Alcatraz Ferry Embarkation and Education Site Feasibility Study* that evaluated twelve potential embarkation sites based on objectives and criteria resulting from a series of workshops in 2009 (NPS 2011b). The FS considered six alternatives located on federal property administered by the Park Service: between Fort Mason piers 1 and 2 (Pier 1-2 Alternative), piers 2 and 3 (Pier 2-3 Alternative), and piers 3 and 4 (Pier 3-4 Alternative); Fort Mason Pier 4; and at the Hyde Street and Municipal piers in Aquatic Park. Additionally, based on input provided by the Port, six sites located on Port property were also evaluated in the study: the Ferry Building Pier and piers 19½, 29½, 31½, 41, and 45.

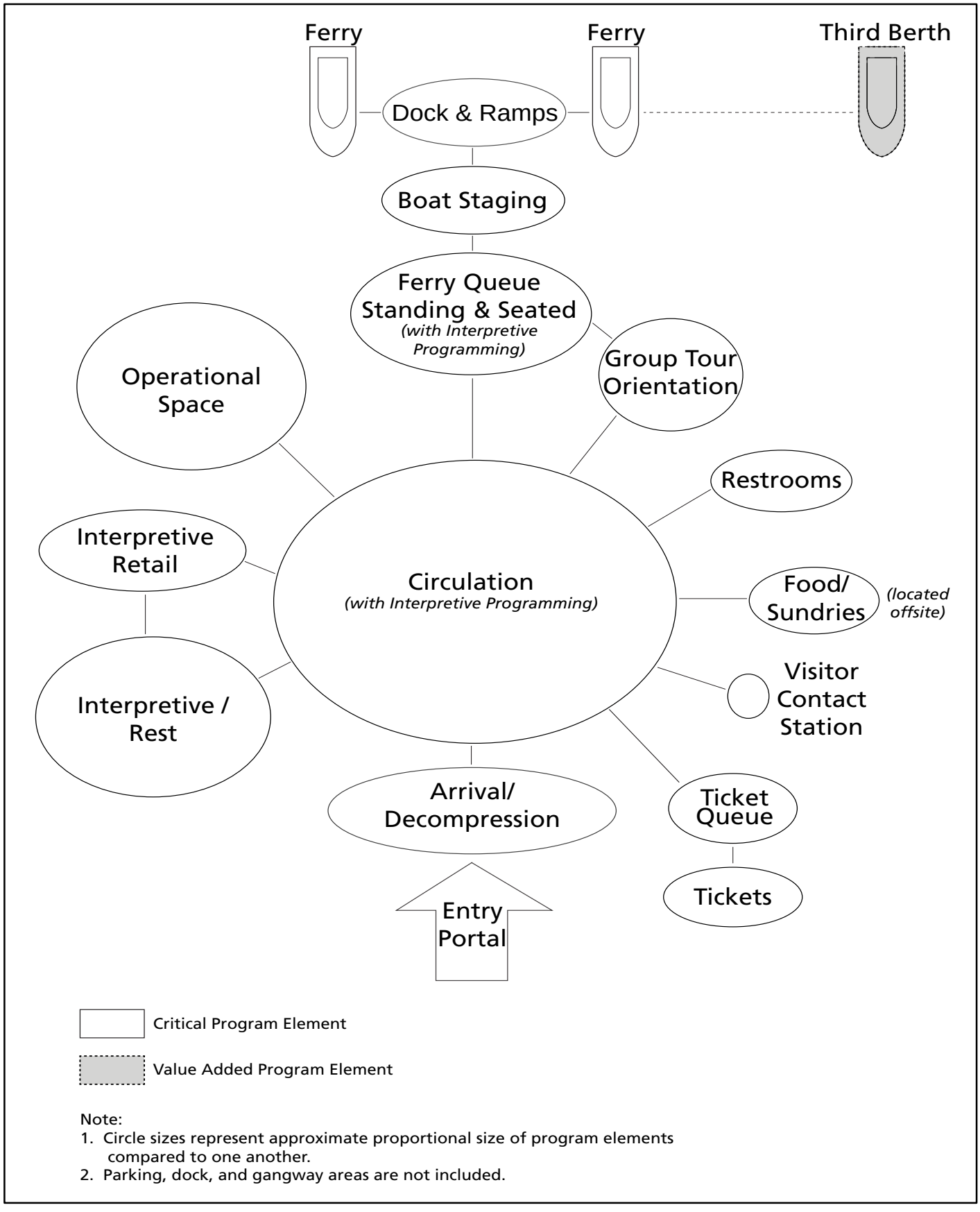
A space planning model (ORCA 2011b) was used to translate NPS programming objectives into critical square footage requirements for essential program elements and expanded (value-added) requirements (Figure 5). The model identified a need of 39,270 square feet for critical functions ("critical criteria") and up to 46,520 square feet to accommodate components valuable for an enhanced visitor experience and improved operational flexibility ("value-added functions"). Under this program, critical criteria needed to be met, while value-added criteria were important and considered in the analysis, but were not critical for Project execution. The difference between the critical and value-added elements is mainly related to size (i.e., the value-added elements are larger), with the exception of adding a new berth to accommodate intermittent ferry service, which is a value-added only component. The program accounted for anticipated future growth in visitation levels at each facility, as well as desired programming changes from each existing facility layout. The space planning model also considered local, state, and federal regulatory requirements for the range of alternatives.

Based on the results of the 2011 draft FS, the Hyde Street Pier, Municipal Pier, and Ferry Building Pier alternatives were eliminated from further consideration. The rationale for these eliminations is discussed the "Alternatives Eliminated from Further Study" section of this chapter.

SITE PLANNING WORKSHOP—FALL 2011

A site planning workshop was held to further evaluate the opportunities and constraints of the remaining nine alternatives, using the same objectives and criteria identified in the 2011 draft FS. The Park Service also carefully evaluated the desired visitor experience parameters for the embarkation site (Figure 6). In addition, the workshop considered changed conditions since the draft FS was performed, including recent Port actions and new information from the Bay Conservation and Development Commission (BCDC).

The workshop included a series of discussions on initial site-specific design programs, which resulted in the elimination of some alternatives and refinement of others. This resulted in the development of six alternatives—Fort Mason Pier 1A, Pier 1B, and Pier 3 alternatives and the Port Pier 31½, Pier 41, and Pier 45 alternatives—which were carried forward for inclusion in public scoping and stakeholder outreach efforts.



Note:
1. Circle sizes represent approximate proportional size of program elements compared to one another.
2. Parking, dock, and gangway areas are not included.

FIGURE 5
PROGRAM ELEMENTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

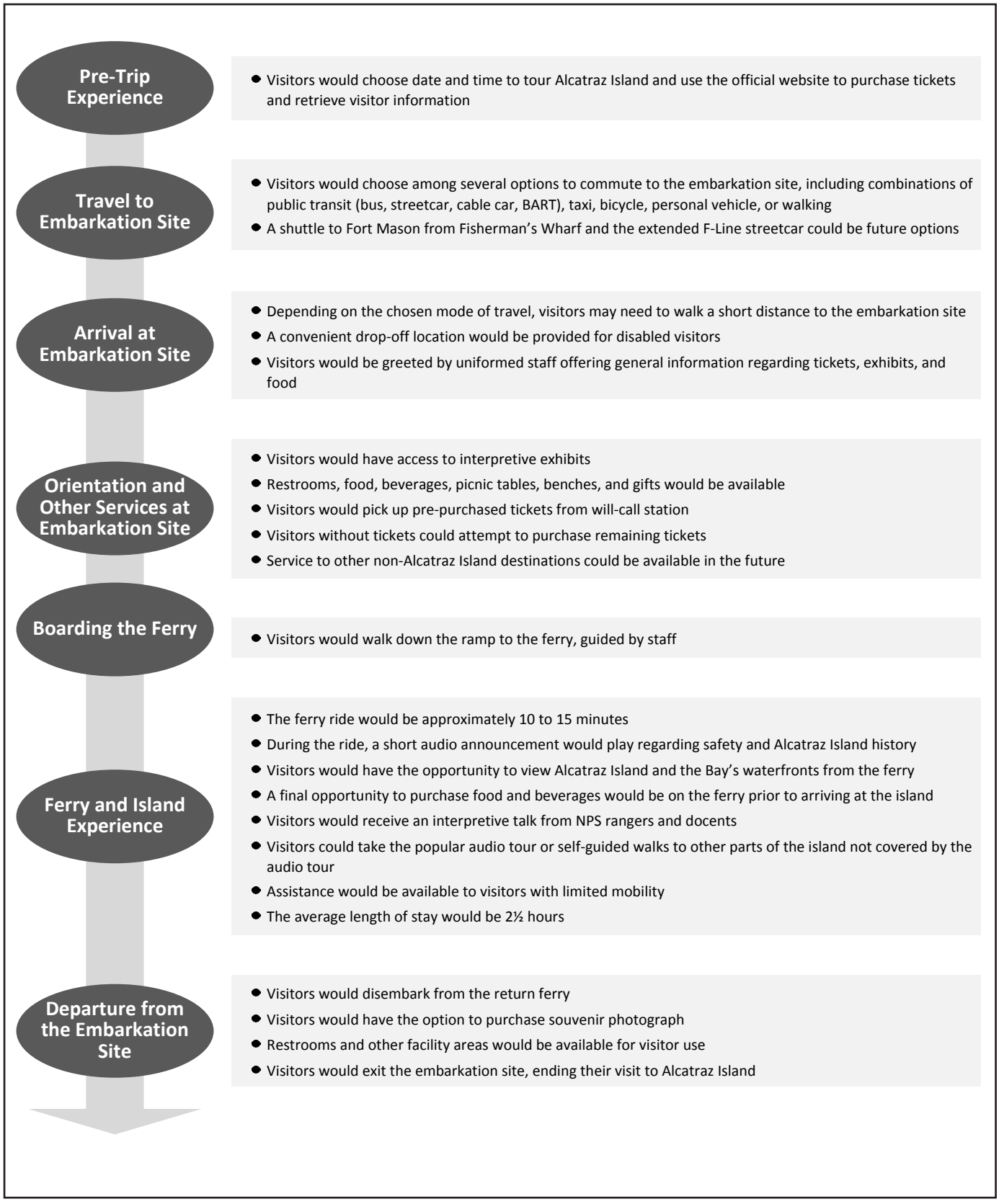


FIGURE 6
VISITOR EXPERIENCE
National Park Service/U.S. Department of the Interior
January 2015

PUBLIC AND AGENCY SCOPING—SPRING/SUMMER 2012

Stakeholder outreach for the Project included early agency and stakeholder scoping in spring 2012, followed by a formal 30-day public scoping period. Additional meetings with key stakeholders were held after public scoping, and included current ferry operators, the Port, BCDC, and the City/County. Comments received during this scoping process are summarized in the Public Scoping Report (NPS 2012c) and information on the key concerns documented during the Project's public and agency scoping process is presented in the "Scoping for the EIS" section of the "Purpose and Need for Action" chapter. No alternatives were eliminated from further study as a direct result of public and agency scoping. Comments were received that recommended additional changes to alternatives, including a suggestion that the Pier 45 concept be modified to include a new set of ramps and floats. All comments were considered for inclusion in the Draft EIS. Ultimately, a few relatively minor modifications were made to the alternatives as a result of public scoping.

VALUE-BASED DECISION MAKING MEETINGS—SUMMER/FALL 2012

The Park Service conducted a series of value-based decision making meetings and workshops between August and December 2012 to further evaluate the remaining six potential action alternatives. As part of these meetings, the Park Service completed a VA process, an important method used to determine the range of alternatives to be analyzed in an EIS. The process included a review of project costs and affordability as they relate to park revenue, as well as recommendations for the following: value-based cost savings, refinements to the alternatives, alternatives to be dismissed, and the preferred alternative. The meetings and workshops conducted during this period are summarized below.

VA Workshops

The purpose of these workshops were to identify, refine, and make improvements to the alternatives to be evaluated in the EIS, analyze Project costs, and recommend value-based cost savings. The action alternatives remaining for consideration were:

- **Fort Mason alternatives:** Pier 3, Pier 1A, and Pier 1B
- **Port alternatives:** Pier 41, Pier 45, and Pier 31½

As part of the conceptual planning completed prior to the VA process, the Park Service refined the elements of the space planning model used in the 2011 *Draft Final Alcatraz Ferry Embarkation and Education Site Feasibility Study* to reflect changed economic conditions and financial constraints. In addition, the design programs for each site were studied and further tailored to the opportunities and constraints of each site.

As a result of these workshops, the Park Service elected to eliminate the Pier 1A, Pier 1B, and Pier 45 alternatives from further study (see the "Alternatives Eliminated from Further Study" section of this chapter). The Pier 3, Pier 31½, and Pier 41 alternatives were identified as viable for meeting the Project purpose, objectives, and need, and are included in the Draft EIS.

Outreach Meetings with Existing Site Operators

The Park Service met with the current operators of the six sites under evaluation, including Alcatraz Cruises (Pier 31½), the Pier 39 Group and Blue & Gold Fleet (Pier 41), the Red & White Fleet (Pier 45), and the Fort Mason Center (Piers 1 and 3), as well as with the Port. These meetings revealed critical information that led the Park Service to eliminate Pier 45, Pier 1A, and Pier 1B as feasible alternatives, and to further modify the remaining alternatives.

ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

As a result of the Project's alternatives development process, the alternatives selected for detailed evaluation in this EIS include the No Action, Pier 3, Pier 31½, and Pier 41 alternatives. This section provides detailed descriptions of each alternative, including a breakdown of design program components and construction activities proposed for each alternative. It also describes Project components common to all action alternatives, including special ferry service from the embarkation site to and from Fort Baker, a programmatic assessment of intermittent ferry service from the embarkation site to other locations on the Bay, and the potential to offer separate special ferry service from Fort Mason to other locations on the San Francisco Bay as part of the Pier 31½ and Pier 41 alternatives.

Selection of any site on Port property would need to be coupled with the execution of agreements by the Port specifying the long-term availability of and conditions under which the ferry embarkation sites would be made available to any ferry services concessioner selected by the Park Service through the solicitation and award process mandated by federal law. Unless the Port provides certainty as to availability and terms of use of embarkation sites, bidders participating in the NPS concessions contract selection process would be unable to make realistic offers, costs and prices would not be able to be accurately proposed and evaluated, and award and contract performance would be delayed. Given the statutory limitations on extensions of the terms of NPS concession contracts, the risk of delay creates in turn a significant risk of interrupting visitor services through the San Francisco waterfront to Alcatraz Island.

NO ACTION ALTERNATIVE

The No Action Alternative is included as an alternative in this EIS for detailed analysis pursuant to 40 CFR 1502.14(d) of the CEQ regulations. The No Action Alternative, which represents no change from the Park Service's current management direction, provides a set of reference conditions for comparing against the other alternatives, evaluating the magnitude of proposed changes, and measuring the effects of those changes. It assumes a continuation of existing conditions without substantial changes, where the location of the embarkation site would be determined through competition for future concession contracts subject to change every 10 years, conducted as mandated by federal law. Federal law generally limits the maximum term of concession contracts to 10 years, and requires that a competitive process be used to select new concessioners. As such, the Alcatraz embarkation site is subject to potential location changes every 10 years, with the re-award of the NPS ferry concession contract. Any site selected under the concession contract should require a reasonable crossing time to Alcatraz Island from the embarkation site, which limits the possible range of sites from which potential concessioners may operate. Thus, a permanent Alcatraz ferry embarkation site would not be established.

Therefore, the future location would depend upon the availability of an embarkation site to future concessioners, and their ability to secure that site for use at the commencement of a new concession contract. Given the unpredictability of where the facility could be located in the future, the Park Service cannot identify this alternative's capital construction or long-term operations and maintenance costs at this time.

Past embarkation sites provide meaningful points of reference for the range of potential future locations for the Alcatraz ferry embarkation site. The site was previously located at Fisherman's Wharf, also on Port-owned piers. While any pier on the San Francisco waterfront that is within a reasonable crossing time from Alcatraz Island and that has adjacent departure, ticketing, and

visitor assembly facilities could feasibly become the ferry embarkation site under the No Action Alternative, the existing site at Pier 31½ is used as a surrogate (or representative set of conditions) for the No Action Alternative, for the purposes of analyzing impacts of this alternative in the EIS. The current San Francisco/Alcatraz Island ferry concession contract was awarded in 2006. The Alcatraz ferry embarkation site's location at Pier 31½ is only certain through the end of the current lease in 2016, after which the location of the embarkation site is unknown. Contracts and arrangements with the Port may be able to be extended for an interim period to allow use of the current site, if needed.

If the site were to move to another location along the San Francisco waterfront under the current protocols that the Park Service uses to award concession contracts, there is the potential that the impacts could differ from those presented under the No Action Alternative in this EIS.

Construction

No substantial facilities changes beyond routine maintenance and repair would be likely under the No Action Alterative. There would be no new construction of wharf facilities or buildings under the No Action Alternative.

Operations

The existing program at Pier 31½ does not contain certain program and visitor experience elements (shown in Figures 5 and 6) that have been identified by the Park Service as desirable for future ferry concession contracts.

Figure 7 shows a layout of the existing embarkation site at Pier 31½, which is currently operated by Alcatraz Cruises, LLC. Visitors enter the site from the Embarcadero just west of the bulkhead building and adjacent to a tour bus and drop-off area compliant with Federal Accessibility Standards (FAS). The Alcatraz embarkation site program is located entirely outdoors (Photo 11), with the exception of a portable restroom facility and limited operations space located in the Pier 33 shed. No portion of the NPS site program is located within the bulkhead building, which is occupied by the Alcatraz Café and Grill and is under a separate lease from the embarkation site. There is currently one float at the existing embarkation site to accommodate two berths.

Transportation

Visitors have several transportation options to arrive at the site, including combinations of public transit (e.g., bus, streetcar, cable car, or Bay Area Rapid Transit [BART]), taxis, bicycles, personal vehicles, and walking. Paid parking for personal vehicles is located nearby, as are many other desirable visitor services. Transportation options are assumed to remain the same as existing conditions under the No Action Alternative.

Site Circulation

Visitors enter the site, pass the booth, circulate through several small interpretive exhibits, and enter the covered queuing area. The queuing area has standing room only. A pre-boarding area adjacent to the gangway offers seating for those with disabilities. Visitors are guided down the gangway and on to the ferry. Site circulation is assumed to remain the same as existing conditions under the No Action Alternative.

Interpretive Elements

The interpretive/rest area is also very limited and entirely outdoors. There is no interpretive retail space and limited areas with seating and rest opportunities. Visitors are guided to walk down the ramp onto the ferry. Interpretive elements are assumed to remain the same as existing conditions under the No Action Alternative.

Visitor Levels

In 2010, 6,160 visitors visited Alcatraz Island per day via the primary embarkation site; in the future, with predicted increases in visitation, it is estimated that 7,400 visitors could visit the primary ferry embarkation site per day under the No Action Alternative (NPS 2014b). These increases are attributable to the factors described below.

Embarkation Site. The current embarkation site minimally accommodates visitors that do not have tickets to Alcatraz or other destinations but are visiting the site to enquire about tickets or learn more about Alcatraz Island. These visitors are expected to continue to visit the site under the No Action Alternative with overall visitor levels increasing with a general growth in tourism in San Francisco.

Alcatraz Island Passengers. Visitor demand at Alcatraz is projected to grow based on general increases in San Francisco tourism levels and population growth. As previously discussed, visitor management improvements on Alcatraz Island will help the Park Service accommodate this growth in an efficient and safe manner. Under the No Action Alternative, there would be no changes in the overall ferry operations. However, passenger levels are expected to grow and therefore there may be changes in the ferry service to accommodate background growth.

Additional Ferry Services. One of the Project objectives is to provide additional ferry service to better connect visitors to GGNRA recreational sites. Under the No Action Alternative, due to space limitations, facilities would not be constructed to accommodate this objective. Therefore, additional ferry services do not factor into the estimated 7,400 visitors per day under the No Action Alternative.

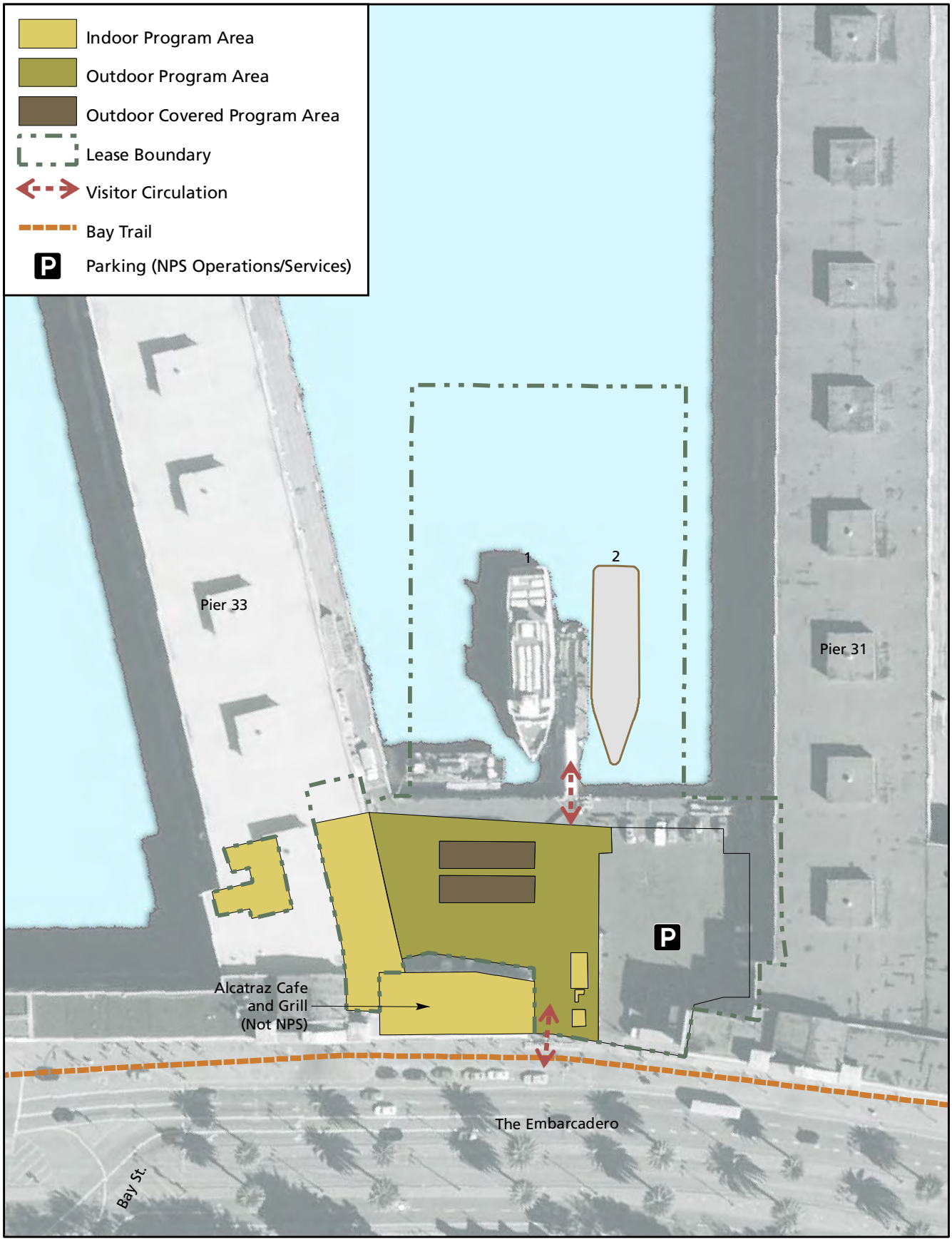


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FIGURE 7
NO ACTION ALTERNATIVE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Photo 11.
View of existing ticket booth located outside at Alcatraz Landing.

PIER 31½ ALTERNATIVE

The Pier 31½ Alternative retains the current Alcatraz ferry embarkation site at Pier 31½ and proposes improvements to the existing facility. It would use the historic Pier 31 north and south bulkhead buildings on the Embarcadero, portions of the Pier 31 and 33 sheds, and all of the outdoor space between Piers 31 and 33 (otherwise known as the Pier 31½ marginal wharf) for embarkation services. Figures 8 and 9 show the concept plan and a perspective sketch of the Pier 31½ Alternative, respectively. This site is within and contributes to the Embarcadero National Register Historic District. This site does not have views of Alcatraz Island and is located between Fisherman's Wharf and other proposed Embarcadero tourist facilities, such as the cruise terminal and the Exploratorium.

The Pier 31½ Alternative requires a low overall initial investment and could be a cost-effective approach pending the outcome of ongoing conversations with the Port regarding needed site repairs and improvements. With this alternative, the Pier 31½ site may initially look similar to current conditions; however, substantial improvements would be implemented in phases over time. Improvements would include rehabilitation of the historic bulkhead buildings and sheds to accommodate essential embarkation program areas.

Key constraints of this alternative include the following: it would offer somewhat less than optimal integration of visitor services; it would have slightly less potential to develop an identifiable NPS-quality entrance to welcome and orient visitors; it would require structural repairs that may be difficult to accomplish; and it would not result in the preservation or adaptive reuse of NPS historic resources (while not a Project objective, this would be accomplished through another alternative).

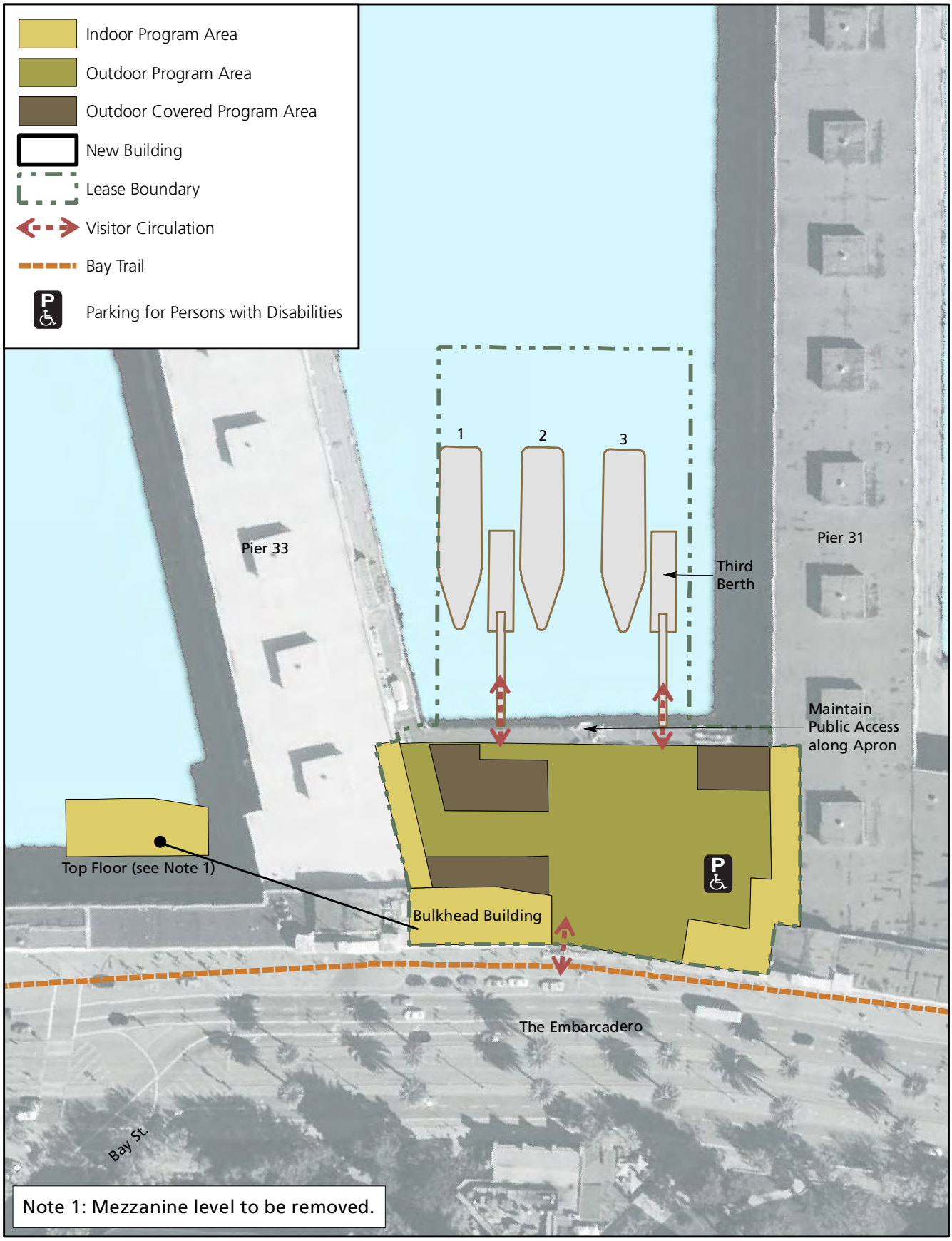

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FIGURE 8
PIER 31½ ALTERNATIVE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

FIGURE 9
PIER 31½ ALTERNATIVE: VIEW FROM COIT TOWER
Golden Gate National Recreation Area
National Park Service / U.S. Department of the Interior
January 2015

Construction

This alternative would replace the existing single dock and gangway with two parallel floating docks (to accommodate three berths) and gangways accessed from the existing bulkhead.

Wharf Facilities. The existing Pier 31½ substructure is a marginal wharf structure located between Piers 31 and 33. It comprises two distinct pier construction types: an old pier, built in the 1910s; and a newer pier, built in the 1960s. The old pier is located adjacent to the Embarcadero and is a contiguous part of the original Pier 33 construction. The two bulkhead buildings are situated on this older portion of Pier 31½. The condition of this portion of the pier is relatively poor, due to the advanced state of corrosion and the high chloride contamination of the concrete, and would require significant upgrade repair, potentially including demolition and replacement. The Port Engineer has determined that the Pier 31½ marginal wharf substructure is "yellow-tagged" based on the Port's 2013 Rapid Structural Assessment Report. Repair actions are limited by the existing bulkhead building above. The adjacent newer pier is a paved parking and assembly area currently used by the existing ferry concessioner.

Retrofit of the existing substructure without demolition and replacement would require several actions. A number of piles under the pier would be repaired. Damaged concrete and reinforcing bars would need to be repaired and replaced on significant portions of the deck soffit (underside), perimeter deck edge, and bulkhead wall. Minor cracking of the asphalt paving on top of the deck would need to be sealed. Abandoned utilities would be removed, and new utilities installed. Most of these would be underpier activities and would be performed from floats staged under the pier. A new gangway and two parallel floats would be installed, and eight steel guide piles would be installed on the sides of the floats (four guide piles per float).

Buildings. The design program for this alternative includes only a small amount of space for essential functions in the Pier 33 shed. This space would be adjacent to the large existing doorways that open onto the marginal wharf. The Pier 31 south bulkhead building would be remodeled to accommodate functions such as interpretive exhibits. Remodeling the interior would seek to preserve its historic character, which is little changed since construction. There would be remodeling of the interior of the Pier 33 south bulkhead building to recapture its historic character, as it has been changed substantially from its original condition, most notably by the addition of a mezzanine floor that has reduced the height of the first floor ceiling. The existing interior space plan would be extensively reconfigured on all floors of the Pier 33 south bulkhead building.

Since the sheds and bulkhead buildings are on the national register, rehabilitation would require consultation with the State Historic Preservation Officer (SHPO). The use of the sheds and bulkhead buildings would require that they be compliant with seismic, life safety, and Architectural Barriers Act Accessibility (ABAAS) codes. All substructure work is subject to review for consistency with the Port's Historic Preservation Guidelines for Pier and Bulkhead Wharf Substructures.

Seismic retrofit of Pier 31 would not affect the appearance of adjacent buildings, but it could affect construction schedules and staging for building rehabilitation.

Operations

Transportation. Site transportation access and arrival options would be consistent with those of the No Action Alternative. No changes to transportation options are expected as a result of this alterative. The existing parking area would be redefined and made FAS-compliant for persons with disabilities. An FAS-compliant dropoff for tour buses and persons with disabilities would be located along the Embarcadero, adjacent to the bulkhead building.

Site Circulation. Similar to the No Action Alternative, visitors would enter this site from the Embarcadero, between the two bulkhead buildings. Additional access could be through the bulkhead buildings. The ferry queuing area (including seated and standing queuing options) would be covered by a freestanding structure. An awning along the north side of the Pier 33 south bulkhead building would provide sun and weather protection for a portion of the group tour, as well as interpretive rest areas. A new, small, freestanding ticket booth would be constructed near the entry. The bulkhead buildings and sheds would house the main restrooms for visitors, as well as space for operations. Visitors would board the ferry in the same manner as in the No Action Alternative.

Interpretive Elements. This alternative would have the most outdoor (covered and uncovered) program area of the three alternatives (Figure 8). By relocating some of the services into the bulkhead building, this alternative would substantially increase the basic visitor services program functional area and provide additional and improved orientation and exhibition opportunities compared to the No Action Alternative.

This alternative would also better accommodate people who are not visiting Alcatraz Island by providing additional information on other recreational options in the park system and access to those sites from ferries utilizing the third berth. Most of the program elements would be in the outdoor areas between piers 33 and 31, including interpretive and rest areas, ticket queuing, and boat staging. The Pier 31½ Alternative also proposes a small food service area and space for sale of interpretive products.

Visitor Levels

In 2010, 6,160 visitors visited Alcatraz Island per day via the primary embarkation site. In the future, with predicted increases in visitation and a third berth providing service to other GGNRA parklands in the Bay, it is estimated that 7,790 visitors could visit the primary ferry embarkation site per day under the Pier 31½ Alternative (NPS 2014b). These factors are described below.

Embarkation Site. The embarkation site currently hosts visitors that do not have tickets to Alcatraz or other destinations but are visiting the site to enquire about tickets or learn more about Alcatraz Island. Facility improvements implemented under the Pier 31½ Alternative would enhance the ability of the site to provide interpretive information to these visitors compared to the No Action Alternative.

Alcatraz Island Passengers. Visitor demand at Alcatraz is projected to grow based on general increases in San Francisco tourism levels and population growth. As previously discussed, management improvements on Alcatraz Island will help the Park Service accommodate this growth in an efficient and safe manner. Like the No Action Alternative, the Pier 31½ Alternative would accommodate this increase, but would provide more room and newer facilities at the embarkation site to provide passengers with a safer and more comfortable experience. Like the No Action Alternative, there may be changes to the ferry schedule to accommodate future passengers.

Additional Ferry Services. This alternative would construct an additional (third) berth at Pier 31½, which would increase its operational capacity, provide visitors the opportunity to visit other park sites within the Bay, and potentially provide special service to Fort Baker or Fort Mason, as discussed in the "Activities Common to All Action Alternatives" section of this chapter.

PIER 41 ALTERNATIVE

The Pier 41 Alternative returns the embarkation site to Pier 41, which served as the Alcatraz ferry embarkation site between the early 1980s and 2006. This alternative proposes that the entire building be used by the ferry concessioner, thereby eliminating incompatible commercial uses in the building

that were present on-site under previous concession contracts. It would utilize and improve the existing nonhistoric building, as well as continue use of the ferry berthing areas, and allow use of the newly renovated Pier 43 promenade for public interpretive programs, which creates synergy with the Fisherman's Wharf waterfront. Figures 10 and 11 show the concept plan and a perspective sketch of the Pier 41 Alternative, respectively. This location is unique among alternative sites in that the existing building has no historic designation.

The site is adjacent to the Embarcadero historic district. It provides excellent views of Alcatraz Island, is centrally located in Fisherman's Wharf, and offers a standalone presence as the Alcatraz ferry embarkation site. The existing facility is currently leased to Blue & Gold Fleet until 2016.

The Pier 41 Alternative requires the second lowest initial investment to prepare the site for use as the embarkation site. Like the Pier 31½ Alternative, this alternative could also be operated somewhat turnkey, and additional improvements could be implemented in phases over time.

Key benefits of this alternative include the fact that it would offer easy access to parking for visitors and would optimize integration of Alcatraz visitor services and compatibility with present and future adjacent uses at Fisherman's Wharf. Key constraints include the following: it would not result in the preservation or adaptive reuse of NPS historic resources (while not a Project objective, this would be accomplished through another alternative); and off-site uses near the site would have the potential to negatively impact visitors and operations (due to crowding or conflicting uses).

Construction

Wharf Facilities. The existing Pier 41 substructure was built in two phases and comprises two structures: an old pier, built in the 1910s; and a new pier, built in the 1980s. The old pier is located adjacent to the Embarcadero on the eastern half of the site and supports a paved assembly area, landscape planters, and a small kiosk, but no substantial existing building structures. The adjacent newer pier supports the two-story Pier 41 building. Pier 43 is located to the west of the pier and includes a new concrete promenade pier structure. A timber public access fishing pier and breakwater is located east of the pier.

This alternative would involve a 7,500 square foot expansion of the existing building footprint. Due to its age and condition, the 1910s pier (and adjacent concrete bulkhead) would be demolished and replaced prior to construction in the Pier 41 building. The timber bulkhead wall of the 1980s pier would be replaced, and piles under the existing building would be reinforced. Between 50 and 100 new piles are anticipated to be required due to the necessity of replacing a portion of older pier, as well as the potential need for a lateral system to accommodate the new building footprint. A new gangway and float would be installed, and eight steel guide piles would be installed on the sides of the floats (four guide piles per float). Abandoned utilities would be removed and replaced. Most of the pier improvements would be performed from floats.

Buildings. The existing building, which was constructed in the 1980s, would be expanded and remodeled, including a 7,500 square foot expansion of the existing building to be constructed on the existing first story deck. The entire building would be updated to be compliant with seismic, life safety, and ABAAS codes. Building systems, such as plumbing; heating, ventilation, and air conditioning (HVAC) and electrical, would be upgraded. The existing building interior would largely be demolished and renovated—its interior partitions would be removed and replaced, and all finishes would be refurbished or replaced. The existing interior space plan on the first floor would be reconfigured. A new large indoor public restroom would be constructed, and additional space for indoor group tour and interpretive retail areas would

be constructed in what is now the outdoor deck area.

Outside areas would also be fully designed and constructed to provide full universal access to the building. The extensive work to the pier would not affect the building's appearance, for the most part. The building's roof, overhangs, and windows may require repair or replacement. The building's façade may require updates and modifications to realize a new 50- year design life. The building's roof, overhangs, and windows may require repair or replacement. Outside areas adjacent to the building would also be fully designed and constructed to provide full universal access to the building.

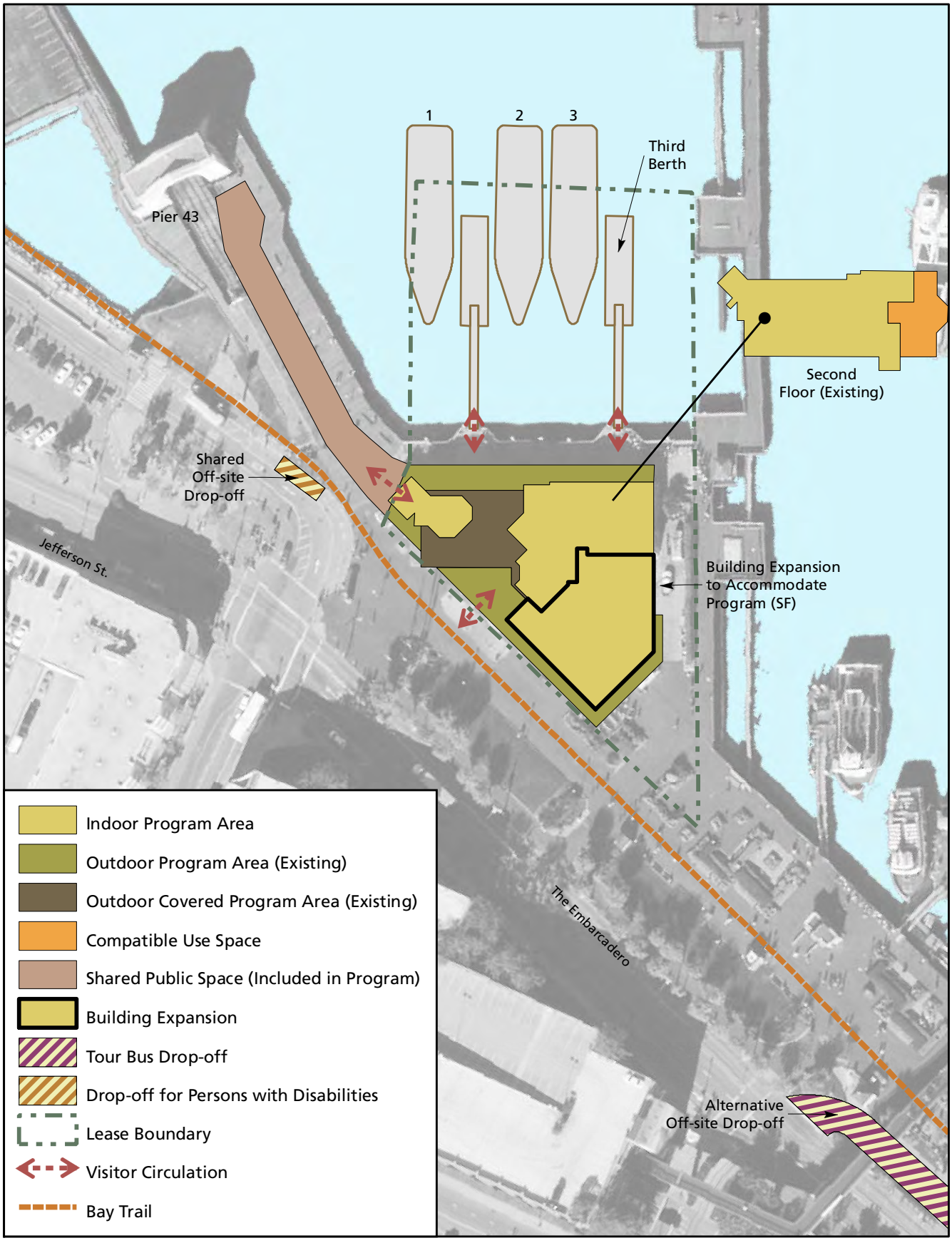

FIGURE 10
PIER 41 ALTERNATIVE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

FIGURE 11

PIER 41 ALTERNATIVE: VIEW FROM JEFFERSON STREET BUILDING

Golden Gate National Recreation Area

National Park Service / U.S. Department of the Interior

January 2015

Operations

Transportation. An FAS-compliant drop-off for persons with disabilities would be provided along The Embarcadero, west of the building. A tour bus drop-off would be located south of the site, adjacent to Pier 39. There would be no on-site parking at this site. Visitors would enter the site from the Embarcadero (Bay Trail), along the southern façade of the building. A new accessible ramp would run adjacent to the existing stairway and would bridge the existing grade change between the Embarcadero and the building's finished floor elevation. Visitors would enter the site from the Bay Trail, along the southern façade of the building. A new stairway and accessible ramp would bridge the existing grade change between the Bay Trail and the building's main floor.

Site Circulation. This alternative would retrofit and expand the existing building structure to accommodate the required program elements. The existing building would be retrofitted to accommodate the remaining indoor program, including ticket sales, queuing, group tour area, and restrooms. Ferry concession operations would be located on the second floor. The existing covered breezeway would be retained and used for visitor circulation and orientation, allowing for an open view through the building to the Bay. The outdoor spaces adjacent to on the north side of the building would be reorganized to accommodate embarkation services, including boat staging and outdoor interpretive and rest areas. Visitors would reach the berths from accessible ramps on the north side of the building. A public walkway would separate the queuing area from the ferry ramps.

Interpretive Elements. The one-story expansion would house various program uses, including indoor interpretive areas and interpretive retail. Additional interpretive areas, including exhibits and group seating, would be located on Pier 43, which would remain public open space, but be managed by the ferry concessioner under an agreement with the Port. The Park Service would have an umbrella agreement (likely a memorandum of understanding) with the Port that would set forth the terms and conditions that each would follow to achieve programmatic goals for ferry services and visitor experience. Control or leasing of Pier 43 from the Port is not proposed as part of this alternative. This alternative would also accommodate people who are not visiting Alcatraz Island by providing information on other recreational options in GGNRA and the park system.

Visitor Levels

Similar to the Pier 31½ Alternative, with predicted increases in visitation and a third berth providing service to other GGNRA parklands in the Bay, it is estimated that 7,790 visitors could visit the primary ferry embarkation site per day under the Pier 41 Alternative (NPS 2014b).

Embarkation Site. The embarkation site currently hosts visitors that do not have tickets to Alcatraz or other destinations but are visiting the site to enquire about tickets or learn more about Alcatraz Island. Facility improvements would result in the ability to provide interpretive information to these visitors while providing an enhanced experience as compared to the No Action Alternative.

Alcatraz Island Passengers. Visitor demand at Alcatraz is projected to grow based on general increases in San Francisco tourism levels and population growth. As previously discussed, management improvements on Alcatraz Island will help the Park Service accommodate this growth in an efficient and safe manner. Like the No Action Alternative, the Pier 41 Alternative would accommodate this increase but would provide more room and newer facilities at the embarkation site to provide passengers with a safer and more comfortable trip. Like the No Action Alternative, there may be changes to the ferry schedule to accommodate future passengers.

Additional Ferry Services. This alternative would construct an additional (third) berth at

Pier 41, which would increase its operational capacity, provide visitors the opportunity to visit other park sites within the Bay, and potentially provide special service to Fort Baker or Fort Mason, as discussed in the "Activities Common to All Action Alternatives" section of this chapter.

PIER 3 ALTERNATIVE

The Pier 3 Alternative would locate the ferry embarkation site in historic Fort Mason, which was constructed between 1910 and 1915 and lies within the San Francisco Port of Embarkation National Historic Landmark. Nearly all services and functions would be located in slightly less than half of the Pier 3 shed building, leaving an opportunity for a compatible use to occupy the remaining space. Figures 12 and 13 show the concept plan and a perspective sketch of the Pier 3 Alternative, respectively. The Alcatraz embarkation program would be located in the front (southern) portion of the pier shed, and the compatible use space would be located in the back (northern) portion. A walkway along the eastern side of the building would provide direct and autonomous access to the compatible use space and would not overlap with the Alcatraz embarkation area. Two landings would be constructed: one between piers 1 and 2, and another between piers 2 and 3.

The Pier 3 Alternative requires the highest overall investment from the Park Service or its concessioner; however, much of that investment would be to rehabilitate the pier, which is already a federal responsibility. Also, this alternative would result in additional revenue-generating possibilities from the potential for compatible use space in the pier shed. Like the other two action alternatives, improvements to the site could be implemented in phases over time.

Key benefits of this alternative include the following: it would highlight the visual and historical connection between Alcatraz Island and Fort Mason; it would allow for the development of an identifiable NPS-quality entrance to welcome and orient visitors and provide a compelling and authentic embarkation experience; and it would minimize risks associated with leasing nonfederal property. In addition, Fort Mason once served as the original embarkation site to Alcatraz Island. Key constraints include the following: site access and parking would be challenging, and the Park Service has concerns with the compatibility of ferry service to Alcatraz Island with present and future uses at Fort Mason as managed by the Fort Mason Center.

Construction

Wharf Facilities. Retrofit of the existing Pier 3 substructure would require a number of actions. Existing piles supporting the pier would need to be repaired, and between eight and 12 piles would need to be installed for the fixed concrete landings (four to six piles for each of the two landings). A new gangway and float would be installed, and eight steel guide piles would be installed on the sides of the floats for each landing (four guide piles per float). Damaged concrete and reinforcing bars on the pier would need to be repaired and replaced on significant portions of the deck soffit (underside of the pier), perimeter deck edge, and bulkhead wall. Fender piles, the asphalt paving on top of the deck, and the existing guardrails would be replaced along the wharf and pier. Abandoned utilities would be removed and replaced. The intent of these activities would be to improve the corrosion resistance and lengthen the life of the concrete structure. Upgrading the pile-to-deck connection would increase the seismic performance and lateral load resisting capacity of the pier. Most of the pier improvements would be performed from floats staged under the pier. New floats and gangways would be constructed between piers 1 and 2 and between piers 2 and 3.

Buildings. The existing Pier 3 shed building would require architectural improvements for seismic retrofit, life safety, ABAAS compliance, and interior design and remodeling upgrades. Each of these

considerations has the potential to impact the shed both visually and functionally.

The large open area, including the historic trusses and clerestory, would be preserved; however, the pier's seismic retrofit may require the use of bracing and other means of reinforcement. Interior partitions would be constructed, and remodeling of the shed could require upgrading the roof and repairing or replacing windows. The Park Service would ensure that the facility meets applicable building codes. The repairs to the Pier 3 shed building would be designed to preserve the character of the building, as required by state and federal historic preservation guidelines.

Operations

Transportation. To facilitate visitor access between Fisherman's Wharf and Fort Mason, visitors would have the option to take a free shuttle to and from each location. The shuttle would capitalize on public transit and parking at Fisherman's Wharf, and promote transit over driving. The vehicle circulation in front of Pier 3 would be revised to a one-way loop that would provide potential access to a shuttle that would drop off visitors. This revised and FAS-compliant access area would also accommodate persons with disabilities and provide a tour bus drop-off location. Tour bus staging would be provided along the Lower Fort Mason retaining wall south of the interpretive rest area. Existing parking within the revised loop circulation would be redefined as an FAS-complaint parking area for persons with disabilities.

Site Circulation. Upon arrival, visitors would be oriented to Alcatraz Island, which is visible from the site, as well as to historic Fort Mason. This site would also accommodate people who are not visiting Alcatraz Island by providing information on other recreational options in the park system. These visitors would have the option to participate in the varied arts and cultural activities offered by Fort Mason Center partners.

Visitors would be directed by various wayfinding elements (e.g., signage) from the main Lower Fort Mason entry to the entrance of the Pier 3 Alcatraz ferry embarkation site, located directly in front of the pier's shed.

Upon entering the Pier 3 shed, visitors would be directed to its western and central portion. The pier apron would remain open to the public. The embarkation gangway and floating dock, located along the pier's western apron between piers 2 and 3, would be accessed through an existing doorway. The float would provide two berths in this location. A third berth would be located between piers 1 and 2 and would be accessed from the Lower Fort Mason seawall.

Interpretive Elements. A new indoor interpretive area, reminiscent of the historic garages and workshops previously located along the Lower Fort Mason retaining wall, would be constructed outside of the Pier 3 shed. The interpretive rest area building would host a variety of cues (i.e., visual and auditory) that would engage the visitor for a desired effect or experience, as is consistent with the Project objectives. This would be the only program element located outside of the Pier 3 shed. Most of the exhibits and waiting areas would be indoors, in the historic pier shed. Food and beverages would be available in other Fort Mason facilities and would not be part of the Project. Similar to the other action alternatives, this alternative would also accommodate people who are not visiting Alcatraz Island by providing information on other recreational options in the park system.

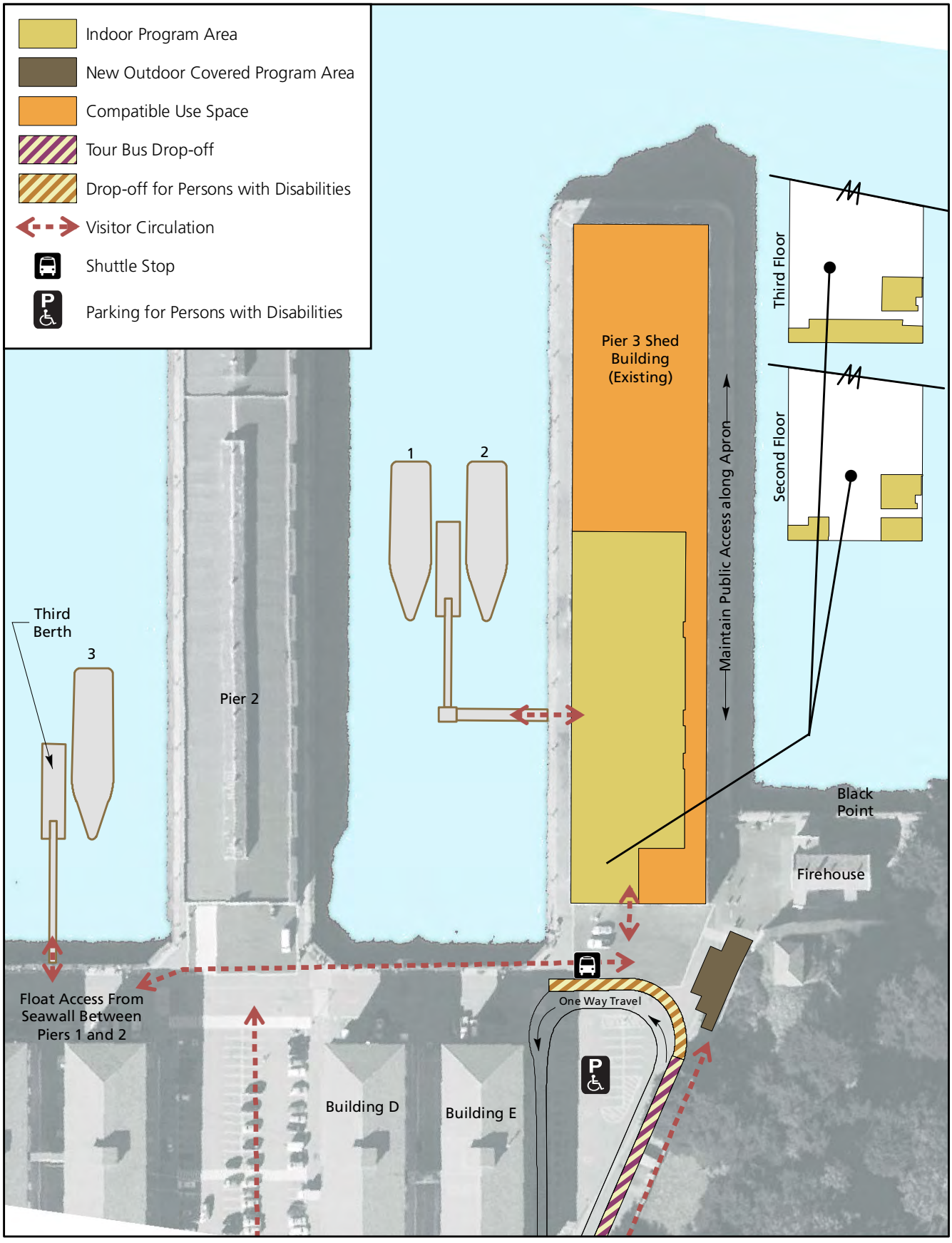

FIGURE 12
PIER 3 ALTERNATIVE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

FIGURE 13

PIER 3 ALTERNATIVE: VIEW FROM McDOWELL AVE VIEWPOINT

Golden Gate National Recreation Area

National Park Service / U.S. Department of the Interior

January 2015

Visitor Levels

Similar to the Pier 31½ and Pier 41 Alternatives, with predicted increases in visitation and a third berth providing service to other GGNRA parklands in the Bay, it is estimated that 7,790 visitors could visit the primary ferry embarkation site per day under the Pier 3 Alternative (NPS 2014b).

This alternative would provide visitors with the opportunity to visit other park sites within the Bay, as well as a special service to Fort Baker, as discussed in the "Activities Common to All Action Alternatives" section of this chapter. Visitors returning to the site could enjoy other amenities offered at Fort Mason or take the free shuttle back to Fisherman's Wharf.

Embarkation Site. The embarkation site currently hosts visitors who do not have tickets to Alcatraz or other destinations but are visiting the site to enquire about tickets or learn more about Alcatraz Island. The Pier 3 Alternative would provide the ability to provide interpretive information to these visitors while providing an enhanced experience compared to the No Action Alternative.

Alcatraz Island Passengers. Visitor demand at Alcatraz is projected to grow based on general increases in San Francisco tourism levels and population growth. As previously discussed, management improvements on Alcatraz Island will help the Park Service accommodate this growth in an efficient and safe manner. Like the No Action Alternative, the Pier 3 Action Alternative would accommodate this increase but would provide more room and newer facilities at the embarkation site to provide passengers with a safer and more comfortable trip. There could be changes to the ferry schedule to accommodate future passengers and the new embarkation location at Fort Mason.

Additional Ferry Services. This alternative would construct an additional (third) berth at Pier 3, which would increase its operational capacity, provide visitors the opportunity to visit other park sites within the Bay, and potentially provide special service to Fort Baker or Fort Mason, as discussed in the "Activities Common to All Action Alternatives" section of this chapter.

ADDITIONAL FERRY SERVICES FROM THE PRIMARY EMBARKATION SITE

The ability of the selected embarkation site to provide recreational ferry service to other destinations in the Bay would enhance the connectivity and accommodation of visitor demands to other GGNRA destinations, which is an important objective of this effort.

Describing the volume of ferry service to sites other than Alcatraz Island is challenging and would require site-specific analyses and market forecasts. Because such analyses and forecasts (and, thus, identification of future service locations and review of requirements and potential actions) are not complete, evaluating service to specific destinations other than Alcatraz Island is not included in this EIS. Instead, the evaluations in this EIS broadly consider the potential impacts of providing ferry service as part of the total forecast of future ridership. Future capacity is based on the forecasted 20% growth in visitors to the site through 2036 (ORCA 2011a). This growth can be attributed to growth in tourism and to the Park Service opening additional areas on Alcatraz Island for visitor use and improving visitor management techniques on the island that would allow for increased visitation; these actions are not associated with this Project. This EIS does not identify schedules, ridership, specific construction or operational requirements, or the impacts of ferry service to potential future ferry service locations. The details associated with providing potential ferry service to particular locations other than Alcatraz Island and Fort Baker would be analyzed in future environmental documents.

CEQ regulations and DO-12 support programmatic evaluations such as this. According to CEQ, "Agencies shall integrate

the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts" (NPS 2011a). Programmatic evaluations allow for an early discussion of the overall impacts of proposed projects, including potential cumulative impacts, before such actions are ready to move forward to project-specific evaluations. They are useful tools to evaluate potential actions broadly and at a program level, before it is appropriate to analyze such actions in detail. These services are included in the estimated 7,790 visitors per day estimate discussed above.

ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

In addition to the activities described above associated with developing a new primary Alcatraz ferry embarkation site, and the desire to provide additional ferry services to other sites in the Bay from the primary embarkation site, the Park Service intends for the selected site to also be capable of providing a special event ferry service to and from both Fort Baker and Fort Mason. These additional services are seen as common to all action alternatives evaluated in this EIS. The following sections present the additional ferry service components of the Project that are common to all alternatives. These services are included in the 7,790 visitors per day estimate for all primary embarkation site action alternatives described above.

Special Ferry Service at Fort Baker

The 2012 *Draft Feasibility Analysis of Sausalito and Fort Baker Embarkation Sites*, which was prepared as part of the alternatives development process, analyzed providing ferry service to Sausalito and Fort Baker from the ferry embarkation site (NPS 2012d). Providing ferry service to other GGNRA destinations in the Bay was also contemplated in prior studies, such as the *Golden Gate National Recreation Area Water Shuttle Access Study and Conceptual Plan* (CHS et al. 2007). Due to concerns expressed during scoping regarding additional ferry operations at the Sausalito Ferry Terminal and traffic in Sausalito, the Park Service is not proposing additional service to the terminal at this time.

Developing a ferry berth at Fort Baker for special service that could operate for special events, such as conferences, occasional excursions, or special occasional service between other parklands and the primary ferry embarkation site in San Francisco, is common to all action alternatives evaluated in this EIS. The 2012 feasibility analysis that evaluated expanding ferry service to Fort Baker focused on capital development needed to create an operational ferry embarkation site where one does not currently exist. Evaluation of Fort Baker service was limited to special events, occasional excursions, or special occasional service due to a variety of operational and physical constraints, including the following: a lack of existing parking at Fort Baker; the current condition of the pier; and the fact that Fort Baker, as a destination by itself, would not draw enough visitors to justify regular service.

Construction. The construction necessary to establish ferry service at Fort Baker would primarily involve upgrades to the existing concrete pier, which was constructed in the late 1930s (Photo 12). The structural deck is constructed of cast-in-place concrete and is topped with an asphalt wearing surface. The concrete deck is supported by plumb, precast-concrete piles, and lateral support to the pier is provided by rows of similar battered piles at the northeast, southeast, and southwest sides. The existing pier has significant damage and deterioration, and precast-concrete piles show significant damage (in the form of large cracks, rust stains, and exposed reinforcing steel) visible above the waterline.

Repairs and upgrades to the existing pier substructure would be needed. A new gangway and float would be installed. A total of four piles would be installed for the gangway landing, and four steel guide piles would be installed for the float. Additional

piles would need to be repaired. Damaged concrete and reinforcing bars would need to be repaired and replaced on significant portions of the deck soffit and bulkhead wall. Fender piles, the asphalt paving on top of the deck, and the existing guardrails would be replaced. Utilities (water and lighting) would be extended and rerouted to the pier. Most of these pier improvements are underpier activities and would be performed from floats staged under the pier.

Photo 12.
View of the existing pier at Fort Baker.

Operations. Figures 14 and 15 show the concept plan and a perspective sketch of the proposed improvements to the Fort Baker pier, respectively. This service would not provide daily or regular service to Alcatraz Island, but there could be special occasional trips to Fort Mason and the primary Alcatraz Island ferry embarkation site in San Francisco.

Transportation. The special ferry service would be intended to serve visitors already at Fort Baker, such as guests of the Cavallo Point Lodge or participants in programs at the Bay Area Discovery Museum. Parking at Fort Baker is limited. Special ferry service at Fort Baker would not serve commuters, and as such, no new parking would be provided at the site.

Site Circulation. The shuttle drop-off would be located west of the Bay Area Discovery Museum. Visitors would walk along a new concrete pathway to the fishing pier and ferry embarkation site. The pathway would run parallel to Center Road, pass southeast of the USCG Station Golden Gate, and then run parallel to Moore Road, adjacent to the existing bulkhead along Horseshoe Bay. Cars would still be able to access Moore Road and the Project would not remove the existing parking along the waterfront.

Interpretive Elements. Visitors would wait for the ferry at a small covered waiting area, located on the shoreline adjacent to the fishing pier. The waiting area would house a covered interpretive exhibit. From the waiting area, visitors would be able to view Fort Baker, Horseshoe Bay, the Golden Gate Bridge, and the Bay. Upon the arrival of the ferry, visitors would walk onto the pier and queue onto the gangway and float.

The upland transportation route was identified as an opportunity for an interpretive trail in the Fort Baker Plan EIS but has not been constructed. Interpretive signs would also be installed. No additional lighting is proposed.

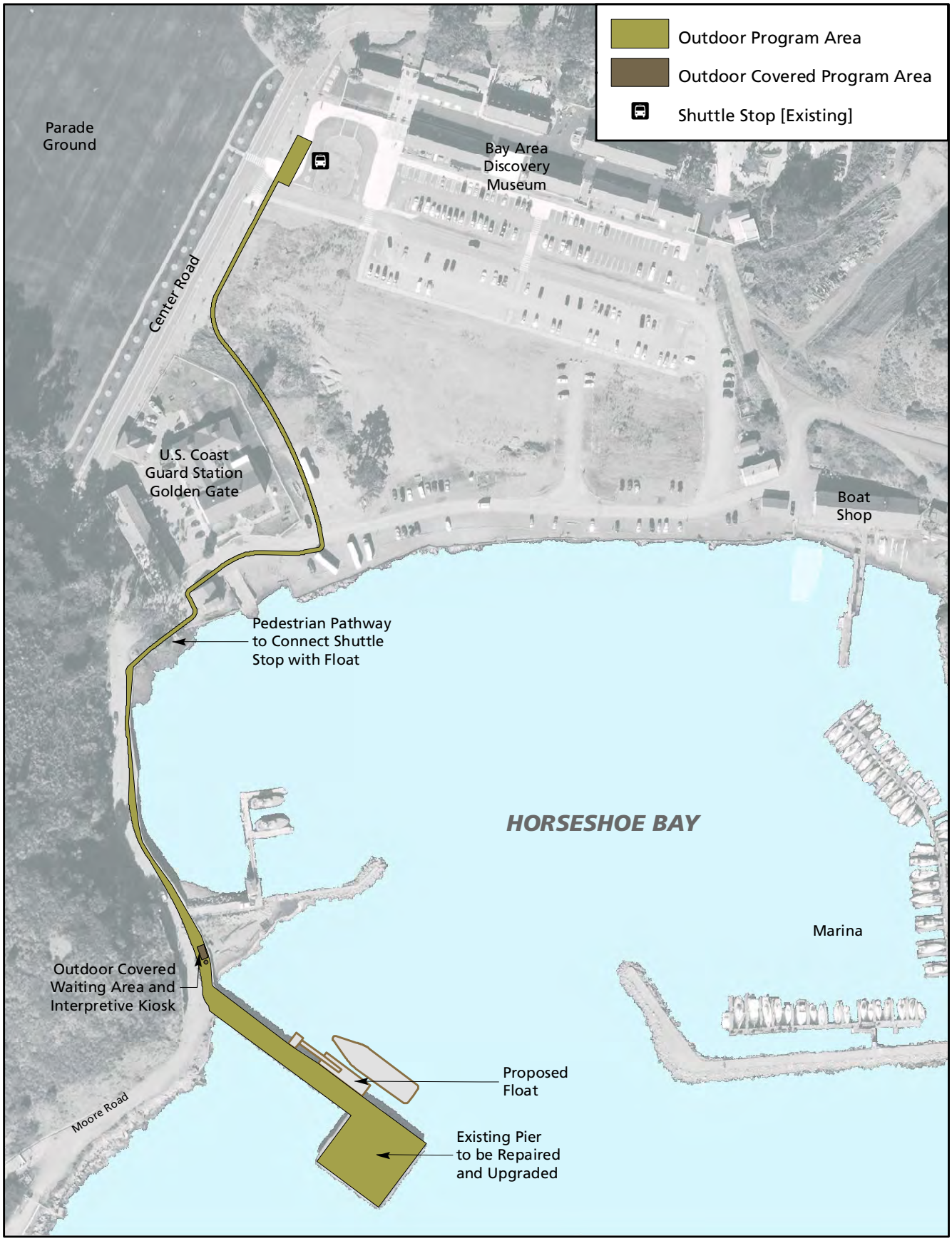

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FIGURE 14
PROPOSED IMPROVEMENTS FOR FORT BAKER FERRY SERVICE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

FIGURE 15
FORT BAKER VIEW FROM LAND
Golden Gate National Recreation Area
National Park Service / U.S. Department of the Interior
January 2015

Special Ferry Service at Fort Mason

As part of enhancing the opportunities for visitors to Alcatraz and the GGNRA, developing a ferry berth at Fort Mason for special service that could operate for special events, such as conferences, occasional excursions, or special occasional service between other parklands and the primary ferry embarkation site in San Francisco is common to all action alternatives evaluated in this EIS. The special ferry service at Fort Mason would be in addition to and separate from the service provided to and from the primary embarkation site.

The purpose of this additional, special service located at Fort Mason is to enhance Fort Mason Center programs through additional recreational opportunities, as well as to provide water-based demand management opportunities to help reduce traffic and parking congestion during peak use.

Construction. This special service would utilize the same float and gangway design described and analyzed as the third berth located between piers 1 and 2 as part of the Fort Mason Pier 3 Alternative.

If special ferry service at Fort Mason is added concurrent with locating the primary Alcatraz ferry embarkation site at piers 31½ or 41 (inclusive of all three berths), the float and gangway between piers 1 and 2 (otherwise referred to as the third berth in the Pier 3 Alternative) would be constructed at Fort Mason.

If the Pier 3 Alternative is selected as the location of the primary Alcatraz ferry embarkation site, the special ferry service would be accommodated by transportation improvements associated with the full buildout of the Pier 3 Alternative.

Operations. This service would not provide daily or regular service to Alcatraz Island, but it could be used for special occasional trips to Fort Baker or other GGNRA sites and NPS units.

Special ferry service at Fort Mason is assumed to operate at off-peak hours (time periods when the area receives the least number of visitors), with a single 220-passenger ferry loading and unloading outside of peak transportation periods.

Special ferry service at Fort Mason would not serve commuters, and as such, no new parking would be provided at the site.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with DO-12 and NEPA, the Park Service is required to identify the environmentally preferred alternative. The CEQ defines the environmentally preferred alternative as, "the alternative that will promote the national environmental policy as expressed in the NEPA's Section 101." Under section 101(b) of the act, it is the continuing responsibility of federal agencies to:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
- Assure safe, healthful, productive, and aesthetically and culturally pleasing surroundings for all Americans
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences
- Preserve important historic, cultural and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative is not the same as the NPS preferred alternative for implementation, nor is the Park Service required to implement the environmentally preferred alternative. Continued discussion between the Park Service and Port is likely to determine the preferred alternative; however, public feedback on this Draft EIS will also be considered. As such, the preferred alternative for implementation is not identified in the Draft EIS, but will be identified in the Final EIS.

Major adverse impacts associated with each of the alternatives evaluated in this EIS are presented in Table 3. For each of the action alternatives, impacts by resource topic are generally consistent with the No Action Alternative, with major adverse impacts limited to transportation, and short-term, major construction-related adverse impacts on air quality and noise. While each action alternative has the potential to result in major seismic hazard-related impacts, these impacts would be reduced as compared to those of the No Action Alternative. The Pier 41 Alternative could result in major socioeconomic impacts. The magnitude of noise impacts would be consistent across the action alternatives, with major impacts limited to short-term construction effects. Transportation impacts would be the least significant under the Pier 31½ Alternative, limited to long-term effects on transit. For the remaining resource topics, the magnitude of impacts would be similar among each of the action alternatives and less than major. Each of the action alternatives would fulfill the Project objectives, while the No Action Alternative would not meet all of the Project objectives.

For the remaining resource topics where impacts of all alternatives would be less than major, the Pier 31½ Alternative would result in the fewest impacts. The Pier 31½, Pier 41, and Pier 3 alternatives would result in equivalent negligible to minor adverse impacts in the categories of water quality and hydrology, aquatic biological resources, and visual resources. Compared to the Pier 3 Alternative, the Pier 31½ Alternative would have reduced impacts related to terrestrial biological resources, cultural resources, recreation (long-term), and socioeconomics. Compared to the Pier 41 Alternative, the Pier 31½ Alternative would have reduced impacts related to recreation (short-term) and socioeconomics. While the Pier 3 and Pier 41 alternatives would result in short-term, minor,

beneficial socioeconomic impacts, the increased impacts to other resource topics (including socioeconomics and transportation and circulation) outweigh these benefits.

Therefore, the Pier 31½ Alternative has been identified as the environmentally preferred alternative, as selection of this alternative would fulfill the Project objectives while having the least transportation impacts and similar or reduced impacts to remaining resource topics as compared to the other action alternatives.

TABLE 3. SUMMARY OF MAJOR ADVERSE IMPACTS

Resource Topic	Major Impacts by Alternative		
	Pier 31½	Pier 41	Pier 3
Land Use			
Transportation and Circulation			
Construction Period			
Intersection Traffic		•	•
Transit	•	•	•
Bicycle Facilities			
Pedestrian Facilities			
Parking Facilities			•
Air Quality			
Construction Period	•	•	•
Operation			
Noise and Vibration			
Construction Period	•	•	•
Operation			
Geology, Soils, and Seismicity	•	•	•
Water Quality and Hydrology			
Aquatic Biological Resources			
Terrestrial Biological Resources			
Aesthetics			
Cultural Resources			
Recreation			
Socioeconomics		•	
Public Services and Utilities			
Hazardous Materials			

COMPARISON OF ALTERNATIVES

Table 4 provides a summary of how each of the alternatives presented in this chapter meet the needs of the Project. Table 5 summarizes the anticipated impacts and proposed mitigation measures for all alternatives under evaluation in this Draft EIS. The "Environmental Consequences" chapter provides full descriptions of each of the mitigation measures noted in Table 5.

TABLE 4. SUMMARY OF HOW EACH ALTERNATIVE WOULD MEET THE NEEDS OF THE PROJECT

Needs of the Embarkation Site	No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Site and associated connections should be a consistent feature over time for visitors to the GGNRA	Would likely not meet	Would meet*	Would meet*	Would meet
Site should allow for efficiency in making facility improvements when necessary and consistency in projecting facility costs	Would likely not meet	Would meet*	Would meet*	Would meet
Site and associated facilities should serve as a gateway to GGNRA, reflecting the Park Service's identity and providing a quality experience for visitors	Would likely not meet	Would meet*	Would meet*	Would meet
Site should provide the space, circulation, and interpretive materials to appropriately and effectively orient visitors to Alcatraz Island and GGNRA	Would not meet	Would meet*	Would meet*	Would meet
Site may provide a valuable opportunity for cross-Bay ferry service to other GGNRA parklands	Would not meet	Would meet*	Would meet*	Would meet

Note:
* If coupled with the execution of agreements by the Port that specify the long-term availability of and conditions under which the ferry embarkation sites would be made available to any ferry services concessioner selected by the Park Service through the solicitation and award process mandated by federal law.

TABLE 5. SUMMARY OF IMPACTS AND PROPOSED MITIGATION MEASURES FOR ALL ALTERNATIVES

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Land Use			
No impacts	• No impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts	• No impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts	• Minor impacts • Fort Mason special ferry service: minor impacts • Fort Baker special ferry service: no impacts
Transportation and Circulation			
• Construction: no impacts • Operation: short- and long-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities • Cumulative[1]: long-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities	• Construction: short-term, minor, adverse impacts • Operation: short-term, minor, adverse impacts on traffic, transit, bicycle facilities, pedestrian facilities, and parking facilities • Cumulative[1]: – Traffic, bicycle facilities, pedestrian facilities, and parking facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts • Mitigation measure: Transportation-MM-1 • Fort Mason special ferry service: consistent with impacts above with additional long-term, adverse transit impact • Fort Baker special ferry service: no impacts	• Construction: short-term, minor, adverse impacts • Operation: – Traffic, transit, bicycle facilities, and parking facilities: short-term, minor, adverse impacts – Pedestrian facilities: short-term, moderate, adverse impacts • Cumulative[1]: – Traffic and pedestrian facilities: long-term, moderate, adverse impacts – Transit: long-term, major, adverse impacts – Bicycle facilities and parking facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts • Mitigation measures: Transportation-MM-1, 2, and 3 • Fort Mason special ferry service: consistent with impacts above with additional long-term, adverse transit impacts • Fort Baker special ferry service: no impacts	• Construction: short-term, minor, adverse impacts • Operation: – Traffic, transit, pedestrian facilities, and parking facilities: short-term, minor, adverse impacts – Bicycle facilities and parking facilities: short-term, moderate, adverse impacts • Cumulative[1]: – Traffic and pedestrian facilities: long-term, minor, adverse impacts – Transit: long-term, major, adverse impacts – Bicycle facilities and parking facilities: long-term, moderate, adverse impacts • Mitigation measures: Transportation-MM-4 and 5 • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: no impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Air Quality			
No impacts	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above	• Construction: short-term, major, adverse impacts • Operation: long-term, minor, adverse impacts • Mitigation measures: Air-MM-1, 2, and 3 • Fort Mason special ferry service: accounted for in impacts above • Fort Baker special ferry service: accounted for in impacts above
Noise and Vibration			
No impacts	• Construction: – Off-site receptors: short-term, negligible impacts – Pier 33 building: short-term, major, adverse impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts	Construction: • Off-site receptors: short-term, negligible impacts • Pier 41 building: short-term, major, adverse impacts • Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts	Construction: • Off-site receptors: short-term, negligible impacts • Mitigation measures: Noise-MM-1 and Vibration-MM-1 • Operation: no impacts • Fort Mason special ferry service: – Short-term, major, adverse construction impacts – Mitigation measures: Noise-MM-1 and Vibration-MM-1 – No operational impacts • Fort Baker special ferry service: – No impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Geology, Soils, and Seismicity			
• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts • Fort Mason special ferry service: – Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Landslides: long-term, negligible impacts – Expansive soils and mineral resources: no impacts • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Expansive soils, landslides, and mineral resources: no impacts • Fort Mason special ferry service: – Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Landslides: long-term, negligible impacts – Expansive soils and mineral resources: no impacts • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts	• Seismically induced ground shaking or liquefaction: long-term, major, adverse impacts • Seismically induced settlement: long-term, minor, adverse impacts • Landslides: long-term, negligible impacts • Expansive soils and mineral resources: no impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Seismically induced ground shaking: long-term, major, adverse impacts – Seismically induced settlement: long-term, minor, adverse impacts – Liquefaction, expansive soils, landslides, and mineral resources: no impacts

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Water Quality and Hydrology			
• Water quality (construction): no impacts • Water quality (operations): long-term, negligible impacts • Flood risk, tsunamis, and seiches: long-term, negligible impacts	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Water quality (construction): short-term, negligible impacts • Water quality (operations), flood risk, sea level rise, tsunamis and seiches: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above
Aquatic Biological Resources			
No impacts	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, essential fish habitat (EFH), and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1	• Marine mammals: short-term, minor, adverse impacts • Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts • Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts • Mitigation measures: Aquatic-MM-1 and 2 • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass,

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
	vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2 • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2	and 2 • Fort Baker special ferry service: – Marine mammals: short-term, minor, adverse impacts – Plants and macroalgae, common fish species, EFH, and protected species: short- and long-term, negligible to minor, adverse impacts – Plankton, protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2	submerged aquatic vegetation beds, or encrusting invertebrates: no impacts – Mitigation measures: Aquatic-MM-1 and 2

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Terrestrial Biological Resources			
No impacts	• No impacts • Fort Mason special ferry service: – Special status bird species: short-term, minor, adverse and long-term, negligible impacts – Common terrestrial wildlife species: long-term, negligible impacts – Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1	• No impacts • Fort Mason special ferry service: – Special status bird species: short-term, minor, adverse and long-term, negligible impacts – Common terrestrial wildlife species: long-term, negligible impacts – Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1	• Special status bird species: short-term, minor, adverse and long-term, negligible impacts • Common terrestrial wildlife species: long-term, negligible impacts • Terrestrial vegetation, special status bat species, mission blue butterfly, or San Bruno elfin butterfly: no impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Common terrestrial wildlife, special status bird species, western red bat, and California least tern: short- and long-term, minor to negligible impacts – Terrestrial vegetation, American badger, or mission blue butterfly: no impacts • Mitigation measure: Noise-MM-1

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Visual Resources			
No impacts	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Addition of a third berth: long-term, negligible impacts • Increased lighting: long-term, minor, adverse impacts • Fort Mason special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial impacts – Addition of two gangways and floats: long-term, minor, adverse impacts – Increased lighting: long-term, moderate, adverse impacts • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measures: Visual-MM-1, 2, and 3	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Vegetation views: long-term, minor, adverse impacts • Shielded lighting: long-term, minor, beneficial impacts • Fort Mason special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial impacts – Addition of two gangways and floats: long-term, minor, adverse impacts – Increased lighting: long-term, moderate, adverse impacts • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measure: Visual-MM-4	• Rehabilitated infrastructure: long-term, minor, beneficial impacts • Addition of two gangways and floats: long-term, minor, adverse impacts • Increased lighting: long-term, moderate, adverse impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: – Rehabilitated infrastructure: long-term, minor, beneficial and adverse impacts – Water views: long-term, minor, adverse impacts – Increased lighting: long-term, minor, adverse impacts • Mitigation measures: Visual-MM-1, 2, and 3
Cultural Resources			
No impacts	• Minor impacts to historic structures • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures and cultural landscapes	• No impacts • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures and cultural landscapes • Fort Mason special ferry service special ferry service: no impacts	• Minor impacts to historic structures and cultural landscapes; potential beneficial impacts to historic structures and cultural landscapes • Fort Mason special ferry service: no impacts • Fort Baker special ferry service: minor impacts to historic structures

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
			and cultural landscapes
Recreation			
Long-term, moderate, adverse impacts	• Construction: short-term, minor, adverse impacts • Operation: long-term, major, beneficial impacts from enhanced recreational opportunities; and no impacts on recreational boating • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities	• Construction: short-term, minor, adverse impacts • Operation: long-term, major, beneficial impacts from enhanced recreational opportunities and short-term, moderate, adverse impacts on Water Emergency Transportation Authority (WETA) ferry services; and no impacts on recreational boating • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities	• Construction: short-term, minor, adverse impacts • Operation: long-term, minor, adverse impacts from loss of Pier 3 for large events; long-term, minor, adverse impacts from increased travel time from parking areas; long-term, major, beneficial impacts from enhanced recreational opportunities; and no impacts on recreational boating or swimming • Fort Mason special ferry service: no construction impacts; long-term, major, beneficial impacts on recreation from operations • Fort Baker special ferry service: short-term, minor, adverse impacts during construction; long-term, minor, adverse impacts on recreational fishing; long-term, major, beneficial impacts from enhanced recreational opportunities • Mitigation measure: Transportation-MM-5

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
Socioeconomics			
Long-term, negligible, beneficial impacts	• Construction: short-term, minor, adverse and beneficial impacts • Operation: long-term, minor, beneficial impacts on merchants near Pier 31½ • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts	• Construction: short-term, minor, beneficial impacts • Operation: long-term, minor, beneficial impacts on Fisherman's Wharf merchants; long-term, negligible impacts on merchants near Pier 31½; and long-term, major, adverse impacts associated with displacing WETA ferry service • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts	• Construction: short-term, minor, adverse and beneficial impacts • Operation: long-term, moderate, adverse impacts on parking for Fort Mason Center tenants; and long-term, moderate, adverse impacts from the loss of Pier 3 event space to the Fort Mason Center and users • Fort Mason special ferry service: short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts • Fort Baker special ferry service: short- and long-term, negligible to minor, beneficial impacts • Mitigation measures: Transportation-MM-5
Public Services and Utilities			
No impacts	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Mitigation measure: Utilities-MM-1	• Construction: short-term, negligible to minor, adverse impacts • Operation: long-term, negligible impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service special ferry service: short-term, negligible to minor, adverse impacts during construction and long-term, negligible impacts during operation • Mitigation measure: Utilities-MM-1

No Action Alternative	Pier 31½ Alternative	Pier 41 Alternative	Pier 3 Alternative
	during operation • Mitigation measure: Utilities-MM-1		
Hazardous Materials			
No impacts	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above	• Construction: short-term, negligible impacts • Operations: long-term, minor, beneficial impacts • Fort Mason special ferry service: consistent with impacts above • Fort Baker special ferry service: consistent with impacts above

Note:
1 Due to the nature of the transportation analysis methodology, the cumulative and long-term operational transportation impacts of the alternatives under evaluation are equivalent. As such, cumulative impacts for transportation (but not other resource topics) are included in this summary table.

ALTERNATIVES ELIMINATED FROM FURTHER STUDY

Based on the alternatives development process carried out for the Project, the following alternatives were eliminated from further study.

FERRY BUILDING PIER ALTERNATIVE

This alternative would place the ferry embarkation site at the San Francisco Ferry Building, which is home to the Downtown San Francisco Ferry Terminal. Initially, the Agriculture Building and the area at the end of the Ferry Plaza were thought to be available for NPS use; however, the Park Service later determined that use of these areas would conflict with the San Francisco WETA's Downtown San Francisco Ferry Terminal Expansion Project. In addition, operating ferry service from this location would exceed the maximum travel time criterion of 15 minutes that was established in the draft FS. Travel times longer than 15 minutes would pose significant operational issues for the ferry service provider, as well as increase fuel requirements and vehicle emissions. For these reasons, the Ferry Building Pier Alternative has been eliminated from further study.

HYDE STREET PIER ALTERNATIVE

This alternative would place the ferry embarkation site at the Hyde Street Pier, an important NPS destination and a central focus of the SF Maritime NHP, which showcases a fleet of historic vessels and a variety of interpretive facilities. Constructing the Alcatraz embarkation site at this location would conflict with and possibly detract from the existing uses of the Hyde Street Pier. For these reasons, the Hyde Street Pier Alternative has been eliminated this alternative from further study.

MUNICIPAL PIER ALTERNATIVE

This alternative would place the ferry embarkation site at the Municipal Pier, which was built in 1929 to serve as a breakwater for Aquatic Park. The Municipal Pier was not designed as, nor has it served as, a vessel berthing or landing area. Structurally, the pier is currently unstable, and the restoration necessary to accommodate a ferry embarkation site would be extremely expensive. The Municipal Pier is also a contributing resource to the Aquatic Park National Historic District and NHL. To accommodate an embarkation site, the curved shape of the pier—which is one of its defining elements—would need to be altered. For these reasons, the Municipal Pier Alternative has been eliminated from further study.

FORT MASON PIER 3-4 ALTERNATIVE

This alternative would place the ferry embarkation site at Pier 3 and would include the construction of an over-water walkway connecting Lower Fort Mason with Pier 4 and Aquatic Park. A breakwater would be required for the site because of the ferry berths' location on the east side of Pier 3, which would result in significant capital costs and lifecycle maintenance costs. This alternative would potentially result in adverse environmental effects to the rare rocky shoreline habitat at Black Point, triggering mitigation. Furthermore, early scoping with BCDC suggested that permitting the over-water walkway would likely face substantial hurdles. For these reasons, the Fort Mason Pier 3-4 Alternative has been eliminated from further study.

FORT MASON PIER 4 ALTERNATIVE

This alternative would place the ferry embarkation site at Pier 4, to the east of the Municipal Pier. Pier 4 was a service landing for the federal penitentiary on Alcatraz Island. The alternative would require reconstruction of the pier, construction of ferry berths and a breakwater, and development of landside facilities adjacent to the pier in Aquatic Park NHL. This site is small in size, not easily accessible, could require the acquisition of additional property, and would face similar restrictions as the Pier 3-4 Alternative in regards to the breakwater and the presence of rocky shoreline habitat at Black Point. Also, constructing new buildings in a NHL could be an adverse impact under section 106 of the National Historic Preservation Act (NHPA), which would require extensive consultation with the SHPO and other consulting parties. For these reasons, the Fort Mason Pier 4 Alternative has been eliminated from further study.

PORT PIER 19½ ALTERNATIVE

This alternative would place the ferry embarkation site at Pier 19½, a bulkhead building along the Embarcadero. It would require reconstruction of the building and construction of ferry berths between piers 19 and 23. Operating ferry service from this location would exceed the maximum travel time criterion of 15 minutes that was established in the draft FS. The alternative is also space-constrained, and poses the potential for traffic, parking, and circulation impacts, given that the James R. Herman International Cruise Terminal and the Exploratorium are immediately adjacent to the site. For these reasons, the Port Pier 19½ Alternative has been eliminated from further study.

PORT PIER 29½ ALTERNATIVE

This alternative would place the ferry embarkation site at Pier 29½, a bulkhead building along the Embarcadero. It would require renovation of the building and construction of new ferry berths between piers 29 and 31. For this reason, the Port Pier 29½ Alternative has been eliminated from further study.

FORT MASON PIER 1A ALTERNATIVE

This alternative would distribute the ferry embarkation site elements among historic Pier 1 and Landmark Building A in Lower Fort Mason, both of which are managed by the Fort Mason Center. Ferries would be accessed from the Pier 1 apron (between piers 1 and 2) via a new fixed-pier gangway and floating dock, and a third berth would be located between piers 2 and 3. Constructing the ferry embarkation site at this location could significantly impact Fort Mason Center's vision for the future of Fort Mason, specifically its operations and ability to generate revenue. This alternative would significantly impact the "heart" of the Fort Mason Center operations, including the corridor between administrative buildings A and B, extending to piers 1 and 2. The Park Service's partnership with the Fort Mason Center is of critical importance to the future and potential operation of the ferry embarkation site at Fort Mason. For these reasons, the Fort Mason Pier 1A Alternative has been eliminated from further study.

FORT MASON PIER 1B ALTERNATIVE

This alternative would locate the ferry embarkation site in nonpier buildings—Landmark Buildings A and B in Lower Fort Mason, both of which are managed by the Fort Mason Center—allowing for compatible redevelopment of Pier 1 as a separate, standalone project. The ferries would be accessed in the same manner as they would be in the Pier 1A Alternative. This site was eliminated during the initial Choosing by Advantages reconsideration meeting because it would not preserve historic structures, integrate Alcatraz visitor services, offer an

identifiable entry portal compared to other Fort Mason alternatives, or provide efficient campus operation. It does not include the interior of a pier shed in its design, and it would have pronounced effects on the displacement of existing Fort Mason tenants from Landmark Buildings A and B. For these reasons, the Fort Mason Pier 1B Alternative has been eliminated from further study.

PORT PIER 45 ALTERNATIVE

This alternative would locate the ferry embarkation site at Pier 45, adjacent to the *USS Pampanito* and the *SS Jeremiah O'Brien*, using a portion of historic Shed A and the dock leased to the Red & White Fleet through 2016. Ferries would be accessed from the east side of Pier 45 via two new fixed gangways and floating docks, which would replace the existing docks and would preserve public access to the Pier 45 apron. A third berth would be constructed to the east of the two ferry docks. This docking location would require the construction of a breakwater, likely to the northeast of the proposed dock location. While this alternative would allow the selected operator to lease the exact amount of space in the Pier 45 shed needed for the ferry embarkation site, it has several significant flaws: rough operating conditions are anticipated to occur at the site (due to the site's orientation and prevailing wind and wave conditions, which would potentially be exacerbated by the removal of Pier 33); potential vessel congestion would occur, as determined through meetings with Red & White Fleet; and fish processing activities at this site would conflict with embarkation site activities. For these reasons, the Port Pier 45 Alternative has been eliminated from further study.

SPECIAL FERRY SERVICE TO SAUSALITO

The 2012 *Draft Feasibility Analysis of Sausalito and Fort Baker Embarkation Sites*, which was prepared as part of the alternatives development process, analyzed providing ferry service to Sausalito and Fort Baker from the ferry embarkation site (NPS 2012d). Providing ferry service to other GGNRA destinations in the Bay was also contemplated in prior studies, such as the *Golden Gate National Recreation Area Water Shuttle Access Study and Conceptual Plan* (CHS et al. 2007). During scoping, the GGBHTD expressed concerns regarding the introduction of additional private operators at the Sausalito ferry terminal because of a lack of GGBHTD control over operator schedules and activities. For these reasons, special ferry service to Sausalito as an action common to all action alternatives has been eliminated from further study.

This EIS analyzes the potential development of a ferry berth at Fort Baker for special service that could operate for special events, such as conferences, occasional excursions, or special occasional service between other parklands and the primary ferry embarkation site in San Francisco as an action common to all action alternatives.

Affected Environment

INTRODUCTION

This chapter describes the elements of the natural, social, and economic environments that might be affected by the Project. The study area for each resource topic is defined, and emphasis is placed on the current status of each element and any trends that may be evident. This chapter also contains applicable regulations on the federal, state, and local level that would apply to the Project. The environmental resources discussed in this chapter are consistent with and presented in the same order as those presented in the "Environmental Consequences" chapter.

LAND USE

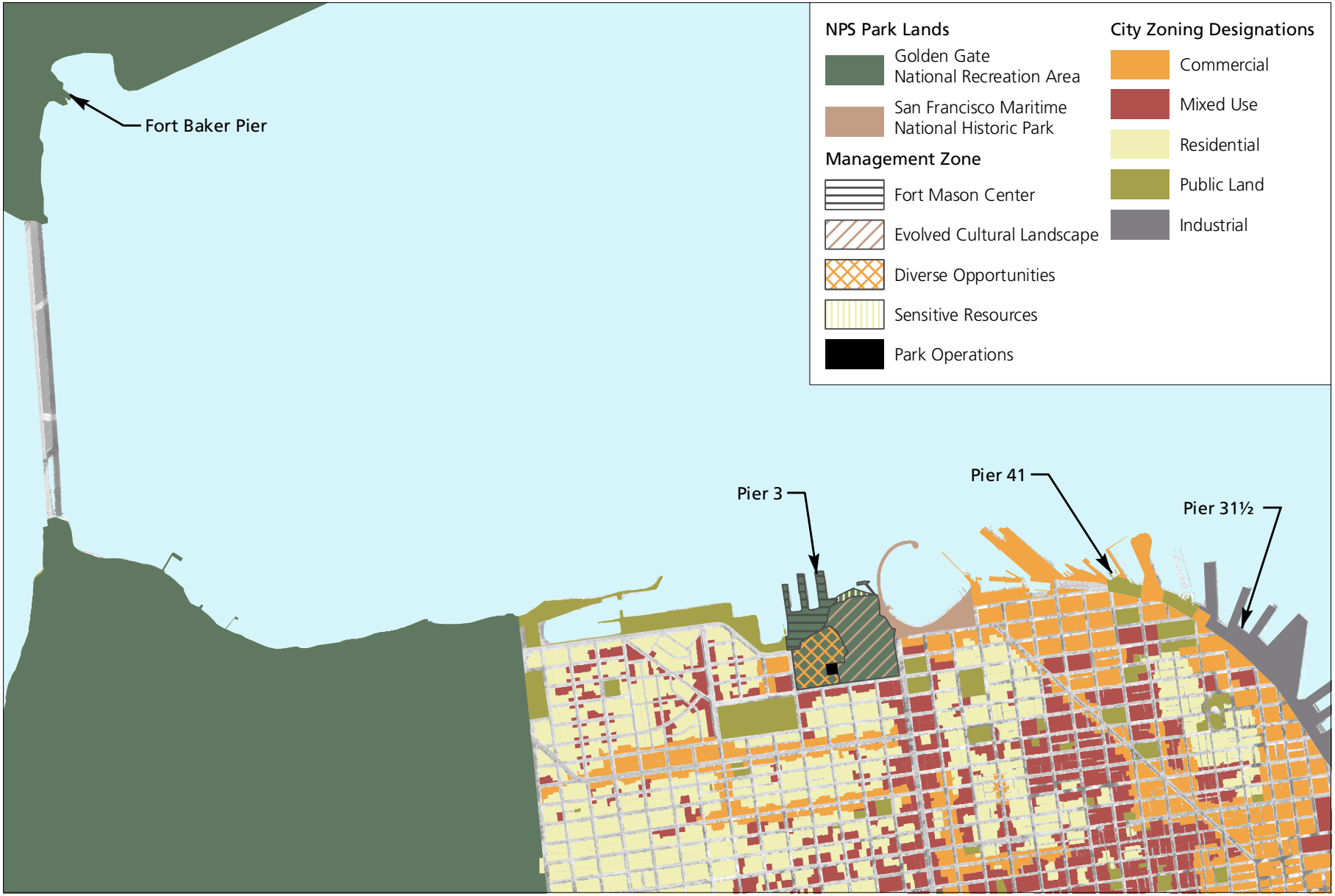
This section discusses the existing land uses within the study area. The study area for this resource topic is defined as the San Francisco waterfront region, which includes the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason) and the Fort Baker area in southern Marin County.

EXISTING CONDITIONS

This section describes the existing and surrounding land uses of the study area and how the potential embarkation sites are governed by regulations and policies. The existing conditions establish a baseline that is used to understand and compare the potential impacts of each alternative. The regulations and policies discussed in this chapter are listed in Table 6. Figure 16 depicts the zoning designations within the study area.

TABLE 6. LAND USE PLANS, POLICIES, AND DECISION DOCUMENTS

Plans and Policies	Affected Alternatives/Elements				
	No Action	Pier 3	Pier 31½	Pier 41	Fort Baker
Federal					
Fort Mason Center Long-term Lease (NPS 2004a)		•			
Fort Baker Plan (NPS 1999)					•
Golden Gate National Recreation Area and Muir Woods National Monument General Management Plan (NPS 2014a)		•			
NPS Management Policies (NPS 2006)	•	•			•
Regional/Local					
Waterfront Land Use Plan (Port 2004)	•		•	•	
Public Access Design Guidelines for the San Francisco Bay (BCDC 2005)	•		•	•	
San Francisco Waterfront Special Area Plan (BCDC 2010)	•		•	•	
San Francisco Bay Plan (Bay Plan; BCDC 2012)	•		•	•	
Northeastern Waterfront Area Plan (City/County 2003)	•		•	•	
San Francisco General Plan (City/County 2012)	•		•	•	
San Francisco Municipal Code (City/County 2013a)	•		•	•	
Fort Mason Center's Long-Term Public Realm Strategy		•			



Source: San Francisco Planning Department 2013; NPS 2014

0 2,500 Feet

FIGURE 16
LAND USE DESIGNATIONS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Pier 31½

The site for the No Action and Pier 31½ alternatives is governed by the regulations shown in Table 6 and described at the end of this section. As shown in Figure 16, the City/County has zoned this site as a light industrial district, directly across the Embarcadero from a commercial community business district (City/County 2013a).

All piers along the Embarcadero are owned by the Port. Piers to the west of the Ferry Building (Pier 1) are sequentially labeled by even numbers (i.e., Pier 2, Pier 4, etc.), while piers to the east of the Ferry Building are sequentially labeled by odd numbers (i.e., Pier 3, Pier 5, etc.). The northeastern portion of the Embarcadero, specifically between piers 7 and 35, has historically been known as a maritime, industrial, and manufacturing area that offers cargo-shipping, ship repair, tug and barge operations, and cruise ship embarkation. However, development over the last 25 years has also introduced new open space, commercial, amusement, and parking uses in this area.

The landward portion of Pier 31½ mainly consists of open space and existing Alcatraz facility operations, which include a ticket sales office, two temporary canopies for ticketed passenger queuing, mobile vending carts, portable benches and water stations, and portable interpretive displays depicting the historic eras and events on Alcatraz Island. There is some parking on the southeast side of the Pier 31½ deck for NPS employees and contractors. The Pier 33 bulkhead building, directly to the west of Pier 31½, provides public restroom facilities and the Alcatraz Landing Café on the ground floor, and private managerial offices on the second and third floors. Farther west is Pier 35, which currently serves as San Francisco's primary cruise terminal. However, this cruise terminal will be relocated to Pier 27 by spring 2014, after which Pier 35 will be used as a secondary cruise terminal. The uses described above are consistent with applicable City/County policies.

Pier 41

The Pier 41 Alternative site is governed by the regulations shown in Table 6 and described at the end of this section. As shown in Figure 16, the City/County has zoned approximately half of this site (specifically piers 41 and 43, as well as the berth closest to Pier 41) as a commercial community business district, while the remainder is zoned for public use (City/County 2013a). Adjacent sites like piers 45 and 39, as well as the area directly across the Embarcadero, are designated as commercial community business districts.

Pier 41 is currently used by the Blue & Gold Fleet as a ferry terminal, and prior to that (between the early 1980s and 2006) it served as the Park Service's former Alcatraz ferry embarkation site. The facility is surrounded on the landward side by a highly trafficked public promenade with well-manicured landscaping. To the west of Pier 41 is Pier 43, which features a recently developed over-water promenade that offers seating and views of the Bay, Alcatraz Island, and the historic Pier 43 arch. The Red & White Fleet also operates ferry service from Pier 43. To the east of Pier 41 is Pier 39—the main highlight of Fisherman's Wharf. Attracting approximately 8 to 10 million visitors annually, Pier 39 provides a year-round outdoor marketplace consisting of 110 specialty stores and 14 restaurants, an interpretive center for the Marine Mammal Center, a public aquarium (Aquarium of the Bay), a video arcade, and a two-story carousel. The uses described above are consistent with applicable City/County policies.

Pier 3

Fort Mason is made up of two distinct areas, Upper Fort Mason and Lower Fort Mason, which are physically separated by a retaining wall and steep concrete staircase. Lower Fort Mason, including Pier 3, is managed according to the policies and decisions set forth in the Park Service's *Fort Mason Center Long-term Lease Environmental Assessment/Finding of No Significant Impact* (NPS 2004a), while Upper

Fort Mason is managed according to the *Golden Gate National Recreation Area General Management Plan/ Environmental Impact Statement* (NPS 2014a). Both of these documents are described in the "Purpose and Need" chapter, as well as at the end of this section. As shown in Figure 16, Upper Fort Mason has established management zones, per the 2013 GMP, and the City/County zoning map designates all of Lower and Upper Fort Mason for public use (City/County 2013a). The area directly across from the Lower Fort Mason entrance is zoned as a neighborhood commercial shopping center district, and is surrounded by similar small-scale neighborhood commercial districts and a residential/mixed high-density district. Areas surrounding Upper Fort Mason along Bay Street and Van Ness Avenue have primarily been zoned as low-, moderate-, and high-density residential/mixed districts, with one community business commercial district and some public uses.

Upper Fort Mason primarily consists of the Great Meadow Park, a portion of the Bay Trail, GGNRA headquarters, and other historic buildings, including a chapel, the General's Residence, the Officers' Club, and the Civil War-era barracks that are now occupied by the San Francisco International Youth Hostel. Some parking is available in Upper Fort Mason.

Lower Fort Mason is located along the waterfront, with the Gashouse Cove Marina occupying property to the west and the SF Maritime NHP to the east of the pier. More than 35 years ago, the Fort Mason Foundation, a nonprofit organization, entered into a cooperative agreement with the Park Service to operate and maintain the facilities at Lower Fort Mason as the Fort Mason Center. The Fort Mason Center has become an established civic hub within San Francisco, as it continues to provide temporary and permanent venues for many cultural, educational, and recreational organizations. Approximately 1.75 million people visit Fort Mason each year to attend one or more of the more than 11,000 events held at the site (NPS 2011b). Events held at the Fort Mason Center are wide-ranging, but often consist of art exhibits, theatrical performances, festivals, classes, corporate events, pop-up stores, product launches, conferences, and private events. The Fort Mason Center Long-term Lease was completed in 2003 to renew and replace the cooperative agreement.

The bulkhead building on Pier 3 currently houses the Festival Pavilion, a storage room and production office, catering preparation and concessions area, and a mezzanine with views of the Golden Gate Bridge. To the west is Pier 2, which was recently seismically upgraded and houses the Herbst Pavilion and Cowell Theater. West of Pier 2 is Pier 1, which is severely degraded and primarily vacant (the front of the pier building is used by the Fort Mason Center for storage). Directly to the east of Pier 3 is the Firehouse. The current uses described above are consistent with the Fort Mason Center Long-term Lease, as well as applicable City/County policies.

Fort Baker

The Fort Baker site is managed according to the policies and decisions set forth in the Park Service's *Fort Baker Plan Environmental Impact Statement* (NPS 1999) and, as shown in Figure 16, is subsequently zoned by Marin County as open space (Marin County 2007a).

The pier was built in 1937 and modified in subsequent years. Currently, the pier is mostly used for recreational fishing and offers clear, unobstructed views of the Bay, Angel Island, and Alcatraz Island. Limited parking is available nearby. These uses are consistent with the policies and decisions set forth in the Fort Baker Plan.

REGULATIONS AND POLICIES

This section describes the federal, regional, and local land use regulations governing the Project, and how these regulations are applicable to the alternatives. A detailed description of the regulations and policies is provided in the "Relevant Policies and Plans"

section of the "Purpose and Need for Action" chapter.

Federal

The following federal regulations are only applicable at Fort Mason and Fort Baker, with the exception that the NPS Management Policies also apply to the No Action Alternative.

GGNRA and Muir Woods National Monument GMP. The 2014 GMP notes the importance of the Alcatraz embarkation facility as a portal to the GGNRA and larger national park system. Specific to the land use study area, the GMP pertains only to Upper Fort Mason; both Lower Fort Mason and Fort Baker are excluded from its scope because they are managed according to the separate, site-specific plans described below. As shown in Figure 16, the GMP identified several different management zones in Upper Fort Mason, including the following:

- Evolved cultural landscape zone, which would function as a portal to the GGNRA by using historic structures to welcome visitors into a setting that would remain a peaceful contrast to the more bustling Lower Fort Mason or Fisherman's Wharf
- Diverse opportunities zone, in which modest improvements would be made to the Great Meadow so it can continue to be used for a variety of purposes and special events
- Park operations zone, in which additional existing buildings could be used for park operational needs
- Sensitive resources zone, in which Black Point and its shoreline buffer would be managed to protect the remaining natural rocky shoreline

In the discussions pertaining to Upper Fort Mason, the 2014 GMP also anticipated the development of a water shuttle and extension of the F-Line streetcar to Lower Fort Mason.

Fort Mason Center Long-term Lease. With the Fort Mason Center long-term lease, the Fort Mason Foundation assumed responsibility for the preservation and maintenance of the site (including the pier buildings), with the exception that the Park Service retained the responsibility to maintain or improve the pier substructures and Building E. The lease requires that public access to the waterfront within Lower Fort Mason (including walking, bicycling, rollerblading, and automobile access) be available. The lease called for existing and new tenant applications to be evaluated based on several factors, including how well the applicant complements the current tenant mix, how Fort Mason would benefit from each applicant's tenancy, and an applicant's consistency with the goals of the mission statement and the 1980 GMP.

Fort Baker Plan. The Fort Baker Plan established the Park Service's plan for development and management of Fort Baker. Numerous plan elements have been implemented, including construction and opening of the Cavallo Point Lodge at Golden Gate, and improvements to the Bay Area Discovery Museum. The plan also noted the potential for the fishing pier to provide water-based connections to other park sites in the future. The Project is consistent with this land use plan.

NPS Management Policies. This document provides the Park Service "the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values" (NPS 2006). Park Service decisionmakers must investigate potential conflicts with proposed park uses and the national park system's "fundamental purpose" of conserving park resources and values. Additional information on this plan is provided in the "Purpose and Need" chapter.

Regional and Local

The following regional and local regulations are enforceable at Port sites but not at Fort Mason or Fort Baker, because these are federal lands. However, the Park Service will strive to meet the spirit of these regulations at Fort Mason and Fort Baker to the extent feasible.

Waterfront Land Use Plan (Waterfront Plan). In 1997, the Port adopted the Waterfront Plan to address how and where existing and new land uses will be located along the waterfront over the next 20 years. The plan outlines general land use policies and objectives for all property under the Port's jurisdiction, specifically in regard to maritime uses, open space and public access, residential and commercial uses, and other/interim uses. Unacceptable nonmaritime uses are also identified. This plan is consistent with the Port's public trust responsibilities and the City/County's *Northeastern Waterfront Area Plan* (2003). As a component to the Waterfront Plan, the *Waterfront Design & Access Element* was prepared to provide goals, policies, and qualitative standards for future waterfront improvement projects, specifically in regard to public access and open space, views, and historical preservation. The plan also provides general architectural criteria for piers, bulkhead sites, and seawall lots, as well as some site-specific architectural criteria.

San Francisco Waterfront Special Area Plan (Special Area Plan). As an extension to the Bay Plan (BCDC 2012; described in the "Purpose and Need" chapter), the BCDC worked in concert with the City's Planning Department and the Port to create the Special Area Plan. Adopted in 1975 and amended through February 2010, this plan identifies site-specific policies pertaining to all Port properties along the shoreline east of Hyde Street Pier to just south of India Basin (located in the southeastern part of San Francisco, near Hunter's Point).

Public Access Design Guidelines for the San Francisco Bay. Based on the Bay Plan, BCDC's design guidelines handbook helps guide design decisions made on future development projects along the Bay shoreline. While only advisory and not legally enforceable, the guidelines were adopted by BCDC in 2005 and have influenced past recommendations and formal decisions made by BCDC and its Design Review Board.

General Plan. California Code Section 65302 specifies that every general plan must include an element regarding land use. The Urban Design Element of the General Plan includes policies that concern the physical character and order of the City, and the relationship between people and their environment. The following policies pertinent to consideration of the proposed Project:

- **Policy 2.1:** Preserve in their natural state the few remaining areas that have not been developed by man.
- **Policy 2.2:** Limit improvements in other open spaces having an established sense of nature to those that are necessary, and unlikely to detract from the primary values of the open space.

Northeastern Waterfront Plan (NE Waterfront Plan). Branching from the General Plan, the City/County's NE Waterfront Plan guides decisions made regarding land use development and urban design specific to San Francisco's northeastern waterfront. The overall goal of this plan is to promote a physical and economic environment along the waterfront that best uses the area's resources and best serves the City/County's community.

Municipal Code. Zoning and land use regulations set forth in the General Plan and NE Waterfront Plan are implemented through the City's Municipal Code.

Fort Mason Center's Long-Term Public Realm Strategy. The Fort Mason Center's current long-term public realm strategy intends to make the campus more pedestrian oriented by limiting vehicular access north of Buildings A, B, C, D, and E and creating

temporary parking/vehicular zones between Buildings A, B, C, D, and E.

TRANSPORTATION AND CIRCULATION

This section analyzes the existing transportation and circulation conditions of the study area. The study area for this resource topic is defined as the travel corridors and facilities along the San Francisco waterfront that may be used to access the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason) and in Southern Marin County, which includes Fort Baker.

CONCEPTS AND TERMINOLOGY

Level of Service

Level of Service (LOS) intersection operations are typically assessed using the concept of intersection LOS. The method used to analyze LOS is documented in the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM; TRB 2000). LOS is a qualitative description of a facility's performance, but is most commonly based on the average delay per vehicle at an intersection. Intersection LOS levels range from LOS A (free-flow conditions with little or no delay) to LOS F (jammed conditions with excessive delays).

Table 7 presents the relationship between LOS and delay for both signalized and unsignalized intersections. The LOS analysis for signalized intersections accounts for factors that affect delay at signalized intersections, including the turning movement volumes, lane geometries, and signal timing plan (e.g., cycle length, coordination, and phasing). Signal timing plans also include information about transit operations at intersections with special timing requirements when transit vehicles pass through the intersection (e.g., along the Embarcadero). The LOS analysis for unsignalized intersections accounts for the delay experienced on each approach. As shown in Table 7, unsignalized intersections have lower delay thresholds for LOS compared to signalized intersections due to driver performance expectations.

TABLE 7. INTERSECTION LOS CRITERIA

LOS	Average Control Delay (Seconds/Vehicle)		Description
	Signalized Intersections	Unsignalized Intersections	
A	< 10.1	< 10.1	Negligible delay: No approach is fully used, and no vehicle waits longer than one red indication (at signals).
B	10.1–20.0	10.1–15.0	Minimal delay: An occasional approach is fully used, and drivers begin to feel restricted.
C	20.1–35.0	15.1–25.0	Average/moderate but acceptable delay: Most drivers feel restricted.
D	35.1–55.0	25.1–35.0	Tolerable delay: Some queuing may occur, but usually dissipates quickly.
E	55.1–80.0	35.1–50.0	Significant delay: Volume approaches capacity, and vehicles may wait through several signal cycles. Drivers at unsignalized intersections may wait in long queues.
F	> 80.0	> 50.0	Excessive delay and congestion: Conditions are at capacity with long delay and queuing.

Note:
Source: Chapters 16 and 17, *Highway Capacity Manual* (TRB 2000)

Pedestrian conditions at intersections were evaluated based on the HCM methodology for pedestrian LOS at signalized intersections. Two distinct measures of pedestrian LOS include pedestrian delay and pedestrian density. Delay is a measurement similar to automobile delay and reflects time spent waiting for a "WALK" signal plus queuing time at the corner, measured in average seconds of delay per pedestrian. When pedestrians experience more than 30 seconds of delay, they are more likely to cross during gaps in traffic rather than waiting for a signal. Table 8 provides LOS criteria associated with average delays at signalized intersections.

TABLE 8. PEDESTRIAN LOS CRITERIA AT SIGNALIZED INTERSECTIONS

LOS	Average Delay (Seconds/Pedestrian)	Likelihood of Noncompliance
A	<10	Low
B	10.1-20.0	Low to Moderate
C	20.1-30.0	Moderate
D	30.1-40.0	Moderate to High
E	40.1-60.0	High
F	>60	Very High

Walkways (not at intersections) were evaluated in accordance with a methodology developed by ORCA Consultants, LLC, which has been used for other NPS projects. The analysis methodology is detailed in the summary memorandum *America's Cup 34 Spectator Site on NPS Properties Visitation Estimates and Capacity Assessment Preliminary Report*, prepared as part of the environmental review for the 34th America's Cup event in San Francisco (ORCA Study; ORCA 2011a). The methodology uses the 2000 HCM LOS descriptions for LOS A to LOS F conditions, but adjusts the flow rates for the walkway analyses to reflect a higher impact of bicycles, presence of slower-moving spectators or tourists on pathways, and high-volume urban conditions commonly found near the study areas. The ORCA Study concluded that hourly flow volumes provide a more direct and consistent indicator than density levels for walkway applications. LOS A represents free-flowing pedestrian conditions, while LOS F indicates that there are substantial restrictions to pedestrian movement and speed. The walkway analysis was conducted for the weekday a.m. and p.m. peak hours and weekend midday peak hour. Table 9 presents LOS descriptions and recommended hourly flow volume standards developed for the SF Maritime NHP and GGNRA, which are applicable to the study area.

TABLE 9. NPS-SPECIFIC PEDESTRIAN LOS CRITERIA FOR WALKWAYS

LOS	Hourly Flow Volume for 18-foot Walkway	Hourly Flow Volume for 12-foot Walkway
A	<430	<287
B	430-1,589	287-349
C	1,590-2,149	350-1,432
D	2,150-3,229	1,433-2,152
E	3,230-5,379	2,153-3,587
F	>5,380	>3,587

Notes:
Source: TRB 2000
Hourly flow volume standards for SF Maritime NHP and GGNRA reported in *America's Cup 34 Spectator Site on NPS Properties Visitation Estimates and Capacity Assessment Preliminary Report* (ORCA 2011a). Table 9 is adapted from the Transportation and Circulation Study tables for varying path width (NPS 2014b).

Capacity Utilization

Capacity utilization is the measurement index used to evaluate transit impacts and peak hour ridership demand versus peak hour capacity. The analysis used a "screenline" method to calculate the total ridership and capacity on all transit routes and lines traveling to and from the potential embarkation sites, consistent with the *City of San Francisco Transportation Impact Analysis Guidelines for Environmental Review*, dated October 2002 and typical practice for impact analysis in San Francisco. The screenline method accounts for the fact that transit riders have multiple transit options to reach their destination and assesses whether an alternative would cause capacity utilization (i.e., the ratio of ridership to

capacity) on transit screenlines to exceed the City's standard of 85% (Muni 2005). For screenlines already exceeding 85% without the Project, the analysis assessed whether an alternative would substantially increase the capacity utilization.

Bikeways

Bicycle conditions are qualitatively measured based on the access to and circulation on-site and in adjoining areas, including potential points of conflict, accessibility limitations, or potentially hazardous conditions resulting from the activities at the potential embarkation site.

Bikeways are typically classified into three categories:

- Class I: Pathways that provide exclusive right-of-way for use by bicyclists and pedestrians
- Class II: Bicycle lanes striped within the roadway for use by bicyclists typically travelling between the vehicle travel lane and parking lane or curb
- Class III: Bicycle routes that are signed and sometimes marked with shared lane markings ("sharrows") where bicycles and vehicles share the same travel lane

Parking Utilization

Parking utilization is the measurement index used to evaluate parking impacts. Parking conditions include the availability of on- or off-street parking near the embarkation site. The analysis determined whether an alternative would cause parking utilization to exceed the existing supply, or if the current supply is already at full capacity during peak periods, as well as whether an alternative would substantially increase demand for parking. Although the City does not have a threshold for acceptable parking occupancy, for purposes of this EIS, parking occupancy over 95% of supply indicates that parking is effectively at or over capacity).

EXISTING CONDITIONS

The study area includes all aspects of the transportation network that may be measurably affected by the alternatives under evaluation. The study area is defined by travel corridors and facilities (e.g., local roadways, bicycle lanes, transit lines, sidewalks) that visitors and employees may use to reach any of the potential sites. The following parameters were used to define the transportation study area and facilities:

- Traffic (Intersection) LOS: Intersections located along major roadways approaching the alternative sites or nearby public parking facilities.
- Transit Service: San Francisco Municipal Railway (Muni) transit service serving the various alternative sites, defined as those major routes operating within 0.5 mile of the alternative sites, with stops within the ½ mile radius. Regional transit providers were also considered, including BART, Golden Gate Transit, and San Mateo County Transit (Samtrans).
- Bicycle Facilities: Existing and planned bicycle routes within 0.5 mile of the alternative sites that provide direct or indirect access.
- Pedestrian Facilities: Existing sidewalks and crosswalks adjacent to the primary pedestrian entrances of the alternative sites.
- Parking Facilities: On-street parking and public off-street parking garages located 0.25 to 0.5 mile from the alternative sites, or other major parking facilities likely to be used by visitors.

Regional Roadways

This section describes the regional highway network within the Project vicinity that provides access to the potential embarkation sites. An illustration of these roadways is provided as Figure 17.

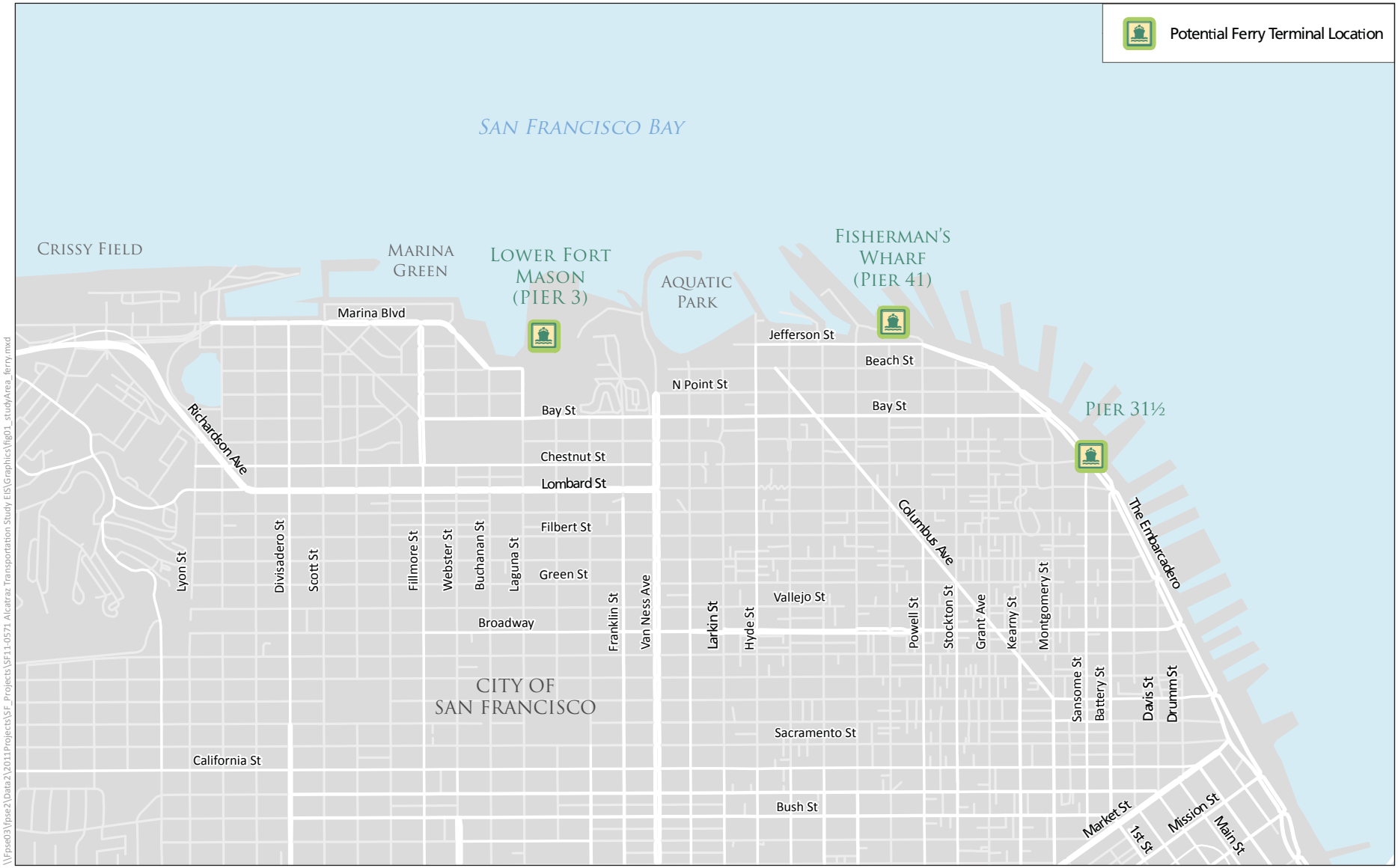


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FIGURE 17
STUDY AREA AND FERRY TERMINAL LOCATIONS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

U.S. 101. U.S. 101 is an access-controlled freeway that serves San Francisco and the Peninsula/South Bay, and extends north via the Golden Gate Bridge to the North Bay (Southern Marin County). Within San Francisco, Lombard Street and Van Ness Avenue are designated as U.S. 101. North of the Golden Gate Bridge, U.S. 101 is an eight-lane north-south freeway.

Interstate 80 (I-80). I-80 connects San Francisco to the East Bay and points further east via the Bay Bridge. U.S. 101 and I-80 merge south of the Project area on an elevated structure. The closest ramps providing access to and from downtown San Francisco are at the intersections of Fourth Street/Harrison Street, First Street/Harrison Street, Essex Street/Harrison Street and Sterling Street/Bryant Street and the off-ramps at the intersections of Fremont Street/Harrison Street and Fourth Street/Bryant Street.

Interstate 280 (I-280). I-280 provides access to southern San Francisco and the Peninsula/South Bay. I-280 has an interchange with U.S. 101 south of downtown San Francisco. The closest on- and off-ramps are located at the intersections of Fifth Street/King Street and Sixth Street/Brannan Street.

Local Roadways

This section describes local streets within the Project vicinity that provide local access to the potential embarkation sites. These streets are described below, and illustrated on Figure 18.

The Embarcadero is a two-way north-south roadway that runs between King Street (in the South Beach area near AT&T Park) and Taylor Street (near Fisherman's Wharf) and is adjacent to piers 31½ and 41. In general, the Embarcadero has two to three travel lanes in each direction, with a wide center median for the F-Line streetcar, as well as the N-Judah and T-Third light rail vehicles. The Embarcadero features sidewalks for pedestrians, public art, viewing decks, active street and sidewalk activities, and open plazas. Bicycle access is provided on-street or on adjacent shared-use facilities of the Embarcadero. On-street parking is not permitted on either side of the street. A 10-foot-wide sidewalk is provided landward, and a 25-foot-wide pedestrian promenade runs along the waterfront.

The General Plan identifies the Embarcadero as a Major Arterial in the Congestion Management Program (CMP) Network, a Metropolitan Transportation System (MTS) Street, a Transit Preferential Street (Transit Important), and a Neighborhood Pedestrian Street. Additionally, The Embarcadero is designated as part of the Bay, Ridge, and Coast trails, which are recreational pedestrian/bicycle paths connecting destinations around the Bay. In 1996, the City gave the name Herb Caen Way to the 25-foot-wide pedestrian promenade that runs approximately 3.2 miles along the waterfront from South Beach to Fisherman's Wharf. Herb Caen Way is part of the Bay Trail, which also runs along the San Francisco waterfront.

North Point Street is a two-way east-west roadway between the Embarcadero and Van Ness Avenue that has one travel lane and a bicycle lane (Class II facility) in each direction. On-street parking is permitted on both sides of the street. The General Plan identifies North Point Street as a Major Arterial in the CMP Network, a Transit Important Street, and a neighborhood commercial street. North Point Street connects the Fisherman's Wharf and Fort Mason areas.

Bay Street is a two-way east-west roadway that runs between The Embarcadero and Fillmore Street, with two travel lanes in each direction. On-street parking is permitted on both sides of the street, except weekdays between 4:00 and 7:00 p.m., when parking is prohibited on the north side of the street to create a third westbound travel lane. Bay Street functions as an arterial street for through traffic and provides access to the Golden Gate Bridge. The General Plan identifies Bay Street as a major arterial in the CMP network, an MTS street, and a neighborhood commercial street.

Bay Street connects the Fisherman's Wharf and Fort Mason areas.

Laguna Street is a north-south street that runs discontinuously between Beach and Market streets and borders Fort Mason. North of Bay Street, Laguna Street has two travel lanes each way, with no parking allowed on either side of the street. Trucks with a gross weight in excess of 6,000 pounds and tour buses or vans carrying eight or more passengers are prohibited from traveling on Laguna Street, north of Bay Street.

Marina Boulevard is an east-west street that runs between Laguna Street and the Doyle Drive approach to the Golden Gate Bridge. It is a four-lane roadway (two travel lanes each way) with regulated nonmetered parking on the south side of the street. In the General Plan, Marina Boulevard is classified as a secondary arterial and part of the MTS network. Marina Boulevard is part of the citywide pedestrian network (Bay, Ridge and Coastal trails). Bicycle Route 2 runs along Marina Boulevard between Fillmore and Lyon streets as a Class I facility (bicycle path). Trucks with a gross weight in excess of 6,000 pounds and tour buses or vans carrying eight or more passengers are prohibited from traveling on Marina Boulevard.

Other Roadways. The other primary roads that provide access to the potential embarkation sites include North Point, Bay, Chestnut, Lombard, and Green streets; Broadway; Washington, Battery, and Sansome streets; Van Ness Avenue; Fillmore, Divisadero, and Laguna streets; Marina Boulevard; and Sausalito Lateral and East roads (Figure 17).

Existing Traffic

Existing conditions at the 41 study intersections were analyzed for the weekday morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak hour and the Saturday midday (12:00 to 2:00 p.m.) peak hour. Intersection turning movement counts were collected at the study intersections on multiple Tuesdays, Wednesdays, Thursdays and Saturdays from March to May of 2011 and April and May of 2012. The counts collected in 2011 were obtained from the transportation analysis conducted for *The 34th America's Cup and James R. Herman Cruise Terminal and Northeast Wharf Plaza Environmental Impact Report (EIR)*.

Although some of these counts are nearly 2 years old, traffic volumes do not typically fluctuate substantially in a 1- to 2-year time frame, and anecdotal experience has actually suggested that traffic volumes in 2013 are somewhat lower than 2010 counts, which implies that, if anything, the older counts from 2011 and 2012 may be higher than 2013 conditions.

Traffic volumes at intersections in downtown San Francisco are generally lower on Saturdays than on weekdays. Alternately, Saturday midday peak hour traffic volumes are greater than the weekday a.m. and p.m. conditions at intersections in the vicinity of Fisherman's Wharf, particularly during good weather weekend days. During peak weekend conditions, congestion occurs northbound along The Embarcadero in an area popular for tourism and recreational sightseeing. This high level of activity contributes toward poor intersection operations in the area.

Most study intersections currently operate at acceptable conditions (LOS D) or better, with the exception of the following:

- Divisadero Street/Marina Boulevard (a.m., p.m., Saturday)
- Franklin Street/Lombard Street (Saturday)
- Kearny Street/The Embarcadero/North Point Street (p.m., Saturday)
- Sansome Street/Broadway (a.m.)

The stop-controlled intersections of Marina Boulevard/Webster Street and Columbus Street/Beach Street also exceed the LOS D threshold; however, they do not meet peak hour signal warrant criteria and therefore are considered to operate acceptably.

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FIGURE 18

STUDY INTERSECTIONS

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

January 2015

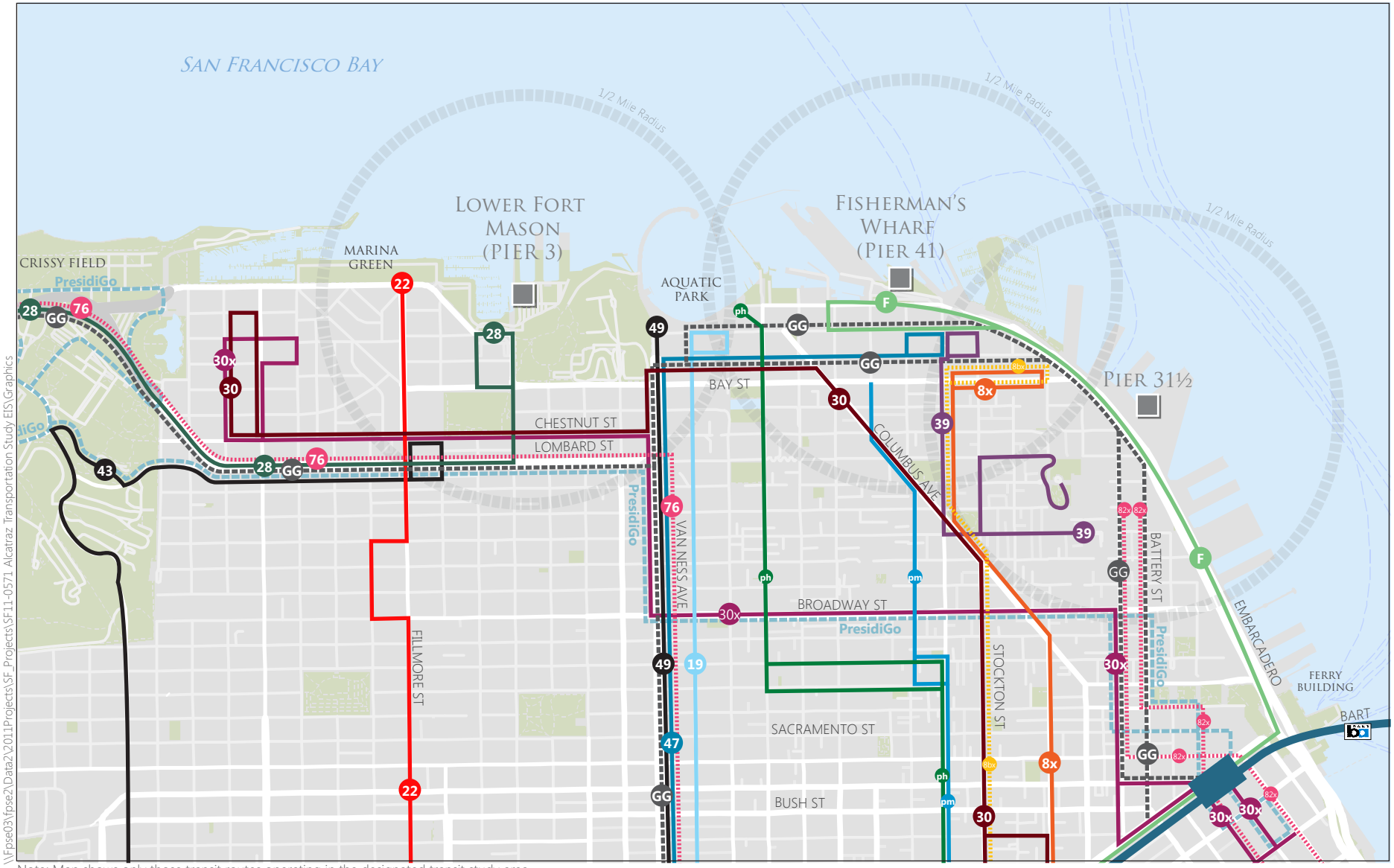
Existing Transit

This section describes the existing transit operations within the study area.

Muni. Local service is provided by Muni, the transit division of the San Francisco Metropolitan Transportation Authority (SFMTA). The Muni bus, cable car, and F-Line streetcar provide service to the Pier 31½, Pier 41, and Pier 3 areas and can be used to access regional transit operators. Muni Metro refers to the light rail vehicles, particularly along the portions that operate as a subway. Figure 19 presents the Muni transit network in the northeast portion of San Francisco. Table 10 summarizes the routes, service hours and headways, nearest stops, and destinations of transit routes to each of the three embarkation sites.

The F-Line streetcar connects Fisherman's Wharf with the Castro district via the Embarcadero and Market Street. It runs within mixed traffic lanes on Market Street, within a semi-exclusive median along The Embarcadero and within mixed traffic lanes within Fisherman's Wharf. Along the waterfront, it serves the Ferry Building, piers 31½, 39, and 41, and Fisherman's Wharf. Along the Embarcadero, ridership demand can exceed capacity, particularly on weekends in the summer.

Muni Metro operates six light rail vehicles that provide citywide service. The station closest to Pier 31½ is the Embarcadero Station, located approximately 1 mile to the south. The Embarcadero Station provides access to all six streetcar lines: J-Church, L-Taraval, M-Ocean View, N-Judah, and K-Ingleside/T-Third. Pier 41 is most accessible to Muni Metro via the Powell Street and Montgomery Street stations, where riders of light rail vehicles would transfer to another Muni transit line to travel north to the waterfront. Metro riders traveling to Lower Fort Mason would most likely transfer to the 22 Fillmore at Church Street Station or the 47 Van Ness or 49 Van Ness/Mission at the Van Ness Station.



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Note: Map shows only those transit routes operating in the designated transit study area.

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FIGURE 19
MUNI TRANSIT LINES

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

January 2015

TABLE 10. EXISTING CONDITIONS – MUNI TRANSIT SERVICE

Route	Destination(s)	Nearest Stop Location	Service Frequency (min)			
			AM	Midday	PM	Sat
Pier 31½						
F-Line	The Embarcadero, Market Street, Upper Market	Embarcadero/Bay	6	6	6	6
8X/8BX Bayshore Express	Balboa Park, Financial District, North Beach	Kearny/North Point	8	9	8	8
39 Coit Tower	Coit Tower, Fisherman's Wharf, North Beach	Stockton/North Point	--	20	20	20
47 Van Ness	Fisherman's Wharf, Soma	Powell/Beach	10	10	10	10
82X Levi Express	Levi Plaza, Caltrain	Battery/Filbert	20	--	15	--
Pier 41						
F-Line	The Embarcadero, Market Street, Upper Market	Jefferson/Taylor	6	6	6	6
Powell/Mason Cable Car (pm)	Union Square, North Beach, Chinatown, Fisherman's Wharf	Taylor/Bay	10	8	8	8
Powell/Hyde Cable Car (ph)	Union Square, Nob Hill, Russian Hill, Fisherman's Wharf	Hyde/Beach	10	8	8	8
8X/8BX Bayshore Express	Balboa Park, Financial District, North Beach	Powell/Bay	8	9	8	8
19 Polk	Fisherman's Wharf, Potrero, Bayview	Larkin/Beach	15	15	15	15
30 Stockton	Marina District, Chinatown, Caltrain	Columbus/Bay	7	12	12	10
39 Coit Tower	Coit Tower, Fisherman's Wharf, North Beach	Powell/Beach	--	20	20	20
47 Van Ness	Fisherman's Wharf, Soma	Powell/Beach	10	10	10	10

Route	Destination(s)	Nearest Stop Location	Service Frequency (min)			
			AM	Midday	PM	Sat
Lower Fort Mason						
Powell/Hyde Cable Car (ph)	Union Square, Nob Hill, Russian Hill, Fisherman's Wharf	Hyde/Beach	10	8	8	8
19 Polk	Fisherman's Wharf, Potrero, Bayview	Beach/Polk	15	15	15	15
22 Fillmore	Marina District, Pacific Heights, Mission, Potrero	Fillmore/Beach	9	10	8	10
28 19th Avenue	Marina District, Richmond, Sunset	Laguna/Marina	12	12	10	12
30 Stockton	Marina District, Chinatown, Caltrain	Laguna/Chestnut	7	12	12	10
30X Marina Express	Marina District, Financial District	Laguna/Chestnut	5	--	8	--
43 Masonic	Marina District, Haight-Ashbury, Balboa Park	Fillmore/Chestnut	10	12	12	15
47 Van Ness	Fisherman's Wharf, Soma	Van Ness/North Point	10	9	10	10
76 Marin Headlands	Marin Headland, Soma	Fillmore/Lombard	--	--	--	60

Note:
-- = Service not provided during these times

BART. BART operates regional rail transit service in the metropolitan Bay Area. BART currently operates five lines. The Embarcadero Station is located nearest to the Pier 31½ and Pier 41 alternatives. Visitors to Lower Fort Mason would likely take BART to the Embarcadero Station, transfer to the F-Line streetcar, and then walk to Lower Fort Mason. Visitors could also take BART to the Civic Center Station and transfer to the 19 Polk, 49 Van Ness/Mission or 47 Van Ness bus routes, or take BART to 16th Street Station and transfer to the 22 Fillmore.

WETA. WETA currently operates ferry service between the Ferry Building and Pier 41 to Alameda, Oakland, and Vallejo. Ferries generally operate hourly between 6:30 a.m. and 8:30 p.m. on weekdays, and every 90 minutes between 9:15 a.m. and 6:30 p.m. on weekends. Not all ferries provide service to Pier 41.

Golden Gate Transit. Golden Gate Transit is operated by the GGBHTD, and provides bus service between the North Bay (Marin and Sonoma Counties) and the City. Golden Gate Transit also operates a ferry service between the North Bay and San Francisco. During the morning and evening commute periods, ferries operate between Larkspur and San Francisco, and between Sausalito and San Francisco. Additional North Bay ferry service operated by the Blue & Gold Fleet connects both Sausalito and Tiburon with San Francisco. Both the Blue & Gold Fleet and Golden Gate Transit provide ferry service

from Sausalito, Tiburon, and Larkspur to San Francisco at Pier 41 and the Ferry Building.

Other transit opportunities in the greater San Francisco area include the Presidio Trust Shuttle Service (PresidiGo Downtown and the PresidiGo Around the Park), AC Transit, Caltrain, and SamTrans (NPS 2014b).

As shown above in Table 10 and below in Tables 11a, b, and c, transit service to the potential embarkation sites generally operates below 85% of available capacity during weekday morning peak periods. In the p.m. peak period, the F-Line streetcar and Powell-Mason cable car operate above SFMTA's 85% capacity utilization threshold in the outbound direction (from Pier 31½ to the south). The east screenline of transit service to Fisherman's Wharf also operates above SFMTA's capacity utilization threshold in the outbound direction (away from Pier 41). All other routes and screenlines operate within SFMTA's capacity utilization threshold during the weekday p.m. peak hour.

During the weekend peak hour, transit service to Pier 31½ experiences substantial crowding, primarily due to higher activity levels along the northeastern waterfront associated with tourism. Specifically, the F-Line streetcar exceeds SFMTA's capacity utilization thresholds in the direction toward Pier 31½, and the Powell-Mason cable car exceeds the threshold in both directions. Similarly, service to Fisherman's Wharf is also crowded during the weekend midday, with the east screenline (which only consists of the F-Line streetcar) exceeding the City's threshold in the inbound direction (toward Fisherman's Wharf). Transit service to Lower Fort Mason operates within the City's threshold during the weekend midday peak hour.

TABLE 11A. EXISTING CONDITIONS—MUNI CAPACITY UTILIZATION ANALYSIS—A.M. PEAK HOUR

Pier 31 Screenlines						
	Inbound			Outbound		
Line	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
47 Van Ness	294	378	78%	276	378	73%
F-Line	289	700	41%	162	627	26%
Powell-Mason Cable Car	220	378	58%	92	378	24%
8X Bayshore Express	616	752	82%	504	752	67%
Total	1,418	2,208	64%	1,034	2,135	48%
Fisherman's Wharf Screenlines						
	Inbound			**Outbound**		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	1,070	1,382	77%	1,000	1,382	72%
West Screenline	855	1,347	63%	553	1,247	44%
East Screenline	289	700	41%	162	627	26%
Total	2,213	3,429	65%	1,715	3,256	53%

Lower Fort Mason Screenlines						
	Inbound			Outbound		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	1,280	1,881	68%	1,094	1,881	58%
West Screenline	471	693	68%	365	630	58%
East Screenline	514	1,118	46%	726	1,291	56%
Total	2,266	3,692	61%	2,184	3,802	57%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward Downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.

TABLE 11B. EXISTING CONDITIONS—MUNI CAPACITY UTILIZATION ANALYSIS—P.M. PEAK HOUR

Pier 31 Screenlines						
	Inbound			Outbound		
Line	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
47 Van Ness	276	378	73%	258	378	68%
F-Line	249	700	36%	**718**	**700**	**103%**
Powell-Mason Cable Car	356	473	75%	**411**	**473**	**87%**
8X Bayshore Express	408	752	54%	416	752	55%
Total	1,289	2,303	56%	1,803	2,303	78%
Fisherman's Wharf Screenlines						
	Inbound			Outbound		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	856	1,382	62%	798	1,382	58%
West Screenline	1,433	2,193	65%	1,556	2,169	72%
East Screenline	249	700	36%	**718**	**700**	**103%**
Total	2,537	4,275	59%	3,071	4,251	72%
Lower Fort Mason Screenlines						
	Inbound			Outbound		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	1,111	1,871	59%	1,181	1,871	63%
West Screenline	282	378	75%	282	378	75%
East Screenline	1,423	1,924	74%	909	1,948	47%
Total	2,816	4,173	67%	2,371	4,196	57%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward Downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold values represent ridership that is over capacity.

TABLE 11C. EXISTING CONDITIONS—MUNI CAPACITY UTILIZATION ANALYSIS—WEEKEND MIDDAY PEAK HOUR

Pier 31 Screenlines						
	Inbound			Outbound		
Line	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
47 Van Ness	220	378	58%	220	378	58%
F-Line	**803**	**700**	**115%**	307	700	44%
Powell-Mason Cable Car	**428**	**473**	**90%**	**428**	**473**	**90%**
8X Bayshore Express	556	705	79%	335	705	48%
Total	**2,007**	**2,256**	**89%**	1,290	2,256	57%
Fisherman's Wharf Screenlines						
	Inbound			Outbound		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	888	1,459	61%	699	1,459	48%
West Screenline	1,160	1,415	82%	1,165	1,415	82%
East Screenline	**803**	**700**	**115%**	307	700	44%
Total	2,851	3,574	80%	2,171	3,574	61%
Lower Fort Mason Screenlines						
	Inbound			Outbound		
Screenline	**Ridership**	**Capacity**	**Utilization**	**Ridership**	**Capacity**	**Utilization**
North/South Screenline	825	1,758	47%	923	1,758	53%
West Screenline	202	564	36%	216	564	38%
East Screenline	1,423	1,924	74%	909	1,948	47%
Total	2,816	4,173	67%	2,371	4,196	57%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward Downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold values represent ridership that is over capacity.

Existing Bicycle Network

Existing bicycle facilities are part of the City's bicycle network. Figure 20 shows the bicycle network along San Francisco's waterfront, followed by a description of existing bicycle conditions nearby the potential embarkation sites. Bicycle counts indicated that overall volumes are moderate, with weekend volumes being somewhat higher than weekday volumes.

Pier 31½. In general, bicycle mobility nearby Pier 31½ is good. To access the existing embarkation site, northbound bicyclists can either use the northbound Class II bicycle lane on the Embarcadero or Herb Caen Way, and then dismount at the embarkation site. Southbound bicyclists can either use Herb Caen Way or the southbound Class II bicycle lane on The Embarcadero and then cross the Embarcadero north of Pier 31½ at Bay Street or south of Pier 31½ at Chestnut and Sansome streets and backtrack to the embarkation site. There is also a pedicab stop located at Pier 31.

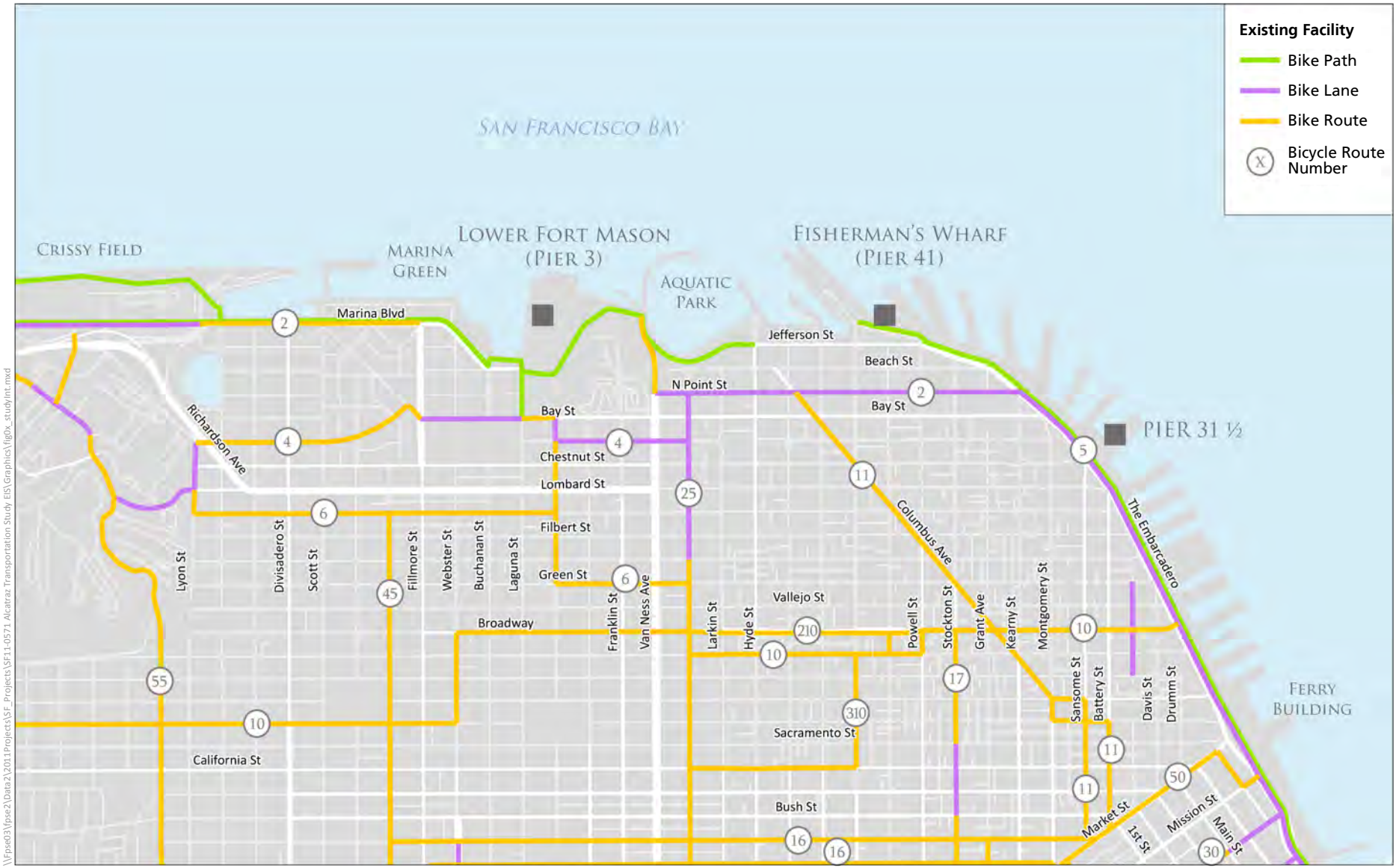

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FIGURE 20

EXISTING BICYCLE FACILITIES

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

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Pier 41. Similar to Pier 31½, Pier 41 is primarily served by Bicycle Routes 2 and 5. Bicycle access is also provided by Bicycle Route 11, which is a Class III facility on Columbus Avenue between North Point Street and the Financial District. North-south bicycle travel is also apparent on Polk Street, which varies between a designated Class II and III facility between Market and Beach streets. Herb Caen Way extends into Fisherman's Wharf and ends at Pier 45 at Hyde Street[1].

The sidewalks on the west side of the Embarcadero and north side of Jefferson Street can be crowded on weekends and days with good weather. At Pier 41, the sidewalk and Herb Caen Way become more congested when passengers are disembarking ferries at Pier 41. During these times, cyclists on Herb Caen Way navigate through increased pedestrian traffic, which creates some conflicts. Bicycle use along the Embarcadero west of Powell Street is fairly low, which may be attributed to high pedestrian volumes that impede bicycle travel. Compared to weekdays, weekend bicycle traffic is considerably higher.

Lower Fort Mason. Lower Fort Mason is well connected to the surrounding bicycle network, particularly for east-west bicycle travel. A portion of the Bay Trail (Class I) runs along the waterfront, beginning at the end of Jefferson Street in Fisherman's Wharf and continuing to Lower Fort Mason and westerly towards the Golden Gate Bridge through Marina Green and Crissy Field. Francisco, Alhambra, and Bay streets (between Fillmore Street and Octavia Boulevard) are designated Bicycle Route 4, which varies between a Class II and III facility between the Presidio to the west and Polk Street to the east. Bicycle Route 106 is a Class III facility on Octavia Boulevard between Bay Street (Fort Mason) and Green Street that is an alternate route to reach Polk Street (via Bicycle Route 6 on Green Street). Polk Street (Bicycle Route 25, which varies between a Class II and III) is the flattest and most direct of the north-south routes through the area. Steiner Street is also designated a Class III bicycle route (Bicycle Route 45) between Fulton Street, near Alamo Square, and Greenwich Street, in Cow Hollow. Bicyclists on Steiner Street can reach Lower Fort Mason using Greenwich Street (Bicycle Route 6) and Octavia Boulevard (Bicycle Route 106).

The Bay Trail in Upper Fort Mason travels down a relatively steep grade to Laguna and Beach streets, and terminates at an approximately 7-foot-wide sidewalk, where substantial volumes of pedestrians and bicycles queue to cross the street. This area was recently redesigned to slow bicycles and direct pedestrians to the crosswalk on the south leg of the intersection, and, while improved, the area remains constrained with many conflicts.

To the east of Pier 4, pedestrians and bicyclists are provided with a relatively flat Class I facility path through the SF Maritime NHP, with relatively limited conflicts. However, to the west, the Class I facility climbs a rather steep hill to Upper Fort Mason. This hill creates challenges for cyclists and pedestrians traveling uphill. In this same area, cyclists traveling downhill are often traveling at high speeds, which increases the likelihood for conflicts with pedestrians and slower cyclists. Bicycle volumes are higher on weekends than during the week at the entrance to the Lower Fort Mason parking lot.

Existing Pedestrian Resources

Existing pedestrian routes and LOS are shown in Table 12.

The Embarcadero. The most active uses on the Embarcadero are located on the east side of the waterfront, where the majority of pedestrian activity occurs. The east side of the Embarcadero has few interruptions from cross streets and driveways, and therefore is an attractive facility for recreational purposes. Embarcadero pedestrian volumes can vary

[1] Herb Caen Way is located on the north side of The Embarcadero; however, in the Fisherman's Wharf area, the Embarcadero veers to the north at Powell Street.

substantially depending on weather or day of the week.

Pier 31½. Near the existing embarkation site at Pier 31½, sidewalks along the east side of The Embarcadero are generally 18 to 25 feet wide. From Pier 31, pedestrians can cross The Embarcadero at either Bay Street, (approximately 350 feet to the north) or Chestnut and Sansome streets (approximately 700 feet to the south).

Pier 41. The waterfront area near Pier 41 experiences very high pedestrian activity. The Embarcadero promenade near Fisherman's Wharf widens out to a large plaza to accommodate increased pedestrian demand and tourist-related activities. The area immediately adjacent to Pier 39 is also used for tour bus pick-up and drop-off, which temporarily increases pedestrian volumes during boarding and disembarking. Similar to Pier 31½, the east side of the Embarcadero near Pier 41 has few interruptions from cross streets and driveways, and therefore is an attractive facility for recreational purposes.

Nearby Jefferson Street has 15-foot-wide sidewalks, which can become overcrowded during peak days and times, The area has a distinct peaking of foot traffic in the midday period, and pedestrian traffic is typically higher on the weekend than during the week. During both the weekday p.m. peak hour and the Saturday peak hour, the north crosswalk across the Embarcadero at Powell Street is severely crowded. The City has recently constructed pedestrian improvements as part of the Fisherman's Wharf Public Realm Plan. With the changes implemented, sidewalks on the south side of Jefferson Street between Powell and Taylor streets are approximately 30 feet wide.

Lower Fort Mason. Lower Fort Mason has four primary pedestrian access points: near the corner of Laguna and Beach streets; the driveway entrance at Buchanan Street and Beach Street-Marina Boulevard; the stairway between the Upper Fort Mason Bay Trail Promenade and Lower Fort Mason; and the Bay Trail adjacent to the Marina Green. Pedestrian pathways are marked through the Lower Fort Mason parking lot to the main on-site buildings.

Pedestrians walking to Lower Fort Mason from the east (i.e., Fisherman's Wharf) would likely use the Bay Trail Promenade around Upper Fort Mason between Pier 4 and Lower Fort Mason. Sidewalks near Lower Fort Mason, including Laguna, Buchanan, North Point, and Beach streets, are generally 10 to 15 feet wide. The north side of Marina Boulevard, west of Webster Street, is designated as part of the Bay Trail (Class I) and has delineated bicycle and pedestrian space to better separate the high volume of both bicyclists and pedestrians that use the path. This path is between 15 and 20 feet wide. Crosswalks along Marina Boulevard have been striped with high visibility continental crosswalk striping. A substantial amount of weekend pedestrian activity in this area is concentrated at the intersection of Laguna and Beach streets, where the Bay Trail Promenade joins the sidewalk along the eastern side of the intersection. Pedestrian volumes passing by the gated entrance to the Lower Fort Mason parking lot north of the Marina Boulevard and Laguna Street intersection are much higher during weekends than during the week. Pedestrian volumes entering Lower Fort Mason from the stairway connecting to Upper Fort Mason are also higher on weekends than during the week. On weekdays, pedestrian volumes are consistently higher than the Laguna Street entrance, suggesting that this is a well-used entryway to Lower Fort Mason.

Pedestrian access to Lower Fort Mason from the east side, adjacent to Pier 4, can be somewhat challenging. To the east, pedestrians are provided with a relatively flat Class I facility (dedicated, multiuse path) through SF Maritime NHP that offers sweeping views of Aquatic Park and the Bay, with relatively limited conflicts. However, to the west, the Class I facility climbs a rather steep hill to Upper Fort Mason, which presents some physical challenges to some visitors and where conflicts with bicycles can be challenging.

TABLE 12. EXISTING CONDITIONS – PEDESTRIAN LOS (WALKWAYS)

Analysis Location and Day of Week	Hourly Flow Volumes/LOS		
	a.m. Peak Hour	Mid-day Peak Hour	p.m. Peak Hour
Pier 31½—Embarcadero Promenade (between Bay and Chestnut Streets); 18-foot Walkway			
Tues-Thur	834 / B	840 / B	777 / B
Fri, Sat, Sun	1,222 / B	1,711 / C	1,707 / C
Pier 41—Embarcadero Promenade (east of Taylor Street); 12-foot Walkway			
Tues-Thur	611 / C	982 / C	817 / C
Fri, Sat, Sun	537 / C	1,692 / D	1,186 / C
Lower Fort Mason—Bay Trail west of Fort Mason Pier 4; 12-foot Walkway			
Tues-Thur	218 / A	172 / A	241 / A
Fri, Sat, Sun	368 / C	380 / C	378 / C

Existing Parking Conditions

Parking conditions generally within 0.25 to 0.5 mile of each potential embarkation site, shown in Figure 21, were evaluated based on parking occupancy and supply surveys conducted in 2011 and data from the SFMTA's *SFpark* Program. Parking is categorized as either on-street parking (i.e., metered and unmetered parking spaces) or off-street parking (i.e., publically accessible garages and surface lots). Overall parking utilization is generally below 80% during the weekdays, although in some cases, on-street parking may be fully utilized while spare capacity exists in off-street facilities. On Saturdays, parking is generally more available (i.e., less occupied) compared to weekdays around Pier 31½. Parking occupancy surrounding Lower Fort Mason increases on Saturday and is likely due to nearby recreational areas at Marina Green or special events at Fort Mason.

Pier 31½. In the vicinity of Pier 31½, there are approximately 1,125 off-street parking spaces in garages and lots within the site's parking catchment area. The parking garages in the area are privately owned, but available to the public. Surface parking in the area is generally managed by the Port, and only represents a small portion of the total off-street parking count. Within the Pier 31½ parking study area, there are approximately 690 on-street parking spaces. This count includes spaces to the northeast of Telegraph Hill but does not include spaces within the 0.25- to 0.5-mile radius that would require a circuitous route to the pier due to topography or discontinuous streets.

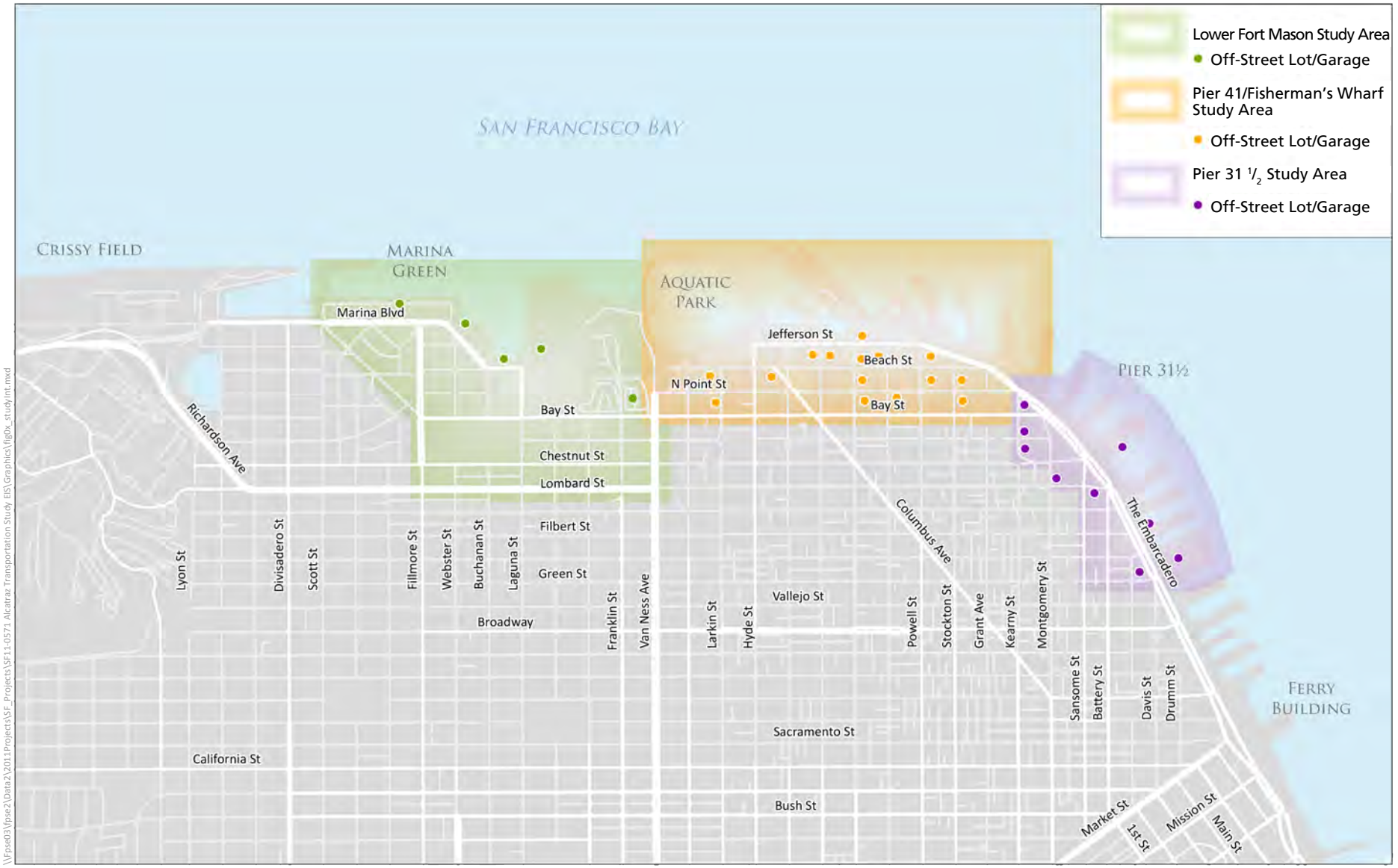

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FIGURE 21

PARKING STUDY AREAS

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

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During the week, parking is most utilized between 12:00 and 3:00 p.m., when 80% of available spaces are occupied. Off-street parking garages are between 50 and 70% occupied during business hours (generally between 9:00 a.m. and 6:00 p.m.), and after 6:00 p.m., parking utilization drops to 26%. On-street parking in the area is also effectively full between 9:00 a.m. and 6:00 p.m., when utilization is between 80 and 100%. Between noon and 3:00 p.m., more vehicles were observed parking on-street than spaces were available (103%). This is likely related to vehicles double parking or parking illegally in unmarked spaces. Weekend parking utilization is around 50%, reflecting the ability to find available parking easily.

Pier 41. There are approximately 3,325 off-street parking spaces in garages and surface lots in the vicinity of Pier 41. Approximately 2,890 on-street parking spaces serve the area. Fisherman's Wharf is located within a *SFpark* study area subject to regular parking rate adjustments to manage and balance parking demand. During the most recent cycle, on-street parking rates in this area were increased in response to high demand on Saturdays. This *SFpark* parking management strategy is intended to increase turnover of on-street parking spaces and encourage people to stay for longer periods and use garages and surface lots.

Parking is about 60% occupied during peak times on a weekday (12:00 to 6:00 p.m.). Off-street parking lots and garages were found to be about half full during this time period. On weekends, parking around Pier 41 is about 80% occupied during peak times on Saturday (12:00 to 6:00 p.m.) with on-street parking at about 90% utilization. None of the parking locations exceed 95% utilization.

Lower Fort Mason. Parking supply in the Lower Fort Mason area consists of multiple parking types and areas: SFMTA-managed public off-street parking garages (approximately 320 spaces); on-street unmetered parking (approximately 1,990 spaces); off-street surface parking lots at Marina Green (approximately 670 spaces); off-street surface parking lot at Lower Fort Mason (approximately 440 spaces); and, off-street surface parking lots at Upper Fort Mason (approximately 350 spaces). On-street parking surrounding Lower Fort Mason is subject to posted regulations of the San Francisco Residential Parking Permit (RPP) program. The RPP designation allows residents who live on streets north of Lombard Street to purchase a RPP "M" permit. During weekdays, vehicles with an M permit may park on-street for an unlimited time, except for posted street cleaning restrictions. Non-residents or visitors without an "M" permit are allowed to park for up to two hours between the hours of 8:00 a.m. and 6:00 p.m. South of Lombard Avenue, streets are part of the "K" RPP zone, which functions the same as the "M" zone.

During the week, public parking garages, lots at Marina Green, and the Lower Fort Mason lot generally operate well below capacity, with only about 50 to 60% of total available spaces occupied between 12:00 and 6:00 p.m. The Upper Fort Mason parking area is essentially full between 9:00 a.m. and 6:00 p.m., when 80 to 90% of available spaces are occupied. These lots are used by Park Service and GGNPC employees, and higher occupancy is consistent with typical work hours. After 6:00 p.m., only about 60% of these spaces remain occupied.

During the week, on-street parking around Lower Fort Mason is about 70% occupied between 9:00 a.m. and 3:00 p.m. After 3:00 p.m., parking occupancy increases to about 85%; then to 93% after 6:00 p.m. This pattern (i.e., lower occupancy during the day and higher occupancy in the evening) is typical of residential areas where residents leave for work in the morning and return home in the evening.

Parking around Lower Fort Mason is generally more constrained on the weekend. Public parking garages (Pierce Street and Lombard Street garages) are about 50% occupied between 12:00 and 6:00 p.m. and are about 70% occupied after 6:00 p.m. Off-street parking at Marina Green is about 80%

occupied between 12:00 and 6:00 p.m. The Upper Fort Mason lots are generally about 85 to 90% occupied throughout the day, with an increase in demand between 3:00 and 6:00 p.m. The Lower Fort Mason lot is overcapacity between 12:00 and 6:00 p.m.

On weekends, on-street parking surrounding Lower Fort Mason is effectively full, with more than 90% of available spaces occupied at all times of day. It should be noted that the analysis described in this report discusses typical conditions at Lower Fort Mason. However, because of its function as an event space and its somewhat seasonal current programming, on days with large events, parking conditions may be substantially more constrained than described within this report for a more typical day.

REGULATIONS AND POLICIES

Federal

GGNRA and Muir Woods National Monument GMP. The GMP identifies a vision for the Alcatraz Island visitor experience that gives visitors a more complete understanding of the complex history of Alcatraz Island, beginning with the embarkation site in San Francisco. The GMP calls for enhanced education and visitor services on the San Francisco embarkation site (NPS 2014a).

Local

WETA's Water Transportation System Management Plan. WETA is a regional agency authorized by the state to operate a comprehensive Bay Area public water transit system. In 2009, the WETA adopted the Emergency Water Transportation System Management Plan, which complements and reinforces other transportation emergency plans that will enable the Bay Area to restore mobility after a regional disaster. As discussed later in this report, WETA also operates passenger ferry service from the San Francisco Ferry Building and Pier 41.

Bay Trail Plan. The Association of Bay Area Governments (ABAG) administers the Bay Trail Plan. The Bay Trail is a multipurpose recreational trail that, when complete, would encircle the San Francisco Bay and San Pablo Bay with a continuous 400-mile network of bicycling and hiking trails. To date, 290 miles of the alignment have been completed. The 2005 *Gap Analysis Study*, prepared by ABAG for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail system; classify the gaps by phase, county, and benefit ranking; develop cost estimates for individual gap completion; identify strategies and actions to overcome gaps; and present an overall cost and timeframe for completion of the Bay Trail system. In the Project area, the 2005 Gap Analysis Study proposes to connect two Bay Trail segments along the waterfront: The Embarcadero between Taylor and Powell streets, and Jefferson Street between Taylor Street and west of Hyde Street.

General Plan. The Transportation Element of the General Plan is composed of objectives and policies that relate to the eight aspects of the citywide transportation system: general regional transportation, congestion management, vehicle circulation, transit, pedestrians, bicycles, citywide parking, and goods management. The Transportation Element references San Francisco's Transit-First policy in its introduction, and contains the following objectives and policies that are directly pertinent to consideration of the proposed Project:

- Objective 2: Use the transportation system as a means for guiding development and improving the environment.
  - Policy 2.1: Use rapid transit and other transportation improvements in the City and region as the catalyst for desirable development, and coordinate new facilities with public and private development.
  - Policy 2.4: Organize the transportation system to reinforce community identity, improve linkages among interrelated

activities, and provide focus for community activities.

- Objective 9: Improve bicycle access to San Francisco from all outlying corridors.
  - Policy 9.2: Where bicycles are prohibited on roadway segments, provide parallel routes accessible to bicycles or shuttle services that transport bicycles.
- Objective 11: Establish public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality.
- Objective 14: Develop and implement a plan for operational changes and land use policies that will maintain mobility and safety, despite a rise in travel demand that could otherwise result in system capacity deficiencies.
  - Policy 14.2: Ensure that traffic signals are timed and phased to emphasize transit, pedestrian, and bicycle traffic as part of a balanced multimodal transportation system.
  - Policy 14.3: Improve transit operation by implementing strategies that facilitate and prioritize transit vehicle movement and loading.
  - Policy 14.4: Reduce congestion by encouraging alternatives to the single-occupancy automobile through the reservation of right-of-way and enhancement of other facilities dedicated to multiple modes of transportation.
  - Policy 14.7: Encourage the use of transit and other alternative modes of travel to the private automobile through the positioning of building entrances and the convenient location of support facilities that prioritize access from these modes.
- Objective 23: Improve the City's pedestrian circulation system to provide for efficient, pleasant, and safe movement.
  - Policy 23.2: Widen sidewalks where intensive commercial, recreational, or institutional activities are present and where residential densities are high.
  - Policy 23.3: Maintain a strong presumption against reducing sidewalk widths, eliminating crosswalks, and forcing indirect crossings to accommodate automobile traffic.
  - Policy 23.6: Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street.
- Objective 24: Improve the ambiance of the pedestrian environment.
- Objective 28: Provide secure and convenient parking facilities for bicycles.
  - Policy 28.1: Provide secure bicycle parking in new governmental, commercial, and residential developments.
  - Policy 28.3: Provide parking facilities that are safe, secure, and convenient.

San Francisco Bicycle Plan. The San Francisco Bicycle Plan describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode. The San Francisco Bicycle Plan identifies the citywide bicycle route network, and establishes the level of treatment (i.e., Class I, Class II, or Class III facility) on each route. The plan also identifies near-term improvements that could be implemented within the next 5 years, as well as policy goals, objectives, and actions to support these improvements. It also includes long-term improvements and minor improvements that would be implemented to facilitate cycling in San Francisco.

Transit-First Policy. In 1998, San Francisco voters amended the City Charter (Charter Article 8A, Section 8A.115) to include a Transit-First policy, which was first articulated as a City priority policy by the Board of Supervisors in 1973. The Transit-

First policy is a set of principles that underscore the City's commitment to the concept that travel by transit, bicycle, and foot be given priority over the private automobile.

These principles are embodied in the policies and objectives of the Transportation Element of the General Plan. All City boards, commissions, and departments are required by law to implement Transit-First principles in conducting City affairs.

Better Streets Plan. The Better Streets Plan focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming to increase pedestrian safety. The Better Streets Plan includes guidelines for the pedestrian environment, which it defines as the areas of the street where people walk, shop, sit, play, or interact. Generally speaking, the guidelines are for the design of sidewalks and crosswalks; however, in some cases, the Better Streets Plan includes guidelines for certain areas of the roadway, particularly at intersections.

AIR QUALITY

This section analyzes the existing air quality conditions of the study area and surrounding region from both stationary and mobile sources of air emissions. The study area for this resource topic is defined as the San Francisco waterfront region, which includes the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, Pier 3 at Fort Mason, and the Fort Baker waterfront). Project activities would be limited to the alternative embarkation sites, the Bay, and surrounding roadways within the peninsula region of the San Francisco Bay Area Air Basin (SFBAAB).

EXISTING CONDITIONS

Development of this section was based on a review of existing documentation of air quality conditions in the region, air quality regulations from the USEPA, the California Air Resources Board (CARB), the Bay Area Air Quality Management District (BAAQMD), and information related to the Project. Potential air quality impacts associated with the Project would be within the jurisdiction of the BAAQMD.

Regional Climate and Meteorology

Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

The study area is located in the SFBAAB's San Francisco peninsula climatological subregion. The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The climate in the SFBAAB is dominated by the strength and location of a semipermanent, subtropical high-pressure cell. During the summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore and the occurrence of storms.

The peninsula climatological subregion of the SFBAAB extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula. The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. The coastal portions of the peninsula experience a high incidence of cool, foggy weather in the summer. In the Project area, the mean maximum summer temperatures are in the mid-60s (degrees Fahrenheit [°F]), whereas the mean minimum temperature during the winter months are in the low-40s. The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. Annual average wind speeds range from 5 to 10 miles per hour throughout the peninsula, with higher wind speeds along the coast.

Criteria Air Pollutants Ambient Air Quality

The USEPA establishes the National Ambient Air Quality Standards (NAAQS). For a region to be considered NAAQS compliant, maximum concentrations for most pollutants, must neither exceed an NAAQS more than once per year nor exceed the annual standards. The CARB establishes the California Ambient Air Quality Standards (CAAQS), which are generally more stringent and include more pollutants than the NAAQS. For a region to be considered CAAQS compliant, maximum pollutant concentrations must not equal or exceed the CAAQS. These standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and, as such, they include a

reasonable margin of safety to protect the more sensitive individuals in the population.

Pollutants that have corresponding NAAQS and CAAQS are known as criteria pollutants. The criteria pollutants of primary concern in this air quality assessment are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with particle diameter less than 10 microns (PM_{10}), and particulate matter with particle diameter less than 2.5 microns ($PM_{2.5}$). Criteria pollutants contribute directly to regional health issues. The known adverse effects associated with these criteria pollutants are shown in Table 13.

Of the criteria pollutants of concern, O_3 is unique because it is not directly emitted from project-related sources. Rather, O_3 is a secondary pollutant, formed from the precursor pollutants volatile organic compounds (VOC) and nitrogen oxides (NOx). VOC and NOx react to form O_3 in the presence of sunlight through a complex series of photochemical reactions. As a result, unlike inert pollutants, O_3 levels usually peak several hours after the precursors are emitted and many miles downwind of the source. Because of the complexity and uncertainty in predicting photochemical pollutant concentrations, O_3 impacts are indirectly addressed in this study by comparing Project-generated emissions of VOC and NOx to daily emission thresholds set by the BAAQMD and by comparing pollutant concentrations to NAAQS and CAAQS.

Air quality at a given location can be characterized by the concentration of various pollutants in the air. Units of concentration are generally expressed as parts per million on a volume basis or micrograms per cubic meter ($\mu g/m^3$) of air. The significance of a pollutant concentration is determined by comparing the concentration to an appropriate NAAQS or CAAQS.

TABLE 13. ADVERSE EFFECTS ASSOCIATED WITH CRITERIA POLLUTANTS

Pollutant	Sources	Adverse Effects
O_3	Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Short-term exposures – Pulmonary function decrements and localized lung edema in humans and animals – Risk to public health implied by alterations in pulmonary morphology and host defense in animals • Long-term exposures – Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures, and pulmonary function decrements in chronically exposed humans • Vegetation damage • Property damage

Pollutant	Sources	Adverse Effects
CO	Incomplete combustion of fuels and other carbon-containing substances such as motor vehicle exhaust, and natural events such as decomposition of organic matter	• Aggravation of some coronary heart disease • Decreased exercise tolerance in persons with peripheral vascular disease and lung disease • Impairment of central nervous system functions • Possible birth defects
NO_2	Motor vehicle exhaust, high temperature stationary combustion, and atmospheric reactions	• Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups • Risk to public health implied by pulmonary and extrapulmonary biochemical and cellular changes and pulmonary structural changes • Contribution to atmospheric discoloration
SO_2	Combination of sulfur-containing fossil fuels, smelting of sulfur-bearing metal ore, and industrial processes.	• Bronchoconstriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10} and $PM_{2.5}$)	Combustion of fuels, construction activities, industrial processes, and atmospheric chemical reactions	• Excess deaths from short-term and long-term exposures • Excess seasonal declines in pulmonary function, especially in children • Asthma exacerbation and possibly induction • Adverse birth outcomes including low birth weight • Increased infant mortality • increased respiratory symptoms in children such as cough and bronchitis • Increased hospitalization for both cardiovascular and respiratory disease (including asthma)[a]
Lead[b]	Metal processing.	• Behavioral and hearing disabilities in children • Nervous system impairment.

Notes:
Source: BAAQMD 2011
a More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: California Office of Environmental Health Hazard Assessment (OEHHA), Particulate Matter Health Effects and Standard Recommendations (www.oehha.ca.gov/air/toxic_contaminants/PM10notice.html#may), May 9, 2002 (OEHHA 2002; USEPA 2004).
b CAAQS have also been established for lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. They are not shown in this table because they are not pollutants of concern for the Project.

USEPA designates all areas of the U.S. according to whether they meet the NAAQS. A nonattainment designation means that a primary NAAQS has been exceeded more than once per year in a given area. States with nonattainment areas prepare a State Implementation Plan (SIP) that demonstrates how those areas will come into attainment.

USEPA currently designates the San Francisco portion of the SFBAAB as marginal nonattainment for 8-hour O_3 and attainment/unclassified for PM_{10}, CO, NO_2, and SO_2 (USEPA 2013). Furthermore, in January 2013, the USEPA issued a final rule stating that the SFBAAB has attained the 24-hour $PM_{2.5}$ NAAQS.

The CARB also designates areas of the state according to whether they meet the CAAQS. A nonattainment designation means that a CAAQS has been exceeded more than once in 3 years. The CARB currently designates the San Francisco portion of the SFBAAB as serious nonattainment for O_3, nonattainment for $PM_{2.5}$ and PM_{10}, and attainment/unclassified for CO, NO_2, SO_2, sulfates, hydrogen sulfide, lead, and visibility reducing particles.

Local Air Monitoring Levels

The CARB and BAAQMD operate a network of monitoring stations that regularly measure the concentrations of the major criteria air pollutants. The most representative and closest station for the Project vicinity is the San Francisco-Arkansas Street monitoring station, which monitors O_3, PM_{10}, $PM_{2.5}$, NO_2 and CO, but does not monitor SO_2. Ambient air measurements for SO_2 were obtained from the Berkeley–6th Street monitoring station, also located close to the Project vicinity. Table 14 shows the highest pollutant concentrations recorded at the station for 2010 to 2012, the most recent complete 3-year period of data available from the CARB. Table 14 shows exceedances of the NAAQS and/or CAAQS in bold.

TABLE 14. MAXIMUM POLLUTANT CONCENTRATIONS MEASURED AT THE SAN FRANCISCO-ARKANSAS STREET MONITORING STATION

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration		
				2010	2011	2012
O_3 (ppm)	1-hour	--	0.09	0.079	0.070	0.069
	8-hour[a]	0.075	0.07	0.051	0.054	0.048
CO (ppm)	1-hour	35	20	N/A	N/A	N/A
	8-hour	9	9	1.37	1.20	1.19
NO_2 (ppm)	1-hour National[b]	0.100	--	0.0766	0.0796	0.0659
	1-hour State	--	0.18	0.080	0.090	0.090
	Annual	0.053	0.030	0.013	0.014	0.012
SO_2 (ppm)[c]	1-hour National[d]	0.075	--	N/A	N/A	N/A
	1-hour State	--	0.25	N/A	N/A	N/A
	24-hour	--	0.04	0.003	N/D	N/D
PM_{10} ($\mu g/m^3$)	24-hour National	150	--	38.6	43.7	48.2
	24-hour State	--	50	39.7	45.6	**50.6**
	Annual	--	20	N/D	19.5	17.5
$PM_{2.5}$ ($\mu g/m^3$)	24-hour[e]	35	--	24.4	26.4	21.5
	Annual	15	12	10.5	9.5	8.2

Notes:
Source: iADAM ARB database - historical air quality data, 2010-2012 (CARB 2013).
Exceedances of the standards are highlighted in **bold**.
Source: NPS 2014b
No data was collected for the cells with dashes.
ppm = parts per million
N/A = not available
N/D = insufficient data
a The monitored concentrations reported for the national 8-hour O_3 standard represent the 3-year average (including the reported year and the prior 2 years) of the 4th-highest 8-hour concentration each year.
b The monitored concentrations reported for the national 1-hour NO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.
c Arkansas Street monitoring station does not monitor SO_2. The Berkeley–6th Street monitoring station was used.
d The monitored concentrations reported for the national 1-hour SO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.
e The monitored concentrations reported for the national 24-hour $PM_{2.5}$ standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th percentile of the annual distribution of daily average concentrations.

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. TACs are identified, and their toxicity is studied by the OEHHA. TACs include air pollutants that can produce adverse human health effects, including carcinogenic effects, after short-term (acute) or long-term (chronic) exposure.

Sensitive Receptors

Air quality does not affect individuals in a given population in the same way; some groups may be more sensitive than others to adverse health effects. The impact of air emissions on sensitive members of the population is a special concern. Sensitive receptor groups include children, the elderly, and the acutely and chronically ill. Land uses and facilities such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. However, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools. Table 15 shows the closest sensitive receptors to each alternative site under evaluation.

TABLE 15. SENSITIVE RECEPTORS

Project Site	Receptor Type and Location	Distance from Project Area
Pier 3	Residential, corner of Marina Boulevard and Buchanan Street	330 meters southwest
Pier 31½	Residential, corner of Sansome and Chestnut streets	220 meters south
Pier 41	Residential, North Point and Powell streets	225 meters south
Fort Baker	Residential, corner of Bunker and McReynolds roads	450 meters north-northwest

Note:
Source: Google Earth

GHG Emissions

Gases that trap heat in the atmosphere are considered GHGs. GHGs are emitted by natural processes and human activities. Examples of GHGs that are produced both by natural processes and industry include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride.

Scientific evidence indicates a trend of increasing global temperatures near the Earth's surface over the past century due to increased human induced levels of GHGs. According to the Intergovernmental Panel on Climate Change (IPCC 2007), the atmospheric concentration of CO_2 in 2005 was 379 ppm, compared to the pre-industrial levels of 280 ppm. In addition, the Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO_2 emissions increased by 20% from 1990 to 2004, while CH_4 and N_2O emissions decreased by 10 and 2%, respectively. Studies suggest a close relationship between the increased concentration of GHGs in the atmosphere and global temperatures.

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase in global temperatures, which in turn has numerous indirect effects on the environment and humans. For example, some observed changes include shrinking glaciers,

thawing permafrost, later freezing and earlier breakup of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees. Other, longer-term environmental impacts of global warming may include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems, including the potential loss of species, and a significant reduction in winter snow pack. Data suggest that in the next 25 years, California could experience longer, more frequent and more extreme heat waves, longer dry periods, an increase in wildfires, and sea level rise.

The 2009 California Climate Adaptation Strategy is a multisector strategy with the objective of guiding California's efforts in adapting to climate change impacts. Cal-Adapt projects the following in the areas surrounding the Project vicinity (Cal-Adapt 2013):

- Temperature rise of approximately 3.2 to 5.5 °F by the end of the century
- Decrease of approximately 1 to 5 inches in annual precipitation by the end of the century
- Increase of threat in areas of inundation during an extreme flood event of 26% (100-year flood)
- Cal-Adapt has not assigned wildfire risk or snow pack change to the area.

REGULATIONS AND POLICIES

The Federal Clean Air Act of 1969 (CAA) and its subsequent amendments established air quality regulations and the NAAQS, and delegated enforcement of these standards to the states. In California, the CARB is responsible for enforcing air pollution regulations. The CARB has, in turn, delegated the responsibility of regulating stationary emission sources to the local air agencies. In the SFBAAB, the local air agency is the BAAQMD. The following is a summary of the key federal, state, and local air quality rules, policies, and agreements that potentially apply to the Project and its related activities.

Federal

NPS Management Policies (4.7.1). The Park Service has a responsibility to protect air quality under both the organic act and the CAA. Accordingly, the Park Service will seek to perpetuate the best possible air quality in parks to preserve natural resources and systems, preserve cultural resources, and sustain visitor enjoyment, human health, and scenic vistas. Vegetation, visibility, water quality, wildlife, historic and prehistoric structures and objects, cultural landscapes, and most other elements of a park environment are sensitive to air pollution and are referred to as "air quality related values." The Park Service will actively promote and pursue measures to protect these values from the adverse impacts of air pollution. In cases where there is doubt as to the impacts of existing or potential air pollution on park resources, the Park Service will err on the side of protecting air quality and related values for future generations.

National Park Service Climate Friendly Parks Program. A joint program of USEPA and the Park Service, the Climate Friendly Parks Program helps parks reduce GHG emission by developing alternative transportation systems, designing and constructing sustainable facilities, and developing plans to reduce energy and water use (NPS 2008b).

National Park Service Pacific West Region Directive PW-047, October 31, 2006. This directive provides policies pertaining to on-site generated renewable energy. Specifically, the conversion to renewable sources of energy is encouraged, and purchasing of green power (including wind, solar, biomass, and geothermal) is allowed when on-site renewable energy systems are not feasible. Alternatively, purchasing Green Power Tags is also permitted (NPS 2008b).

State Implementation Plan. The City/County region is designated a nonattainment area for the federal 8-hour O_3 air quality standard and as such is required, per the California Clean Air Act (CCAA) to

undertake planning efforts to reach the health-based standard for O_3. In response to this requirement, the BAAQMD has been preparing O_3 plans since 1982. The most recent O_3 plan is the Bay Area 2010 Clean Air Plan. This plan is a multipollutant plan that provides an integrated control strategy to reduce O_3, particulate matter, TACs, and GHGs.

Furthermore, in January 2013, the USEPA determined that the SFBAAB had attained the 24-hour $PM_{2.5}$ NAAQS. This action suspends federal SIP planning requirements for SFBAAB (BAAQMD 2013).

Emission Standards for Nonroad Diesel Engines. To reduce emissions from offroad diesel equipment, USEPA established a series of increasingly strict emission standards for new offroad diesel engines. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower (hp) category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards were phased in from 2006 to 2008. Tier 4 standards, which require add-on emission control equipment to attain them, are being phased in between 2008 and 2015. These standards apply to Project-related offroad construction equipment, based on year of manufacture.

Emission Standards for Marine Diesel Engines. To reduce emissions from Category 1 (greater than 50 hp, less than 5 liters per cylinder displacement) and Category 2 (between 5 and 30 liters per cylinder displacement) marine diesel engines, USEPA established emission standards for new engines, referred to as Tiers 2, 3, and 4 marine engine standards. Tier 2 standards were phased in between 2004 and 2007, depending on the engine size. Tier 3 standards are being phased in between 2009 and 2014. The after-treatment-based Tier 4 standards will be phased in between 2014 and 2017. These standards apply to Project-related ferries, depending on year of engine manufacture.

Emission Standards for Onroad Trucks. To reduce emissions from onroad, heavy-duty diesel trucks, USEPA established a series of increasingly strict emission standards for new truck engines. The 1988 to 2003 emission standards applied to trucks manufactured between 1988 and 2003. In 1997, USEPA adopted new emission standards for model year 2004 and later heavy-duty trucks. The goal of the 1997 regulation was to reduce NOx engine emissions to approximately 2.0 grams per brake hp. In 2000, USEPA adopted standards for particulate matter (PM), NOx and nonmethane hydrocarbon (NMHC) for model years 2007 and later, heavy-duty highway engines and a 15 ppm limit on the sulfur content of diesel fuel. The NOx and NMHC standards were phased in between 2007 and 2010, and the PM standard applied to 2008 and newer engines. These standards apply to some supply delivery trucks used during Project operation.

Nonroad Diesel Fuel Rule. With this rule, USEPA set sulfur limitations for nonroad diesel fuel, including marine vessels. For the Project, this rule affects construction equipment and harbor craft, as well as ferries used during Project operation, although the California Diesel Fuel Regulations (described under state regulations) generally preempt this rule. Under this rule, the diesel fuel used by offroad equipment and harbor craft was limited to 500 ppm sulfur content prior to June 1, 2007, and further limited to 15 ppm sulfur content (ultralow sulfur diesel) starting January 1, 2010, for nonroad fuel, and June 2012 for marine fuels.

Highway Diesel Fuel Rule. With this rule, USEPA set sulfur limitations for onroad diesel fuel to 15 ppm, starting June 1, 2006.

General Conformity Rule. Section 176(c) of the CAA states that a federal agency cannot support an activity unless the agency determines that the activity will conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval must not do the following:

- Cause or contribute to any new violation of an NAAQS
- Increase the frequency or severity of any existing violation
- Delay the timely attainment of any standard, interim emission reduction, or other milestone

In an area with a SIP (an area in nonattainment of a NAAQS), conformity can be demonstrated in one of four ways:

- By showing that the emission increases caused by an action are included in the SIP;
- By demonstrating that the state agrees to include the emission increases in the SIP;
- Through offsets; and
- Through mitigation.

USEPA and Department of Transportation's National Highway Traffic Safety Administration (NHTSA) Light-Duty Vehicle GHG Emission Standards and Corporate Average Fuel Economy Standards. In May 2010, the USEPA, in conjunction with the NHTSA, finalized the Light-Duty Vehicle Rule (LDVR) that establishes a national program consisting of GHG emissions standards and Corporate Average Fuel Economy (CAFE) standards for light-duty vehicles (USEPA 2010). LDVR standards first apply to new cars and trucks starting with model year 2012. Although the rule is designed to address GHG emissions, the fuel economy standards portion of the rule would primarily serve to reduce criteria pollutant emissions. On August 28, 2012, USEPA and NHTSA extended the national program of harmonized GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles. The 2010 and 2012 rules affect passenger vehicles (i.e., employees and visitors) and other light-duty vehicles.

Energy Independence and Security Act of 2007. The Energy Independence and Security Act of 2007 was signed into law on December 19, 2007, and includes provisions covering the following:

- Renewable Fuel Standard (section 202)
- Appliance and Lighting Efficiency Standards (sections 301 to 325)
- Building Energy Efficiency (sections 411 to 441)

Additional provisions of the energy independence and security act address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

The Renewable Fuel Standard is of some relevance to the Project, as the regulations require annual increases in biofuels sold—both biodiesel and bioethanol—from the years 2010 to 2022. By year 2022, the renewable fuel standard will require at least 74 billion gallons of biofuel to be sold in the U.S., compared to the 2010 level of approximately 14.5 billion gallons. This act, although not directly relevant to Project activities, serves to highlight the developing GHG regulatory framework.

CEQ NEPA Guidance on Consideration of Effects of Climate Change and GHG Emissions. In February 2010, CEQ released a guidance memorandum on the ways that federal agencies can improve their consideration of the effects of GHG emissions and climate change in their evaluation of proposals for federal actions under NEPA. The guidance was intended to help explain how agencies of the federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with section 102 of NEPA and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR parts 1500 to 1508. The guidance affirmed the requirements of the statute and regulations and their applicability to GHGs and climate change impacts. CEQ advised federal agencies that they should consider opportunities to reduce

GHG emissions caused by proposed federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures.

The guidance advised federal agencies to consider whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decisionmakers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide equivalent (CO_2e) GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decisionmakers and the public. The guidance identified a "reference point" of 25,000 metric tons of direct CO_2e GHG emissions as an indicator that the proposed federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. For indirect GHG emissions (i.e., GHG emissions that have a causal nexus to, but are neither directly emitted by nor the direct result of, the Project), the guidance did not propose a reference point indicating when such indirect emissions are significant and cautioned that any consideration of indirect GHG emissions needed to recognize the limits of feasibility in evaluating upstream and downstream effects of proposed federal actions.

The guidance did not propose this reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather as a minimum standard for reporting emissions under the CAA.

State

CCAA. The CCAA of 1988, as amended in 1992, outlines a program to attain the CAAQS by the earliest practical date. Because the CAAQS are more stringent than the NAAQS, attainment of the CAAQS requires more emissions reductions than would be required to show attainment of the NAAQS. Consequently, the main focus of attainment planning in California has shifted from federal to state requirements. Similar to the federal system, the state requirements and compliance dates are based upon the severity of the ambient air quality standard violation within a region.

California Diesel Fuel Regulations. With this rule, the CARB set sulfur limitations for diesel fuel sold in California for use in on- and off-road motor vehicles. Harbor craft were originally excluded from the rule, but were later included by a 2004 amendment. Under this rule, diesel fuel used in motor vehicles except harbor craft has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm on September 1, 2006.

CARB Statewide Portable Equipment Registration Program (PERP). The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. The PERP applies to off-road construction equipment that would be used during Project construction.

CARB In-use Off-road Diesel Vehicle Regulation. In 2007 the CARB adopted a rule that requires owners of off-road mobile equipment powered by diesel engines that are 25 hp or larger to meet the fleet average or Best Available Control Technology requirements for NOx and PM emissions by March 1 of each year (California Code of Regulations [CCR] Title 13, section 2449). The rule is structured by fleet size: large, medium and small fleets. The regulation was adopted in April 2008 and subsequently amended to delay the turnover of Tier 1 equipment for meeting the NOx performance requirements of the regulation, and then to delay overall implementation of the equipment turnover compliance schedule in response to the economic downturn in 2008 and 2009.

In September 2013, the CARB received authorization from USEPA to enforce the in-use off-road diesel vehicle regulation, including the regulation's performance requirements, such as turnover requirements and restrictions on adding older, dirtier Tier 0 and 1 vehicles. Enforcement of the restrictions on adding Tier 0 and 1 vehicles will begin January 1, 2014. Enforcement of the first fleet average requirements for large fleets (greater than 5,000 total fleet hp) will begin on July 1, 2014. For the purposes of this analysis, the regulation was applied to construction activities.

CARB On-road Heavy-duty Diesel Vehicles (In-use) Regulation—Truck and Bus Regulation. In December 2011, CARB amended the 2008 statewide truck and bus regulation to modernize in-use heavy-duty vehicles operating throughout the state. The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses with a gross vehicle weight rating greater than 14,000 pounds. Heavier trucks must be retrofitted with PM filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year or later engines or the equivalent. This regulation applies to construction trucks and to tour buses.

CARB Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft. In November 2007, the CARB adopted a regulation to reduce diesel particulate matter and NOx emissions from new and in-use commercial harbor craft. Under the CARB's definition, commercial harbor craft include tug boats, tow boats, ferries, excursion vessels, work boats, crew boats, and fishing vessels. The regulation implemented stringent emission limits on harbor craft auxiliary and propulsion engines. In 2010, the CARB amended the regulation to add specific in-use requirements for barges, dredges, and crew/supply vessels.

The regulation requires that all in-use, newly purchased, or replacement engines meet USEPA's most stringent emission standards per a compliance schedule set forth by the CARB. The compliance schedule, as listed in the 2007 regulation for in-use engine replacement, was supposed to begin in 2009, but was not enforced until August 2012, after USEPA approved the CARB's regulation (CARB 2011). This regulation was assumed to apply to harbor craft used during Project construction and ferries used during operation.

Assembly Bill (AB) 1493—Vehicular Emissions of GHGs. AB 1493 (Pavley), enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by the CARB apply to 2009 and later model year vehicles. The CARB estimated that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by 18% in 2020 and 27% in 2030 (CARB 2004).

Executive Order S-3-05. Executive Order S-3-05 set forth statewide GHG emission reduction targets as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80% below 1990 levels.

AB 32—California Global Warming Solutions Act of 2006. The purpose of AB 32 is to reduce statewide GHG emissions to 1990 levels by 2020. This enactment instructs the CARB to adopt regulations that reduce emissions from significant sources of GHGs and establish a mandatory GHG reporting and verification program by January 1, 2008. AB 32 required the CARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which became effective on January 1, 2012. The CARB also established a market-based cap and trade system. AB 32 does not identify a significance level of GHG for NEPA purposes.

California Climate Change Scoping Plan (Scoping Plan). The Scoping Plan is the state's roadmap to reach the GHG reduction goals required in the global warming solutions

act of 2006, or AB 32. This plan calls for reductions in California's carbon footprint to 1990 levels. The Scoping Plan calls to cut approximately 30% of GHGs from business-as-usual emissions levels projected for 2020, or about 15% from today's levels. The Scoping Plan includes strategies such as the cap-and-trade program, improved appliance efficiency standards and other energy efficiency measures, capture of high global warming potential gases, more efficient agricultural equipment and uses, reduction of 30% of vehicle GHG emissions by 2016 (known as the 'Pavley standards') followed by further reductions from 2017, better land use planning, regulations on the largest emission sources, forestry measures, waste facility emission reduction measures, and improved recycling measures. The Scoping Plan requires the CARB and other state agencies to adopt regulations and other initiatives in 2010 and 2011.

Energy Conservation Building Standards. In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California green building standards code (proposed 24 CCR 11) was adopted as part of the California building standards code (24 CCR). Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California energy code requirements), water conservation, material conservation, and internal air contaminants. Some of these standards have become mandatory in the 2010 edition of 24 CCR 11.

The California Energy Commission has opened a public process and rulemaking proceeding to adopt changes to the 2013 Building Energy Efficiency Standards contained in 24 CCR 6 (also known as the California energy code), and associated administrative regulations in Part 1 (collectively referred to here as the Standards). The proposed amended Standards will be adopted in 2014. The 2013 Building Energy Efficiency Standards are 25% more efficient than previous Standards for residential construction and 30% better for nonresidential construction. The Standards, which take effect on January 1, 2014, will offer builders better windows, insulation, lighting, ventilation systems, and other features that will reduce energy consumption in homes and businesses.

Local

GGNRA Climate Change Action Plan, December 2008. In December of 2008 the GGNRA published its report, the *Golden Gate National Recreation Area Climate Change Action Plan*, with the objective of identifying actions that GGNRA can undertake to reduce GHG emissions, and thereby address climate change. The plan presents the park's emission reduction targets and associated reduction strategies designed to achieve the park's emission reduction goals. Specifically, the plan provides the GGNRA's goals and objectives, climate change background, an inventory of GHG emissions and criteria air pollutants, and the following four strategies:

(1) Reduce GHG emissions resulting from activities within and by the park;
(2) Plan and adapt to future impacts of climate change;
(3) Increase climate change education and outreach; and
(4) Evaluate progress and identify areas for improvement (NPS 2008b).

BAAQMD Rule 401—Ringelmann Chart/Opacity. This rule limits the discharge of air contaminants into the atmosphere through visible emissions and opacity. The rule stipulates that a person shall not discharge into the atmosphere any air contaminant, other than uncombined water vapor, from any single source of emission whatsoever for a period or periods aggregating more than 3 minutes in any 1 hour which is:

- As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or
- Of such opacity as to obscure a human observer's view, or a certified calibrated in-stack opacity monitoring system to a degree equal to or greater than does smoke described in Subsection 301.1 of the rule.

BAAQMD Rule 402—Nuisance. The purpose of the rule is to protect the public's health and welfare from the emission of air contaminants that constitute a nuisance. The rule requires that a person not discharge from any source such quantities of air contaminants or other materials that may cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public, that endanger the comfort, repose, health or safety of any such persons or the public, or that cause or have the natural tendency to cause injury or damage to businesses or property.

BAAQMD Rule 403—Fugitive Dust. The purpose of the rule is to regulate operations that periodically may cause fugitive dust emissions into the atmosphere. The rule requires that a person take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or from any wrecking, excavation, grading, and clearing of land or solid waste disposal operation. Reasonable precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways, or the clearing of land.
- Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces that can give rise to airborne dusts.

San Francisco Construction Dust Control Ordinance. San Francisco health code article 22B and San Francisco building code section 106.A.3.2.6, which collectively comprise the construction dust control ordinance, require that all site preparation work, demolition, or other construction activities within the City that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from the Department of Building Inspection.

NOISE AND VIBRATION

This section discusses the existing noise and vibration conditions and identifies sensitive receptors that may be affected by Project-related noise and vibration in the study area. The study area for this resource topic is defined as the built and natural environment within and adjacent to the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), as well as at the Fort Baker area in southern Marin County.

EXISTING CONDITIONS

Concepts and Terminology

Noise. Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted or undesired sound caused by humans. Whether a noise is considered unpleasant (e.g., due to quality, intensity, or repetition) depends on the individual listening to that noise, as well as what that individual is doing when that noise is heard (i.e., working or sleeping). The absence of all noise is often referred to as natural quiet or ambient sound.

Sound can be characterized using multiple parameters, with the most common being sound pressure (amplitude), which describes deviations in ambient sound caused by noise. In air, sound pressure can be measured by a microphone in decibels (dB), a logarithmic loudness scale, with 10 dB corresponding roughly to the threshold of human hearing (e.g., listening to human breathing), and 120 to 140 dB corresponding to the threshold of human pain (e.g., standing beside a jet engine). However, when assessing potential impacts on the environment, sound pressure is typically measured in A-weighted decibels (dBA), a frequency weighting that better reflects human sensitivity to sound in regards to extremely high and low frequencies. Noise is often a byproduct of desirable activities or machines, and can be generated by both mobile (i.e., cars) and stationary (i.e., operational machinery) sources. Mobile sources typically attenuate at a rate of 3.0 to 4.5 dBA per doubling of distance, depending on the ground surface and obstructions between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, typically have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, typically have an attenuation rate of 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance.

In general, noise-sensitive land uses include those uses where noise exposure could result in human health risks (e.g., sleep disturbances in a residential zone), as well as uses where minimal sound is essential to their intended purpose (i.e., cemeteries or libraries). Noise levels can be reduced by placing barriers between the noise source and the receiver that break the "line of site" between each. Solid barriers, like buildings and concrete walls, are generally more effective than soft barriers, like wooden fences or foliage.

To assess the existing noise levels within a particular environment, noise monitoring surveys are often conducted. Surveys typically record data over an extended period of time (often 1 hour), due to the constant fluctuation of noise levels within environments. The most commonly used noise descriptors include the following:

- L_{max} (Maximum Noise Level). The maximum instantaneous noise level measured during a specified time period, also referred to as the "peak noise level."
- L_{min} (Minimum Noise Level). The minimum instantaneous noise level measured during a specified time period.
- L_{eq} (Equivalent Noise Level). The equivalent noise level used to describe the average noise exposure level over a specified period of time.

- L_{dn} (Day-Night Noise Level). The average noise level over a 24-hour period, with a penalty of 10 dBA added if noise is generated during the nighttime hours of 10:00 p.m. to 7:00 a.m.

Vibration. In its simplest form, vibration is the oscillation or repetitive motion of an object from its original position. Vibrating objects can radiate their energy through the ground upon contact; if the object is large or close enough to an observer, ground vibrations can be perceived. As such, environmental impact analyses typically study vibration as it relates to building damage and human annoyance. However, since ground vibration generated by manmade activities typically attenuates rapidly from the source of vibration, manmade vibration issues are usually confined to short distances, such as 500 feet or less from the source (FTA 2006).

The peak particle velocity (PPV) is a common descriptor used to identify the maximum peak of vibration. Since ground shaking speeds are typically very slow, PPV is measured in inches per second (in/s) and is generally used to measure vibration impacts on fragile buildings. Another useful descriptor is known as vibration decibels (VdB) and is commonly used to measure human response to vibrations. Human response to vibration is not usually significant unless the vibration exceeds 70 VdB (FTA 2006).

Collection of Ambient Data

For this analysis, noise data was collected to form baseline ambient noise levels for locations along the San Francisco waterfront. Over a 2-day period in April 2013, noise monitoring surveys were conducted during the peak times of 9:30 a.m. and 3:30 p.m. Specifically, an A-weighted microphone was used to collect data over a 1-hour period at both the proposed berthing area and the entrances to each alternative site. Additional 10-minute recordings were taken at various locations surrounding the sites' entrances. Figures 22 through 25 depict the locations of these noise monitoring activities. The minimum, maximum, and average noise levels recorded are shown in Tables 16, 17, and 18 for Pier 31½ , Pier 41, and Pier 3, respectively. These values have been rounded down to the nearest integer to provide a more conservative baseline for this analysis.

TABLE 16. AMBIENT NOISE DATA COLLECTED AT PIER 31½ (DBA)

Location	L_{min}	L_{max}	L_{eq}
Berthing Area	46	75	56
Entrance	53	89	68
Corner of Bay Street and the Embarcadero	57	88	68

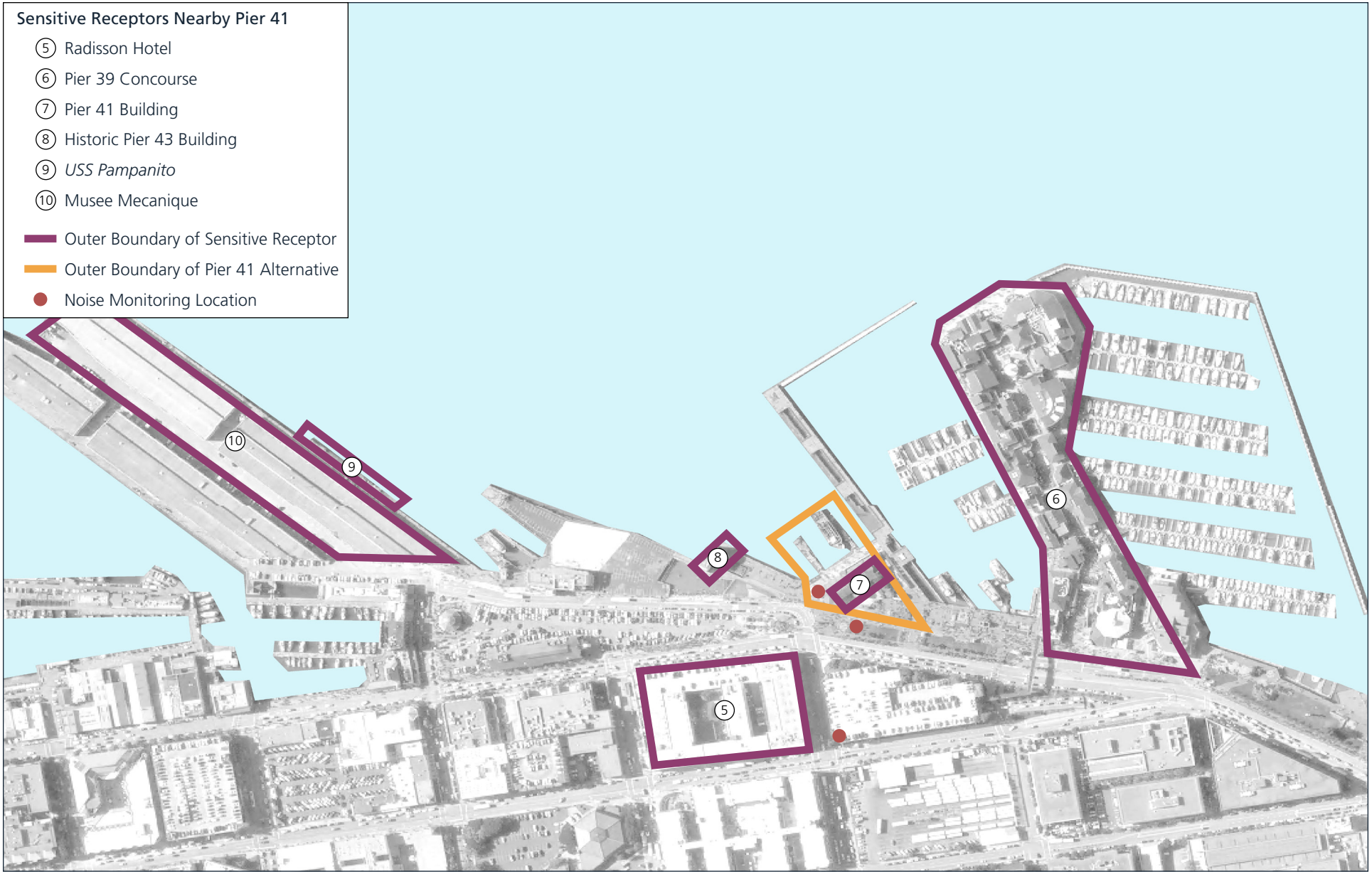
TABLE 17. AMBIENT NOISE DATA COLLECTED AT PIER 41 (DBA)

Location	L_{min}	L_{max}	L_{eq}
Berthing Area	57	85	68
Entrance	56	83	64
Corner of Beach and Powell streets	56	88	65

TABLE 18. AMBIENT NOISE DATA COLLECTED AT PIER 3 (DBA)

Location	L_{min}	L_{max}	L_{eq}
Berthing Area	32	64	46
Entrance	35	83	57
Corner of Bay and Buchanan streets	45	75	58
Corner of North Point and Buchanan streets	46	76	56
Corner of North Point and Laguna streets	46	76	55
Upper Fort Mason	37	74	46

FIGURE 22
PIER 31½ ALTERNATIVE CONSTRUCTION NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



0 150 Feet

FIGURE 23
PIER 41 ALTERNATIVE CONSTRUCTION NOISE

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

January 2015

0 300 Feet

FIGURE 24
PIER 3 ALTERNATIVE CONSTRUCTION NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

0 200 Feet

FIGURE 25
FORT BAKER PROJECT SITE CONSTRUCTION NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior

January 2015

Noise and Vibration in the Vicinity of Pier 31½

Pier 31½ is located in an industrial zone within The Embarcadero, a highly urbanized stretch along the waterfront that supports heavy pedestrian, bicycle, and automobile traffic. It is surrounded landward to the west by several commercial and office buildings, as well as cafés and restaurants. This site contributes to the Port Embarcadero Historic District. While there are no residential units located immediately adjacent to the site, a residential zone (specifically, a high-density combined commercial/residential zone) is located one block away at the corner of Chestnut and Sansome streets.

Based on data collected from the noise monitoring surveys conducted for this Project (as described in the previous section), ambient noise levels at this site range from 56 to 68 dBA. The peak L_{max} recorded was 89 dBA, and the L_{min} was 46 dBA. In particular, the berthing area produced the lowest noise levels likely because, as stated by the City/County, "meandering paths along and between some of the buildings provide refuge from the loud traffic along the Embarcadero" (City/County 2010). Common sources of existing noise at Pier 31½ include street vehicles (especially motorcycles, tour buses, and F-Line streetcars), aircraft, passerby conversations, ferry boarding announcements, and ferries during arrival and departure. Natural sounds in the area include birds, wind, and waves. Existing ground vibration levels at Pier 31½ are typically 81 VdB (Port 2011a).

For purposes of this analysis, nearby receptors sensitive to potential noise and vibration impacts from the Project are shown in Table 19. Reasons for their sensitivity, as well as their existing ambient noise and vibration levels and approximate distance from the embarkation site alternatives, are also included in this table.

TABLE 19. SENSITIVE RECEPTORS IN THE VICINITY OF PIER 31½

Receptor		Existing Information			
No.	Description	Reason for Potential Sensitivity	Distance from Site (feet)[1]	Ambient Noise (dBA)[2]	Maximum Vibration (VdB)[3]
1	Historic Pier 29 Building	Contributes to the Port of San Francisco Embarcadero Historic District	340	68	81
2	Historic Pier 33 Bulkhead Building	Contributes to the Port of San Francisco Embarcadero Historic District; structurally fragile	0	68	81
3	Businesses directly across the street from Pier 31½	Some commercial facilities are located outdoors, and therefore are potentially more susceptible to verbal interferences	120	68	81
4	Residences at the corner of Chestnut and Sansome streets	Considered the closest residences to the Pier 31½ Alternative site, and therefore are the most susceptible to sleep disturbances	530	63	81

Notes:
1 Per Federal Transit Administration (FTA) guidance, distance was measured from the outer boundary of the receptors to the outer boundary of the proposed Pier 31½ Alternative site. Figure 22 depicts these boundaries.
2 Noise data was collected for this Project at various locations within the vicinity of Pier 31½. Ambient data obtained at the Pier 31½ entrance (immediately adjacent to the historic Pier 33 bulkhead building) was assumed to be identical to the ambient noise level at receptor No. 2, and representative of ambient noise levels at receptor Nos. 1 and 3. Noise data for receptor No. 4 was sourced from an EIR published by the Port in 2011 (Port 2011a).
3 Maximum vibration levels for receptor Nos. 1 through 4 and the general area was sourced from an EIR published by the Port in 2011, which states that the "maximum vibration level monitored along an F-Line straightaway segment, such as along The Embarcadero, was 81 VdB at 25 feet" (Port 2011a).

Noise and Vibration in the Vicinity of Pier 41

Pier 41 is located within both commercial and public zones in Fisherman's Wharf, a bustling maritime community and popular tourist attraction. The 'public zone' portion primarily consists of a large promenade that receives high levels of foot traffic. Pier 41 also lies within the Port of San Francisco Embarcadero Historic District. Across the street to the south is a 355-room hotel and a multilevel parking garage, as well as other commercial businesses.

Data collected from noise monitoring surveys conducted for this Project indicate that average ambient noise levels at this site range from 64 to 68 dBA. The peak L_{max} recorded was 85 dBA, and the L_{min} was 56 dBA. Common sources of existing noise include street vehicles (especially motorcycles, tour buses, and F-Line streetcars); aircraft; passerby conversations; boarding announcements; and ferries during arrival and departure. Natural sounds include birds, wind, and waves. Based on available vibration data for the area, the existing ground vibration level at this site is 81 VdB (Port 2011a).

For purposes of this analysis, nearby receptors sensitive to potential noise and vibration impacts from the Project are shown in Table 20. Reasons for their sensitivity, as well as their existing ambient noise and vibration levels and approximate distance from the embarkation site alternatives, are also included in this table.

TABLE 20. SENSITIVE RECEPTORS IN THE VICINITY OF PIER 41

Receptor		Existing Information			
No.	Description	Reason for Potential Sensitivity	Distance from Site (feet)[1]	Ambient Noise (dBA)[2]	Maximum Vibration (VdB)[3]
5	Radisson Hotel	Considered the closest residences to the Pier 41 Alternative site and therefore the most susceptible to sleep disturbances	180	65	81
6	Pier 39 Concourse	Some commercial facilities are located outdoors, and therefore are potentially more susceptible to verbal interferences	300	68	81
7	Pier 41 Building	Structurally fragile	0	68	81
8	Historic Pier 43 Building	Contributes to the Port of San Francisco Embarcadero Historic District	220	68	81
9	*USS Pampanito*	Concern regarding noise impacts was expressed during public scoping	900	68	70
10	Musée Mécanique	Concern regarding noise impacts was expressed during public scoping	870	68	81

Notes:
1 Per FTA guidance, distance was measured from the outer boundary of the receptors to the outer boundary of the proposed Pier 41 Alternative site. These boundaries are depicted in Figure 23.
2 Noise data was collected for this Project at various locations within the vicinity of Pier 41. Ambient data obtained at the Pier 41 entrance was assumed to be representative of ambient noise levels at receptor Nos. 6 and 8 through 10.
3 The *USS Pampanito* is located more than 900 feet from the F-Line streetcar. As such, ambient vibration data for receptor No. 6 was sourced from an EIR published by the Port in 2011, which states that vibration levels on the Embarcadero "are typically less than 70 VdB, "along streets with high traffic volumes where there are no streetcar operations" (Port 2011a). Maximum vibration levels for all other receptors located closer to the F-Line streetcar was also sourced by the Port's 2011 document, which indicates that the, "maximum vibration level monitored along an F-Line straightaway segment, such as along the Embarcadero, was 81 at 25 feet" (Port 2011a).

Noise and Vibration in the Vicinity of Pier 3

Pier 3 is located within Lower Fort Mason's Fort Mason Center, a multicultural center that hosts events, conferences, performances, and exhibits. As described in the "Land Use" section of this chapter, both Upper and Lower Fort Mason are federally owned and zoned as public land, and comprise the San Francisco Port of Embarkation NHL. Connected to Lower Fort Mason to the west is Marina Green, and to the south is Great Meadow, both of which are popular public parks. The street block immediately adjacent to the entrance is zoned for commercial use and currently supports a 24-hour Safeway grocery store with a large parking lot. Other neighborhood commercial businesses line the streets beyond the Safeway, including a post office and several cafés, restaurants, dry cleaners, pet facilities, and salons and spas, as well as several physical therapy and health and wellness centers. While there are no residential units located immediately adjacent to Pier 3 or the Lower Fort Mason entrance, the blocks immediately beyond the Safeway are mostly zoned for residential use.

Due to concerns expressed by the public during pre-scoping regarding potential noise impacts from the Project (as described in the "Public Involvement" section of the "Purpose and Need for Action" chapter), noise monitoring surveys were conducted at several locations in the vicinity of Pier 3 (as described in the "Collection of Ambient Data" section of this chapter). Based on these recordings, ambient noise levels range from 46 to 57 dBA in Lower Fort Mason and 55 to 58 dBA around the blocks closest to the entrance at Fort Mason Center. The ambient noise level at Upper Fort Mason is 46 dBA. Based on available vibration data, the maximum vibration levels at Upper and Lower Fort Mason are 58 and 45 VdB, respectively (NPS 2012e). These levels are not subjectively noticeable to humans.

For purposes of this analysis, nearby receptors sensitive to potential noise and vibration impacts from the Project are shown in Table 21. Reasons for their sensitivity, as well as their existing ambient noise and vibration levels and approximate distance from the embarkation site alternatives, are also included in this table.

TABLE 21. SENSITIVE RECEPTORS IN THE VICINITY OF PIER 3

Receptor		Existing Information			
No.	Description	Reason for Potential Sensitivity	Distance from Site (feet)[1]	Ambient Noise (dBA)[2]	Maximum Vibration (VdB)[3]
11	Fort Mason Center Landmark Buildings A through E	Concern regarding noise impacts was expressed during public scoping	25	46	58
12	Great Meadow	Considered an area potentially used for quiet activities	100	46	45
13	Marina Green		760	46	45
14	Residences near the corner of Beach and Buchanan streets	Considered the closest residences to the Pier 3 Alternative site, and therefore the most susceptible to sleep disturbances	930	55	58
15	Residences near the corner of North Point and Buchanan streets		730	56	58
16	Residences near the corner of North Point and Laguna streets		1,030	58	58
17	Hostel at Upper Fort Mason		280	46	45

Notes:
1 Per FTA guidance, distance was measured from the outer boundary of the receptors to the outer boundary of the proposed Pier 3 Alternative site. These boundaries are depicted in Figure 24.
2 Noise data was collected for this Project at various locations within the vicinity of Pier 3 to inform receptor Nos. 11 and 14 through 17. Ambient data obtained at the hostel within the park at Upper Fort Mason was assumed to be representative of ambient noise levels at receptor Nos. 12 and 13 due to similar uses and activities.
3 The maximum vibration levels for receptor Nos. 11 through 17, and the general area was identified using information from an EIS published by the Park Service in 2012 (NPS 2012e).

Noise and Vibration in the Vicinity of Fort Baker

Fort Baker is located within the GGNRA and is zoned as open space by Marin County. The Fort Baker pier is located northwest of the Golden Gate Bridge's northern terminus, and is currently used for fishing and other recreational activities.

Based on the Fort Baker Plan (NPS 1999), ambient noise levels in the area range between 55 to 60 dBA, with, "the western end of the site [having] more ambient urban noise from traffic along U.S. Highway 101." For purposes of this EIS, the general Fort Baker area was assumed to have an ambient noise level of 55 dBA (the lower end of the 55 to 60 dBA range) to provide a more conservative baseline for this analysis.

Vibration data for Fort Baker was unavailable during the preparation of this EIS. As such, for purposes of this analysis, Fort Baker was assumed to have the same ambient vibration level as Upper Fort Mason (45 VdB) because the assumed noise level (55 dBA) and existing activities at Fort Baker identify most closely with those of Upper Fort Mason.

According to the Fort Baker Plan, sensitive receptors within and adjacent to Fort Baker include recreational use areas, the Bay Area Discovery Museum, and the USCG Station (NPS 1999). For purposes of this EIS, the "recreational use area" within Fort Baker is defined as the area around Fort Baker pier. These receptors and their reasons for sensitivity, as well as their existing ambient noise and vibration levels and approximate distance from the embarkation site alternatives, are shown in Table 22.

TABLE 22. SENSITIVE RECEPTORS IN THE VICINITY OF THE FORT BAKER PIER

Receptor		Existing Information			
No.	Description	Reason for Potential Sensitivity	Distance from Site (feet)[1]	Ambient Noise (dBA)[2]	Maximum Vibration (VdB)[3]
18	Recreational Use Area	Considered an area potentially used for quiet activities	0	55	45
19	USCG Station		600	55	45
20	Bay Area Discovery Museum		1,150	55	45

Notes:
1 Per FTA guidance, distance was measured from the outer boundary of the receptors to the outer boundary of the Fort Baker pier. These boundaries are depicted in Figure 25.
2 Noise data was sourced from the Fort Baker Plan (NPS 1999).
3 The maximum vibration level at Upper Fort Mason is 45 VdB (NPS 2012e). Because the existing activities at Fort Baker identify most closely with those at Upper Fort Mason, the vibration levels at receptor Nos. 18 through 20 are assumed to be reflective of those at Upper Fort Mason.

REGULATIONS AND POLICIES

Federal

NPS Management Policies. Section 4.9 of the 2006 NPS Management Policies (NPS 2006) directs park superintendents to identify acceptable levels and types of unnatural sounds within a particular park. These levels will generally be greater in developed areas. To the greatest extent possible, the Park Service will preserve natural soundscapes and restore those that have become degraded by unnatural sounds. Additionally, the Park Service will monitor noise adjacent to the parks, and will take action, as needed, to eliminate, mitigate, or minimize all noise that adversely affects the soundscape or other park resources or values, or noise that exceeds

acceptable or appropriate levels for visitor uses.

DO-47: Soundscape Preservation and Noise Management. DO-47 outlines 11 guidelines that require, to the fullest extent possible, the protection, maintenance, or restoration of NPS natural soundscapes in a condition unimpaired by inappropriate or excessive noise sources (NPS 2000).

FTA Transit Noise and Vibration Guidance. The FTA's *Transit Noise and Vibration Impact Assessment* (FTA 2006) provides criteria for maximum-acceptable noise levels for different types of land uses: Category 1 (quiet is essential); Category 2 (residences and buildings where people sleep); and Category 3 (institutions used primarily during the daytime and evening, such as schools and libraries). However, this criterion does not apply to most commercial or industrial uses that generally generate higher noise levels. Similarly, while historically significant sites are often treated as noise-sensitive, "if [these] buildings or structures are used for commercial or industrial purposes and are located in busy commercial areas, they are not considered noise-sensitive and noise impact criteria do not apply." Parks are also addressed in the same light.

In addition to noise criteria, the FTA also provides criteria for maximum-acceptable vibration levels for fragile buildings (defined as "buildings extremely susceptible to vibration damage.")

Regional and Local

General Plan. The environmental protection element of the General Plan contains land use compatibility guidelines for community noise. These guidelines indicate that the maximum satisfactory L_{dn} noise levels for the following uses:

- 60 dBA for residences and hotels
- 70 dBA for playgrounds, parks, office buildings, and some commercial uses (i.e., retail, theaters, and restaurants)
- 75 dBA for water-based recreation areas
- 77 dBA for other commercial uses such as wholesale, some retail, industrial/ manufacturing, transportation, communications, and utilities

New construction or development that exceeds the maximum satisfactory noise levels identified by the General Plan is generally discouraged, and should only be undertaken following a detailed analysis of noise reduction requirements and incorporation of noise reduction features into the Project design. Policy 11.3 of the environmental protection element further discourages developments that will bring appreciable traffic into or through noise-sensitive areas if there are appropriate alternative locations where the noise impact would be less.

San Francisco Noise Ordinance. Article 29 of the San Francisco Police Code (City/County 2008) gives authority to police to regulate unnecessary, excessive, and offensive noise. Under this ordinance, ambient sound is defined as the lowest repeating sound level within a 10-minute time period (at a minimum), and considered to be no less than 35 dBA within interior residences and 45 dBA in all other locations. Regarding construction noise, section 2907 prohibits such equipment that emits noise in excess of 80 dBA at 100 feet. However, impact tools and equipment (e.g., pile drivers, pavement breakers, and jackhammers) are exempt from this regulation, provided that they are affixed with approved noise-reducing shields or shrouds. Regarding operational noise, section 2909 states that no person shall produce or allow to be produced by any machine or device, or any combination of the same, a noise level more than 10 dBA above the local ambient sound level at a distance of 25 feet or more on public property, unless the machine or device is being operated to serve or maintain the property.

The San Francisco Municipal Code does not address vibration.

Marin County Noise Ordinance. Sections 6.70.030(5) and 6.70.040 of the Marin County

Noise Ordinance (Marin County 2005) address noise from construction activities. Pertinent to this Project, Marin County requires that loud noise-generating construction-related equipment only be operated Monday through Friday between 8:00 a.m. and 5:00 p.m.

GEOLOGY, SOILS, AND SEISMICITY

This section analyzes the geological conditions of the study area. The study area for this resource topic is defined as the San Francisco waterfront region, which includes the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason) and the Fort Baker area in Southern Marin County.

EXISTING CONDITIONS

Regional Geology

Geologic and seismic conditions in the study area are governed by the overall geologic and tectonic characteristics of the greater Bay Area, including the San Francisco peninsula, the Bay, and the Marin Headlands. The San Francisco peninsula and Marin Headlands are within the northern Coast Ranges physiographic province. This province is characterized by a north/northwest-trending series of mountains and intervening valleys that extend from the Oregon/California border south to the Transverse Ranges of Southern California (Wong et al. 1988). The Bay is a topographic trough formed by a combination of warping and faulting within the northern Coast Ranges (Olson and Zoback 1998). The Sacramento and San Joaquin rivers drain into the Bay, and the Bay connects to the ocean via the main channel through the Golden Gate.

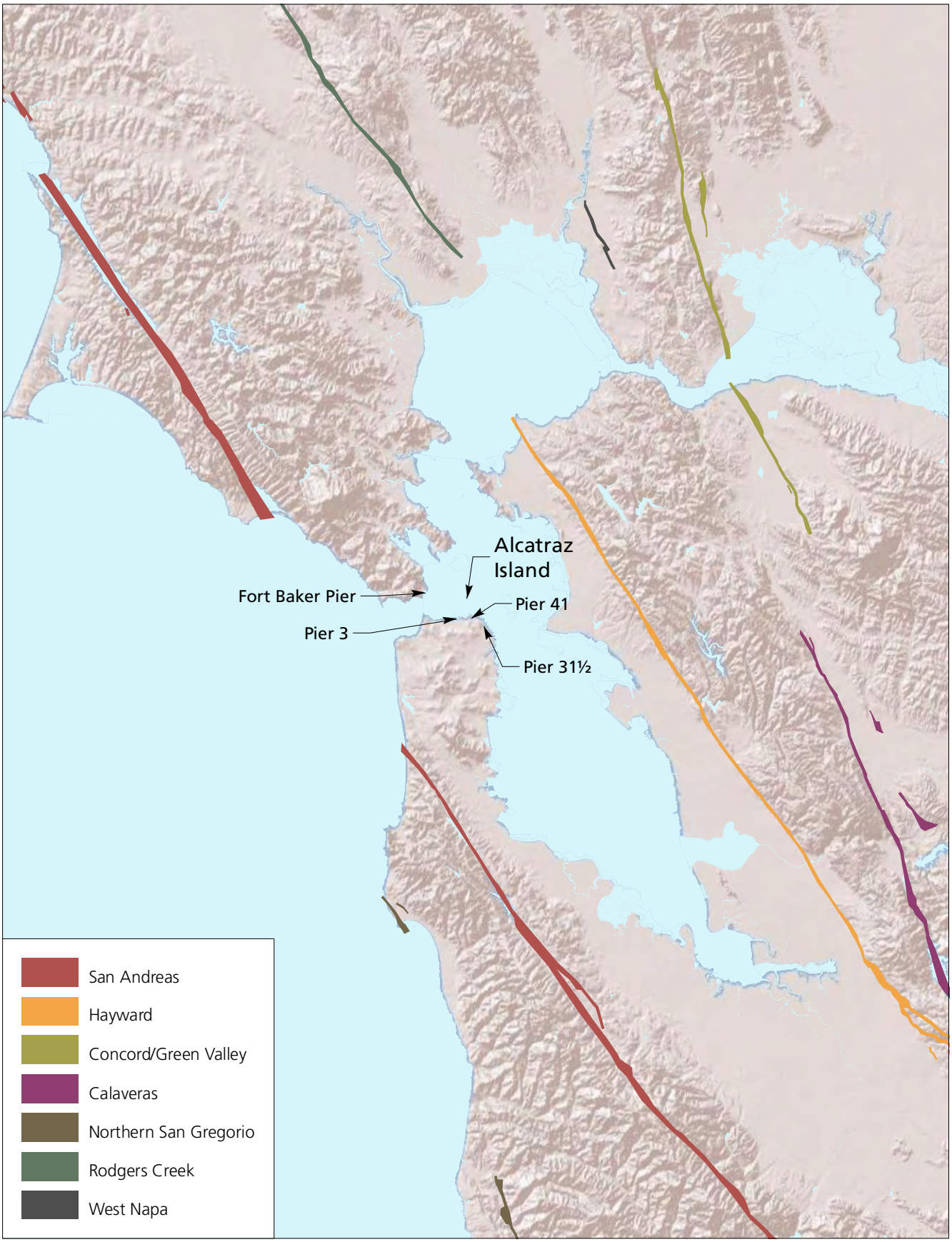
Faults and Seismicity. The Bay Area is located on the boundary between the North American and Pacific tectonic plates. This zone encompasses all the major faults in Northern California, and is therefore subject to high levels of seismic activity (ABAG 2013a). Historical seismicity is primarily associated with the strike-slip faults of the San Andreas system (Figure 26). The two historically active faults closest to the embarkation site alternatives are the San Andreas and Hayward faults. Major earthquakes along these faults have affected the region in the past; most recently, a magnitude 6.9 earthquake occurred along the San Andreas fault zone in 1989, while an estimated magnitude 6.8 earthquake occurred along the Hayward fault in 1868 (California Geological Center 2007). Earthquakes can be expected to occur again in the near future on one of the principal active faults in the San Andreas system.

Site Geology

Geological Conditions. Piers 3, 41, and 31½ are located in areas mapped as artificial fill, consisting of sands, silt, clay, and manmade debris. The Fort Baker pier is immediately adjacent to an area mapped as older landslide deposits, consisting of bedrock, sand, silt, and clay. The area around Horseshoe Bay, the small Bay inlet area within Fort Baker, contains land mapped as slope debris ravine fill, bay mud and clay, alluvium, artificial fill, younger landslide deposits, and greenstone (Schlocker 1974).

Topography and Drainage. The topography of the Bay Area is generally flat with localized hilly areas that drain into the Bay. Pier 3 is immediately northwest of the Fort Mason Green, a hilly area reaching elevations of approximately 110 feet above sea level (USGS 2012). Fort Baker is located in a valley of the hilly Marin Headlands, and the pier is located at approximately sea level.

In the vicinity of Piers 3, 41, and 31½, stormwater drainage is captured by the San Francisco Public Utility Commission (SFPUC) combined sewer system and treated at the Southeast Treatment Plant prior to discharge. Closer to Piers 41 and 31½, another municipal storm sewer system provides additional stormwater conveyance separate from the SFPUC combined system. Stormwater conveyed via the separate municipal storm sewer system is discharged directly to the Bay (SFPUC 2011a).



Source: ABAG 2013a

0 50,000 Feet

FIGURE 26
REGIONAL FAULTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Soils. Soils mapped by the Natural Resources Conservation Service near Piers 3, 41, and 31½ fall under the classification Urban land-Orthents—reclaimed complex (0 to 2% slopes; NRCS 2012). These classifications indicate that the soils are highly disturbed and have little agricultural viability. Soil adjacent to the Fort Baker pier falls under the classification of Tamalpais-Barnabe variant very gravelly loams (30 to 50% slopes), while other areas surrounding Horseshoe Bay fall under the additional classifications of Tamalpais-Barnabe variant very gravelly loams (15 to 30% slopes) and Xerorthents fill (specifically, the parking lot area north of Horseshoe Bay). The soils at Fort Baker are of similarly low agricultural value.

Mineral Resources. The California Geological Survey has mapped nonfuel mineral resources of the state to indicate where economically significant mineral deposits are either present or likely to occur. These resources have been mapped using the California Mineral Land Classification System, which includes the following four Mineral Resource Zones (MRZs):

- MRZ-1. Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence
- MRZ-2. Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence
- MRZ-3. Areas containing mineral deposits, the significance of which cannot be evaluated
- MRZ-4. Areas where available information is inadequate for assignment to any other zone

In accordance with this mapping, the entire San Francisco waterfront is mapped as either MRZ-1 or MRZ-4, indicating that substantial mineral resources do not occur in the vicinity of the embarkation site alternatives (Stinson et al. 1987a). The General Plan does not identify any areas of important mineral resources (San Francisco Planning Department 2009). The area surrounding the Fort Baker pier is mapped as MRZ-3, while most of the area surrounding Horseshoe Bay is mapped as MRZ-4 (Stinson et al. 1987b). This indicates that significant mineral deposits are not known in the area. The *Marin County Countywide Plan* does not identify this as a mineral resource site (Marin County Community Development Agency 2005).

Sand mining is conducted on several parcels within the Bay that are owned by the State Lands Commission and under lease to a private company (San Francisco Planning Department 2011). Existing ferry service to Alcatraz does not interfere or conflict with ongoing sand mining operations.

Surface Fault Rupture. Surface fault rupture is defined as slip on a fault plane that has propagated to the earth's surface and caused a rupture or disturbance. Fault rupture almost always follows pre-existing faults, which are zones of weakness. During the past 10,000 years, several faults in the region have experienced surface rupture associated with large, damaging earthquakes. The most recent occurrence was ground rupture along the San Andreas Fault associated with the 1906 earthquake (USGS 1999). There is a very low potential for fault rupture at any of the alternative sites because no active faults cross the study area.

Ground Shaking. Strong ground shaking from earthquakes is considered a seismic hazard in the Bay Area. Ground shaking can be described in terms of acceleration, velocity, and displacement of the ground. Greater movement can be expected at sites on poorly consolidated material such as alluvium, at sites on compressible material such as bay mud or nonengineered fill, at sites that are in close proximity to the causative fault, or in response to an event of great magnitude. A significant seismic event along the San Andreas or Hayward faults would result in significant ground shaking along the San Francisco shoreline and at Fort Baker (ABAG 2003).

Liquefaction. Liquefaction is the transformation of a granular material

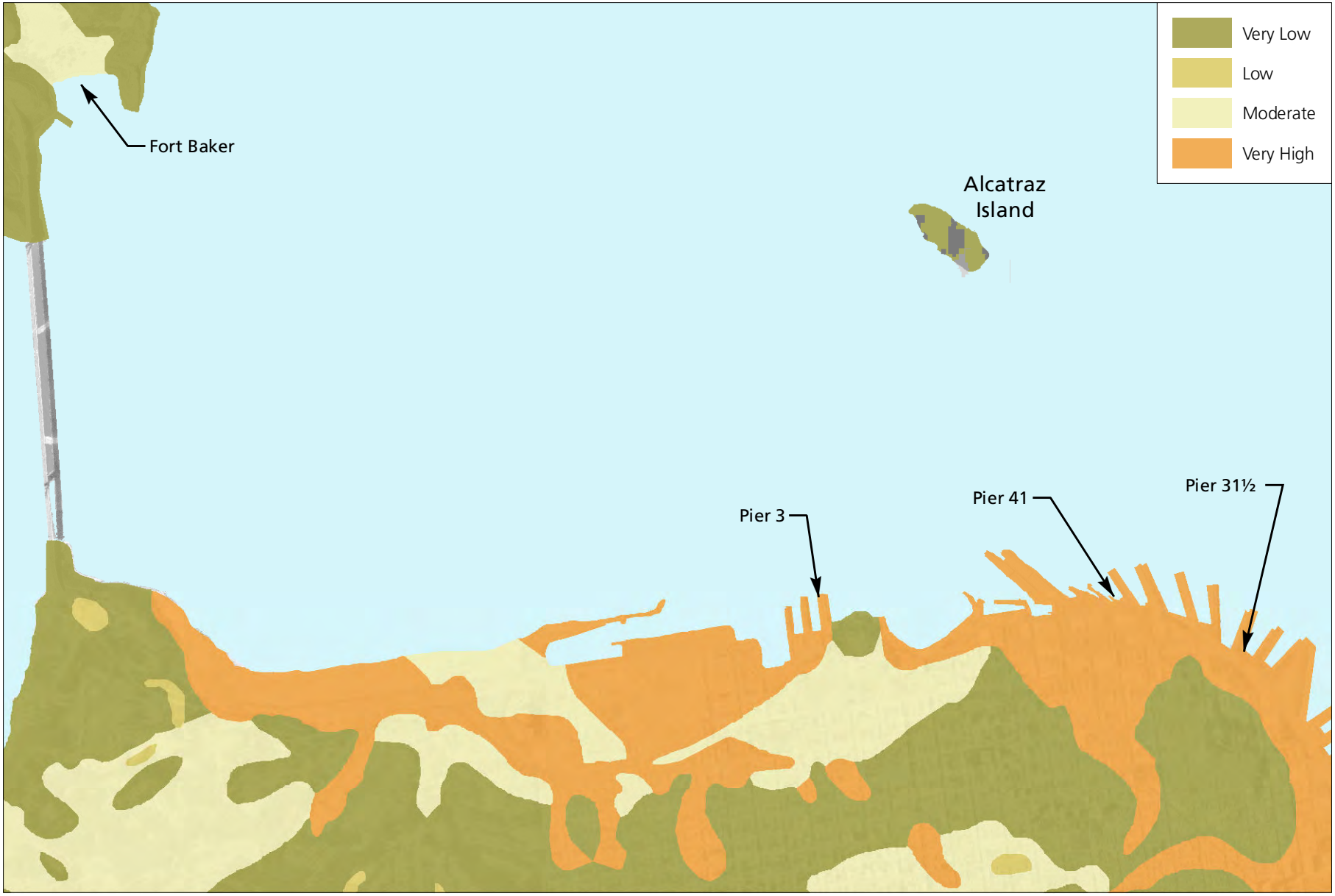
(sediments or soils) from a solid into a liquefied state, often resulting from strong seismic ground shaking in areas with susceptible soils. Factors known to affect the liquefaction potential of soils are the characteristics of the materials, such as grain size distribution, relative density, and degree of saturation; the initial stresses acting on the soils; and the characteristics of the earthquake, such as the intensity and duration of the ground shaking. Figure 27 shows liquefaction susceptibility in the Bay Area. Most of the north and western shoreline of the San Francisco Peninsula has been identified as having very high susceptibility to liquefaction, including the locations of the embarkation site alternatives. The Fort Baker pier has a very low susceptibility to liquefaction, while the area immediately north of Horseshoe Bay has moderate liquefaction susceptibility (ABAG 2013b).

Subsidence and Settlement. Subsidence involves a sudden sinking or gradual settling and compaction of soil and other surface material with little or no horizontal motion. Land surface subsidence can result from both natural and manmade phenomena, including tectonic deformation, consolidation, hydro compaction, collapse of underground cavities, oxidation of organic-rich soils, rapid sedimentation, and the withdrawal of groundwater. Expansive soils and materials are more susceptible to subsidence, including bay mud, estuarine sediments, organic rubbish, or thick organic deposits. Areas underlain by bedrock, dense fill, and dune sand have a low susceptibility to subsidence.

Settlement occurs when ground shaking reduces the amount of pressure existing between soil particles, resulting in a reduction of the volume of the soil. Areas are susceptible to differential settlement if they are underlain by compressible sediments, such as poorly engineered artificial fill or bay mud. Differential settlement can damage structures, pipelines, and other subsurface entities. Earthquakes and seismic activity can accelerate and accentuate settlement. Fill materials underlying the alternative sites and the area north of Horseshoe Bay at Fort Baker are susceptible to future seismically induced settlement during seismic events. Underlying materials near the Fort Baker pier are less susceptible to settlement.

Slope Failure and Slope Stability. Earthquakes can cause significant slope stress, potentially resulting in earthquake-induced landslides. Landslides most commonly occur in areas with steep slopes, or within slide-prone geologic units that contain excessive amounts of water. Other factors that affect slope stability include site geology, climate, and human activity. The 1989 earthquake triggered numerous landslides throughout the Bay Area. Within the study area, the San Francisco and Fort Baker waterfronts are relatively flat and not likely to be affected by earthquake-induced landslides. Relatively steep slopes that have been delineated as within an earthquake-induced landslide zone exist in the Fort Mason Green to the east of Pier 3 (ABAG 2013a).

Expansive Soils. Expansive soils are high in clay content and increase and decrease in volume upon wetting and drying, respectively. The change in volume exerts stress on buildings and other loads placed on these soils. Expansive soils are common throughout California and can cause damage to foundations and slabs unless properly treated during construction. Often, grading, site preparations, and backfill operations associated with subsurface structures can eliminate the potential for expansion. The locations of the embarkation site alternatives have been previously developed, and underlying materials including artificial fill, bedrock, and sand have low expansive properties; however, clay-rich sediments have expansive properties and also underlie the study area.



Source: ABAG 2013B

0 2,500 Feet

FIGURE 27
LIQUEFACTION SUSCEPTIBILITY
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

REGULATIONS AND POLICIES

Federal

NPS Management Policies. As stated in the NPS Management Policies on Geologic Resource Management, "[t]he Park Service will preserve and protect geologic resources as integral components of park natural systems. As used here, the term 'geologic resources' includes both geologic features and geologic processes. The Park Service will (1) assess the impacts of natural processes and human activities on geologic resources; (2) maintain and restore the integrity of existing geologic resources; (3) integrate geologic resource management into Park Service operations and planning; and (4) interpret geologic resources for park visitors" (NPS 2006).

International Building Code. The international building code addresses the design and installation of building systems through requirements that safeguard public health and safety. The code establishes minimum regulations for building systems, using prescriptive and performance-related provisions. The international building code is available for adoption and use by jurisdictions internationally. The California building code is based on the international building code.

State

Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo earthquake fault zoning act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. According to the act, buildings for human occupancy cannot be constructed within regulatory "earthquake fault zones" established and mapped around the surface traces of active faults. This typically includes areas within approximately 200 to 500 feet of major fault lines. The construction of habitable structures is not proposed as part of any of the action alternatives, and the study area is not within an earthquake fault zone as defined by the act (CDMG 2001); as such, this act would not apply to the Project.

Seismic Hazards Mapping Act. The seismic hazards mapping act of 1990 was developed to reduce threats to public health and safety and to minimize property damage caused by earthquakes, including the impacts of ground shaking, liquefaction, landslides, other ground failure, and other hazards. The act directs the California Geological Survey to identify and map seismic hazard zones for the purpose of assisting cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit may be granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted, and appropriate mitigation measures must be incorporated into the Project's design.

Surface Mining and Reclamation Act. In accordance with the surface mining and reclamation act of 1975, the State of California established a mineral land classification system to help identify and protect mineral resources in areas that are subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Protected mineral resources include nonfuels (i.e., construction materials, industrial and chemical mineral materials, and metallic and rare minerals), as well as nonfluid mineral fuels. The act directs the state to classify (identify and map) the nonfuel mineral resources to show where economically significant mineral deposits occur and where they are likely to occur based on the best available scientific data. Areas identified as containing significant mineral deposits are not present in the study area, and as such, this act is not applicable to the Project.

California Building Code. The California building code contains the minimum standards for design and construction in California. The standards provide requirements for general structural design and include means for determining earthquake loads, as well as other loads (flood, snow, wind, etc.), for inclusion into building codes. The provisions of the California building code apply to the construction, alteration, movement, replacement, and demolition of

every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. This code would apply only to the Pier 31½ and Pier 41 alternatives.

Local

Port of San Francisco Building Code. The 2010 Port of San Francisco building code amends the California building code and applies to projects constructed on Port property, including temporary buildings or structures. The Port of San Francisco building code is administered by the Port Commission, through the Chief Harbor Engineer, and establishes minimum building requirements to safeguard public health and safety, and general welfare. This code would only apply to the Pier 31½ and Pier 41 alternatives.

General Plan. The General Plan contains a community and safety element that addresses seismic hazards. The element includes a series of maps illustrating Bay Area earthquake faults, ground shaking intensity due to earthquakes on the San Andreas and Hayward faults, areas of liquefaction potential, areas susceptible to landslides, and tsunami run-up. Relevant community safety element policies include:

- Policy 2.1: Assure that new construction meets current structural and life safety standards
- Policy 2.3: Consider site soils conditions when reviewing projects in areas subject to liquefaction or slope instability
- Policy 2.5: Assess the risks presented by other types of potentially hazardous structures and reduce the risks to the extent possible
- Policy 2.9: Consider information about geologic hazards whenever decisions are made that will influence land use, building density, building configurations or infrastructure

The General Plan also contains an environmental protection element, which includes the following policies related to geology and soils:

- Policy 7.3: Require that filling of land adhere to the highest standards of soils engineering consistent with the proposed use
- Policy 7.4: Ensure the correction of landslide and shore erosion conditions where it is in the public interest to do so
- Policy 7.5: Prohibit construction, as a general rule, on land subject to slide or erosion

The General Plan is considered a policy document rather than a formal regulation, though many elements are based on existing regulations. The General Plan would apply only to the Pier 31½ and Pier 41 alternatives.

WATER QUALITY AND HYDROLOGY

This section analyzes the water quality and hydrology of the study area. The study area is defined as the northeastern San Francisco waterfront region, which includes the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason; and the Fort Baker waterfront) and Horseshoe Bay area in southern Marin County. Waters adjacent to these areas that may be affected by the Project are considered in this analysis, as well as stormwater drainage, conveyance, and treatment infrastructure that service the area.

EXISTING CONDITIONS

San Francisco Bay

The Bay is primarily affected by tidal saltwater inputs from the Pacific Ocean through the Golden Gate to the west and freshwater inputs from the Sacramento-San Joaquin Delta (Delta) to the northeast. The Bay and Delta combine to form the Bay-Delta Estuary, encompassing an area of 1,600 square miles and conveying drainage from more than 40% of the state (SFEP 1999). The Bay can be divided into three distinct hydrologic segments: the North Bay (including the Suisun Bay, Carquinez Strait, and San Pablo Bay), the Central San Francisco Bay (Central Bay; bounded by the San Pablo Strait to the north, the Golden Gate Bridge to the west, and the Bay Bridge to the south), and the South Bay (all Bay waters south of the Bay Bridge). Each of these segments are influenced by their respective proximity to the Golden Gate and Delta inlets: the North Bay is a partially to well-mixed estuary dominated by seasonally varying river inflow; the Central Bay is most strongly influenced by tidal currents; and the South Bay is a tidally oscillating, lagoon-type estuary, where variations are determined by water exchange between the northern reach and the ocean (BCDC 1998).

The primary embarkation site alternatives on the northeastern San Francisco waterfront and Fort Baker each front the Central Bay. Because of its proximity to the Golden Gate and Pacific Ocean, the Central Bay is predominantly ocean water, which is cold, saline, and low in total suspended sediment. Water quality parameters therefore fluctuate less than in other sectors of the Bay more strongly influenced by freshwater flows. The Bay experiences two tidal cycles daily, cycling an average approximately 1.3 million acre-feet of water (BCDC 1998).

Water quality in the Central Bay is predominantly influenced by tidal inflow (BCDC 1998). Tidal currents influence circulation, flushing action, and water exchange within the Bay, thereby affecting water quality characteristics and sedimentation. Contaminants are introduced in the Bay through several major transport pathways, such as runoff from rivers and creeks, atmospheric deposition, municipal and industrial wastewater effluent discharge, and remobilization of contaminants from surface sediments to the overlying water column (SFEI 2013). Stormwater runoff from urban areas may transport pollutants to the Bay. Common sources of pollution include equipment and vehicles that may leak oil, grease, hydraulic fluid or fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil.

Since 1993, the San Francisco Estuary Institute (SFEI) has administered a Regional Monitoring Program (RMP) to access water quality in the Bay. The RMP measures concentrations of trace constituents in water, sediment, and transplanted bivalves at various locations in the estuary (SFEI 2013). The RMP is one of many entities that provide data to the San Francisco Bay Regional Water Quality Control Board (RWQCB), which uses the information to compile the 303(d) List (listing of impaired waters under the Clean Water Act [CWA]) and to develop total maximum daily loads (TMDLs). In August 2010, the San

Francisco Bay RWQCB adopted the 2010 303(d) List, as approved by the by the USEPA, which listed the Central Bay as an impaired waterbody. Listed pollutants for the Central Bay include are presented in Table 23.

TABLE 23. POLLUTANTS IN THE CENTRAL BAY

Pollutant	Pollutant Category	Potential Sources
Chlordane[1]	Pesticides	Nonpoint source
DDT[1] (Dichlorodiphenyltrichloroethane)	Pesticides	Nonpoint source
Dieldrin[1]	Pesticides	Nonpoint source
Dioxin compounds[1] (including 2,3,7,8-TCDD)	Other Organics	Atmospheric deposition
Furan Compounds[1]	Other Organics	Atmospheric deposition
Invasive Species[1]	Miscellaneous	Ballast water
Mercury[2]	Metals/Metalloids	Natural sources, atmospheric deposition, industrial point sources, municipal point sources, nonpoint source, resource extraction
Polychlorinated biphenyls (PCBs)[1]	Other Organics	Unknown nonpoint source
Selenium[1]	Metals/Metalloids	Industrial point sources, exotic species, natural sources
Trash[1]	Trash	Illegal dumping, urban runoff/storm sewers

Notes:
Source: SWRCB and RWQCB 2010.
1 TMDL still required
2 being addressed by USEPA approved TMDL
All Pollutants are CWA 303(d) Listed

Bay sediments may contain particulate-bound pollutants that could affect water quality as a result of resuspension by natural processes or mechanical disturbances such as pile driving. Sediment suspension may also create turbid conditions that adversely affect water quality. Total suspended sediment concentrations in the Central Bay are relatively low compared to the rest of the Bay-Delta Estuary.

Northeastern San Francisco Waterfront

The embarkation site alternatives are located in an urbanized waterfront area of northeastern San Francisco adjacent to the Central Bay. The area is highly modified, and no natural Bay tributaries or waterbodies exist within or adjacent to the embarkation site alternatives. The Pier 31½, Pier 41, and Pier 3 sites are almost entirely developed and covered in impermeable surfaces. As described in the "Public Services and Utilities" section of this chapter, stormwater runoff from the northeast Bay waterfront generally flows into the SFPUC combined stormwater system or the separate stormwater system, is conveyed to treatment plants in San Francisco, treated, and discharged into either the Bay or Pacific Ocean. During prolonged storm events resulting in rainfall that exceeds the system's capacity, water is discharged either into the Bay or the ocean through one of 36 discharge points, following primary treatment within a system of storage/transport boxes. In the vicinity of Pier 31½ and Pier 41, a separate municipal storm sewer system provides stormwater conveyance in addition to the SFPUC combined system. Wastewater from these areas is directed to the SFPUC

combined system; however, stormwater from these areas is instead discharged into the Bay (SFPUC 2004).

Fort Baker and Horseshoe Bay

The Fort Baker portion of the study area is largely developed; the pier, adjacent asphalt roadway, and parking lot are located within the study area. The proposed pedestrian trail would traverse portions of Fort Baker on or adjacent to buildings, roadways, sidewalks, parking lots, barren dirt areas, and ornamental grassy fields. There are no permanent streams or ponds at Fort Baker; former natural streamflows were routed through buried culverts to outfalls during site development. Fort Baker lies within a rectangular watershed, and its surrounding hillsides are undeveloped and vegetated. Stormwater runoff is conveyed via a trunkline system consisting of catch basins, pipes, and concrete-lined swales that drain to four major storm drain outfalls along the seawall of Horseshoe Bay. Remaining surface runoff drains to Horseshoe Bay or recharges the shallow groundwater in the alluvial fill at the base of the hills (NPS 1999). Stormwater conveyance at Fort Baker is also discussed within the "Public Services and Utilities" section of this chapter.

Boatyard Facilities/Water Pollution from Vessels

The Bay is a heavily trafficked maritime area, with large amounts of commercial, recreational, and military vessels, frequently traversing the waters near the various Project sites. Ferry operations currently occur at the Pier 31½ and Pier 41 sites, and Pier 3 was historically a point of embarkation during World War II. There is an existing marina within Horseshoe Bay northeast of the pier at Fort Baker, and the City/County operates a marina directly west of Fort Mason. These types of facilities typically perform some degree of boat maintenance (e.g., general mechanical repairs and hull treatments) and fueling activities, as well as sewage and bilge water pumpout, which can affect water quality. Refueling and other operations involving the handling of potentially harmful products, and materials are carried out under strict regulatory guidance, which is discussed within this chapter.

Marine fuel spills can result from leaks or breaks in vessel fueling equipment, vessel collisions or sinkings, mechanical or structural failures, or simple human errors such as leaving valves open or aligning them improperly. Very few spills linked to ferries have occurred, and the volumes involved have been minimal; during the period of 1998 to 2001, six spills of 15 gallons or fewer were attributed to Bay ferry boats (USCG Office of Investigations and Analysis, as cited in URS 2003). Industrial and marine facilities and operations are subject to the federal, state, and local environmental regulations imposed by regulatory agencies.

Floodplain Areas

The Federal Emergency Management Agency (FEMA) maintains maps of 100-year flood areas in the Bay counties. A "100-year flood" refers to a flood level with a 1% or greater chance of being equaled or exceeded in any given year. Portions of the San Francisco waterfront, including the primary ferry embarkation site alternatives are within the delineated FEMA 100-year flood area (FEMA 2007). FEMA flood maps for the Fort Baker pier area are not available; however, waterfront areas in adjacent Sausalito and the Marin Headlands are mapped by FEMA as occurring with the 100-year flood area (FEMA 2009). Accordingly, the Fort Baker pier area would likely be subject to similar inundation.

Tsunamis and Seiches

The Bay Area is within a region of high seismic activity, as described in the "Geology, Soils, and Seismicity" section of this chapter. Seismic activity can potentially result in tsunamis or seiches, which would present a hydrological hazard. Tsunamis (seismic sea

waves) are long-period waves that are typically caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. Tsunamis can travel across oceanic basins and cause damage several thousand miles from their sources. Low-lying coastal areas, such as tidal flats, marshlands, and former Bay margins that have been artificially filled but are still at or near sea level, are generally the most susceptible to tsunami inundation. A seiche is caused by oscillation of the surface of an enclosed waterbody, such as the Bay, due to an earthquake or large wind event. Seiches can result in long-period waves that cause runup or overtopping of adjacent landmasses, similar to tsunami runup.

Because the majority of the region's faults are strike-slip faults, a tsunami is not expected to be a major threat as a result of a regional earthquake. The primary tsunami threat along the central California coast and Bay is from distant earthquakes along subduction zones elsewhere in the Pacific basin, including Alaska (City/County 2011). The most recent local and significant tsunami event occurred in March 2011, when a tsunami originating in Japan caused a swell of two feet in the Bay (NOAA 2011).

All alternatives are within the tsunami inundation area, as delineated on the state's tsunami inundation maps (California Emergency Management Agency 2009a, 2009b). The estimated increase in wave heights (above normal wave height of the tide cycle) is as much as 10.17 feet at the locations of the embarkation site alternatives along the San Francisco waterfront (City/County 2011). Tsunami-induced wave height increases have not been estimated for Marin County coastal areas within the Bay, such as Fort Baker (Marin County Sheriff Office of Emergency Services 2007).

The National Oceanic and Atmospheric Administration (NOAA) operates the tsunami warning system that serves both San Francisco and Marin counties, among other areas (City/County 2011). Tsunami warning procedures for the counties of San Francisco and Marin are provided in their respective tsunami emergency response plans (City/County 2011; Marin County Sheriff Office of Emergency Services 2007).

Sea Level Rise

USGS maps identify coastal areas around the San Francisco Bay that would be vulnerable to inundation during 100-year flood events under four simulated sea level rise conditions: no sea level rise (existing conditions), and sea level rises of 50 centimeters (cm) (20 inch), 100 cm (39 inch), and 150 cm (59 inch). While FEMA maps identify each of the Project sites as within the FEMA 100-year flood area, USGS sea level rise maps show that there would be an increase in the area within the embarkation sites that would be vulnerable to inundation during 100-year flood events in the event of 100-cm (39-inch) and 150-cm (59-inch) sea level rise.

Under the USGS no sea level rise scenario, small portions of the Pier 3 and Fort Baker sites would be subject to inundation during 100-year flood events. At each of the potential embarkation sites (Pier 31½, Pier 41, Pier 3, and Fort Baker) partial or complete inundation during 100-year flood events would occur in the event of the 100-cm (39 inch) sea level rise scenario. Under the 150-cm sea level rise scenario, additional areas within the embarkation sites would be inundated (USGS 2013).

REGULATIONS AND POLICIES

Federal

CWA. The CWA is the principal statute governing water quality on a national level. The CWA sets water quality standards and regulates discharge of pollutants into the nation's waters. The statute employs a variety of regulatory and nonregulatory tools to reduce pollutant discharges into waterways. It mandates permits for wastewater and stormwater discharges, regulates publicly owned works that treat municipal and

industrial wastewater, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality. The USEPA has delegated responsibility for implementation of portions of the CWA, including water quality control planning and programs, in California to the State Water Resource Control Board (SWRCB) and nine RWQCBs. The following CWA sections are relevant to the Project:

- **Sections 301 and 402.** These sections establish National Pollutant Discharge Elimination System (NPDES) permit requirements for discharge of pollutants from point sources, including ferry vessels. NPDES permits are not required for discharges incidental to the normal operation of a vessel, such as sewage, gray water, and effluent from properly functioning marine engines. The USEPA currently regulates discharges incidental to the normal operation of commercial vessels greater than 79 feet in length and operating as a means of transportation primarily through the vessel general permit (VGP). The VGP regulates discharges incidental to the normal operation of vessels operating in a capacity as a means of transportation. The VGP includes general effluent limits applicable to all discharges; general effluent limits applicable to 26 specific discharge streams; narrative water-quality based effluent limits; inspection, monitoring, recordkeeping, and reporting requirements; and additional requirements applicable to certain vessel types.

  CWA Section 402 regulations prohibit discharges into waters of the U.S. unless the discharge is in compliance with an NPDES permit regulating stormwater and industrial discharges. Specific to stormwater, the SWRCB has elected to adopt one statewide construction stormwater general permit that will apply to most stormwater discharges associated with construction activities. The Project would proceed in compliance with NPDES requirements under authorization of the construction stormwater general permit.
- **Section 311.** Under Section 311 of the CWA, the discharge of fuel, oil, oily wastes, and hazardous substances is prohibited into or upon the navigable waters of the U.S. or the waters of the contiguous zone, if such discharge causes a film or sheen upon, or discoloration of the surface of the water, or causes a sludge or emulsion beneath the surface of the water. If a discharge occurs, the violating party is responsible for control and cleanup, as well as costs incurred. Oil and chemical spills need to be reported to both the National Response Center and the state. A placard displaying discharge restrictions is required for all vessels 26 feet or longer.
- **Section 312.** Section 312 of the CWA prohibits discharge of untreated sewage within navigable waters. This section of the CWA is implemented jointly by the USCG and the USEPA. Section 312 also establishes effluent standards for marine sanitation devices (MSDs; i.e., onboard sewage treatment), including acceptable fecal coliform and suspended solid levels. Onboard systems must have a USCG certification label.
- **Section 303(d) and TMDLs.** States must present the USEPA with a list of "impaired water bodies," defined as those waterbodies that do not meet state water quality standards for identified pollutants. The CWA requires the development of TMDLs for impaired waters and their source pollutants. Implementation of this program in the study area is conducted by the San Francisco Bay RWQCB.
- **Section 401.** Section 401 of the CWA requires compliance with state water quality standards for actions within state waters. Activities that may result in a discharge to a waterbody must obtain a Water Quality Certification that the proposed activity will comply with state

water quality standards. The Project would comply with these water quality standards and obtain a Water Quality Certification from the RWQCB.

- **Section 404.** CWA Section 404 establishes the program that regulates the discharge of dredged and fill material into waters of the U.S. The U.S. Army Corps of Engineers (USACE) is responsible for enforcement and individual permit decisions, while the USEPA develops environmental criteria used in evaluating applications. Any discharge of fill associated with the Project would occur under authorization of a Standard Individual Permit from the USACE.

Rivers and Harbors Act. The rivers and harbors act of 1899 prohibits discharge of refuse matter into navigable waters or tributaries thereof of the U.S. without a permit. Permits are also required for any activities that excavate, fill, or alter the course, condition, or capacity of any port, harbor, channel, or other areas covered by the act. Many of these activities are additionally regulated by the CWA. Project alternatives would obtain approval under the rivers and harbors act through authorization of a Standard Individual Permit from the USACE.

Coastal Zone Management Act (CZMA) and Amendments. The CZMA of 1972, as amended, provides for management of the nation's coastal resources. In 1990, Congress passed the coastal zone act reauthorization amendments to address nonpoint source pollution problems in coastal waters. Within the Bay, BCDC has authority for implementation of the CZMA. The CWA and CZMA require that the state develop coastal nonpoint source pollution control programs that incorporate required management measures to reduce or prevent polluted runoff to coastal waters from specific sources. With the Park Service acting as the federal lead agency, the Project would comply with CZMA requirements by preparing a CZMA Consistency Determination.

National Flood Insurance Program. The National Flood Insurance Program, administered by FEMA, requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year flood zone. FEMA is responsible for preparing maps delineating these areas.

Executive Order 11988 and Director's Order 77-2, Floodplain Management. Executive Order 11988 and DO 77-2 require the Park Service to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Per Procedural Manual 77-2: Floodplain Management, the Park Service is required to prepare a formal Statement of Findings (SOF) for actions sited in a regulatory floodplain that cannot be located to non-floodplain sites. While the Project area does include the 100-year floodplain, the Project qualifies as an Excepted Action because the alternative locations are integral to their significance in providing access and orientation to Alcatraz and the GGNRA. Therefore, an SOF is not required.

International Convention for the Prevention of Pollution from Ships (MARPOL). The MARPOL convention is the international treaty that regulates disposal of wastes generated by normal operation of vessels. This treaty is implemented in the U.S. by the act to prevent pollution from ships. Annex IV of the MARPOL convention (Prevention of Pollution by Sewage from Ships) addresses discharge of sewage from ships. Within the Bay and study area, the USCG is the enforcement agency for the MARPOL convention.

Federal Refuse Act. The federal refuse act (1899 33 USC 407) prohibits the discharge or deposition of any refuse matter of any kind into national waters. Refuse includes: garbage, trash, oil and other liquid pollutants. The

USCG has enforcement authority over vessels within national waters.

Marine Plastic Pollution Research and Control Act. Under the marine plastic pollution research and control act (33 CFR 151.59), operators of vessels 26 feet or longer on federal waters must display a garbage disposal placard that notifies passengers and crew about discharge restrictions.

State

Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The Porter-Cologne Act (Division 7 of the California water code) is the primary state regulation that addresses water quality standards. Under the act, the SWRCB has the ultimate authority over water rights and water quality policy. The act also established nine RWQCBs to oversee water quality on a day-to-day basis at the regional level. The state and regional boards regulate all pollutant or nuisance discharges that may affect either surface water or groundwater. The study area is under the jurisdiction of the San Francisco Bay RWQCB. Under oversight by the USEPA, the SWRCB and San Francisco Bay RWQCB have the responsibility for establishing regulatory standards and objectives for water quality in the Bay; developing TMDLs for impaired waterbodies (including the Central Bay); and issuing CWA NPDES permits. Approval for Project activities subject to the Porter-Cologne Act would be obtained through the water quality certification/ waste discharge requirements issued by the San Francisco Bay RWQCB.

San Francisco Bay Water Quality Control Plan (Basin Plan). Regulatory standards and water quality objectives developed by the San Francisco Bay RWQCB are presented in the *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the Basin Plan. The Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality control, developed in compliance with CWA and Porter-Cologne Act requirements. The Basin Plan applies to all areas under the BCDC's jurisdiction, including the potential embarkation sites at Pier 31½, Pier 41, Pier 3, and Fort Baker.

Marine Invasive Species Act. The marine invasive species act of 2003 (public resources code sections 71200 through 71271) revised and expanded the California ballast water management for control of nonindigenous species act of 1999 (AB 703), which established a statewide program to address introduction and spread of nonnative aquatic species. The program requires that all vessels carrying ballast water must either conduct a mid-ocean exchange of ballast water or retain all ballast water onboard the vessel, among other "good housekeeping" preventative actions. The program is under the direction of the California State Lands Commission in consultation with other state and federal agencies.

California Health and Safety Code. California law prohibits dumping any garbage into the navigable waters of the state (California health and safety code, sections 117475 through 117500). In addition, it is illegal to deposit human excreta in the navigable waters from any vessel tied to any dock, slip, or wharf that has toilet facilities available for the use of persons on the vessel (California health and safety code, division 104, part 13, section 117515).

California Fish and Game Code. California fish and game code, section 5650 prohibits discharge of harmful materials to water of the state. It is unlawful to deposit in, permit to pass into, or place where it can pass into California waters any petroleum, acid, coal or oil tar, lampblack, aniline, asphalt, bitumen, or residuary product of petroleum; any carbonaceous material or substance; any refuse, liquid or solid, from a refinery, gas house, tannery, distillery, chemical works, mill, or factory of any kind; any sawdust, shavings, slabs, or edgings; any factory refuse, lime, or slag; any cocculus indicus; or any substance or material deleterious to fish, plant, mammal, or bird life. Section 5655 of the code requires that parties responsible for

polluting waters of the state pay for removal costs and environmental damages.

McAteer-Petris Act. The McAteer-Petris act established BCDC as a temporary state agency charged with preparing a plan for the long-term use of the Bay. In August 1969, the McAteer-Petris act was amended to make BCDC a permanent agency and to incorporate the policies of the Bay Plan into state law. The primary purpose of the act is to promote responsible planning and regulation of the Bay. The act emphasizes: eliminating unnecessary placement of fill in the Bay; using the Bay for water-oriented uses; and providing public access to the Bay. BCDC's jurisdiction generally extends to all areas of the Bay that are subject to tidal action, including sloughs and marshlands, the 100-foot shoreline band surrounding the Bay, saltponds, and managed wetlands as defined in the act, as well as certain designated waterways.

Within this jurisdictional area, projects that involve fill, extraction, or substantial changes in use of land, water, or existing structures in the Bay must obtain a BCDC permit. In determining whether to issue permits, the BCDC looks to policies set forth in the act and in the Bay Plan. In general, these policies authorize fill or excavation of wetlands only for water-dependent projects where no feasible upland alternatives exist, and only if wetlands impacts are mitigated. Approval for Project activities subject to the McAteer-Petris act would be obtained through obtaining a BCDC Administrative or Major Permit.

Local

Stormwater Design Guidelines. The Port of San Francisco and the SFPUC established stormwater design guidelines that require a Stormwater Control Plan for all projects greater than 5,000 square feet in size. The Stormwater Control Plan must specify how projects will comply with San Francisco's stormwater design performance measures, including treatment of stormwater runoff resulting from a rain event equal to at least 0.2 inches per hour of intensity; or 80% or more of the annual stormwater runoff volume, determined from design rainfall capture curves. The Stormwater Control Plan must additionally contain erosion and sediment control and pollution prevention measures during construction.

San Francisco Building Code Requirements. The San Francisco Department of Building Inspection and/or the Port's Building Department administer building codes that include provisions for managing drainage from new construction. This includes site grading and drainage requirements for stormwater flow conveyance during both construction and the life of the Project.

City and County of San Francisco Floodplain Ordinance. The City and County of San Francisco floodplain management ordinance requires that projects involving new construction or improvements to existing buildings within the floodplain conform to construction standards minimizing flood hazards. In general, this entails floodproofing the first floor of structures in designated flood hazard zones. These provisions apply to projects within the FEMA delineated 100-year flood zone, consistent with National Flood Insurance Program requirements.

Marin County Countywide Plan. The 2007 *Marin County Countywide Plan* includes clean water goals and policies meant to improve water quality in Marin County and the Bay. The following plan policies are relevant to Fort Baker:

- *WR2-3 Avoid Erosion and Sedimentation*—Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and waterbodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon Project completion.

- *WR-2.b Integrate Bay Area Stormwater Management Agencies Association (BASMAA) Stormwater Quality Protection Guidelines into Permitting Requirements for All Development and Construction Activities*—All projects should integrate stormwater pollution prevention design features for water quality protection to the extent feasible, such as those included in the BASMAA Start-at-the- Source manual and the Tools Handbook.

AQUATIC BIOLOGICAL RESOURCES

This section analyzes aquatic biological resources within the study area. The study area for this resource topic is defined as the adjacent shoreline and aquatic environment of the northern San Francisco waterfront at the three embarkation alternative sites (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), and the Fort Baker and Horseshoe Bay area in southern Marin County.

EXISTING CONDITIONS

Regional Setting

The study area is located within the Central Bay. Because of its proximity to the Golden Gate channel and Pacific Ocean, Central Bay habitat most closely resembles open coast marine communities. Marine biota potentially found in the study are representative of species assemblages at pier locations throughout the Central Bay, and include benthic fauna, encrusting organisms, aquatic vegetation, planktonic organisms, fish, and marine mammals. Each of these habitats and associated biological communities are described herein.

Site Settings

Piers 31½, 41, and 3. Marine habitats along the northeastern San Francisco waterfront include intertidal, subtidal, and open water. The shoreline areas at piers 31½, 41, and 3 are developed with piers and hard armoring. Marine habitats and associated communities present in these areas include artificial intertidal structures (e.g., pilings and seawalls), substrate and benthos, and open water. No natural undisturbed shorelines exist in the vicinity of these sites, with the exception of the last remaining natural stretch of shoreline in the Bay, Black Point, a short, steep bluff located directly to the east of the Fort Mason portion of the study area.

Fort Baker and Horseshoe Bay. The study area at Fort Baker primarily includes the existing pier structure, which provides habitat to encrusting organisms within the intertidal zone, and adjacent open waters. Neighboring Horseshoe Bay also contains sandy-gravel beaches and rocky intertidal habitats, and an offshore population of eelgrass (USACE 2011a; NPS 1999).

Marine Communities and Aquatic Resource Habitats

Intertidal Habitat and Associated Species. Intertidal habitat includes areas that lie between low and high tides. Within the intertidal areas at piers 3, 31½, and 41, this area is developed and includes bulkheads, pilings, and other artificial structures. These habitats are also present at Fort Baker, along with sandy beaches and rocky intertidal habitats. Hard substrates, such as piers, bulkheads, breakwaters, and riprap, function as habitat for benthic invertebrates. These artificial intertidal habitats are commonly populated by algae, barnacles, mussels, tunicates, bryozoans, cnidarians, and crabs. Additionally, these structures can serve as habitat for invasive species such as Japanese brown alga (*Undaria pinnatifida*) At Fort Baker, the rocky intertidal areas support kelp, sea lettuce (*Ulva lactuca*), turkish towel (*Gigartina exasperata*), and other seaweeds and algae (Costenio 1997, as cited in NPS 1999).

Subtidal Habitat and Associated Species. Subtidal habitat refers to bottommost areas that are below the tideline and are always submerged. In the Central Bay, this includes both soft sediment and hard substrate areas. Hard substrates include natural features, such as boulders and rock outcrops, as well as artificial structures, such as submerged bulkheads, pilings, and pipelines. These artificial features are most common in developed areas, such as those occurring at piers 31½, 41, and 3, and Fort Baker. Hard

substrate areas in the subtidal zone provide habitat for an assemblage of marine species similar to hard substrate in the intertidal zone, including hydroids, bryozoans, tunicates, encrusting sponges, encrusting diatoms, and anemones. Soft sediment subtidal areas are generally composed of mud/silt/clay, sand, and pebble/cobble, with varying amounts of intermixed shell fragments. Soft sediment subtidal habitats support a diverse polychaete community, and large mobile invertebrates, commonly including blackspotted shrimp (*Crangon nigromaculata*), Bay shrimp (*C. franciscorum*), Dungeness crab (*Metacarcinus magister*), and slender rock crab (*Cancer gracilis*) (NMFS 2007).

Open Water Habitat and Associated Species. The study area is in close proximity to the Golden Gate inlet and Pacific Ocean. As such, open water habitat is similar to the open water coastal environment. Open water habitat affected by Project-related construction and operational activities would primarily include surface waters and shallow open waters. Open water habitats are inhabited by planktonic organisms, fish, and marine mammals.

Plankton. Plankton represent the lower levels of the food chain, serving as important resources to many marine communities, including benthic organisms, fish, and mammals. Open water areas of the Central Bay provide habitat to three major components of plankton, including phytoplankton, zooplankton, and ichthyoplankton (fish larvae and eggs).

Phytoplankton are usually microscopic in size, consisting of a single cell or chains of cells. Phytoplankton abundance directly affects productivity of other organisms, such as clams, worms, mussels, and zooplankton (NMFS 2007).

Zooplankton are microscopic or macroscopic animals that either free-float or feebly swim in open water and provide an ecologically important food source for many marine community members, including benthic organisms, fish, and mammals. Common zooplankton found in the Bay include copepods, rotifers, tintinnids, and larval forms of gastropods, bivalves, barnacles, polychaetes, and crustaceans such as the dungeness crab (Ambler et al. 1985; NMFS 2007).

Ichthyoplankton are the eggs and larval forms of marine fishes, such as Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), goby, white seabass (*Cynoscion nobilis*), staghorn sculpin (*Leptocottus armatus*), and diamond turbot (*Hypsopsetta guttulata*). Plankton abundances are affected by seasonality, geographical variations, life histories, and other variables (Ambler et al. 1985).

Aquatic Vegetation. Aquatic vegetation occurs throughout the Central Bay in association with both soft and hard substrates. Subtidal plant beds in the Bay include algal beds (both macro and micro) and angiosperm beds (submerged aquatic vegetation). Within the Central Bay, common macroalgae belong to the taxonomic groups Chlorophyta (green), Rhodophyta (red), and Phaeophyta (brown) (NMFS 2007). The most widely distributed submerged aquatic vegetation habitat is eelgrass (*Zostera marina*) (Merkel & Associates 2003, as cited in NMFS 2007), followed by widgeon grass (*Ruppia maritima*), sago pondweed (*Stuckenia pectinata)*, and surf grass (*Phyllospadix scouleri*) (NMFS 2007). All submerged aquatic vegetation in the Central Bay is considered critical essential fish spawning habitat for Pacific herring, and eelgrass is considered a Habitat Area of Particular Concern (HAPC), which is afforded additional protection.

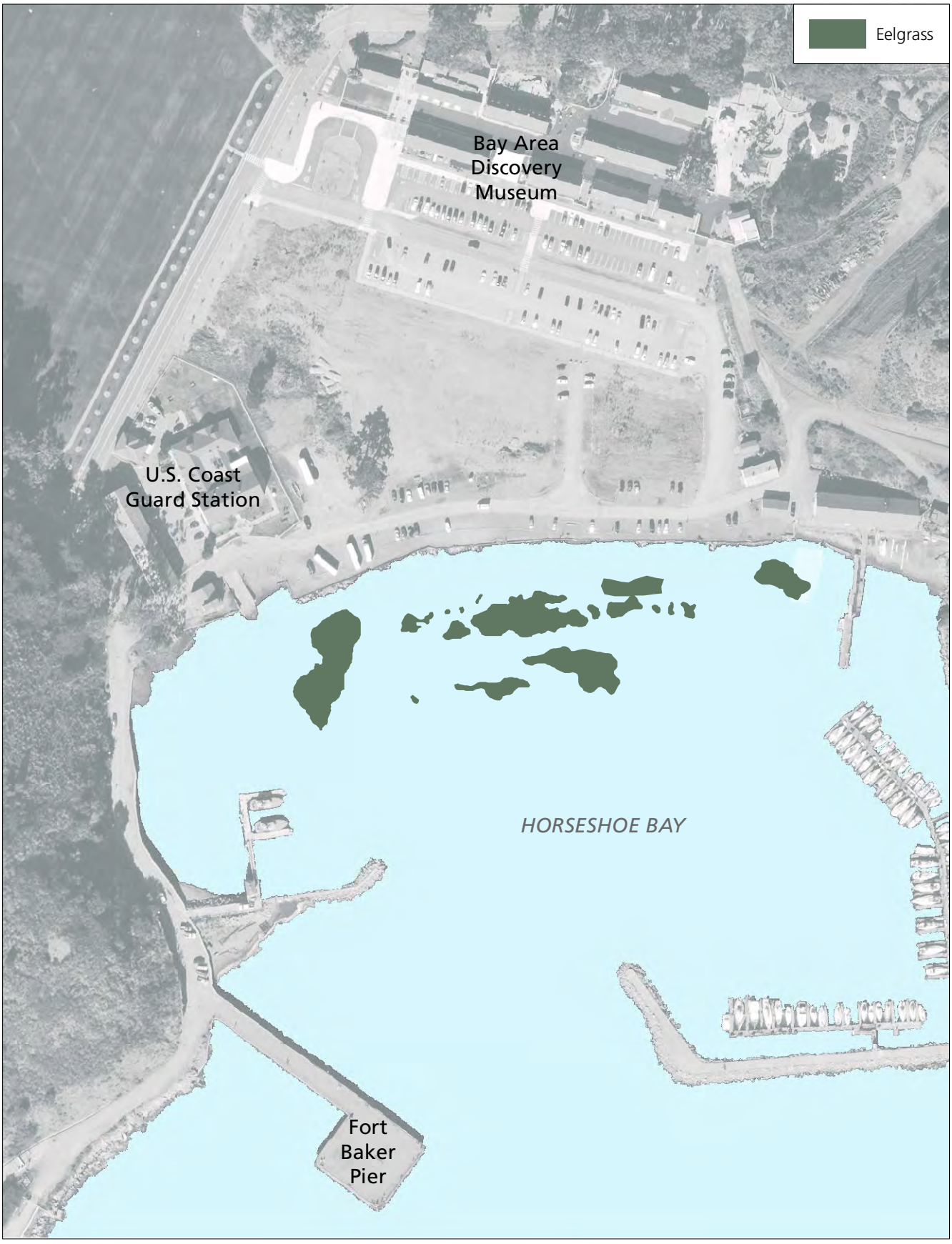
Based on limited surveys of the Bay, eelgrass or other submerged aquatic vegetation has not been observed in the vicinity of the primary embarkation site alternatives along the San Francisco waterfront (USACE 2011a). Within the study area at Fort Baker, kelp, sea lettuce, turkish towel, and other seaweeds and algae grow on intertidal rocks (NPS 1999). As is shown in Figure 28, eelgrass has been mapped as inhabiting Horseshoe Bay nearby to the Fort Baker pier (USACE 2011a; NPS 1999).

Fish. A wide variety of fish species inhabit the Central Bay. Species assemblages vary according to habitat types, including open water (pelagic), seafloor (demersal), and hard substrates (natural and artificial) with several species present across multiple habitat types. The majority of fish species complete all life stages within the Bay, while some species, known as anadromous fish, spend a portion of their lives in the Bay as they migrate between freshwater streams and the open ocean. Several fish species in the Central Bay and study area have protected status under the federal Endangered Species Act (ESA), California Endangered Species Act (CESA), or the Magnuson-Stevens fishery conservation and management act (M-SFCMA).

Within pelagic waters (open waters) of the Central Bay, northern anchovy is the overwhelmingly dominant species, accounting for up to 94% of those fish inhabiting the water column, as documented in monthly bottom trawl fish collections undertaken by the California Department of Fish and Wildlife (CDFW) between 2005 and 2009 (IEP 2005-2009). Pacific herring and jacksmelt (*Atherinopsis californiensis*) are the second and third most common fish taxa in Central Bay waters, together accounting for an additional 5% of the fish sampled on an annual basis. Other notable managed or sensitive pelagic fish species documented in the study area include longfin smelt (*Spirinchus thaleichthys*), Chinook salmon (*Oncorhynchus tshawytscha*), Pacific sardine (*Sardinops sagax*), and English sole (*Parophrys vetulus*) (NMFS 2001).

Additional fish species are associated with the demersal (Bay floor or water bottom) zone. As documented in CDFW bottom trawl fish collections of the Central Bay between 2005 and 2009, dominant species commonly inhabiting the seafloor and immediately adjacent waters include Bay goby (*Lepidogobius lepidus*), English sole, speckled sanddab (*Citharichthys stigmaeus*), plainfin midshipmen (*Porichthys notatus*), staghorn sculpin, shiner perch (*Cymatogaster aggregata*), cheekspot goby (*llypnus gilberti*), longfin smelt, white croaker (*Genyonemus lineatus*), bonyhead sculpin (*Artedius notospilotus*), Pacific sanddab (*Citharichthys sordidus*), and bay pipefish (*Syngnathus leptorhynchus*) (IEP 2005-2009). Managed, protected, or other fish species of concern or special significance observed inhabiting Central Bay seafloor areas include Pacific sardine, English sole, Pacific sanddab, lingcod (*Ophiodon elongates*), brown rockfish (*Sebastes auriculatus*), kelp greenling (*Hexagrammos decagrammus*), leopard shark (*Triakas semifaciata*), spiny dogfish shark (*Squalus acantias*), skates (*Raja* spp.), cabezon (*Scopaenichthys marmaoratus*), Pacific herring, and longfin smelt (NMFS 2001).

Fish assemblies associated with the rocky substrate, and artificial hard substrates such as piers and pilings mainly consist of various surfperch species and brown rockfish (URS 2003).



0 200 Feet

FIGURE 28
EELGRASS MAPPED IN HORSESHOE BAY
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Special Status Species and Habitats

Special Aquatic Sites. Certain waters of the U.S. that are recognized as having unique ecological value have been designated "special aquatic sites." This includes sanctuaries and refuges, mudflats, wetlands, vegetated shallows, eelgrass bed, coral reefs, and riffle and pool complexes. Special aquatic sites may be afforded additional protection or consideration under federal regulations. Within the Central Bay, two unique natural communities are considered special aquatic sites: eelgrass beds and native oyster beds.

Eelgrass has been afforded special management considerations by CDFW, the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), USEPA, BCDC, and the Golden Gate Audubon Society. NMFS considers eelgrass beds to be a HAPC. Eelgrass commonly inhabits shallow, soft-bottom substrates of bays and estuaries throughout the California coast. Eelgrass beds often accrete sediments and function ecologically as substrate for epifauna and nursery habitat for juvenile fish. In the Bay, eelgrass provides unique biological environments for spawning Pacific herring, and serves as a nursery area for many valued species of fish, including Pacific herring, halibut (*Hippoglossus* spp.), and English sole. Comprehensive eelgrass surveys of the Bay were completed as part of a Bay-wide programmatic EFH consultation for the long-term management strategy program. EFH was not observed at the San Francisco waterfront locations (piers 31½, 41, and 3), but was observed within Horseshoe Bay adjacent to the study area at Fort Baker (USACE 2011a; NPS 1999).

Native oyster beds are composed of living Olympia oysters (*Ostrea conchaphila*) and remnant beds composed of dead shell material. Oyster beds form in the subtidal zone, typically bordered by mudflats at higher elevations and eelgrass beds at lower elevations. No live subtidal Olympia oyster beds have been documented in the Bay, and native oyster beds are not expected to be present in the study area (NMFS 2007). Native oysters have been reported to inhabit intertidal wharf pilings on Port piers (San Francisco Planning Department 2011), and may be found on pilings within the study area.

EFH. The Central Bay, including the study area, is designated EFH for assorted fish species managed under the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon Fishery Management Plans (FMPs). The Pacific Coast Groundfish FMP manages at least 89 species over a large, ecologically diverse area covering the entire West Coast of the continental U.S.; 15 species managed under this FMP have species distributions within the Central Bay. The Coastal Pelagic Species FMP includes five species, three of which have known species distributions in the Central Bay. In addition, the Pacific Coast Salmon FMP includes Chinook salmon and coho salmon, and it identifies the entire Bay as EFH (NMFS 2001). Species for which EFH has been designated that are likely to exist in the study area are listed in Table 24.

TABLE 24. SPECIES WITH DESIGNATED EFH WITHIN THE IMMEDIATE PROJECT AREA

Common Name	Scientific Name
Pacific Groundfish FMP	
English sole	*Parophrys vetulus*
Starry flounder	*Platichthys stellatus*
Brown rockfish	*Sebastes auriculatus*
Pacific sanddab	*Citharichthys sordidus*
Lingcod	*Ophiodon elongatus*
Sand sole	*Psettichthys melanostictus*
Leopard shark	*Triakis semifasciata*
Spiny dogfish	*Squalus acanthias*
Big skate	*Raja* ssp.
Pacific whiting (hake)	*Merluccius productus*
Kelp greenling	*Hexagrammos decagrammus*
Soupfin shark	*Galeorhinus galeus*
Curlfin sole	*Pleuronichthys decurrens*
Bocaccio	*Sebastes paucispinis*
Cabezon	*Scorpaenichthys marmoratus*

Common Name	Scientific Name
Coastal Pelagic FMP	
Northern anchovy	*Engraulis mordax*
Jack mackerel	*Trachurus symmetricus*
Pacific sardine	*Sardinops sagax*
Pacific Coast Salmon FMP	
Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*Oncorhynchus kisutch*

Note:
Source: NMFS 2001. *Fisheries Management Plan Species Distributions in San Francisco, San Pablo and Suisun Bays*. Accessed September 1, 2013. http://swr.nmfs.noaa.gov/hcd/loclist.htm)

ESA-listed Marine Species. Table 25 lists marine species listed as threatened or endangered pursuant to the federal ESA, and species listed as rare, threatened, or endangered pursuant to CESA, with recorded occurrences of inhabiting the vicinity of the study area. Several marine species may be reasonably expected to inhabit the study area based on the presence of suitable habitat. ESA and CESA species with a moderate to high potential to inhabit, or with critical habitat or the EFH that they depend on in the study area are discussed in further detail below.

TABLE 25. FEDERAL ESA- AND STATE ESA-LISTED MARINE SPECIES WITH THE POTENTIAL TO INHABIT THE STUDY AREA

Species	Federal	State	Habitat Association	Potential to Inhabit
Fish				
Green sturgeon southern DPS (*Acipenser medirostris*)	T	SSC	Marine and estuarine environments and Sacramento River; all of San Francisco Bay-Delta (Bay-Delta)	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Tidewater goby *(Eucyclogobius newberryi)*	E	SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River	No suitable habitat present. Species presumed to be extirpated from Bay-Delta.
Delta smelt *(Hypomesus transpacificus)*	T	E	Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, river channels and sloughs in Delta	Outside known range.
Central California coast ESU coho salmon *(Oncorhynchus kisutch)*	E	E	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Central California coast DPS steelhead trout *(Oncorhynchus mykiss)*	T	SSC	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Central Valley DPS steelhead trout *(Oncorhynchus mykiss)*	T	-	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Sacramento River winter-run ESU Chinook salmon (*Oncorhynchus tshawytscha)*	E	E	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Central Valley spring-run ESU Chinook salmon *(Oncorhynchus tshawytscha)*	T	T	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay. Critical habitat present in the study area.
Central Valley fall-run/late fall-run Chinook salmon *(Oncorhynchus tshawytscha)*	FSC	SSC	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through the Bay-Delta to freshwater spawning grounds	High potential to inhabit. Known to inhabit the Central Bay.
Longfin smelt *(Spirinchus thaleichthys)*	-	T	Euryhaline, nektonic, and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column.	High potential to inhabit. Known to inhabit Central Bay.

Species	Federal	State	Habitat Association	Potential to Inhabit
Marine Mammals				
Humpback whale *(Megoptera noveangliae)*	E	-	Predominantly coastal waters, although occasional individuals enter the Bay-Delta.	Will not inhabit Project footprint. Infrequent transient visitor to the Bay, typically only in deeper waters.

Notes:
DPS = distinct population segment
E = endangered
ESU = evolutionarily significant unit
FSC = federal species of special concern
SSC = state species of special concern
T = threatened
Source: CDFW 2013. California Natural Diversity Database (CNDDB) and USFWS database search of Project and surrounding quadrangles; San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, San Francisco South.
NMFS, 2001. *Fisheries Management Plan Species Distributions in San Francisco, San Pablo and Suisun Bays*. Accessed September 1, 2013. http://swr.nmfs.noaa.gov/hcd/loclist.htm)

Chinook salmon—Three Chinook salmon ESUs migrate through the northern and central portions of the Bay: Sacramento River winter-run, Central Valley spring-run, and Central Valley fall/late fall-run (CDFG 1987). Each ESU is considered a distinct race and has been given its own management status: the Sacramento River ESU is state and federally listed as endangered; the Central Valley spring-run is federal and state listed as threatened; and the Central Valley fall/late fall-run is a state and FSC (CDFW 2003).

Sacramento River winter-run Chinook salmon migrate and spawn from mid-December to August along the Sacramento River, up to Keswick Dam in Shasta County. Adult winter-run Chinook salmon can be found in the Bay in November and December. Central Valley spring-run Chinook salmon have a similar life history, but begin spawning migration to the Delta in late winter to spring. Adults are found in the Bay during the migratory period in the spring, and juveniles have the potential to inhabit the Bay in the fall, winter, and spring. Critical habitat for Sacramento River winter-run Chinook and Central Valley spring-run Chinook salmon includes all waters of the Bay north of the Bay Bridge (NMFS 2001). Adult Central Valley fall-run/late fall-run Chinook salmon begin their migration toward their spawning grounds in June, with a peak in September. They spawn in the Delta in December and January. Juvenile salmon potentially inhabit the Bay in the late winter through summer. There is no critical habitat designated for this species.

Coho salmon—Coho salmon are listed as threatened under ESA and endangered under CESA. Adult coho migrate through the Bay after late fall or winter heavy rains to spawn in the Delta. Juvenile coho potentially inhabit the Bay in the spring, summer, and fall and may be present in the Central Bay. Critical habitat for Central California Coast coho salmon within the Bay includes all waters of the Central Bay north of the Bay Bridge (NMFS 2001).

Steelhead trout—Individuals from two steelhead ESUs can be found in the Bay: central California coast steelhead and Central Valley steelhead. Both ESUs are federally listed as threatened, while central California coast steelhead are also a SSC. Central Valley steelhead migrate between the ocean and the Delta and its tributaries via the San Francisco and San Pablo bays. Upstream migration occurs in the winter, with peak spawning occurring from December through April. Central California coast steelhead migrate from the Pacific coast through the Bay in the winter to spawn in freshwater in the upper Sacramento River. Critical habitat for central California coast steelhead and Central Valley steelhead occurs in the Central Bay and includes the study area (NMFS 2001).

Green sturgeon—Green sturgeon is listed as a federally threatened species and as a state species of concern. Green sturgeon are found throughout the Bay and are native to the Sacramento-San Joaquin River system. Spawning occurs in the lower reaches of the Sacramento-San Joaquin River system; however, feeding occurs throughout the Bay. Adult green sturgeon migrate into freshwater beginning in late February, with spawning occurring in March through July and peak activity in April and June. After spawning, juveniles remain in fresh and estuarine waters for 1 to 4 years and then begin to migrate out to sea. Critical habitat for green sturgeon occurs within the Central Bay and includes the study area (NMFS 2001).

Longfin smelt—Longfin smelt are listed as a state threatened species. Longfin smelt live in open waters of the Central Bay, including within the study area (IEP 2005-2009). Longfin smelt inhabit Central Bay waters throughout the year, although they migrate to the Delta to spawn in freshwater during the winter. No critical habitat has been designated for this species.

Marine Mammals. The most common marine mammals to inhabit the study area are Pacific harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Other marine mammal species that occasionally inhabit the Bay and could be considered transient visitors in the study area include the gray whale (*Eschrichtius robustus*),

harbor porpoise (*Phocoena phocoena*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), and, less frequently, the southern sea otter (*Enhydra lutris*) (URS 2003). On rare occasions, individual humpback whales (*Megaptera novaeangliae*) have entered the Bay.

Pacific harbor seals are nonmigratory, have limited seasonal movements associated with foraging and breeding activities, and use the Bay year-round (Kopec and Harvey 1995). Harbor seals forage in shallow waters on a variety of fish and crustaceans, and therefore, could occasionally be found foraging in the study area. Harbor seals come ashore (haulout) in groups ranging in size from a few individuals to several hundred. Habitats used as haulout sites include tidal rocks, bayflats, sandbars, and sandy beaches (Zeiner et al. 1990). California sea lions breed in Southern California and along the Channel Islands. After the breeding season, males migrate up the Pacific Coast and enter into the Bay. Sea lions are known to haul out at Pier 39 in Fisherman's Wharf, which is adjacent to Pier 41 (Photo 13). During anchovy and herring runs, approximately 400 to 500 sea lions (mostly immature males) feed almost exclusively in the North and Central Bay (USFWS 1992) and could occasionally forage in the study area.

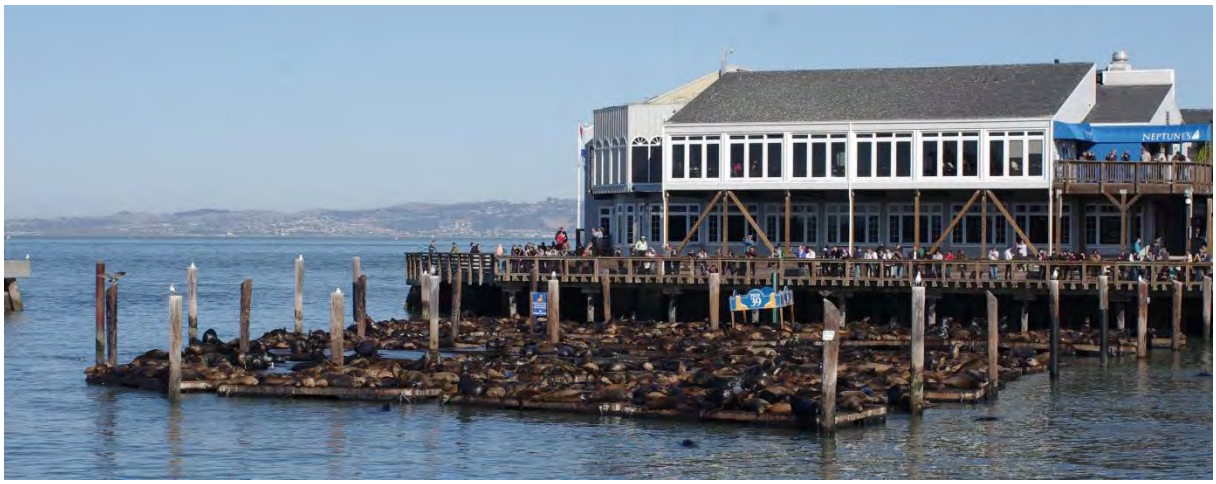


Photo 13.
View of sea lions hauled out at Pier 39.

REGULATIONS AND POLICIES

Federal

Federal ESA (16 USC 1531-1544). Under the ESA, the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533(c)). Pursuant to the requirements of ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the study area and determine whether the proposed project may affect or "take" such species. Taking is defined by ESA [section 3(19)] as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An incidental take of a listed species requires consultation with the USFWS or NMFS to determine whether the project is likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat (see below) proposed to be designated for such species (16 USC 1536(3)).

Fish and Wildlife Coordination Act (16 USC 661-667e). This act requires consultation with the USFWS, NMFS, and state agencies responsible for fish and wildlife

resources for all proposed federal undertakings and nonfederal actions needing a federal permit or license that would impound, divert, deepen, or otherwise control or modify a stream or waterbody, and to make mitigation and enhancement recommendations to the involved federal agency.

M-SFCMA (16 USC 1801-1882). The primary purpose of this act is conservation and management of fishery resources in the U.S., development of domestic fisheries, and phasing out foreign fishing activities within federal waters (the 200-mile limit extending from the edge of state waters). The amended M-SFCMA, also known as the sustainable fisheries act (Public Law 104-297), requires all federal agencies to consult with the Secretary of Commerce on proposed projects authorized, funded, or undertaken by that agency that may adversely affect EFH. The main purpose of the EFH provisions of the sustainable fisheries act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat.

Marine Mammal Protection Act (MMPA). The MMPA was enacted on October 21, 1972, and was reauthorized by the MMPA amendments of 1994 (Public Law 103-238). Under the MMPA, all species of marine mammals are protected. The MMPA prohibits, with certain exceptions, the "take" of marine mammals. Under the MMPA, take is defined as the means, "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill." Harassment is defined as, "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to migration, breathing, nursing, breeding, feeding, sheltering." Sections 101(a)(5)(A) and (D) of the MMPA (16 USC 1361 et seq.) allow incidental take of marine mammals during specified activities under authorization of the Secretary if the total take would have negligible impacts on the species.

State

CESA (California Fish and Game Code 2050-2116). Similar to ESA, CESA (along with the native plant protection act) authorizes the California Fish and Game Commission to designate, protect, and regulate the taking of special-status species in the state of California. CESA defines “endangered” species as those whose continued existence in California is jeopardized. State-listed “threatened” species are those not presently threatened with extinction, but which may become endangered if their environments change or deteriorate. Any proposed projects that may adversely impact state-listed threatened or endangered species must formally consult with the CDFW. Section 2080 of the California fish and game code prohibits the taking of state-listed plants and animals. The CDFW also designates “fully protected” or “protected” species as those that may not be taken or possessed. Species designated as fully protected or protected may or may not be listed as endangered or threatened.

In addition to state-listed special-status species, the CDFW also maintains a list of “species of special concern,” most of which are species whose breeding populations in California may face extirpation. To avoid the future need to list these species as endangered or threatened, the CDFW recommends consideration of these species, which do not as yet have any legal status, during analysis of the impacts of proposed projects.

Local

San Francisco Bay Subtidal Habitat Goals Project. Developed primarily by BCDC, the California Ocean Protection Council/ California State Coastal Conservancy, NMFS, and the San Francisco Estuary Partnership, the San Francisco Bay Subtidal Habitat Goals Project provides recommendations for restoration and protection of subtidal areas. The project goals are nonbinding, but they provide guidance to assist the planning process, including evaluation, avoidance, and minimization of impacts. Habitat conservation

goals that are relevant to the Project include avoiding net loss of subtidal and intertidal sand habitats; minimizing disturbance to Bay soft bottom habitat; enhancing and protecting habitat function and the historical value of artificial structures in the Bay; minimizing placement of artificial structures that are detrimental to subtidal habitat function; and avoiding net loss of existing eelgrass and macroalgal beds. Nonbinding recommendations from the San Francisco Bay Subtidal Habitat Goals Project are generally consistent with conservation goals of the BCDC, San Francisco Bay RWQCB, USACE, and NMFS, as implemented through their respective permitting and authorization processes.

TERRESTRIAL BIOLOGICAL RESOURCES

This section analyzes terrestrial biological resources within the study area, including common and special status wildlife and plant species and their associated habitats. The study area is defined as the terrestrial habitat within and adjacent to the three embarkation site alternatives on the northern San Francisco waterfront (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), and at Fort Baker in southern Marin County.

EXISTING CONDITIONS

Regional Setting

The terrestrial study area is located in the Bay/Delta Bioregion, as defined by the state's Interagency Natural Areas Coordinating Committee (Biodiversity Council of California 2012). The bioregion is made up of the watershed of the Bay Area and the Sacramento–San Joaquin River Delta, not including the major rivers that flow into the Delta. The habitats and vegetation within the Bay/Delta Bioregion varies widely from coastal prairie scrub, mixed hardwoods, and valley oaks to salt- and freshwater marshes. The Bay Area is characterized by microclimates with significant weather variations over small areas. This is particularly true in San Francisco, the Marin Headlands, and other coastal areas affected by maritime influences such as fog, wind, and ocean/bay temperatures. Subregional habitats are strongly influenced by these conditions. The diversity in microclimates, soils, topography, and temperature throughout the region results in high levels of species unique to the area. The study area is within a Mediterranean climate, with relatively mild, wet winters and warm, dry summers. The rainy season typically lasts from October to April, while the warmest months are usually September and October.

Site Settings

The three northern San Francisco primary embarkation site alternatives are located in areas that are substantially developed and devoid of natural vegetation, with the exception of native trees and coastal scrub areas in Upper Fort Mason. The Fort Baker site in southern Marin County is also developed, with surrounding natural areas. The following paragraphs provide additional detail on the site settings.

Pier 3. The study area at Pier 3 includes Lower and Upper Fort Mason. Lower Fort Mason contains a parking lot, currently occupied buildings, and historic piers 1, 2, and 3. Vegetation in Lower Fort Mason is limited to nonnative ornamental trees located west of Building A. Upper Fort Mason is a landscaped park with lawn, ornamental herbs, shrubs, and trees. The small undeveloped areas of Upper Fort Mason include mature stands of nonnative and native trees (NPS 2012e).

Piers 31½ and 41. The areas surrounding piers 31½ and 41 are minimally vegetated, with a few landscaped trees and bushes intermittently located along the adjacent promenade. Palm trees have been planted in the median along the Embarcadero.

Fort Baker. Development within the study area at Fort Baker includes a public fishing pier and roadways providing access to neighboring buildings and services, including USCG facilities, the Presidio Yacht Club, and the Cavallo Point Lodge. The Fort Baker Plan EIS (NPS 1999) described the vegetation of Cavallo Point and the developed areas of Fort Baker as "Urban/Disturbed" as a result of historic use and landscape plantings. Developed areas of Fort Baker are bordered on three sides by undeveloped lands managed by the Park Service, and by Horseshoe Bay to the south. The hillside immediately west of the pier consists of coastal scrub dominated by coyote brush (*Baccharis pilularis*) and California sagebrush (*Artemisia californica*).

Planted stands of Monterey cypress (*Cupressus macrocarpa*) are also located near the pier (NPS 1999).

Habitat Types

Habitat types within the site study areas were further characterized using the California Wildlife Habitat Relationship System (CDFW 2008), and a site-specific natural resource inventory survey completed at Fort Baker (NPS 1999). The following paragraphs describe these habitats and associated terrestrial plants and animals. Marine habitats and associated wildlife are discussed in the "Aquatic Biological Resources" section of this chapter.

Urban Landscaping/Developed. The Pier 31½, Pier 41, and Pier 3 alternative sites are located in developed urban areas. Vegetation is minimal, primarily consisting of ornamental landscaping and scattered trees and bushes. These developed areas are unlikely to support native, special status plant species. Wildlife species expected to inhabit these developed areas include common and nonsensitive urban species such as raccoon (*Pryocyn lotor*), striped skunk (*Mephitis mephitis*), house sparrow (*Carpodacus mexicanus*), and Brewer's blackbird (*Euphagus cyanocephalus*) (NPS 2012e).

Upper Fort Mason contains more abundant landscaping, including well-maintained lawn areas, flowering shrubs, hedges, and perennials, which enhance the area's parklike quality. Dominant trees include mature stands of Monterey cypress, Monterey pine (*Pinus radiate*), Canary Island date palm (*Phoenix canariensis*), and eucalyptus (*Eucalyptus* sp.). Native plants are also propagated in a small section of Upper Fort Mason. Nesting or roosting habitat for birds and bats may also be present in the tunnel beneath Upper Fort Mason (NPS 2012e), although this area would not be affected by the Project.

Fort Baker is largely composed of urban landscaping and developed areas, including the fishing pier, Cavallo Point Lodge, Presidio Yacht Club, USCG facilities, and associated roadways. In these areas, most of the native vegetation has been removed, with some areas re-landscaped with ornamental species or left as bare ground. Neglected areas have been colonized by annual grasses and weeds, such as pampas grass (*Cortaderia selloana*), Cape ivy (*Senecio mikanioides*), English ivy (*Hedera helix*), broom (*Cytisus monspessulanus* and *C. scoparius*), sweet fennel (*Fonoecium vulgare*) and common mustard (*Brassica* sp.). Wildlife in the urban/disturbed areas of Fort Baker is typical of urban settings, and includes scrub jays (*Aphelocoma coerulescens*), American robins (*Turdus migratorius*), mice (*Mus* sp.), rats (*Rattus* sp.*)*, sparrows (*Passeridae)*, and pigeons (*Columbidae*). Several bat (*Chiroptera*) species have been documented within the Marin Headlands, including the Townsend's western big-eared bat (*Corynorhinus townsendii*), an SSC, the Yuma myotis (*Myotis yumanensis*), and Brazilian free-tailed bats (*Tadarida brasiliensis*) (NPS 1999). These species may occupy abandoned or minimally occupied buildings and structures within Fort Baker.

Coastal Scrub. Limited areas of coastal scrub habitat occur within the study area, including a small area at the northernmost end of Upper Fort Mason and an area of hillside immediately west of the Fort Baker pier. In less exposed areas like Upper Fort Mason, coastal scrub plant structure is typified by low- to moderate-sized shrubs (Harrison et al. 1971; Bakker 1972), often dominated by coyote brush (Heady et al. 1977).

Coastal scrub habitat within the study area at Fort Baker is dominated by coyote brush and nonnative annual grasses. Other common species include poison oak (*Toxicodendron diversalobum*), California sagebrush, and bush monkey flower (*Mimulus aurantiacus*). Invasive nonnatives include broom and pampas grass. Commonly associated wildlife species include western fence lizards (*Sceloporus occidentalis*), gopher snakes (*Pituophis catenifer*), common king snakes (*Lampropeltis getulus*), deer mice (*Peromyscus maniculatus*), mule deer (*Odocoileus hemionus*), Anna's hummingbird (*Calypte*

anna), sparrows, and raptors. The American badger (*Taxidea taxus*), an SSC, typically inhabits grassland areas, though they may also frequent coastal scrub habitats (NPS 1999).

Monterey Cypress and Pine Stands. Mature stands of Monterey cypress and pine are present within the study area at Fort Baker. These species were planted at Fort Baker and do not naturally inhabit these areas. The associated understory is dominated by nonnatives, including annual grasses, English ivy, and cape ivy. Commonly associated wildlife species include raptors, woodpeckers (*Colaptes auratus*), deer mice, raccoons, and gopher snakes (NPS 1999). Mature Monterey cypress and pine stands are also present in Upper Fort Mason, within the urban landscaping and developed area (NPS 2012e).

Special Status Species

Special status species are plants and animals legally protected under state and federal regulations. This EIS considers all federal ESA-listed species, in addition to other state and locally rare and sensitive species including the following:

1. Species considered threatened, endangered, a species of special concern, or a fully protected species by the CDFW
2. Plant species considered rare, threatened, or endangered by the California Native Plant Society (CNPS) (a CNPS Rank 1 or 2 species)
3. Species that are a candidate for listing as threatened or endangered under federal or state law
4. Bird species protected by the federal migratory bird treaty act (MBTA) or California fish and game code sections 3503, 3503.5, or 3513.

Special status species with the potential to inhabit the study area and immediate vicinity were identified from the following sources:

- USFWS species list provided for the 7.5-minute U.S. Geological Survey (USGS) quadrangle for the study area and adjacent quadrangles, including San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, and San Francisco South (USFWS 2012)
- Species records in the CNDDB for the 7.5-minute USGS quadrangle for the study area and adjacent quadrangles, including San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, San Francisco South, including CNPS-ranked species (CDFG 2012a).

Special status species that have been noted to inhabit the vicinity of the study area are presented in Appendix A, Table 1 (federal and state endangered, threatened, fully protected, and species of special concern), including a description of their habitat associations and potential to inhabit the study area. Most of the species are not expected to inhabit the study area because their required habitat is not present. Additional CNPS-ranked plant species are listed in Appendix A, Table 2. Based on the current habitat conditions and the known range of these species, none of these have potential to inhabit the study area.

Federal-Status Plants. The study area is primarily disturbed and developed, consisting of buildings, piers, roadways, landscaped habitats, and barren areas. While the CNDDB identifies the endangered beach layia (*Layia carnosa*) as having historic habitat range in the study area (CDFG 2012a), and habitat at Fort Baker is considered suitable for the federally endangered San Francisco lessingia (*Lessingia germanorum*; NPS 1999), suitable micro habitat for these species is not present in the disturbed and developed study area. In addition, there are no recorded occurrences of federal-status threatened or endangered plants or designated critical habitat within the study area (CDFG 2012a).

Federal-Status Wildlife. Habitat within the study area is largely unsuitable for federal-status threatened or endangered wildlife species. There is no designated critical habitat for terrestrial wildlife species within the study

area. Coastal scrub habitat within Upper Fort Mason may be suitable for the federally endangered mission blue butterfly (*Aricia icarioides missionensis*) and San Bruno elfin butterfly (*Callophrys mossii bayensis*). These species are strongly associated with their respective host plants, stonecrop (*Sedum spathulifolium*) and perennial lupines (*Lupinus albifrons, L. Variicolor*, and *L. Formosus*). Coastal scrub habitat at Upper Fort Mason is low-quality, as it occurs in an isolated area surrounded by urban development. There are no recorded occurrences of these species within the study area.

Populations of the mission blue butterfly and host species lupine have been recorded at several sites within the Marin Headlands and Fort Baker. While lupine is most commonly associated with coastal chaparral and grasslands, this species could potentially inhabit coastal scrub areas in the study area at Fort Baker (NPS 1999). NPS conducts annual surveys for the mission blue butterfly, which includes mapping lupine populations. Neither the mission blue butterfly or host lupine species have been recorded during these surveys within coastal scrub in the study area at Fort Baker (Urban Wildlands Group 2012).

The federal and state endangered California least tern (*Sterna antillarum browni*) has been observed feeding in Horseshoe Bay and next to the jetties (NPS 1999).This species is not expected to use the study area as nesting habitat (CDFG 2012a, 2012b).

MBTA-Protected Species. Birds protected under the MBTA may nest in trees, shrubs, or buildings within the study area. Trees in the study area at Fort Baker and Upper Fort Mason may provide nesting or roosting habitat for birds of prey, such as the great horned owl (*Bubo viginianus*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and Cooper's hawk (*Accipiter cooperii*) (NPS 2012e). In addition, cliff swallows (*Hirundo pyrrhonota*) are known to nest on buildings at Fort Baker (NPS 1999). All owls, hawks, and swallows are protected by the MBTA.

State Special Status Plants. The CNDDB identifies three special status plant species (CNPS Rank 1 or 2 species) with historic ranges in the vicinity of the study area: bristly sedge (*Carex comosa*), rose leptosiphon (*Leptosiphon rosaceus*), and beach layia (CDFG 2012a). Based on historic occurrences in the region and association with habitats at Fort Baker, three additional species are considered to have potential to inhabit the study area: San Francisco wallflower (*Erysimum franciscanum*), San Francisco campion (*Silene verecunda* ssp. *verecunda*), and San Francisco lessingia (NPS 1999). Suitable habitat or microhabitat conditions specific to these species do not exist because of long-term disturbances associated with the study area. Therefore, these CNPS-ranked species are unlikely to inhabit the study area (NPS 1999, 2012e).

State Special Status Wildlife. This section addresses state of California-listed special status wildlife species, including state-listed rare, threatened, or endangered species as identified by the CDFW. Most of the listed species do not inhabit the study area because their required habitat is not present or the study area is outside the species' range. State-listed wildlife species that are also listed as federally endangered or threatened are discussed in the "Federal-Status Wildlife" subsection of this section.

Numerous special status bat species are known to inhabit the Bay Area, and may potentially inhabit the vicinity of the study area. The CNDDB lists four bat SSCs as inhabiting the study area, including the pallid bat (*Antrozous pallidus*), Townsend's big-eared bat, western red bat (*Lasiurus blossevilli*), and big free-tailed bat (*Nyctinomops macrotis*) (CDFG 2012a). Townsend's big-eared bats have been documented at buildings in the Marin Headlands (NPS 1999). Townsend's big-eared bats and pallid bats may roost in abandoned or minimally occupied structures within the study area, while western red bats may roost in trees (NPS 1999, 2012e). These special status species, and other bat species, have the potential to forage or roost in the study area.

No bat surveys have determined which species inhabit the various regions of the study area.

The American badger, a state species of special concern, has been observed at Wolfback Ridge in the vicinity of Fort Baker (NPS 1999). This species is typically associated with open, arid habitats, including grasslands within the Marin Headlands. They may occasionally frequent coastal scrub habitats, possibly including those occurring adjacent to the study area at Fort Baker.

REGULATIONS AND POLICIES

Federal

Federal ESA. Under the federal ESA, the Secretary of the Interior and the Secretary of Commerce have the joint authority to list a species as threatened or endangered (16 USC 1533(c)). Pursuant to the requirements of ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the study area and determine whether the proposed project may affect or "take" such species. "Take" is defined by ESA [Section 3(19)] to mean, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An incidental take of a listed species requires consultation with the USFWS or NMFS to determine whether the project is likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat (see below) proposed to be designated for such species (16 USC 1536(3)).

MBTA. The MBTA of 1918 (16 USC 703-711) is the primary legislation in the U.S. to conserve migratory birds. It implements the U.S.'s commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The MBTA prohibits the taking, killing, trading, or possessing of migratory birds. This includes disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young).

State

CESA. Under the CESA, the CDFW (formerly California Department of Fish and Game [CDFG]) is responsible for maintaining a list of threatened, endangered, and candidate species (California Fish and Game Code Section 2070). The CDFW also designates "fully protected" or "protected" species as those that may not be taken or possessed. Species designated as fully protected or protected may or may not be listed as endangered or threatened. The CDFW also tracks species of special concern, which are animal species whose populations have diminished and may be considered for listing if declines continue. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the study area and determine whether the proposed project will have a potentially significant impact on such species. "Take" of a species, under CESA, is defined as an activity that would directly or indirectly kill an individual of a species. The CESA definition of "take" does not include "harm" or "harass," as is included in ESA. As a result, the threshold for a take under CESA may be higher than under ESA because habitat modification is not necessarily considered take under CESA. CDFW may issue incidental take permits when adequate minimization measures are met, and issuance of the permit will not jeopardize the continued existence of a state-listed species. Should the project applicant receive authorization to take federally listed species under ESA, take authorization may also be sought as a "consistency determination" from CDFG under Section 2080.1 of CESA.

California Native Plant Protection Act. The California native plant protection act (fish and game code sections 1900–1913), natural communities conservation planning act, and CESA provide guidance on the preservation of

plant resources. Vascular plants listed as rare or endangered by the CNPS, but which may have no designated status or protection under federal or state endangered species legislation, are defined as follows:

- Rank 1A: Plants presumed to be extirpated in California and either rare or extinct elsewhere.
- Rank 1B: Plants rare, threatened, or endangered in California and elsewhere.
- Rank 2A: Plants presumed to be extirpated in California, but more common elsewhere.
- Rank 2B: Plants rare, threatened, or endangered in California, but more common elsewhere.
- Rank 3: Plants about which more information is needed—a review list.
- Rank 4: Plants of limited distribution—a watch list.

In general, plants listed as CNPS Rank 1A, 1B, 2A, or 2B also meet the definition of section 1901, chapter 10 of the native plant protection act, and sections 2062 and 2067 (CESA) of the California fish and game code. As discussed in the "Existing Conditions" section, the CNDDB identifies three special status plant species (CNPS Rank 1 or 2 species) with historic ranges in the vicinity of the study area. However, suitable habitat or microhabitat conditions specific to these species do not exist at the Project sites.

Fish and Game Code Sections 3503, 3511, 3513, 4700, 5050, and 5515. Provisions of the MBTA are adopted through the fish and game code. Under section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or related regulations. Section 3513 prohibits take or possession of any designated migratory nongame bird or any part of such migratory nongame bird. The state code offers no mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds.

The California fish and game code strictly prohibits the incidental or deliberate take of fully protected species. CDFG cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock; therefore, avoidance measures may be required to avoid a take (section 3511 birds, section 4700 mammals, section 5050 reptiles and amphibians, and section 5515 fish).

VISUAL RESOURCES

The study area is defined as the areas in the northwestern San Francisco waterfront region surrounding and connecting to the three embarkation site alternatives: Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason, as well as the Fort Baker area, in which day- and nighttime views may be affected by design proposals for each alternative.

CONCEPTS AND TERMINOLOGY

The study area for visual resources is based on a GIS viewshed analysis, which was refined through field observations and the exclusion of private lands. The study area boundary was used to identify key viewpoints where representative photographs were taken. These photographs and field observations were used to provide a baseline assessment of existing conditions, and the photographs were also used as a base with modeled structure modifications and design features to illustrate changes to the existing views.

The study area for each alternative is shown in Figures 29 through 32. The boundaries were determined through the following steps:

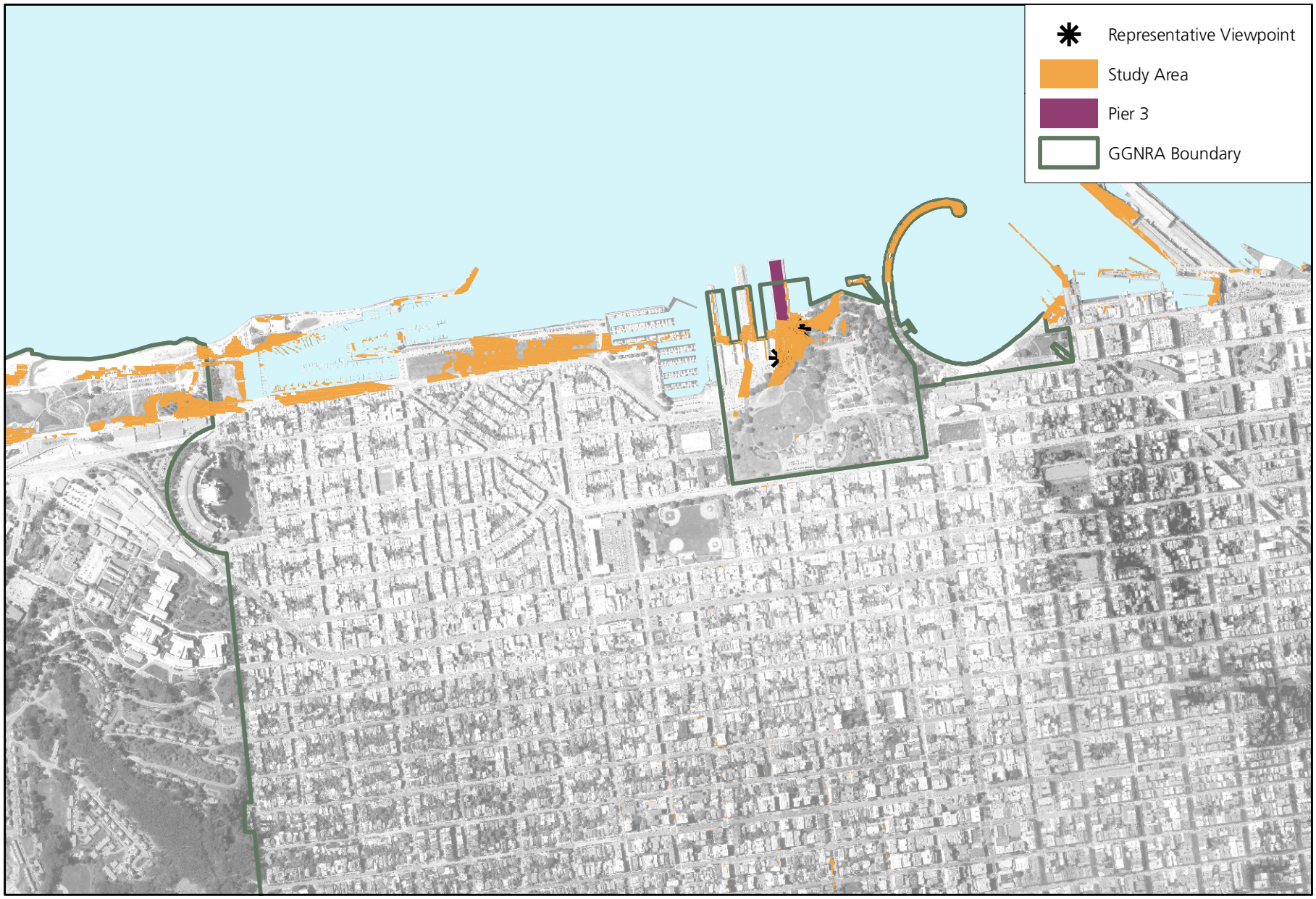
- **Data Collection and Processing.** Geospatial Light Detection and Range (LiDAR) topography data from NOAA and building footprint data from the City of San Francisco were collected. The LiDAR data were converted into a raster surface based on the bare earth elevation attributes. The building footprint data were converted into a raster surface with Z-axis values based on each building's height. This dataset was needed to more realistically model viewsheds, as the bare earth topography alone would overestimate visible areas due to a lack of barriers (such as buildings) being included in the model. A final topography plus buildings surface was created by using the GIS raster calculator to add the two raster surfaces together, creating a surface that takes into account both bare earth topography and three-dimensional buildings. To perform a viewshed analysis, the area to be viewed would also need to be represented in the model. Therefore, a polyline dataset of the boundary of each alternative was created. A polyline dataset, rather than a point location dataset, was used to more accurately capture the full extent of each alternative.
- **Viewshed Analysis.** Using the Spatial Analyst extension in ArcGIS, a simple viewshed analysis was performed. The analysis uses the surface (topography plus building heights) and the alternatives boundary, and results in a binary raster surface that illustrates areas that are not visible and are visible from the boundary of each alternative. Consequently, these areas also represent areas of land where each alternative boundary can and cannot be seen.
- **Viewshed Analysis Refinement.** Visual resources provided from public lands are the focus of this analysis. While impacts to private lands are considered, the viewpoints used to assess baseline conditions and impacts were from public lands to better represent the visual resource issue for the largest amount of users, and to feasibly collect baseline viewpoint photographs. Therefore a GIS layer of public lands was used to extract an inset of public land areas where each alternative was visible.

0 1,500 Feet

FIGURE 29
VISUAL RESOURCES, PIER 31½ STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

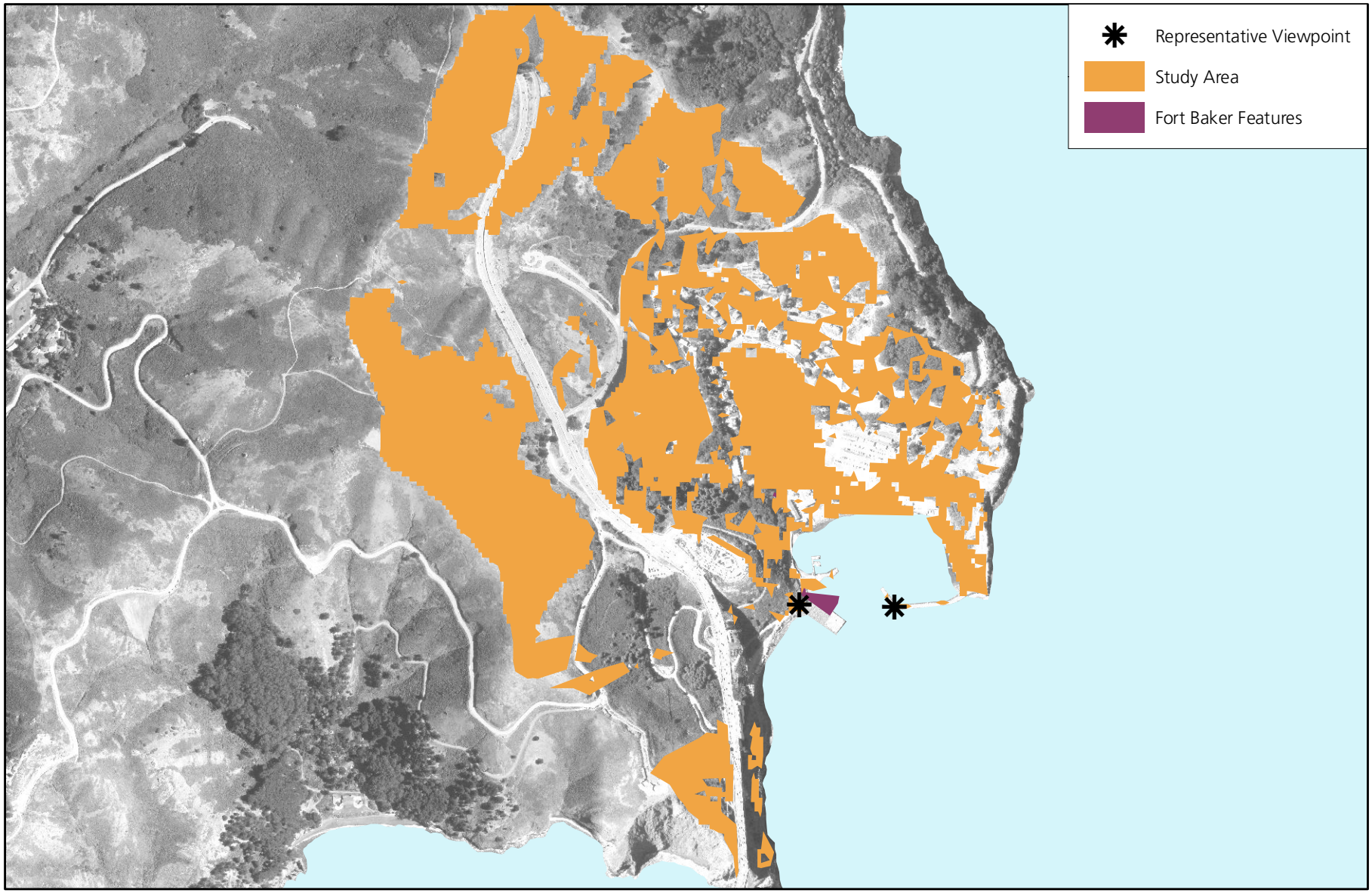
0 1,000 Feet

FIGURE 30
VISUAL RESOURCES, PIER 41 STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



0 1,200 Feet

FIGURE 31
VISUAL RESOURCES, PIER 3 STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



0 1,150 Feet

FIGURE 32
VISUAL RESOURCES, FORT BAKER STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Bureau of Land Management's Visual Resource Contrast Rating (VCR) System

The baseline visual character of the area surrounding each alternative site was assessed based on the characteristic landscape description of the Bureau of Land Management's VCR system. The VCR system is used to apply the basic principles of design: form, line, color, and texture, to describe the existing aesthetics of a place, as well as to project aesthetic impacts of proposed conditions. The basic principle suggests that the degree of impacts of a proposal is based on the degree to which a visual contrast is created between existing and proposed features of a view. Proposed activity descriptions and a discussion of visual contrast between the existing and proposed conditions will be presented in the "Visual Resources" section of the "Environmental Consequences" chapter. This section will describe the existing visual character, represented in each of the representative viewpoints. In following the format of the VCR system, this description will discuss the following:

- The character of waterbodies and landforms (including low groundcover plants)
- Vegetation, including tall groundcover plants, shrubs, and trees
- Structures, including buildings, bridges, and other infrastructure

EXISTING CONDITIONS

Within the study area, representative viewpoints were selected to illustrate the baseline conditions and potential impacts from each of the proposed alternatives. Viewpoint locations are shown in the photos on the subsequent pages. Daytime viewpoint photographs are used both in this section and the "Visual Resources" section in the "Environmental Consequences" chapter to illustrate design proposals for each alternative. Nighttime photographs for Fort Baker were unable to be collected; two daytime views are provided for this location. The following sections present and describe the locations and the visual character from representative viewpoints for the alternatives under evaluation.

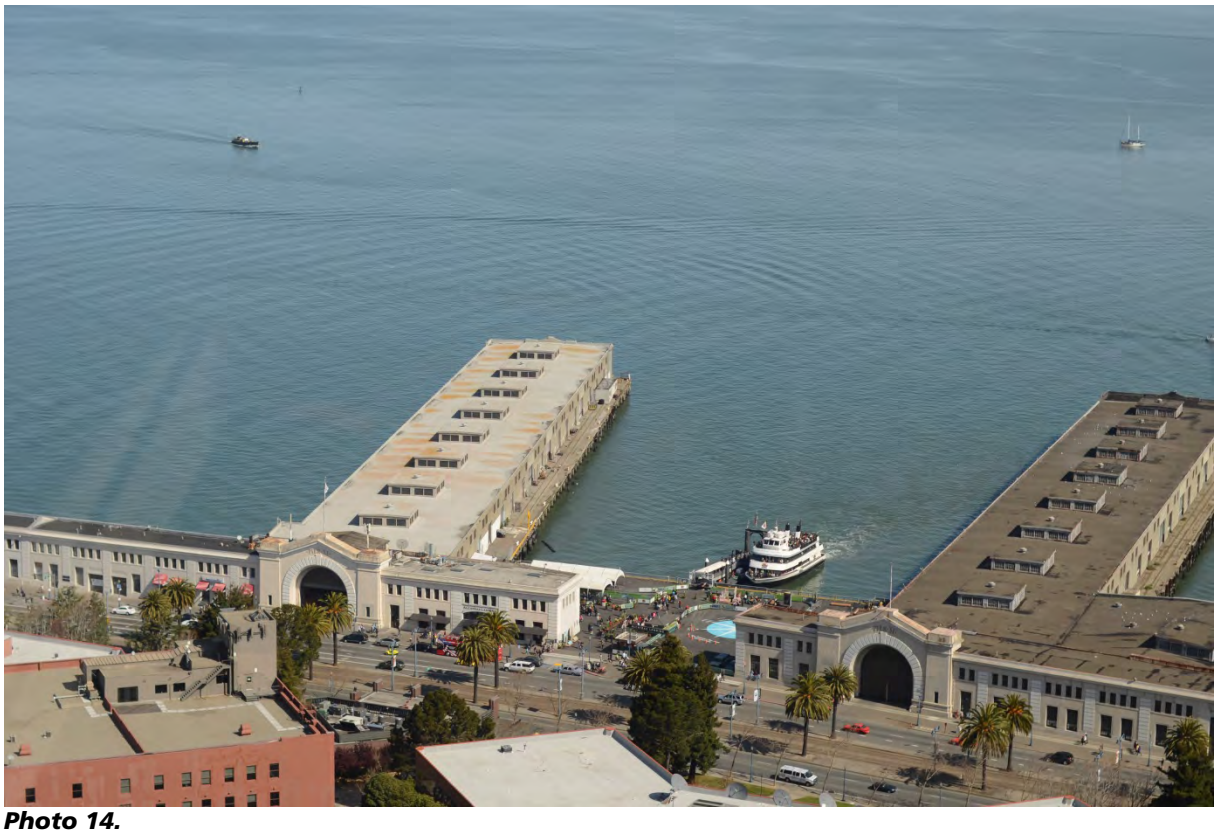


Photo 14.
Pier 31½—Daytime. The daytime viewpoint of Pier 31½ is located within Coit Tower in Pioneer Park, to the southwest of the pier. Coit Tower is a popular destination for viewing the San Francisco skyline and surrounding region.

The foreground view includes building rooftops along the slope of Telegraph Hill. The rooftops are square-shaped, straight-lined, and flat, with the exception of infrastructure elements (elevator, HVAC, etc.). The roof color is grey, and the building façade seen in Photo 14 has red-brick colored walls.

The midground view includes the Embarcadero, with streetcar tracks running through its middle, the track area is lined with palm trees. The landform is flat and punctuated by the street trees, which provide texture within a predominately smooth environment. The roadway is grey, and the streetcar way is a warmer grey-brown color through the use of brick material. The pier building structures dominate this portion of the view. These structures mostly contain straight line design elements, with the exception of the main pier entrances, which have a curved arch. The buildings are white with grey roofs, and the Pier 33 building appears to have orange rust stains on the roof, which are somewhat distinctive given the roof's brighter grey color (in comparison to Pier 31's darker roof). Pier 31½ has a dark grey asphalt ground plane with a brightly painted blue and white compass along the southeast side of the pier.

The background portion of this view is the San Francisco Bay.

Photo 15.
Pier 31½—Nighttime. The nighttime viewpoint of Pier 31½ is located across the Embarcadero on the sidewalk, to the southwest of the pier.

The lighting conditions near Pier 31½ are quite bright due to the urban, transportation-focused, and historic nature of the setting. Along the streetcar tracks, dual lamp fixtures alternate with palm trees. These fixtures illuminate the roadway and streetcar tracks. These fixtures have small shields. The sidewalk fixtures across the street appear historic and do not employ shields, and thus contribute the greatest amount of light pollution into the dark sky. The Alcatraz Landing sign lettering is lit up, and the sign has underlights as well. Within Pier 31½, the ticket booth employs lighting under its overhang. Additional lights are found near the vessels and are provided for security and safety. The vessels themselves are also well-lit for security and safety. Overall, the area is quite bright, with a warmer hue of light near the street and cooler lamp colors within the pier itself.

Photo 16.
Pier 41—Daytime. The daytime viewpoint of Pier 41 is located along the northern side of the upper floor of a parking garage across the street and to the south of the pier. This parking lot is located on public lands and is operated by a private company. It is a very well-used facility that provides excellent views of the pier, the Ferry Arch on Pier 43, and Alcatraz Island and Angel Island State Park in the background.

The foreground of the view includes the tops of street trees, light poles, and a visitor's kiosk, as well as a view of a shaded portion of the Embarcadero. The vegetation provides amorphous, textured shapes and natural green colors. The lights provide a historic form, with blue posts and slightly ornate lamps, though utilitarian signage and traffic lights are attached to their posts. The roadway is flat, smooth, and mostly monochrome. It is bordered by bollards separating vehicular traffic from streetcars. The streetcar way is brick-lined, with a formal regular texture and slightly warmer grey-brown color.

The midground of the view includes the sidewalk, a portion of the Embarcadero behind Jefferson Street, the piers, and buildings, and associated landscaping. This view is dominated by structures including the building that houses the Blue & Gold Fleet, and the Ferry Arch on Pier 43. The landform is predominately flat, with straight lines demarking changes in material and the boundary between land and water. However, the Embarcadero does curve around in front of Pier 43 at this location, and all crosswalk curbs and flagpole plazas utilize curved lines. The street trees in this area have been pollarded, giving them a stout appearance. The ground colors include dark grey asphalt, light grey concrete, grey-brown brick below the flagpoles, and bright green turf and colorful ornamental grasses and flowers. The structures are predominately white, though the building has dark blue trim. Flags, vending tents, and shops are brightly colored, though blue hues predominate. Landscaping at the east side of the building is finely textured with green and brown-purple colored foliage.

The background of the view includes the Pier 41 overwater walkway, development on Pier 39, the Bay, Alcatraz Island, Angel Island State Park, and the Marin Headlands. Geometric forms are seen along the walkway, within the Pier 39 concourse development and marina. The islands and headlands provide softer amorphous shapes, though the structures on Alcatraz Island provide geometric and vertically aligned elements. The colors of the Pier 39 development include white, brown, and tan with grey roofs, and the walkway provides a natural wood color. The island landforms are brown and green, with structures on Alcatraz of a tan and grey color. The Marin Headlands are brown hued, with landforms along the horizon a brown-blue color, slightly darker than the Bay waters.

Photo 17.
Pier 41 – Nighttime. The nighttime viewpoint of Pier 41 is located along the Embarcadero walkway south of the Pier 43 Ferry Arch.

The lighting conditions near Pier 41 are quite bright during the night, as can be expected in an urban, developed, and well-used area. The darkest portions of the view are the sky and areas closest to the water's edge. Streetlights along the Embarcadero walkway employ shields and have large circular lamps that give off a cool, brightly colored light, possibly from LED bulbs. The waterward side of the Pier 41 building is lit with warm-toned lamps that also have shields, though these shields are not as wide as those found along the walkway. Streetlights in the background of this view have a historic form and do not employ shields; thus, they contribute the greatest amount of light pollution to the dark sky. A cruise ship can be seen in the background of the view in the Photo 17. This structure provides a large amount of light through vessel room, decorative, and safety mast lighting. In addition to permanent lighting, during the nighttime visit, vendors were selling glow in the dark paraphernalia along the street as shown in the purple ball/projectile on the right side of Photo 17.

Photo 18.
Pier 3—Daytime. The daytime viewpoint of Pier 3 is located on the multiuse Bay Trail along the slope above the Festival Pavilion and Pier 3 to the southeast. This viewpoint is a popular location for taking photographs of the Golden Gate Bridge, shown in the background of the view.

The foreground of the view includes a landform sloping down towards the midground portion of the view. The foreground has soft, highly textured lines provided by irregularly mowed turf grass, evergreen low growing shrubs, and overhanging conifer branches. The top of a retaining wall and corner of a smaller outbuilding are the only structures. These provide the only straight, geometric forms and lines within the foreground of the view. The color is predominately green or yellow-green, with differing levels of shading. The retaining wall is dark grey, and the outbuilding is a warm tan with an orange-red tile roof.

The midground of the view is located below the retaining wall and includes the remaining portions of the Fort Mason Center. The landform is flat, with straight geometric lines bounding the land and the water. Light poles, building structures, and vehicles provide the most dominant vertical elements. There is no vegetation within the midground view, and the water provides the only natural element. The ground plane is monochromatic, grey and white for the roadways and parking lots. Warm tan and brown colors can be seen at the walkway edges of each pier. The structures are also of a warm tan color accented by orange-red roofs, doors, window stiles, muntin, and casings.

The background of the view includes portions of the Bay, the marina and marina green, the hills and tall vegetation of the Presidio, the Golden Gate Bridge, the Golden Gate Recreation Area, and Sausalito. The vegetation and foothills provide amorphous forms, with the exception of the bridge, with

its straight deck, piers, towers, suspension cables, and formal arched main cables, as well as straight sailboat masts within the marina. The colors within the background are muted and predominately natural blues, greens and browns, though the bridge itself is orange-red.

The majority of Fort Mason Center is quite dark at night. The nighttime photograph of Pier 3 (Photo 19) shows that security lighting is used along the southern wall of the Festival Pavilion, underneath the eastern overhang of Building E, and within the surrounding parking lot. This lighting creates a well-lit parking area. The area along the western edge of the Festival Pavilion remains unlit. The portion approximately 50 feet from the southwest corner of the building receives minimal light pollution, keeping it and the surrounding water is quite dark.

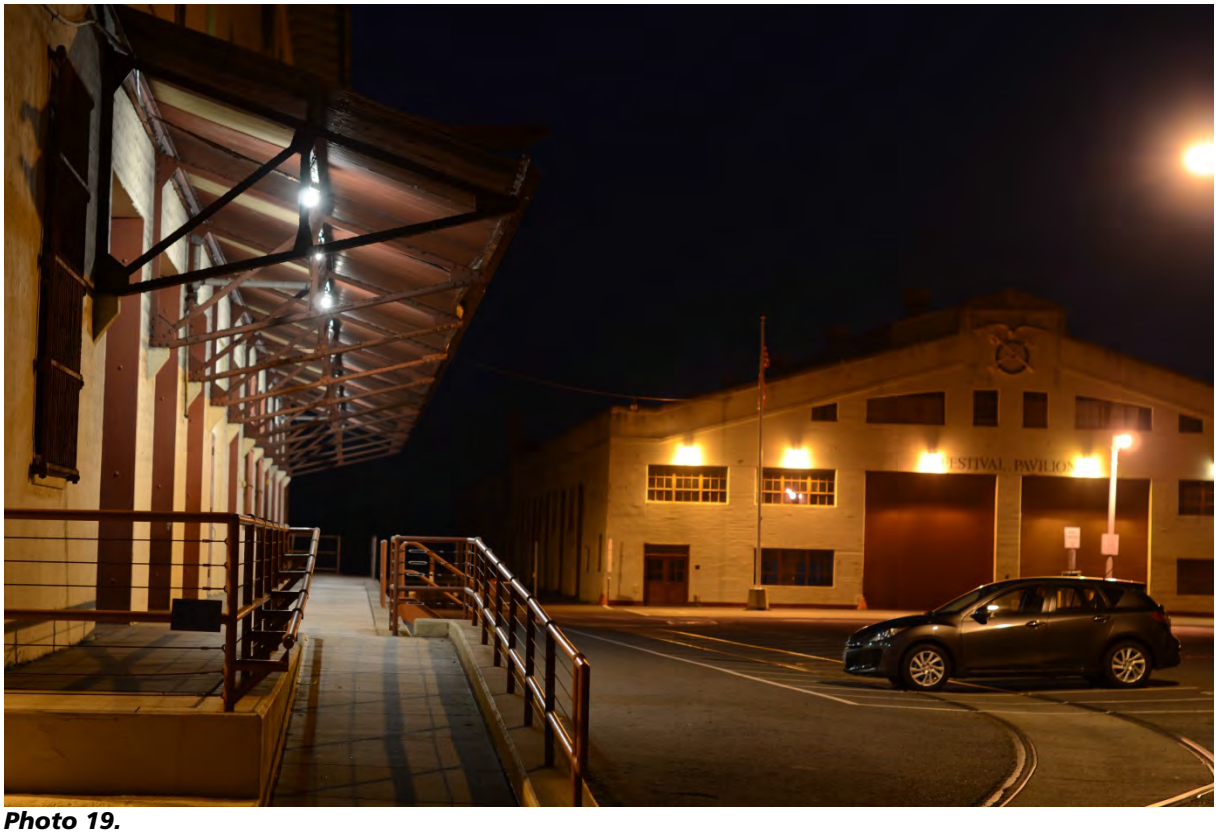


Photo 19.
Pier 3—Nighttime. The nighttime viewpoint of Pier 3 is located within the parking lot east of Building E and south of the Festival Pavilion.

The foreground of the view includes Moore Road and the connection to the existing pier. The ground plane is flat, with lines that curve away to the left of the view and are straight within the right side of the view due to the pier structure. The color is predominately grey, though more natural colors can be seen in a small patch of groundcover plants at the bottom right corner of the view. Also, the woodpile of the pier is a washed out brown/tan color. The texture of this portion of the view is predominately smooth; however, cracks and joins, as well as potholes, can be seen in portions of the street, sidewalk, and pier.

The midground of the view contains the near view of the Bay, including a small breakwater to the north of the pier. The end of the existing pier is also part of this view. The forms and lines of the breakwater and water's edge are amorphous and curved. The end of the pier is straight with vertical element pile. Vegetation within the breakwater landform is predominately unmowed grasses. The colors are green to yellow-green, with driftwood, the gravel substrate, and water providing a

somewhat natural view. A small structure at the end of an access trail to the breakwater is painted tan with an orange-red roof, which provides a contrast to the surrounding blue water.

The background of the view includes larger developed areas of Fort Baker, including the Bay Area Discovery Museum and Presidio Yacht Club. These buildings provide straight geometric shapes and are flanked by amorphously shaped foothills covered in vegetation. The buildings are painted white with orange-red roofs. The hillside and vegetation is tan, green, and yellow-green. Further in the background, Alcatraz Island and the cities of San Francisco and Oakland can be seen.

Photo 20.
Fort Baker—Daytime #1. The first daytime viewpoint of Fort Baker special ferry service is located west of the existing Pier across Moore Road.

Photo 21.
Fort Baker – Daytime #2. The second daytime viewpoint of Fort Baker special ferry service is located east of the existing Pier, across Horseshoe Bay on the Satterlee Breakwater.

The foreground of the view contains the Bay.

The midground of the view contains the existing pier and Moore Road. The form of the pier is flat, with piles providing a vertically aligned texture. The color of the pier is a washed out tan-brown. A retaining wall/storage structure is highlighted in white behind the pier.

The background of the view contains the northern extent of Golden Gate Bridge, including a heavily scaffold-clad section of the approach structure in orange-red, a large bright grey pier, and the beginnings of the arched suspender cables above the straight deck, which are also an orange-red color. The bridge is set into the surrounding foothills, which have an amorphous, curved shape. This landform is clothed in low ground covers, providing predominately green and tan colors, though flowering plants provide small highlights in yellow, orange, and purple.

REGULATIONS AND POLICIES

Regulations and policies related to visual resources are discussed below. Preservation of parkland scenery and views of San Francisco Bay are the main themes.

Federal

Organic Act of 1916. The organic act of 1916 established the Park Service and directs the agency, "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (NPS 1916). As such, the conservation of visual resources or "the scenery" is established through the Park Service's mission.

NPS Management Policies. This policy document provides the latest guidance for managing NPS lands as a whole. Specific policies for each NPS unit are provided in individual management plans (discussed below). Visual resources are generally addressed through this document.

The underlying principles of unit management are based on the agency's mission, and include preventing the impairment of resources and values of each park to pass on to future generations these desired resources, and also to improve opportunities for resource enjoyment over time. The definition of resources and values includes the park's scenery, including natural visibility both during the day and at night (NPS 2006).

The natural resource management section includes a discussion of lightscape management, with an objective to preserve natural dark skies. Policies towards this end include the use of artificial lighting in parks only as needed for user security and safety or for cultural resource requirements. Where lighting is needed, minimal impact techniques and products will be used, and shields will be used as needed to prevent the disruption of natural processes and the natural night sky.

Related to new or rehabilitated facilities, the document notes that cultural values and resources should be protected where present, which includes historic structures. The policies state that new facilities will not be made to duplicate a historic design, nor should these new facilities be portrayed as historic. Vernacular architecture, which reflects local traditions through traditional architectural form and local materials, may be used for new facilities to better complement cultural landscapes and structures. Parking areas should not impact park resources and values, including views. Parking facilities should be of the smallest size possible, and when larger areas are needed, screening through plantings and other design elements should be employed.

GGNRA and Muir Woods National Monument GMP. The GMP notes that a purpose of the GGNRA is, "to offer national park experiences to a large and diverse urban population while preserving and interpreting the park's outstanding natural, historic, scenic, and recreational values." One of the

key values identified in the plan is scenic beauty. This value is characterized by dramatic settings provided through the contrast between undeveloped and urban settings, and a compelling historic narrative within this set of Park Service units (NPS 2014a).

Regional or Local

Bay Plan. BCDC prepared the Bay Plan, which was completed and adopted in 1969 and amended in 2007. The Bay Plan presents the policies for future development and use of the shoreline, with the preferred uses stated as those that provide substantial public benefit. Within the Appearance, Design, and Scenic Views section of the Bay Plan, the most popular use of the Bay is identified as simply viewing the waterbody. Policies that relate to the alternative designs for Alcatraz embarkation include:

- "Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects, working in conjunction with engineers and professionals in other fields.
- "Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.
- "To enhance the maritime atmosphere of the Bay Area, ports should be designed, whenever feasible, to permit public access and viewing of port activities by means of (a) viewpoints (e.g., piers, platforms, or towers), restaurants, etc., that would not interfere with port operations, and (b) openings between buildings and other site designs that permit views from nearby roads.
- "Shoreline developments should be built in clusters, leaving open area around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance views along the waterway, so as to provide maximum visual contact with the Bay.
- "ln order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of Bay-front projects by the above guidelines.
- "Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).
- "Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkways, trails, or other appropriate means and connects to the nearest public thoroughfare where parking or public transportation is

available. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance of the areas being viewed." (BCDC 2012) Note that Coit Tower is a designated vista point within this plan.

General Plan - Northeastern Waterfront Area Plan. The General Plan guides development and growth, and is tailored to various portions of the City. The Northeastern Waterfront Area includes Alternative sites Pier 41 and Pier 31½. This area plan includes objectives and policies that can meet the goal to, "(1) provide for those uses which positively contribute to the environmental quality of the area and contribute to the economic health of the Port and the City, (2) preserve and enhance the unique character of the area, and take advantage of the unique economic opportunity provided by San Francisco Bay, and (3) provide the maximum possible visual and physical access to San Francisco Bay while minimizing the adverse environmental impacts of existing and new activity." (City/County 2003)

San Francisco Scenic Roads. The City's Downtown Association designated the 49-mile Scenic Drive in 1938. The route, which has changed over time, is now closer to 46 miles in length. Alternative sites Pier 41 and the southern edge of Fort Mason Center (outside of the Pier 3 Alternative boundary) are included within the scenic drive.

State Scenic Highways. The State of California created the Scenic Highway program in 1963 to "protect and enhance the natural scenic beauty of California highways and adjacent corridors." The streets and highways codes, sections 260 through 284 cover this regulation (CALTRANS 2012). I-80 and State Route 1, while not officially designated at this time, are eligible for inclusion as State Scenic Highways. Fort Mason can be seen, albeit very distantly (2.5 miles away) from State Route 1 on the Golden Gate Bridge; however, the Alternative 3 study area is not visible due to the surrounding Pier sheds.

CULTURAL RESOURCES

This section discusses the cultural resources, including historic structures, archeological resources, and cultural landscapes in the study area. The study area for the Project is shown in Figure 33.

The boundary of the study area was determined based on the following potential impacts:

- Direct effects to archeological sites at areas of ground disturbance
- Direct effects to historic structures where structures will be modified
- Indirect effects to historic structures where construction noise or vibration could cause damage
- Indirect effects to historic structures where changes in motorized or nonmotorized transportation patterns could change the use, viability, or maintenance of historic properties
- Effects to historic districts when one or more contributing properties are affected

In addition, impacts to cultural resources are being analyzed separately and concurrently under section 106 of the NHPA.

EXISTING CONDITIONS

Environmental Setting

The environmental setting in the past and present indicates what kinds of cultural resources might be present in the study area. The study area is located in the Bay, a large, shallow, productive estuary.

Prior to Euroamerican contact, the Bay was a large estuarine ecosystem, fringed by tidal flats and salt marshes. A wide variety of estuarine, marine, and upland resources would have been available for human use, including shellfish and other invertebrates, marine and freshwater fish, waterfowl, and terrestrial mammals.

Euroamerican activities have changed the local ecology significantly. It is estimated that two-thirds of the Bay's salt marshes were destroyed before 1980 by filling, diking, and straightening waterways (Mann 2000).

Most of the study area has been extensively modified over the last 100 years. Piers 3, 41, and 31½ are located in areas mapped as artificial fill, consisting of sands, silt, clay, and manmade debris. However, the Fort Baker area is mapped as older landslide deposits, consisting of bedrock, sand, silt, and clay (Schlocker 1974).

Ground cover in the area of piers 3, 41, and 31½ consists of paved areas, decking, and landscaping. Vegetation in the Fort Baker portion of the study area consists of native dune and salt marsh species, as well as nonnative Monterrey Cypress and French and Scotch broom (GGNPC 2013).

Cultural Setting

The cultural setting describes how people used the study area in the past, and helps contextualize cultural resources.

Human habitation of the Bay region probably dates to the late Pleistocene, more than 10,000 years ago. No archeological evidence exists of these Clovis hunter-gatherers in the Bay (known from other regions). Sites dating to that period are likely submerged or deeply buried (Rosenthal and Meyer 2004). During the next 10,000 years, communities moved from a mobile hunter-gatherer lifeway to more sedentary communities, with increased socio-political complexity.

0 4,000 Feet

FIGURE 33
CULTURAL RESOURCES STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Archeological sites from about 1,000 years ago until Euroamerican contact correlate with ethnographically described Native American communities in the Bay Area.

When Euroamerican settlers first arrived in the region, Costanoan and Miwok languages were spoken in the Bay Area. Ohlone people inhabited the San Francisco Peninsula, and Coast Miwok people the Marin Headlands. Ohlone and Miwok communities moved seasonally between permanent villages and temporary resource-gathering locations.

The arrival of Euroamericans brought significant changes to Coast Miwok and Ohlone communities. The earliest recorded sighting of California by Spanish explorers was in 1539, but for the next 200 years, contact with native communities was brief. The 1770s saw increasing Spanish settlement, with the establishment of missions; by 1900, Native Californian populations declined by "at least 95 percent" (Chartkoff and Chartkoff 1984). Despite these major disruptions, Ohlone and Miwok people persevered, and their descendants are members of a number of federally recognized tribes.

The founding of the missions continued in Alta California even as problems began for the territorial governors in Mexico. By 1810, Mexican rebels declared themselves an independent country. Nearly a decade of fighting ensued. In 1822, the newly established government took control of the missions and all the land formerly claimed by Spain.

At first, as under Spanish rule, the lands were largely settled and controlled by the Missions with the aid of the Mexican Army. In 1834, the Mexican government began to redistribute this land to wealthy Mexican patrons and honored military veterans as ranchos. While portions of present-day San Francisco were given as grants, the land in the San Francisco portion of the study area was either set aside as a military reserve, or was already being settled as a small town. Yerba Buena was officially founded in 1835 at a location several blocks west and south of the study area, and centered on present-day Portsmouth Square Plaza. By 1847 the population of San Francisco was less than 500 people (SFM 2013).

Throughout the 1830s and 1840s the stream of American and European settlers continued west into Alta California, creating land-ownership conflicts. In 1846, all American settlers in the Mexican territories in California were told to relinquish their claims on Mexican-held land or face involuntary removal. A small group of settlers banded together and gained control of most of Northern California. These events, and similar struggles in Texas, prompted the U.S. to declare war on Mexico later that year. When Alta California was officially ceded to the U.S. in 1847, the short-lived Republic of California became a U.S. Territory and eventually the 31st state in the union in 1850.

Elsewhere in the state, gold fever was transforming the landscape. When news of the 1848 discovery of gold on the American River reached the eastern U.S., a flood of miners and entrepreneurs came to California with dreams of finding their fortune. This had a profound impact on the small settlement of Yerba Buena and began the transformation of the study area from Bay waters to a thriving port (SFM 2013).

Between 1847 and 1850, Yerba Buena became San Francisco, and the population rose dramatically. By the time the City/County was officially formed on June 11, 1856, the population was about 30,000 people. The small collection of shacks and tents was a fully formed city with streets, frame and brick buildings, warehouses, residential areas, banks, theaters, and a host of entertainments for the masses of gold seekers arriving in the busy port.

San Francisco Waterfront. The San Francisco waterfront has a long history of port and maritime uses. In 1861, it was the sixth largest port in the country. The first seawall, which allowed for future development and control of shipping-related infrastructure along the waterfront, was built in 1867. A second seawall was constructed between 1878

and 1915, establishing the shoreline from which the piers and wharves now recognized as the modern day Port were built up.

At the close of the nineteenth century, the Port began to upgrade their facilities to respond to the rapidly changing shipping and cargo handling requirements. These efforts were marked by the construction of the Ferry Building in 1903, and hastened by repairs necessitated after the 1906 earthquake. At that time, concrete piers began to replace the short-lived wooden construction and a comprehensive architectural design aesthetic began to emerge. The City Beautiful movement was shaping the industrial waterfront of San Francisco.

The first phase of this construction was concentrated south of Market Street. Here, the covered piers received onshore- and offshore-facing bulkheads in a simplified Mission style. North of Market Street the bulkheads were largely completed in a Neoclassical style. As development continued at the ends of the working zone through the 1920s and 1930s, the piers became wider and the bulkheads were designed in a Gothic Revival style. By 1938, the San Francisco waterfront between Black Cove and Mission Bay had obtained the form and appearance that is represented today.

When the United States entered World War II in 1941, much of the Port became involved with the movement of troops and equipment to the Pacific front as part of the San Francisco Port of Embarkation, headquartered at Fort Mason. This movement continued through 1946, when military operations ceased.

After World War II, Port activities declined sharply. Break bulk ports became outdated as shipping increasingly moved to containerized movement of goods. This adjustment accelerated through the 1960s, and the ports of Oakland, Long Beach, and Los Angeles were better equipped to handle the changes. In 1969, the Port was transferred back to the City of San Francisco.

After the 1989 Loma Prieta earthquake damaged the Embarcadero freeway, it was removed, and redevelopment of the waterfront as a tourist and recreational zone began to take shape. Today there is a mixture of commercial uses in this area, along with landscaping and pedestrian and recreational trails that provide public access to the waterfront.

Fort Mason and Environs. When the U.S. took control of California in 1847, there was an existing military post at the Presidio and several small military outposts located around the Bay, including one at a sandy promontory covered with dark Laurel trees, alternately known as Punta San Jose, Punta Medanos (sand dunes), or Black Point. Point San Jose, the name the U.S. military preferred, was included in the 1850 orders of President Fillmore that set aside acreage around the Bay for military fortifications. Even though Black Point was a military reservation, there was little enforcement of the claim, and no efforts were made by the government to improve the area. Civilians occupied the area, constructing several wood frame houses with gardens and landscaping.

When the military turned its attention to the area in 1863, these civilians had their properties seized as illegal development. Some of the buildings were converted for use as officers' quarters and offices for the Army commanders. Today they remain as some of the oldest buildings in San Francisco.

Additional development at Point San Jose was slow, as military development during the Civil War concentrated on other establishments around the Bay. In 1882, the name was officially changed to Fort Mason in honor of Colonel Richard Barnes Mason, onetime military governor of the California territory (NPS 2004a). With the success of the American military in the Spanish-American War, the importance of a strong Pacific presence was reflected in heavy investment in Fort Mason and other installations along the California coast. At that time, construction began in earnest. "In 1908, the decision was made to concentrate [the functions of] a

general depot at Fort Mason. The submerged land to the northwest of the reserve was acquired through condemnation and, in 1910, construction began on what came to be called the San Francisco Port of Embarkation. This land acquisition increased the size of the reservation from 55 to 68.5 acres" (ARG 1991). This area is known today as Lower Fort Mason.

Starting in 1912 and continuing into the 1930s, Fort Mason was further developed with piers, warehouses, and other support buildings. The responsibilities concentrated at Fort Mason, particularly related to the Port of Embarkation, continued to expand during World War I and leading up to U.S. involvement in World War II. Throughout the period of active fighting in the Pacific, Fort Mason was the "primary port for the Central, South, and Southwest Pacific Areas. Fort Mason remained an active processing center through the post-World War II period and the Korean War. However, modernization of troop movements and the changing needs of the Army were straining the ability of the facilities as a command center. In 1963, after several years of study, the Army announced the closure of Fort Mason and the San Francisco Port of Embarkation (Higgens-Evenson 2002).

Aquatic Park and Environs. Aquatic Park is located at the former site of Black Point Cove. It was part of the original military reservation created by President Fillmore in 1850. However, its prime waterfront location made it desirable for commercial purposes. Like Black Point, people moved in to claim land through squatter's rights. Unlike the residential inhabitants of Black Point, the commercial interests in the cove were more successful and were allowed to keep their land and the improvements made upon it (ARG 2002).

In 1858, the Pioneer Woolen Mill was established. This complex of buildings spread across present-day Ghirardelli Square and continued westward across the current site of the Maritime building. By 1899, it was joined by the Spring Valley Water Company facilities, the Ghirardelli Chocolate Company, and a number of canning and other manufacturing businesses (Sanborn 1899).

In spite of the industrial usage of the land, the waterfront was a popular recreational area because of its sheltered location and relatively shallow waters. Private and public bathhouses were constructed around the cove to serve patrons who swam in the cool waters of the Bay. As indoor plumbing and heated indoor pools became more prevalent toward the end of the nineteenth century, the Black Cove bathhouses were largely abandoned, although the site remained popular with rowers and boatmen up through the first few decades of the twentieth century (NPS 2010).

During this time, filling of the Bay was expanding the buildable areas at the waterfront and changing the topography of the landscape. Black Cove was being slowly filled as early as the 1860s (NPS 2010). Filling of the cove, and of the San Francisco waterfront in general, greatly accelerated in the aftermath of the 1906 earthquake and fire. In light of the rapid pace of changes along the waterfront, and the existing tensions between industrial users and recreational users, concerned citizens formed the Aquatic Park Improvement Organization in 1909 to establish a city park at the site (NPS 2010). By 1917, most of the submerged lots had been condemned by the City for the purposes of creating a new park, and several privately held properties were also acquired.

In 1923 the City approved a plan for the park that included bathhouses, landscape features, landings, and other site improvements. However, with the onset of the Great Depression, funding sources became scarce and work slowed.

In 1935, the project was awarded Works Progress Administration (WPA) funds to complete the project. City Engineer John Punnett revised the site plan to create a more cost-effective architectural vision for the park (NPS 2010). This resulted in the Streamline Moderne designs that are present today. Aquatic Park officially opened on January 22,

1939. In spite of being dedicated, the park was not fully completed or open to the public.

Beginning in 1941, the Army took over use of the park, and it remained under Army control until 1948, when ownership was turned back to the City. The building and park were open to the public on a limited basis as a bathhouse. Other areas were used as a senior center, one of the first of its kind. Then, in 1951, the San Francisco Maritime Museum opened in a portion of the bathhouse. These two uses, Senior Center and Maritime Museum, remain the primary uses of the building today.

In 1978, the property was transferred to the Park Service as part of the GGNRA. Ten years later, in 1988, Aquatic Park became part of the San Francisco National Maritime Park.

Fort Baker. The southern tip of Marin County, known collectively as the Marin Headlands, was part of President Fillmore's military land grab in 1850. This area was later home to forts Baker, Barry, and Cronkhite. Construction was slow at first and limited to wooden storage facilities and minor structures. In 1866, construction began at Lime Point on the first of many batteries along the shore and in the hills throughout the Headlands. In 1897, Fort Baker was officially designated as the post to cover the batteries in the surrounding hills.

Major building began around 1900, when a bid was let for construction of proper barracks and support buildings, according to standard quartermaster plans. In 1901, more buildings were authorized, and in 1903, a new wharf was constructed to replace a previous pest-damaged structure. By 1906, Fort Baker had essentially reached completion as it stands today, and attention turned to landscaping. The large salt marsh in Horseshoe Bay was filled in, roads and infrastructure were completed around the fort, and grass and trees were planted to help control dust and mud (Thompson 1979a). During this time, many of the coastal batteries were disarmed, and the equipment used to support military action in Europe.

Fort Baker became active in the preparation for U.S. involvement in World War II. In 1941, a new hospital was constructed to alleviate overcrowding at Letterman Hospital at the Presidio.

After World War II, the Army continued to occupy the post but with greatly reduced numbers. During the Cold War period, some increase in activity was experienced as Fort Baker became an administrative headquarters and maintenance facility for local coastal defenses (such as the Nike missile program) (Newland et al. 2001). By 1972, when the GGNRA was formed, the Marin Headlands, including Fort Baker, were included as potential additions to the park unit should the Army relinquish the post. Most of the land immediately surrounding Fort Baker became part of GGNRA at this time, but it was not until 1995 that the Army announced its intentions to vacate Fort Baker. The land was transferred to the Park Service in 2001. Today the majority of the post has been adaptively reused as Cavallo Point Lodge. Other buildings are occupied by the Bay Area Discovery Museum and other public and private ventures.

RECORDED CULTURAL RESOURCES IN THE STUDY AREA

Historic Structures and Cultural Landscapes

Historic structures include buildings, bridges, retaining walls, and other infrastructure that are not in ruins. The study area contains nine national register-listed historic structures or groups of historic structures, three of which are also NHLs (Table 26, Figure 34).

Some national register-eligible historic properties may be described as cultural landscapes. A cultural landscape is, “a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values” (Birnbaum 1994). Three historic districts are also cultural

landscapes: Aquatic Park, Fort Mason, and Fort Baker (Figure 35). The cultural landscapes have been described, but are not separately listed on the national register or designated NHLs.

TABLE 26. RECORDED HISTORIC STRUCTURES

Property Name	Address/Location	National Historic Landmark	National Register	Designated Cultural Landscape	Alternative(s) within Proximity
San Francisco Port of Embarkation, U.S. Army	Fort Mason	Yes	Part of the Fort Mason National Historic District	Part of the Fort Mason cultural landscape	Pier 3 and Fort Mason Special Ferry Service
Fort Baker	Fort Baker	No	Part of the Forts Baker, Barry, and Cronkhite National Historic District	Yes	Fort Baker Special Ferry Service
Fort Mason Historic District	Fort Mason	No, though Port of Embarkation NHL is within the boundaries	Yes	Yes	Pier 3 and Fort Mason Special Ferry Service
Haslett Warehouse	680 Beach Street	No	Yes	No	Pier 41
Pioneer Woolen Mills and D. Ghirardelli Company	900 North Point Street	No	Yes	No	Pier 41
Aquatic Park Historic District	Fort Mason	Yes	Yes	Yes	Pier 3 and Fort Mason Special Ferry Service
Port of San Francisco Embarcadero Historic District	Piers 45 to 48, Embarcadero	No	Yes	No	Pier 31½ and Pier 41
Pump Station 2	Northern end of Van Ness Avenue	No	Yes	No	Pier 3 and Fort Mason Special Ferry Service
San Francisco Cable Cars	1390 Washington Street	Yes	Yes	No	Pier 31½ and Pier 41

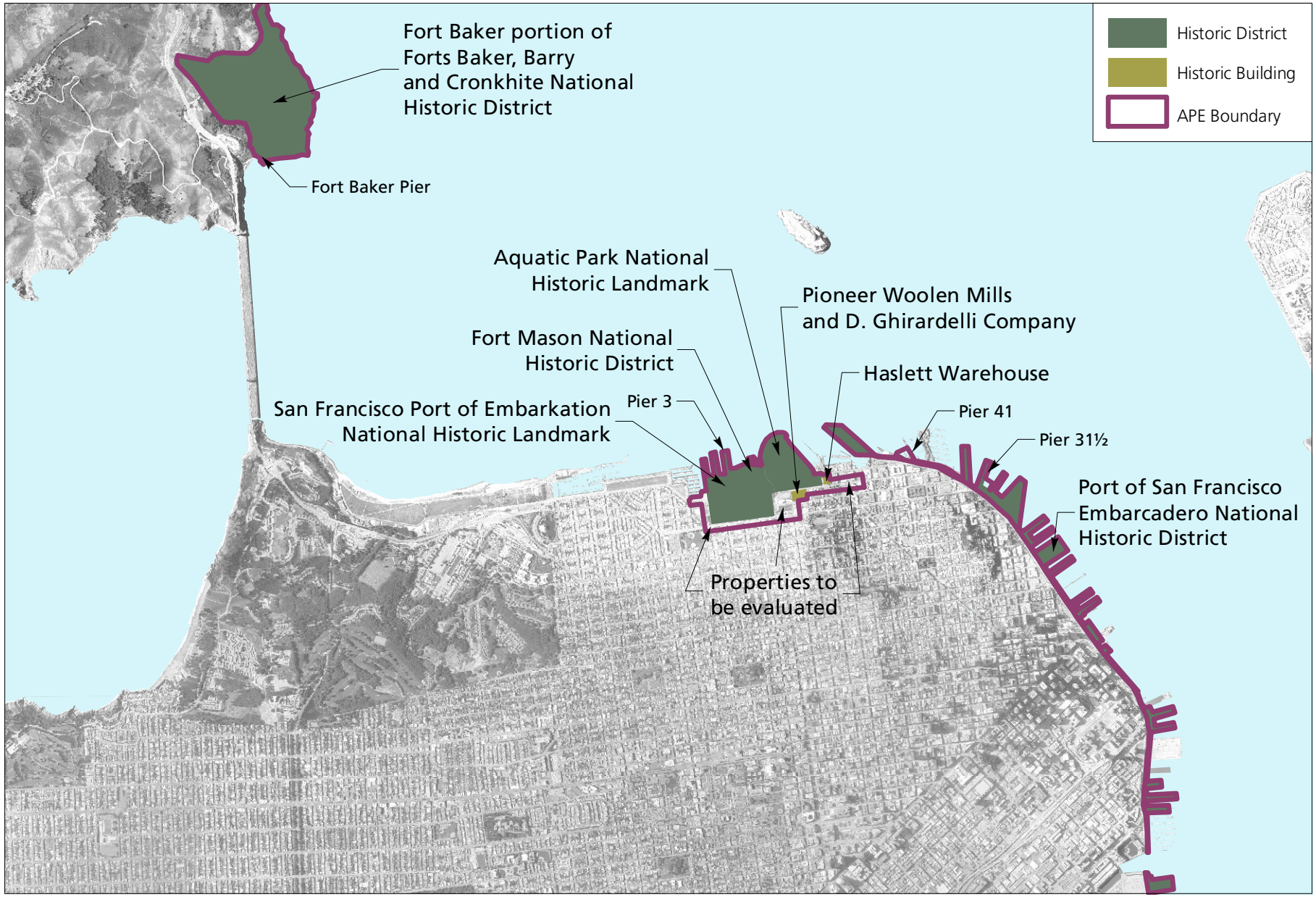
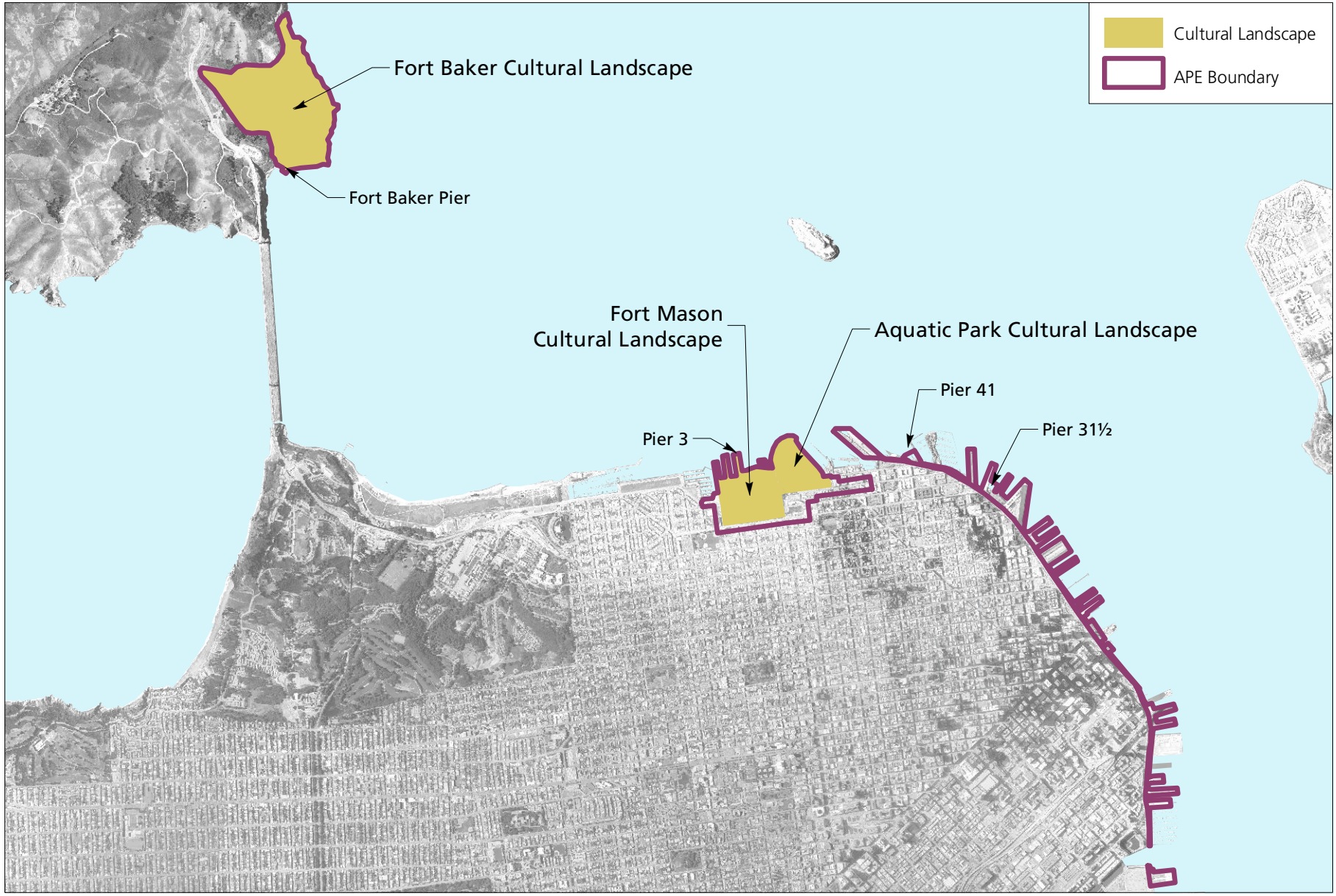


FIGURE 34
HISTORIC STRUCTURES
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



0 4,000 Feet

FIGURE 35
CULTURAL LANDSCAPE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

San Francisco Port of Embarkation. The San Francisco Port of Embarkation National Historic Landmark District was listed in 1985 and, "represents the country's massive mobilization associated with World War II as the principal port on the West Coast for delivering personnel, material, weapons, and ammunition to the fighting fronts in the Pacific theater" (NPS 2007b). During this period, more than 1.75 million soldiers were shipped out from this location and 500,000 soldiers returned. After military action ceased, another 500,000 debarked through Fort Mason. All American casualties in the Pacific, as well as prisoners of war, were delivered to this location. It also served as the main command center for all other West Coast military ports. It is composed of 13 buildings and five structures in Lower Fort Mason, as well as Headquarters Building 201 in Upper Fort Mason. The site covers 21 discontinuous acres. It is located within the Fort Mason National Register District.

Fort Baker. Fort Baker was listed on the National Register in 1973 as part of the Forts Baker, Barry, and Cronkhite Historic District. This collection of military installations represents a rare example of early U.S. coastal fortifications on the West Coast. The area has been used as part of our national defense strategy from 1866 through 1995, when it became part of GGNRA. The site consists of an intact grouping of buildings primarily constructed between 1900 and 1906, wharf and warehouse structures (most adaptively reused) and a number of physical remnants from earlier batteries, coastal defenses, navigation beacons, and infrastructure.

Fort Baker is also a designed cultural landscape, significant for the coastal defense history of the site (NPS 2005). Its boundaries are the same as the national register boundaries of Fort Baker (not including forts Barry and Cronkhite).

The cultural landscape is divided into the following six areas:

- The Batteries Landscape Character Area, including six intact batteries and two remnant battery complexes
- The Cantonment Landscape Character Area, which is the core of Fort Baker and includes "the formal parade ground, Murray Circle, and twelve historic structures clustered around the parade ground" (NPS 2005)
- The Waterfront Landscape Character Area, which includes " the Moore and Satterlee breakwaters, the mine wharf, the seawall, the marine railway, Moore Road, mine deport structures, and loading rooms along the west side of the Bay, and the boat and ship repair shops at the east end of Sommerville Road" (NPS 2005)
- The Quartermaster Warehouse Landscape Character Area, including ten structures currently used by the Bay Area Discovery Museum
- The Open Area Landscape Character Area, including all open areas that were undeveloped during the period of significance, as well as the landscape surrounding batteries and fortifications.
- The Access Roads Landscape Character Area, which comprises four historic roads.

The period of significance for the Fort Baker Cultural Landscape is 1866 to 1945 (NPS 2005).

Fort Mason Historic District. Fort Mason was listed on the national register in 1972 and enlarged in 1979. First established by the Spanish in 1797 as the second battery of their coastal defenses in the area, the area occupied by Fort Mason has served as a military fortification under three different governments. It officially became a U.S. military reservation in 1850 under the orders of President Fillmore. As a district, "Fort Mason today represents 100 years of army architecture, including the typical, modest structures of mid-nineteenth century military; variations of styles used in the Victorian period; Mission Revival; and the clean lines of the Endicott battery" (Thompson 1979b). In total, the enlarged district encompasses 68.5

acres of land and contains approximately 55 contributing buildings and features. Fort Mason is included as part of the GGNRA management area.

Fort Mason is also a designed cultural landscape, significant as a military fortification. It is divided into Upper Fort Mason and Lower Fort Mason (Hoke and Foulds 2004).

The Upper Fort Mason landscape is divided into eight areas:

- The East Black Point Landscape Character Area, including four dwellings and the surrounding landscape
- The North Fortifications Landscape Character Area, including coastal defenses and associated infrastructure
- The Central Cantonment Landscape Area, including the facilities for enlisted personnel
- The East Waterfront Landscape Character Area, including coastal defenses and associated infrastructure
- The North Cliff Landscape Character Area, an undeveloped section of shoreline
- The Northwest Embankment Landscape Character Area, including the embankment separating Upper and Lower Fort Mason and associated infrastructure
- The Great Meadow Landscape Character Area, including planted trees and a curved retaining wall
- The South Expansion Landscape Character Area, including a variety of twentieth century buildings and associated infrastructure

Lower Fort Mason is a single character area, which includes, “all of the area created from land made by filling in a portion of the San Francisco Bay” (Hoke and Foulds 2004). The period of significance for the Fort Mason Cultural Landscape is 1855 to 1953 (Hoke and Foulds 2004).

The Haslett Warehouse. The Haslett Warehouse is a four-story brick warehouse designed by William Mooser, Jr. and built from 1907 to 1909 for the adjacent California Fruit Canner's Association cannery (later the California Packing Company or Calpak, parent company to the Del Monte brand). It was listed on the national register in 1975 because it, "exemplifies the genre of warehouses which were once prominent in the northern waterfront area of San Francisco," under Criterion A (Trends and Events). It is also recognized as the work of a master architect who was locally significant, William Mooser, Jr., under Criterion C (Design). The building is 180,000 square feet and currently houses the Argonaut Hotel and the San Francisco Maritime Park Museum.

Pioneer Woolen Mills and D. Ghirardelli Company. Popularly known as Ghirardelli Square, this resource contains a portion of the former Pioneer Woolen Mill (1861, designed by William S. Mooser), the D. Ghirardelli Chocolate Company (1900 to 1923, designed by William S. Mooser Jr. (son of William S. Mooser, Sr. and father to William S. Mooser, III), and Ghirardelli Square, an early adaptive reuse complex (1962 to 1968, designed by Wurster, Bernardi & Emmons). The entire complex was listed on the national register in 1982. It is recognized under a variety of criteria for each of its development periods: architecture and landscape, commerce, adaptive reuse, industry, and association with prominent businesses and businessmen who were influential in San Francisco. The complex is internationally recognized as a successful example of reuse of an entire industrial complex for nonindustrial purposes. It comprises the block bounded by North Point, Larkin, Beach, and Polk streets.

Aquatic Park. "San Francisco's Aquatic Park is of national significance in architecture and landscape architecture because of its outstandingly thorough and masterful design... The art works inside the bathhouse (Maritime Museum) are outstanding examples of federally funded art of the 1930s." The interior spaces contain WPA-funded murals, terrazzo and other building artwork by a

number of well-known local and international artists. In addition, the park is recognized for its importance in military history (World War II), social movements (WPA, early senior center, and maritime history museum), recreation, and planning (Delgado and Harrison 1986). It became a NHL in 1987 and encompasses approximately 10 acres of land between Beach and Hyde streets, the waterfront, and Van Ness Avenue. There are three buildings and five structures that contribute to the district. While a separate district, it is contained within the SF Maritime NHP.

Aquatic Park is also a designed cultural landscape. It was designed for passive recreation and is centered on the Aquatic Park Cove outlined by the shoreline and the municipal pier (NPS 2010). The boundaries of the cultural landscape include the NHL plus a small park to the west of Van Ness Avenue.

Defining features of the cultural landscape include the following:

- Site topography (grade, relationship between the ground plane and structures)
- Streamline Moderne structures
- Circulation features
- Vegetation

The period of significance for the cultural landscape at Aquatic Park is from 1920 (when construction of the park began) to 1945 (when military use of the site ended) (NPS 2010).

Port of San Francisco Embarcadero Historic District. The Port of San Francisco Embarcadero Historic District was listed on the national register in 2006 for a number of areas of significance at the national, state, and local levels. Initially constructed in 1878, the second seawall in this area gave the shoreline of San Francisco its current shape and location. Engineering and architectural advances during the next century continued to shape the waterfront and establish trends for port design across the country. The work at the Port was critical to the development of the region, both because of the goods shipped from and delivered to the waterfront, and for the water-based transportation portals that connected San Francisco to the rest of the region. It was also the stage for the 1934 Big Strike that influenced labor relations on a national level for decades to come (Corbett et al. 2002). It consists of 24 buildings and 24 structures spread along the Embarcadero from Pier 45 to Pier 48. Piers 31 and 33 are contributing structures within the district. This also includes the substructure, transit sheds, and bulkhead buildings for both piers. The Pier 31½ Alternative includes proposed work on the Pier 31½ bulkhead building, Pier 33 transit shed, and the space between the two piers; Pier 41 is within the district but is not a contributing structure.

Pump Station 2. Designed in the Mission Revival style and constructed in 1912 of reinforced concrete, Pump Station No. 2 contains three Sterling boiler units and associated pumping and power generation equipment dating to 1912. It was individually listed on the national register in 1976 in recognition of its innovative architecture and engineering as a representative of an innovative emergency fire suppression system developed in response to the 1906 San Francisco earthquake and fire (Chappell 1976). As part of San Francisco's Auxiliary Water Supply System, it has also been determined to be a contributor to a national-register-eligible discontinuous district for its engineering innovations and for its association with the 1906 earthquake and fire (TetraTech 2009). The building is situated on federal land and is included as a noncontributing building within the borders of the Fort Mason Historic District.

San Francisco Cable Cars. This once-ubiquitous form of transportation was developed in San Francisco by Andrew Hallidie in 1873 as a response to the numerous steep hillsides and challenging topography. Adapted for use in urban areas around the world, the cable cars have become synonymous with San Francisco. Today they are the last operating cable cars in the United States (Dillon 1978). The cable cars were designated a NHL in 1964 and today consist

of more than 10 miles of cable and 40 cars running on three routes (Cable Car Museum 2013). The Powell-Hyde line turntable, near the intersection of Hyde and Beach streets, is within Aquatic Park and the Project study area.

Archeological Sites

Archeological sites are locations that show evidence of past human activity, including the following:

- Prehistoric sites, such as settlements, camps, or resource gathering locations
- Historic structures or infrastructure that is no longer used or maintained and is in ruins

There are six recorded archeological sites in the study area. None of the sites are within the area of where direct effects could occur (Table 27, Figure 35).

TABLE 27. ARCHEOLOGICAL SITES

Site Number	Name	Status	Alternative(s) within Proximity
CA-SFR-23	Precontact hearth and midden	Considered national register-eligible, if present	Pier 3 and Fort Mason special ferry service
CA-SFR-29	Precontact midden	Considered national register-eligible	Pier 3 and Fort Mason special ferry service
CA-SFR-30	Black Point midden	Considered national register-eligible, if present	Pier 3 and Fort Mason special ferry service
CA-SFR-31	Precontact midden	Considered national register-eligible, if present	Pier 3 and Fort Mason special ferry service
CA-SFR-127H	Mid-Embarcadero historic fill	National register	Piers 31½ and 41
CA-MRN-648H	Multiple sites and structures in east Fort Baker	National register	Fort Baker special ferry service

CA-SFR-23, Precontact Hearth and Midden. This site was reported in two 1861 publications cited in the Archeological Site Survey Record on file at the California Office of Historic Preservation (Davis 1954). The publications described the site as a hearth and midden near what is now the southeastern corner of Aquatic Park. The record states that the site was destroyed after 1861, but this has not been field-verified.

CA-SFR-29, Precontact Midden. This site, located at Fort Mason, was reported shortly before a major renovation in 1978 at the fort. An attempt to relocate the site in 2010 located only small quantities of shell. It is not known how much of the site, if any, remains intact (Psota 2010).

CA-SFR-30, Black Point Midden. Like the preceding site, this precontact midden was recorded before the major renovation. This site could not be relocated in 2010, but may be intact beneath Pope Road or nearby structures (Psota 2010).

CA-SFR-31, Precontact Midden. Also located at Fort Mason, this large midden site was recorded before the 1978 renovation. No attempt has been made to relocate it, and it may remain intact under, "several feet of sterile sand" and asphalt (Baker et al. 1978).

CA-SFR-127H, Mid-Embarcadero Historic Fill. This site consists of a thick layer of fill containing at least 14 historic features, a cable raceway, a previous seawall, and the Gold Rush-era vessel *Rome*. Artifacts and features

appear to date from the Gold Rush era (circa 1849) to the early twentieth century.

CA-MRN-648, East Fort Baker Sites. Site CA-MRN-648 has been assigned to a group of 55 structures and archeological sites in east Fort Baker (Newland et al. 2001). They are all historic, and include various infrastructure elements and debris concentrations. Some of the features are also part of the national register district described above. Many of the archeological features have not been evaluated for national register eligibility, and some are not likely associated with the period of significance of Fort Baker.

REGULATIONS AND POLICIES

Federal

American Antiquities Act (1906). The antiquities act (16 USC 431-433) established the ability of the President to identify national monuments, and criminalized unpermitted excavation or vandalism of archeological resources. The act is relevant to the Project because it gives federal agencies jurisdiction over cultural resources on their lands, and the Project area includes lands owned by the Park Service.

Historic Sites Act, as amended (1935). The historic sites act (16 USC 461-467) established the NHL program. NHLs are historic and archeological sites, buildings, and objects of national significance. The act is relevant to the Project because there are three NHLs in the Project area.

NHPA, as amended (1966). The NHPA (16 USC 470 et seq.) establishes key aspects of the federal historic preservation program Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on national-register-eligible historic properties. Agencies must afford the Advisory Council on Historic Preservation and the SHPO an opportunity to comment on any undertaking that may affect historic properties, and must also consult with interested and affected Indian tribes, other interested parties, and the public.

The NHPA is relevant to the Project because of the following:

- The Project is an undertaking as defined in 36 CFR 800.16(y).
- The Project area includes lands owned by NPS.
- There are three NHLs in the Project area.

NEPA documentation is being used to fulfill section 106 requirements to consult with the public, but other section 106 consultation and review is being conducted separately.

Archeological and Historic Preservation Act (AHPA), as Amended (1974). The AHPA (16 USC 469-469c) requires that federal agencies preserve or recover significant historical or archeological resources, and authorizes agencies to fund these preservation or recovery activities. The AHPA is relevant to the Project because significant historical and archeological resources are present in the study area.

American Indian Religious Freedom Act (AIRFA; 1978). The AIRFA (42 USC 1996 et seq.) protects the rights of Native Americans (American Indians, Eskimos, Aleuts, and Native Hawaiians) to practice and express their traditional religion, access sacred sites, and possess sacred objects. AIRFA regulations are found at 43 CFR 7. AIRFA would be applicable to the Project if any sacred sites, traditional religious locations, or objects are discovered in the Project area.

Archeological Resources Protection Act (ARPA; 1979). The ARPA (16 USC 470) is the primary law that protects archeological resources on federal lands. In contrast to the NHPA, archeological resources are defined in ARPA as "any material remains of human life or activities which are of archeological interest" and "at least 100 years of age." ARPA provides for permitting of archeological investigations, and criminalizes unpermitted excavation or vandalism. ARPA would be

applicable to the Project if any archeological resources would be impacted, and those effects mitigated through scientific excavation. ARPA would be applicable to the Project if any archeological resources would be impacted, and those effects mitigated through scientific excavation.

Abandoned Shipwreck Act (1987). The Abandoned Shipwreck Act (43 USC 2101) claims federal ownership of certain shipwrecks in navigable state-controlled waters. Federally owned shipwrecks do not belong to the finder (as they otherwise would under maritime law) and may not be salvaged by private parties. The act would apply to the Project if any shipwrecks are found to be present in the Project area.

Native American Graves Protection and Repatriation Act (NAGPRA; 1990). The NAGPRA (25 USC 3001 et seq.) applies to human remains, funerary objects, sacred objects, and objects of cultural patrimony (together called "cultural items") related to Native Americans or Native Hawaiians. It describes the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations regarding treatment, repatriation, and disposition of cultural items. NAGPRA applies to inadvertent discoveries on federal or Indian lands. It would apply to the Project if any cultural items were encountered on NPS-owned lands in the Project area.

Local

BCDC has jurisdiction over Bay and upland areas within 100 feet of the shoreline under the McAteer-Petris Act. BCDC adopted the Bay Plan, as called for under that legislation. In 1975, BCDC, acting in concert with the Planning Department and Port, adopted the Special Area Plan. The Special Area Plan, together with the McAteer-Petris Act and the Bay Plan, and subsequent amendments to all three documents, prescribes a set of rules for nonmaritime shoreline development along the San Francisco Waterfront.

NE Waterfront Plan (City/County 2003). The overall goal of the NE Waterfront Plan is to create a physical and economic environment in the northeastern waterfront area that will use the area's resources and potential in the manner that will best serve the needs of the City's community. To accomplish this goal, the dominant planning principles of the NE Waterfront Plan are to do the following:

- Provide for those uses that positively contribute to the environmental quality of the area and contribute to the economic health of the Port and the City,
- Preserve and enhance the unique character of the area, and take advantage of the unique economic opportunity provided by the Bay, and
- Provide the maximum possible visual and physical access to the Bay while minimizing the adverse environmental impacts of existing and new activity.

The plan applies because the study area for this Project includes portions of the NE Waterfront Plan Base of Telegraph Hill subarea.

Waterfront Plan (Port 2004). The goals of the Waterfront Plan are to maintain and improve the working waterfront, a revitalized Port, a diversity of activities and people, access to and along the waterfront, an evolving waterfront mindful of its past and future, urban design worthy of the waterfront setting, and economic access that reflects the diversity of the City. The Waterfront Plan includes general land use policies for maritime uses, open space and public access, residential and commercial uses, and other and interim uses, and identifies unacceptable nonmaritime land uses. It includes five subarea plans, of which three and one half are entirely within the area covered by the NE Waterfront Plan. The Waterfront Plan's related waterfront design and access policies include goals, policies, and criteria that address urban design, public access, city pattern, and historic preservation, which will be achieved in future waterfront improvement projects.

Special Sign District for the Northeast Waterfront (SF planning code section 608.15). While not in the Northeast Waterfront historic district, the study area is directly adjacent to this district and may be subject to the restrictions on signage presented in the San Francisco planning code section 608.15. This code governs advertising, rooftop, hanging, and other commercial signage. It does not include restrictions on directional or wayfinding signage.

Embarcadero Promenade Design Criteria (Port 2011b; DRAFT). The Waterfront Design & Access Element (WD&A) of the Port's Waterfront Plan includes design direction for urban design, historic resources, views, and open space. The Promenade Criteria in the WD&A direct the architectural character for site furnishings and provide specific design direction for improvements on and adjacent to The Embarcadero Promenade. The Promenade Criteria generally do not apply to improvements waterward of the front of the bulkhead buildings, where improvements will be evaluated on an individual basis with the WD&A. The Embarcadero Promenade Design Guidelines would be applicable to the Pier 31½ and Pier 41 alternatives.

Fisherman's Wharf Public Realm Plan (2010 DRAFT). The Fisherman's Wharf Public Realm Plan is an interagency partnership led by the San Francisco Planning Department that studies ways to improve the streets and public spaces of Fisherman's Wharf. A redesigned Jefferson Street is the central element of the plan, but the plan also contains the following:

- New streetscape designs for the remainder of the Wharf region's streets
- Design guidelines for new development
- A revamped parking and circulation plan
- Proposals for new and refurbished public open spaces

This plan is currently in development and may be applicable to design within the study area related to the Pier 41 Alternative.

RECREATION AND VISITOR USE

This section discusses the recreational opportunities, including visitor use and experience, located within and adjacent to the study area. The study area is defined as the areas in the northwestern San Francisco waterfront region immediately surrounding and connecting to the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), as well as the Fort Baker area in Southern Marin County. Several Project objectives, as described in the "Purpose and Need" chapter, focus on providing improved recreational resources and visitor use and experience.

EXISTING CONDITIONS

San Francisco provides a variety of recreational opportunities for both tourists and residents. Some of the main attractions include museums, parks and scenery, views, historic sites and landmarks, picturesque and unique neighborhoods, and performing arts. More than one in four people surveyed in 2010 reported traveling to the City specifically to visit a garden or park, watch a live music performance, or attend a special event (SF Travel 2013). Several media outlets have continuously ranked the City as one of the nation's top tourist destinations. In 2012, the City attracted approximately 16.5 million visitors, who spent over $8.93 billion at local businesses, including restaurants, shops, attractions, and cultural institutions (SF Travel 2013). Recreational resources in the study area are shown on Figure 36.

GGNRA

GGNRA is an 80,002-acre park surrounding the Bay Area. The park is managed by the Park Service and is one of the most visited units of the national park system in the U.S., with more than 13 million visitors a year. It is also one of the largest urban parks in the world. The GGNRA is a vital part of the available recreational opportunities within the study area, providing visitors with numerous recreational activities. Within GGNRA, the Presidio provides a variety of recreational options, including hiking, camping, golfing, relaxing on the beach, photographing flora and fauna, and learning about the history of San Francisco. At Lower Fort Mason, visitors can explore several local art and cultural organizations within Landmark Buildings A through E, as well as larger events, which often occur in the Herbst and Festival pavilions. Farmers markets and other outdoor gatherings are also regularly held within the Lower Fort Mason parking lot. In Upper Fort Mason is the Great Meadow, a popular park for picnicking, sunbathing, walking, and sports activities. This park also provides panoramic views of the Bay and the San Francisco skyline. Visitors can also explore a variety of historic buildings, which include a popular hostel, and visit GGNRA headquarters in Upper Fort Mason. To the north of San Francisco, and also included in the GGNRA is Fort Baker. This area is popular for hiking, fishing, and crabbing at Horseshoe Cove, kayaking and sailing, visiting the Bay Area Discovery Museum, and exploring the historic waterside fortifications at Battery Yates on the eastern bluffs.

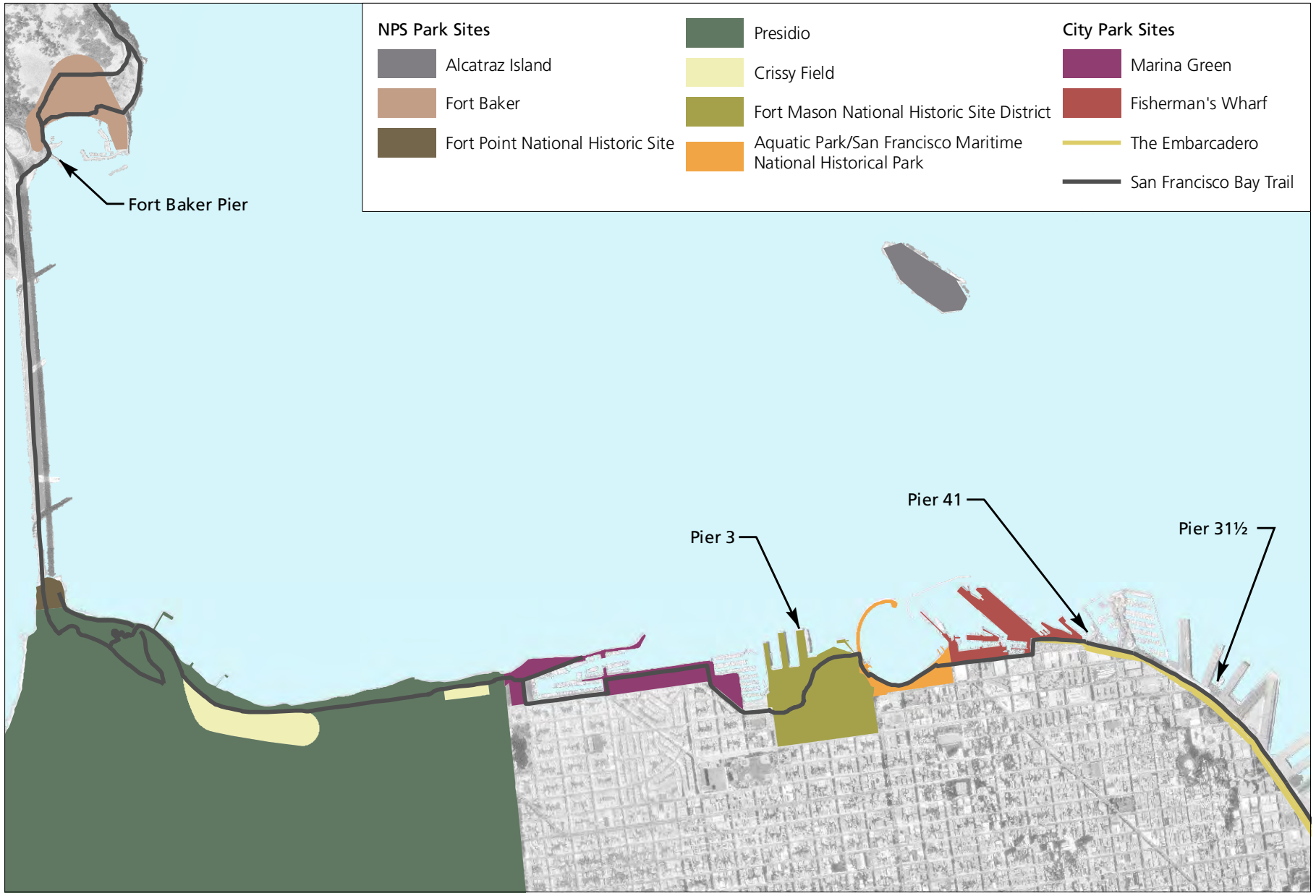


FIGURE 36
RECREATIONAL RESOURCES WITHIN THE STUDY AREA
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

Tours of Alcatraz Island, which is a part of the GGNRA, attract more than 1.4 million visitors each year. In addition to the historic penitentiary and the first west coast lighthouse, Alcatraz Island provides panoramic views of the city skyline and the Bay. Primary visitor experience is provided by the 10 to 15 minute ferry ride to the island from San Francisco's northern waterfront. Upon arrival, visitors are able to view multiple structures such as the historic barracks (Building 64), exhibits, a theater, and a small gift shop (NPS 2014a). Visitors are permitted to access the majority of the main prison building and the Recreation Yard. A 2011 study commissioned by the Park Service estimated that visitor use of Alcatraz Island is approximately 5,300 on a design day (busy but not peak visitation) and 5,460 on a peak day.

The Embarcadero

The Embarcadero functions as part of the City of San Francisco Waterfront Plan "PortWalk," which seeks to improve shoreline access by providing new pedestrian walkways and amenities to extend onto piers with the purpose of fostering new mixed use pier developments (City/County 2013b). The Exploratorium, a popular science museum, is located at Pier 15, and the new cruise terminal is located at Pier 27 along the Embarcadero. The Embarcadero is a gateway to numerous attractions, including Fisherman's Wharf, Pier 39, and the Ferry Building, and is a vital recreational and commercial thoroughfare, providing a variety of recreational opportunities for visitors, including running, walking, cycling, and sightseeing.

Fisherman's Wharf

Fisherman's Wharf is located roughly between Van Ness Avenue east and Kearny Street along the Embarcadero. Fisherman's Wharf provides a variety of recreational opportunities for visitors. It is well-known for tourist attractions such as Pier 39, SF Maritime NHP, the Cannery Shopping Center, Ghirardelli Square, the Ripley's Believe it or Not Museum, the Musée Mécanique, and Forbes Island. Additional recreational opportunities within Fisherman's Wharf include the Hyde Street Pier, the *USS Pampanito*, a decommissioned World War II era submarine, and the *Balclutha*, a nineteenth century whaling ship. Further, Fisherman's Wharf provides a variety of restaurants, eateries, and views of the San Francisco northern waterfront (NPS 2012e). Fisherman's Wharf has approximately 10 million visitors annually and approximately 60,000 visitors on busy days (San Francisco Planning Department 2013).

Recreational Opportunities Near Embarkation Site Alternatives

Pier 31½. The current Alcatraz Island ferry embarkation site is located at Pier 31½ on the Embarcadero. There are no formally designated parks in the vicinity of Pier 31½. The Bay Trail, a multi-use pedestrian and bicycle trail, is adjacent to Pier 31½ and provides access to Fisherman's Wharf, Aquatic Park, Fort Mason, and other portions of the GGNRA to the west. The Pier 31½ site does not provide access to the Bay for swimmers or recreational boaters, nor is such infrastructure in place.

Pier 41. Formerly the location of the Alcatraz Island ferry embarkation site from 1980 to 2006, Pier 41 is located within the central hub of Fisherman's Wharf business district, just west of Pier 39. The Blue & Gold Fleet, under contract to the San Francisco Bay Area WETA, operates a limited commuter ferry service to Sausalito and Tiburon from Pier 41, as well as special event ferry service between San Francisco's AT&T Park baseball stadium and various cities throughout the Bay Area. The Embarcadero borders Pier 41 to the south, providing a pedestrian corridor for walking, running, cycling, and sightseeing. The Bay Trail is adjacent to Pier 41 and provides access to other recreational opportunities to the west, including Aquatic Park, Fort Mason, and other areas of the GGNRA. The Pier 41 site does not provide

access to the Bay for swimmers or recreational boaters, nor is such infrastructure in place.

Pier 3. Pier 3 provides immediate access to variety of recreational opportunities for visitors that function as part of the larger GGNRA. Fort Mason is located west of the SF Maritime NHP and Aquatic Park, and east of the Marina Green and Gashouse Cove Marina. Recreational opportunities at Fort Mason include the multitude of Fort Mason Center events, including farmers' markets, wine festivals, and craft fairs, as well as the J. Porter Shaw Library and museum collections. Upper Fort Mason's Great Meadow offers open space for picnicking, walking, or flying kites. The Golden Gate Promenade/Bay Trail traverses across Fort Mason along the harbor's edge, and grants visitors scenic natural views of the Bay and access to other areas of the GGNRA and tourism opportunities, such as Fisherman's Wharf, to the east. The Pier 3 site does not provide access to the Bay for swimmers or recreational boaters, nor is such infrastructure in place. Aquatic Park, located east of Fort Mason, includes a waterfront area popular with swimmers and small beach-launched vessels such as kayaks and row boats. The Aquatic Park Pier and area breakwaters prohibit large vessel traffic, including ferries, from entering the area, while also providing protection from wave and vessel wake action.

Fort Baker. Recreational opportunities at Fort Baker include the pier, which is accessible to the public and is a popular fishing spot and a boat launch, the Bay Area Discovery Museum, Travis Sailing Center, Presidio Yacht Club, Cavallo Point Lodge and its restaurant and bar, and hiking trails to historic batteries and viewing points. Fort Baker also includes a large grassy area called the Parade Grounds. The Bay Trail follows the shoreline of Horseshoe Bay and extends north toward Sausalito along East Road.

REGULATIONS AND POLICIES

The following regulations and policies related to recreation and visitor use and experience govern the review, analysis, and implementation of the proposed alternatives.

Federal

NPS Management Policies. The NPS Management Policies 2006 stipulate that the primary purpose of all parks is to enhance the enjoyment of park resources and values by the people of the U.S. The Park Service is dedicated to providing recreational opportunities that enhance visitor use experience at national parks (NPS 2006). According to the Management Policies, the national park setting is not suitable for all potential forms of recreation, and therefore, the Park Service shall strive to do the following (NPS & USCG 2012):

- Offer recreational opportunities that enrich the natural and cultural resources found within the local area.
- Defer to local, state, and other federal agencies and other nongovernmental entities to service a greater range of recreational demands that are not suitable for a national park setting.

The Park Service may permit other forms of recreation that do not meet all the criteria specified above if the recreational activities are relevant to the fundamentals for which the park was established and that would support the preservation of park resources or values (NPS 2006).

GGNRA and Muir Woods National Monument GMP. Five guiding principles are highlighted in the GMP to promote visitor use and experience throughout the park. These principles are sustainability, community-based stewardship, civic engagement, partnerships, regional collaboration, and inclusion. The purpose of the GGNRA is to provide national park experiences to a large diverse urban population, while continuing to preserve and interpret stewardship of GGNRA's natural historic, scenic, and recreational values (NPS 2014a).

Local

General Plan. The General Plan's Recreation and Open Space Element contains several objectives and policies to maintain balance between open space and recreation opportunities and development in this urban setting. The objectives and policies relevant to the Project and alternatives include:

- Objective 3: Provide continuous open space along the shoreline unless public access clearly conflicts with maritime uses or other uses requiring a waterfront location
  - Policy 3.1: Assure that new development adjacent to the shoreline capitalizes on its unique waterfront location
  - Policy 3.2: Maintain and improve the quality of existing shoreline open space
  - Policy 3.3: Create a visually and physically accessible urban waterfront along the Embarcadero corridor
  - Policy 3.4: Provide new public open spaces along the shoreline

Marin County Countywide Plan. The Parks and Recreation Element of the Marin County Countywide Plan focuses on augmenting and improving active recreation facilities (Marin County 2007a). The objectives and policies relevant to the Project and alternatives include:

- Goal PK – 1: A high quality parks and recreation system
  - Conduct and coordinate park planning
  - Consider user needs, impacts, and costs
  - Protect park resources from the impacts of climate change

SOCIOECONOMICS

This section describes the current socioeconomic conditions within the study area. The study area for this resource topic is defined as the existing business and residential communities within and adjacent to the three northern San Francisco embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), and the Fort Baker area in southern Marin County. The study area description includes historic and projected population and employment levels.

EXISTING CONDITIONS

The analysis for Project-related socioeconomic impacts considered the local and regional geographic area encompassing communities and neighborhoods that would potentially be affected by changes associated with the proposed alternatives. Because the ferry service currently exists, the analysis focuses on the potential effects to regional and local population and employment from the potential changes in the embarkation sites. Parallel census data for the state are also presented for comparison purposes.

Population

The proposed alternatives are located within the City/County, with the exception of the Project element that is common to all alternatives at Fort Baker, which is located in Marin County. A comparison of the historical population growth and the existing and Project population growth of the City and Marin County are presented in Table 28. In general, historic and projected population growth in the City and Marin County has been slower than California as a whole. The population of the City grew by 11.2% between 1990 and 2010 (Table 28) (NPS 2012e; Bay Area Census 2013). The population of Marin County increased by 9.7% between the years 1990 and 2010. In comparison, the population of the state increased by 25.1% during the same time period.

TABLE 28. HISTORICAL POPULATION

Year	City	Marin County	California
1990	723,959	230,096	29,760,021
2000	776,733	247,289	33,871,648
2010	805,235	252,409	37,253,956
Growth 1990 to 2010	11.2%	9.7%	25.1%

Notes:
Sources: NPS 2012e; Bay Area Census 2013; U.S. Census Bureau 1992, 2001, 2013

The California Department of Finance (DOF) estimates that the population of the City will increase by 5.1% by 2030, and the population of Marin County will decrease by 0.78% by 2030 (Table 29). In comparison, the state is expected to increase in population by 14.1% by 2030.

TABLE 29. EXISTING AND PROJECTED POPULATION

Area	2015	2020	2025	2030	Projected Growth 2015-2030
City	835,109	852,788	867,354	877,847	5.1%
Marin County	255,006	251,361	251,899	253,026	-0.78%
California	38,801,063	40,643,643	42,451,760	44,279,354	14.1%

Note:
Source: DOF 2013

Employment

Historic labor force and unemployment rates are depicted in Table 30. Existing and projected jobs within the City and Marin County are depicted in Table 31. Historically, the City and Marin County have had lower unemployment rates than California as a whole, although both counties and California experienced a large increase in unemployment from 2000 to 2010. During this timeframe, San Francisco, Marin County, and California more than doubled the unemployment rate (Table 30). The California Employment Development Department estimates that the San Francisco-San Mateo-Redwood City Metropolitan Division (Metropolitan Division; which includes San Francisco, Marin, and San Mateo counties) will have a projected increase in employment of 18.7% by 2020, a larger increase than California as a whole, which is only anticipated to increase by 16.3% in the same timeframe.

TABLE 30. HISTORIC LABOR FORCE AND EMPLOYMENT

Area	Year	Civilian Labor Force	Civilian Employment	Civilian Unemployment Rate
City/County	1990	409,500	394,100	3.8%
	2000	472,800	456,700	3.4%
	2010	457,000	413,300	9.6%
Marin County	1990	131,900	128,600	2.5%
	2000	141,800	137,800	2.8%
	2010	133,200	122,600	8.0%
California	1990	15,168,500	14,294,100	5.8%
	2000	16,857,600	16,024,300	4.9%
	2010	18,330,500	16,063,500	12.4%

Note:
Source: California Employment Development Department Labor Market Information Division 2013a

TABLE 31. EMPLOYMENT PROJECTIONS

Area	2010[1]	2020	Projected Growth 2010-2020
Metropolitan Division	1,047,900	1,243,900	18.7%
California	15,916,200[2]	18,511,200	16.3%

Notes:
Source: California Employment Development Department Labor Market Information Division 2013b
1 Estimates for 2010 are different from census estimates in Table 30 because different methodologies were used
2 Includes San Francisco, Marin, and San Mateo Counties

Local Setting

The proposed alternatives are located along San Francisco's northern waterfront and in the Fort Baker pier area in southern Marin County. The land uses surrounding the proposed alternatives include commercial, residential, public/semipublic, and parks and open space.

Economic industries vary throughout the study area, with tourism constituting a major component. Metropolitan Division leisure and hospitality employment is the second largest employment sector, following the professional, scientific, and technical category. In April 2013, there were 136,910 jobs in the leisure and hospitality category in the Metropolitan Division, which accounted for approximately 13% of the total jobs (Bay Area Council Economic Institute 2013a, 2013b). The following sections describe the existing contribution of the GGNRA to the local economy and the specific business mix in the vicinity of the alternatives under evaluation.

GGNRA

Each year, millions of visitors to the GGNRA contribute hundreds of millions of dollars to the Bay Area economy and support jobs at hotels, restaurants, and stores that serve park visitors. When preparing the GGNRA Draft Management Plan, the Park Service modeled the direct and indirect contribution of visitors to the local economy. The model determined that local day trips accounted for the vast majority (80%) of visitation, with each local day trip party spending an average of $32 per day. Hotel-based visitor parties spent an average of $220 per day. Averaging all types of park visitors (local day trips, non-local day trips, hotel, and camping), a park visitor spends $43 at local businesses per day. The analysis noted that, in addition to contributing directly to the local economy, the GGNRA (including Alcatraz Island discussed below), contributes to the economy by helping generate tourism to other Bay Area attractions. This economic value primarily applies to visitors who come from outside the Bay Area. When all of the Bay Area attractions are considered together, the Bay Area becomes a very appealing region to visit for visitors coming from elsewhere in California, the U.S., and internationally. For example, nearly 25% of visitors to Alcatraz Island come from other countries (NPS 2014a).

Socioeconomic Setting in the Vicinity of Pier 31½

The site of the No Action Alternative and the Pier 31½ Alternative is located on the Embarcadero, along the northeastern San Francisco waterfront to the east of Fisherman's Wharf. The area has historically been known to support maritime, industrial, and manufacturing uses, and is characterized as a light industrial district, directly across the Embarcadero from a commercial community district. The Alcatraz Island ferry embarkation site is a significant tourist attraction that benefits local area businesses, including numerous retail stores and restaurants, and 11

commercial parking garages that cater to Alcatraz Island tourists (Fisherman's Wharf 2013). Currently, many visitors to Alcatraz Island begin their journey at Fisherman's Wharf (NPS 2012e). For example, for a period of time after ferry service operations began at Pier 31½, the Park Service operated a shuttle from Fisherman's Wharf to the site. It was discontinued due to low use; visitors tended to walk or take public transit from Fisherman's Wharf to the site instead. Landside businesses located in immediate proximity to Pier 31½ include restaurants to the west and several souvenir and food service kiosks located at the immediate entrance to the Alcatraz ferry embarkation site named "Alcatraz Landing." Across the Embarcadero are two large commercial buildings that house various business offices and retail uses, including several law firms, health practitioners, technical services, and a cafe. An additional restaurant is located between the commercial buildings, and is accessible from Montgomery Street to the south. South of Montgomery Street is a large residential apartment building and Ace Parking Garage. Additional parking available to visitors is located at the corner of Bay Street and the Embarcadero to the west and further south at the corner of the Embarcadero and Lombard Street. On-water activities at Pier 31½ are associated with tours to Alcatraz Island.

Socioeconomic Setting in the Vicinity of Pier 41

The Pier 41 Alternative is located within the central portion of Fisherman's Wharf. Fisherman's Wharf offers a variety of attractions, lodging, restaurants, shopping, and tours catering to tourists—specifically: Pier 39, the SF Maritime NHP, the Cannery Shopping Center, Ghirardelli Square, the Ripley's Believe it or Not Museum, the Musée Mécanique, and Forbes Island. The Blue & Gold Fleet, under contract to WETA, operates a limited commuter ferry service to Sausalito and Tiburon from Pier 41, as well as special event ferry service between San Francisco's AT&T Park baseball stadium and various cities throughout the Bay Area. Pier 39 is located at the northern end of The Embarcadero, just east of Pier 41. Pier 39 is a two-story commercial area, with 110 shops and 13 restaurants, street performers and musicians, California sea lions, the two-tier San Francisco Carousel, the California Welcome Center, and the Blue & Gold Fleet Bay Cruises. The National Liberty Ship Memorial, the *SS Jeremiah O'Brien*, is moored nearby at Pier 45 (NPS & USCG 2012)

Socioeconomic Setting in the Vicinity of Pier 3

The Pier 3 Alternative is located within Fort Mason, a historic district within the GGNRA adjacent to the SF Maritime NHP on the east, and west of the Marin Green and Yacht Harbor (NPS 2012e). Fort Mason is located within the Marina District, predominantly comprised of residential and parks and open space land uses. Landside commercial businesses within the vicinity of Fort Mason are located near the southwest and southeastern corners of the park. The nonprofit Fort Mason Center has 28 venues providing flexible meeting rooms, theaters, and exhibit halls used by groups numbering from five to 20,000. The venues are available and heavily used for events, including art exhibits, classes, corporate events, pop-up stores, product launches, conferences, and private events, which draw a mix of tourists and locals. Special events at the Fort Mason Center include commercial activities such as farmers' markets, wine festivals, and craft fairs. The Fort Mason Center campus is home to the following organizations: BATS Improv, Blue Bear School of Music, San Francisco Museum of Modern Art Artists Gallery, the Long Now Museum & Gallery, Magic Theatre, California Lawyers for the Arts, Greens Restaurant, the Mexican Museum, City College of San Francisco (CCSF) Art Campus, Lily Cai Chinese Dance Company, Off the Grid, On the Commons, Environmental Traveling Companions, Readers Book Store, World Arts West, San Francisco Children's Art Center, Seedling Projects, Young Performers Theatre, Cooks & Company, Goody Café, The Interval Salon,

and the Museo ItaloAmericano. The entrance to Lower Fort Mason is directly across from a neighborhood commercial shopping center, which is anchored by a large commercial grocery store located on the corner of Laguna Street and Marina Boulevard. The majority of the surrounding land uses are other GGNRA parklands, educational facilities, and residential housing.

Socioeconomic Setting in the Vicinity of Fort Baker

Commercial activity within the vicinity of Fort Baker is limited to the Cavallo Point Lodge at Golden Gate, a lodge and spa with restaurant and bar that is located approximately 1.5 miles southwest of Fort Baker near the Golden Gate Bridge. The Presidio Yacht Club maintains a yacht harbor on Horseshoe Cove, under lease to the Park Service, with 70 berths, guest docks, maintenance facilities, and a clubhouse. The club and its members are active in Bay Area yacht racing, power and sail cruising, and the local, regional, and international boating community. The Bay Area Discovery Museum, a children's museum, and the Institute at the Golden Gate, an environmentally focused institution, are also located at Fort Baker. The City of Sausalito represents the closest commercial business location, located 1.4 miles north of Fort Baker. The closest residents are located approximately 0.5 miles to the north.

REGULATIONS AND POLICIES

There are limited federal or state policies or regulatory requirements related to the socioeconomic impact analysis.

Federal

NPS Director's Order 12 Section 1.3 Introduction states that, "(w)hile NEPA [National Environmental Policy Act] is only triggered when there is a physical impact on the environment; the CEQ [Council on Environmental Quality] regulations require analysis of social and economic effects in both an EA [Environmental Assessment] and an EIS [Environmental Impact Statement]. Social and economic impacts should be analyzed in any NEPA document where they are affected."

Local

General Plan. The General Plan's Commerce and Industry Element includes objectives and policies based on the premise that economic development activities in San Francisco must be designed to achieve the following three overall goals (City/County 2013c):

- Economic Vitality—The first goal is to maintain and expand a healthy, vital, and diverse economy, which will provide jobs that are essential to personal well-being, as well as revenues to pay for the services essential to the quality of life in the City.
- Social Equity —The second goal is to ensure that all segments of the San Francisco labor force benefit from economic growth. This will require that particular attention be given to reducing the level of unemployment, particularly among the chronically unemployed and those excluded from full participation by race, language, or lack of formal occupational training.
- Environmental Quality—The third goal is to maintain and enhance the environment. San Francisco's unique and attractive environment is one of the principal reasons the City is a desirable place for residents to live, businesses to locate, and tourists to visit. The pursuit of employment opportunities and economic expansion must not be at the expense of the environment that is appreciated by all.

Marin County Countywide Plan. The Marin County Countywide Plan's Socioeconomic Element has the following applicable goals and policies (Marin County 2007a):

- Goal EC-1: Establish and maintain a diverse and sustainable local economy
  - Policy EC1.1 - Attract and Retain Businesses. Support businesses that contribute to a robust, viable, and sustainable economy, and are consistent with the goals and policies of the Marin County Countywide Plan.
  - Policy EC-1.2 - Provide Land for Commercial Enterprise. Ensure that adequate and appropriate sites suitable for commercial uses are available.
  - Policy EC-1.3 - Promote Green Business. Support businesses that utilize environmentally sound practices.
  - Policy EC-1.4 - Implement the Recommendations of the Targeted Industries Study. Continue to refine Marin County's overall economic agenda and identify specific action steps for updating and achieving the recommendations of the Targeted Industries Study.
  - Policy EC-1.5 - Consider the Impacts of Climate Change. Identify strategies to protect the economy from the impacts of sea level rise, natural disasters, and outbreaks of disease.

PUBLIC SERVICES AND UTILITIES

This section discusses existing public services and utilities within the study area that may be affected by Project construction or operation through potential service interruption, exceedance of capacity, or other effects. The study area for this resource topic is defined as the northern San Francisco waterfront region, which includes the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason); and Southern Marin County, which includes Fort Baker.

EXISTING CONDITIONS

Fire and Police Services

San Francisco Fire Department (SFFD). The SFFD provides fire protection and emergency medical services for San Francisco and portions of the GGNRA, including Fort Mason (Pier 3) and property under the jurisdiction of the Port (Piers 31½ and 41). For Port properties, the Port's Fire Marshal acts as liaison to the SFFD. Fire stations nearest to the embarkation site alternatives include Station 16 at 2251 Greenwich Street, and Station 28 at 1814 Stockton Street (City/County 2013d). The SFFD operates two fireboats in the Bay (Guardians of the City 2013), and is currently pursuing funding for a third (SFGate 2013).

Southern Marin Fire Protection District (SMFPD). Fire and emergency medical services at Fort Baker are currently provided under contract from the SMFPD, an independent special district that serves unincorporated communities in southern Marin County. The nearest SMFPD station is located at 333 Johnston Street in Sausalito, approximately 5.5 miles from Fort Baker (SMFPD 2013).

San Francisco Police Department (SFPD). The SFPD provides law enforcement services in San Francisco. Fort Mason (Pier 3) is within the northern district police station service area, while the Pier 31½ and Pier 41 alternative sites are within the central police station service area (City/County 2013e). The SFPD also maintains a Marine Unit with four to six watercrafts available for law enforcement services (SFPD 2011). The Port employs one police officer based at Pier 26 to respond to complaints and actively patrol Port property spanning from Pier 90 to Aquatic Park during daytime hours (San Francisco Planning Department 2011).

U.S. Park Police (USPP). The USPP is a unit of the Park Service, with jurisdiction in all NPS properties, including Fort Baker and Fort Mason. There is a USPP office at Fort Mason, and Fort Baker is within USPP Beat 813, which incorporates all NPS-controlled property in the Marin Headlands (San Francisco Planning Department 2011).

NPS Rangers. In addition to the USPP, police services within the GGNRA are provided by NPS Rangers. Ranger stations are located in the Presidio of San Francisco and at Fort Baker (San Francisco Planning Department 2011).

Marin County Sheriff's Department (MCSD). The MCSD Southern Substation in Marin City provides patrol service in the unincorporated areas of southern Marin County, and the Marine Patrol Unit operates two patrol boats and two personal watercrafts (Marin County 2007b, 2007c). Both the USPP and NPS Rangers provide service at Fort Baker under a memorandum of understanding with the MCSD.

USCG. The USCG is the lead federal agency for water rescue and maritime-related law enforcement services. USCG stations servicing the Project area include Station San Francisco on Yerba Buena Island and Station Golden Gate at Fort Baker (USCG 2013a, 2013b). The USCG operates 24 hours per day, 7 days per week, and 365 days per year.

Public Utilities

Water Systems. The SFPUC provides water services throughout San Francisco. Water principally comes from Sierra Nevada snowmelt stored in the Hetch Hetchy Reservoir on the Tuolumne River in Yosemite National Park, supplemented by runoff from regional watersheds. Within San Francisco, SFPUC operates ten reservoirs, seven water tanks, 17 pump stations, and approximately 1,250 miles of transmission lines and water mains (SFPUC 2011b). The Park Service owns and operates the water distribution system at Fort Mason, which is served by SFPUC pipes and reservoirs (NPS 2012e). In addition, SFPUC operates a separate and distinct water supply system only used for fire protection and known as the Auxiliary Water Supply Source, which can be supplied with salt water (City/County 2013f). Auxiliary water supply system pipelines are present throughout the northeast waterfront area of San Francisco, including at or adjacent to piers 31½, 41, and 3 (SFPUC 2012).

The Marin Municipal Water District provides potable water to Fort Baker via water mains, where it is stored on-site in a 400,000-gallon reinforced concrete storage tank and distributed throughout Fort Baker (NPS 1999).

Sanitary Sewer/Storm Drain Systems. Within San Francisco (including all potential embarkation site alternatives), wastewater and stormwater flows are conveyed, treated, and discharged via a combined sewer system operated and maintained by SFPUC. The system conveys to one of three treatment plants in San Francisco: the Oceanside Plant, the Southeast Plant, and the North Point Facility. The Oceanside and Southeast plants operate continuously, while the North Point Facility operates only when it rains. Following treatment, effluent is discharged into either the Bay or Pacific Ocean. Treated solids become biosolids for land application. Each nonrainy day, more than 80 million gallons of wastewater are collected and transported to treatment plants. This number can reach as much as 500 million gallons per day during rain events (SFPUC 2011c).

The combined sewer system includes several underground storage/transport boxes used to store stormwater and sewage for later treatment, when treatment facilities are operating at capacity. Two storage/transport boxes are located in the vicinity of the primary embarkation site alternatives: one is located beneath Marina Boulevard along the northern waterfront, adjacent to Marina Green near Pier 3; and another is located beneath The Embarcadero along the northeast waterfront near Pier 31½ and Pier 41 (SFPUC 2011d). The storage/transport boxes provide primary treatment consisting of settling and screening of floatable materials. During prolonged storm events resulting in rainfall that exceeds the system's capacity, water is discharged either into the Bay or the Pacific Ocean through one of 36 discharge points.

In the vicinity of piers 31½ and 41, a separate municipal storm sewer system provides stormwater conveyance in addition to the SFPUC combined system. Wastewater from these areas is directed to the SFPUC combined system; however, stormwater from these areas is discharged into the Bay (SFPUC 2004). Stormwater treatment units have been installed at three locations along the mid-Embarcadero: extending from Pier 15 to Pier 26, at AT&T Park parking lots, and at Pier 48 (Port 2003).

The Fort Baker area is currently served by a trunkline system consisting of catch basins, pipes, and concrete lined swales. Stormwater is gathered and conveyed via gravity flow to four major storm drain outfalls along the seawall at Horseshoe Bay (NPS 1999).

Wastewater from Fort Baker is collected via a gravity sewer system that drains to an on-site wastewater pumping station and is then conveyed via a force main to the Sausalito-Marin City Sanitary District (SMCSD) wastewater treatment plant for treatment and disposal (NPS 1999). Treated effluent is discharged 300 feet offshore at a 30-foot depth

into the Central Bay through a submerged diffuser (SMCSD 2007).

Pumpout Systems. Under existing conditions and operation by Alcatraz Cruises, sewage systems onboard the ferries are all self-contained and pump off into the SFPUC combined sewer system at Pier 33. Sewage from Alcatraz Island is collected and treated along with ferry sewage.

Solid Waste. Solid waste collection and disposal services in San Francisco are provided by Recology San Francisco. Currently, solid waste that cannot be recycled, composted, or reused is principally disposed of at the Altamont Landfill in Alameda County; there are no landfills in the City/County. By as early as 2015, solid waste may instead be diverted to Ostrom Road Landfill in Yuba County. This plan is currently under environmental review (Yuba County Planning Department 2013).

Bay Cities Refuse provides solid waste collection within unincorporated southern Marin, including Fort Baker. The majority of solid waste in Marin County is sent to Redwood Sanitary Landfill. The County recently approved an expansion of the landfill to allow operation through 2024 (Marin County Community Development Agency 2008).

Electrical and Gas Systems. Electricity and natural gas is provided to each of the primary embarkation site alternatives and Fort Baker by Pacific Gas and Electric Company (PG&E). The PG&E electrical system is a combination above- and underground system, while gas pipelines are contained underground.

REGULATIONS AND POLICIES

Federal

NPS Management Policies (9.1.5.1 – 9.1.5.4). These policies relate to the Park Service's construction and use of water supply, wastewater treatment, utility lines, and waste management systems.

Policy 9.1.5.1 calls for the Park Service to use water efficiently and sustainably by designing water systems that conserve water and the energy used in its treatment and distribution.

Policy 9.1.5.2 requires that conservation measures be considered and evaluated prior to construction of new wastewater systems or extensions, and that wastewater conveyed by any such improvements be adequately treated to meet applicable water quality standards.

Policy 9.1.5.3 requires, where feasible and practicable, NPS utility lines to be placed underground, except where such placement would cause greater damage to natural or cultural resources (such as historic structures or cultural landscapes) than alternative utility line placements.

Policy 9.1.6.1 calls for the Park Service to implement cost-effective solid and hazardous waste management practices that integrate waste reduction, and reuse and recycling programs to minimize the generation and disposal of solid and hazardous waste at and from parks.

Executive Order 13148. Executive Order 13148 was issued by the White House in April 2000 and applies to all federal facilities that interact with the environment. Under the order, the Park Service must implement an Environmental Management System to address "environmental goals, objectives, and targets." The Park Service complies with these requirements through its Climate-Friendly Parks Program, which includes park-based solutions to address energy and water use, as well as resource consumption and disposal issues.

State

Porter-Cologne Act. Under the Porter-Cologne Act, the SWRCB has the ultimate authority over state water rights and water quality policy. The SWRCB develops water quality standards and performs other functions to protect California's waters. Within the state, RWQCBs oversee water

quality at the local and regional levels. This includes issuing NPDES permits for stormwater and wastewater discharges to the Bay and ocean.

California Integrated Waste Management Act. The California integrated waste management act of 1989 required the implementation of integrated waste management plans containing source reduction, recycling, and composting components. The act establishes a statewide goal of 75% recycling, composting, or source reduction of solid waste by 2020. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less-than-significant levels. In 2006, the Per Capita Disposal Measurement System (Senate Bill 1016) established per capita disposal rates as measurements to determine if a jurisdiction's efforts are meeting the requirements of the act. These goals are implemented in San Francisco and Marin County through the San Francisco Zero Waste Policy and Marin County Zero Waste Resolution, respectively.

Local

San Francisco Department of Public Works Article 14: Underground Pipes, Wires, and Conduits, Section 670. This article grants persons, firms, or corporations the right to install, maintain, and operate pipes, wires, conduits, and connections within public streets and thoroughfares in San Francisco, as is necessary to supply inhabitants with gas and electricity for lighting, heating, and power purposes.

San Francisco Department of Public Works Article 18: Utility Facilities. Section 901, Permits – Consent. Before installing, locating or relocating any utility facility, every owner or operator of any utility facility shall file a written application with the Director of Public Works for a permit to do such work and obtain a written permit for the work as provided in article 2.4. In accepting such a permit, the permittee expressly consents to regulation by any applicable rules or ordinances.

General Plan. The General Plan Environmental Protection Element includes the following policies relevant to water supply systems:

- *Policy 5.1*—Maintain an adequate water distribution system within San Francisco
- *Policy 5.2*—Exercise controls of development to correspond to the capabilities of the water supply and distribution system
- *Policy 6.1*—Maintain a leak detection program to prevent the waste of fresh water
- *Policy 6.2*—Encourage and promote research on the necessity and feasibility of water reclamation

The plan includes the following objectives and policies relevant to wastewater and stormwater:

- *Environmental Protection Element, Policy 3.1*—Cooperate with and otherwise support regulatory programs of existing regional, state, and federal agencies dealing with the Bay, the ocean, and shorelines.
- *Environmental Protection Element, Policy 3.3*—Implement plans to improve sewage treatment and halt pollution of the Bay and the ocean
- *Community Facilities Element, Objective 10*—Locate wastewater facilities in a manner that will enhance the effective and efficient treatment of storm- and wastewater
- *Community Facilities Element, Policy 10.1*—Provide facilities for treatment of storm- and wastewater prior to discharge into the Bay or ocean. Locate such facilities according to the Wastewater and Solid Waste Facilities Plan

The plan contains the following policies relating to solid waste:

- *Objective 11*—Locate solid waste facilities in a manner that will enhance the effective and efficient treatment of solid waste
- *Policy 11.1*—Provide facilities for treatment of solid waste, and locate such facilities as shown on the Wastewater and Solid Waste Facilities Plan.

San Francisco Stormwater Design Guidelines. The SFPUC and the Port of San Francisco have developed the San Francisco Stormwater Design Guidelines, which establishes an engineering, planning, and regulatory framework for designing new infrastructure in a manner that reduces or eliminates pollutants commonly found in urban runoff. The San Francisco Stormwater Design Guidelines are currently directed primarily to San Francisco's separate storm sewer areas, such as systems in the vicinity of piers 31½ and 41.

San Francisco Zero Waste Policy. In September 2002, the San Francisco Board of Supervisors adopted ordinance 679-02, which set a goal of 75% landfill diversion by 2010. This goal was met in 2008 through the implementation of numerous programs and efforts (City/County 2013g). In 2003, a renewed goal of zero waste to landfill by 2020 was adopted with the passing of resolution 002-03-COE by the San Francisco Commission on the Environment. The resolution directs the Department of the Environment to develop policies and programs to achieve zero waste, including increasing producer and consumer responsibility, so that all discarded materials will be diverted from landfill through recycling, composting, or other means.

San Francisco Construction and Demolition Waste Ordinance. In 2006, the City adopted ordinance No. 27-0635, mandating the recycling of construction and demolition debris. This ordinance affects all construction projects and requires the building permit holder or the property owner to ensure that all construction and demolition materials removed from the Project are properly recycled. It prohibits any construction and demolition materials from being placed in trash or sent to a landfill and requires that they be separated at the construction site and taken to a facility for reuse or recycling. The ordinance requires that all mixed construction and demolition debris be transported off-site by a registered transporter and taken to a registered facility that can process mixed debris.

San Francisco Green Building Ordinance. In 2008, San Francisco enacted Green Building Requirements that require sufficient space be provided for recycling, composting, and trash storage, collection, and loading, and sufficient quantity and type of containers to be compatible with current methods of collection (1304C.0.4 Solid waste).

San Francisco Mandatory Recycling and Composting Ordinance. In order to meet the San Francisco goal of zero waste by 2020, the mandatory recycling and composting ordinance requires that owners or managers of food establishments or events maintain convenient labeled containers for recyclables, compostables, and trash. Employees and contractors must be educated on what materials go in each container.

Marin County Countywide Plan. The Marin County Countywide Plan Community Facilities Element includes the following policies relevant to water, wastewater, stormwater, and solid waste utility systems:

- Policy PFS-2.1 requires the conservation of water and utilization of sustainable sources
- Policy PFS-2.3 requires that water resources be managed sustainably
- Policy PFS-4.1 requires the reduction of solid waste
- Policy PFS-4.b requires implementation of the construction and demolition waste ordinance to divert construction waste from landfills

Marin County Zero Waste Resolution. In 2007, The County of Marin approved a zero waste resolution to adopt the goal of 80% landfill diversion by 2012, and a zero waste goal by 2025. Diversion rates for 2006 were 72%, up from 32% in 1995.

HAZARDOUS MATERIALS

This section discusses the potential presence of hazardous materials in the Project area that may be encountered during Project construction or operation and may potentially result in health and safety hazards for construction workers, the public, and the environment. The study area for this resource topic is defined as the areas within and adjacent to the three embarkation site alternatives (Pier 31½ on the Embarcadero, Pier 41 at Fisherman's Wharf, and Pier 3 at Fort Mason), and the Fort Baker area in southern Marin County.

EXISTING CONDITIONS

Regional Setting

Fisherman's Wharf and The Embarcadero were once highly industrialized areas supporting railyards, fuel terminals, shipyards, and tanneries. In addition, much of the San Francisco shoreline is made up of imported fill, consisting of soil and debris from the 1906 earthquake, which potentially contains lead and other hazardous materials. Because of potential public and worker health exposure, the San Francisco Board of Supervisors adopted the Maher ordinance (Article 22A of the San Francisco health code) in 1986, which requires soil analysis for a specified list of inorganic and organic chemicals at construction sites where: 1) at least 50 cubic yards of soil are disturbed; 2) there is construction on the Bay side of the historic high-tide line; or 3) there is reason to believe that hazardous waste may be present. The Fisherman's Wharf and Embarcadero areas are listed as Maher sites, which denote that they are areas of known historical landfill with a high likelihood of contamination (DPH 2013).

Fort Mason was formerly owned and used by the U.S. Department of Defense and is listed in the Formerly Used Defense Site (FUDS) database as a hazardous, toxic, and radioactive waste site with possible soil and groundwater contamination (USACE 2011b). It is also listed on the San Francisco RWQCB-maintained Geotracker and EnviroStor databases as a military cleanup Site and active state response site (DTSC 2007, 2013). Fort Mason is part of the Defense Environmental Restoration Program, and a Site Investigation Work Plan has been prepared to identify hazardous materials on site and guide remediation activities as necessary.

Fort Baker has a similar history of former use by the U.S. Department of Defense. It is listed in the FUDS database as both a hazardous, toxic, and radioactive waste site, and a military munitions response program site (USACE 2011b). The U.S. Army is the lead agency conducting the investigation and cleanup of areas at Fort Baker contaminated by hazardous materials as a result of military operations. During the site investigation of Fort Baker, eight areas were identified with elevated soil concentrations of polycyclic aromatic hydrocarbons (PAHs), pesticides, metals, and petroleum hydrocarbons. Of the eight areas, four have been recommended for advancement to a remedial and feasibility investigation. These areas include the storm drain system, Horseshoe Bay, a petroleum tank site near Building 637, and a concrete basin near Building 407. The four remaining areas (an engine repair shop, a small paint shed, soil beneath the deck of the historic boat shop, and the vehicle wash rack adjacent to Building 691) have been cleaned up. Underground storage tanks likely remain throughout Fort Baker, which may have started leaking into the surrounding soils (NPS 2009a).

Hazardous Materials within the Study Area

The term "hazardous material" is defined in the state's health and safety code (chapter 6.95, section 25501[o]) as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a

significant present or potential hazard to human health and safety or to the environment. Within the study area, hazardous materials may be present within building materials, structures, or soils underlying the sites and may be exposed during construction. Table 32 presents an overview of hazardous materials that may be encountered in the study area during construction and operations.

TABLE 32. POTENTIAL HAZARDOUS MATERIALS IN THE STUDY AREA

Hazard		Human Health Effects
PAHs	PAHs include a group of approximately 10,000 chemical compounds, including benzo(a)pyrene, benzanthracene, benzo(b)fluoranthene, fluoranthene, and naphthalene.	Certain PAHs may be carcinogenic, mutagenic, or teratogenic (interfere with embryonic development).
Heavy Metals	The term 'heavy metals' refers to any metallic chemical element that has a relatively high density and is toxic or poisonous at low concentrations. Examples of heavy metals include mercury, cadmium, arsenic, chromium, thallium, and lead.	Heavy metal toxicity can result in damaged or reduced mental and central nervous system function, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs. Long-term exposure may result in slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease, Parkinson's disease, muscular dystrophy, and multiple sclerosis, and repeated long-term contact may also cause cancer.
VOCs	VOCs are emitted as gases from certain solids or liquids. Examples include: paints and lacquers, paint strippers, cleaning supplies, and pesticides.	Many VOCs are irritants and can cause headaches, eye, nose, and throat irritation, and dizziness. Long-term exposure to certain VOCs may lead to chronic diseases or cancer. At high concentrations, some VOCs are toxic.
PCBs	PCBs belong to a broad family of manmade organic chemicals known as chlorinated hydrocarbons that were banned in 1979.	PCBs have been demonstrated to cause cancer, as well as a variety of other adverse health effects on the immune system, reproductive system, nervous system, and endocrine system.
Asbestos	Asbestos is a common name for a group of naturally occurring fibrous silicate minerals that are made up of thin but strong, durable fibers.	Asbestos is a known carcinogen and presents a public health hazard. The prolonged inhalation of asbestos fibers can cause lung diseases such as asbestosis, mesothelioma, and lung cancer.
Lead	Lead is a heavy metal.	Depending on the level of exposure, lead can cause a range of human health effects, including nervous system damage, stunted growth, kidney damage, delayed development, and reproductive problems.
Mercury	Mercury is a naturally occurring element.	For fetuses, infants, and children, the primary health effect of mercury is impaired neurological development. For adults, mercury exposure can result in impairment of the peripheral vision; disturbances in sensations; lack of coordination of movements; impairment of speech, hearing, and walking; and muscle weakness.

Hazard		Human Health Effects
Creosote	Creosote is a mixture of hundreds of chemicals. The major chemicals in creosote are PAHs, phenol, and creosols.	Longer exposure to small amounts of creosote over time, by direct skin contact or by contact with creosote vapors, may cause damage to the skin or eyes. Exposure to creosote vapors can irritate the lungs. The USEPA has determined that coal tar creosote is a probable human carcinogen
Di(2-ethylhexyl)phthalate (DEHP)	DEHP is a chemical compound used as a plasticizer in polyvinyl chloride (PVC) polymers.	USEPA has classified DEHP as a probable human carcinogen. The state of California has listed DEHP as a reproductive toxicant.

Notes:
Sources:
USEPA Air Quality Guidelines http://www2.epa.gov/learn-issues/learn-about-air
USEPA Chemicals and Toxics http://www2.epa.gov/learn-issues/learn-about-chemicals-and-toxics
California Office of Health and Hazards Assessments http://www.oehha.ca.gov/prop65/law/dehpmadl.html

Hazardous Materials in Soils. Hazardous materials in soils may be encountered during construction. As described in the "Geology, Soils, and Seismicity" section of this chapter, piers 31½, 41, and 3 are located in areas mapped as artificial fill, consisting of sands, silt, clay, and manmade debris. Fill in these areas is commonly composed of debris from structures destroyed during the 1906 fire and earthquake, including hazardous materials associated with industrial buildings (San Francisco Planning Department 2011). As a result, fill underlying the San Francisco waterfront, which includes the study area, commonly contains PAHs, heavy metals, oil and grease, and VOCs.

Hazardous Building Materials. Hazardous building materials may be encountered as a result of demolition or renovations to existing structures at the alternative sites. Certain existing structures may contain hazardous materials including asbestos, lead-based paint, PCBs, DEHP, mercury, and creosote. Piers and buildings in the study area were generally constructed prior to the 1960s, when relevant hazardous material regulations were implemented. As such, hazardous building materials have the potential to be present in the study area, including but not limited to asbestos, lead, PCBs, and creosote.

Table 33 presents site-specific information regarding such materials. This information was obtained through review of regulatory databases and available information.

TABLE 33. SITE-SPECIFIC INFORMATION REGARDING HAZARDOUS BUILDING MATERIALS

Site	Excavated Soils (PAHs, heavy metals, oil and grease, VOCs)	Building Improvements (asbestos, lead-based paint, PCBs, DEHP, mercury, creosote)
Pier 31½	Artificial fill underlying Pier 31½ may contain PAHs, heavy metals, oil and grease, and VOCs	Older buildings on site may contain may contain asbestos, lead-based paint, and PCBs; potential for creosote on pier structures
Pier 41	Artificial fill underlying Pier 41 may contain PAHs, heavy metals, oil and grease, and VOCs	Older buildings on site may contain may contain asbestos, lead-based paint, and PCBs; potential for creosote on pier structures
Pier 3	Former Department of Defense facility; Artificial fill underlying Pier 3 may contain PAHs, heavy metals, oil and grease, and VOCs	Older buildings on site may contain may contain asbestos, lead-based paint, and PCBs; potential for creosote on pier structures
Fort Baker Area	Former Department of Defense facility; known soil contamination and potential underground storage tanks	Older buildings on site may contain may contain asbestos, lead-based paint, and PCBs; potential for creosote on pier structures

REGULATIONS AND POLICIES

Construction activities and operation of ferries at the ferry embarkation site will require compliance with a number of federal, state, and local regulations to support public health and safety and environmental protection. This includes handling, transport, and disposal of hazardous materials. State and local agencies often have either parallel or more stringent rules than federal agencies. In most cases, state law prevails over federal law, and enforcement of these laws is the responsibility of the state or a local agency to which enforcement powers are delegated.

Federal

Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act). The community right-to-know act imposes requirements for responding to chemical accidents and providing information about chemical hazards by establishing criteria for identifying, packaging, and labeling hazardous wastes; prescribing management of hazardous waste; establishing permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identifying hazardous wastes that cannot be disposed of in landfills. In California, this act is administered by the California Department of Toxic Substances Control (DTSC).

Resource Conservation and Recovery Act of 1976 (RCRA) and Hazardous and Solid Waste Act. The RCRA directs the USEPA to establish controls on the management of hazardous wastes from their point of generation through transportation and treatment, storage, and disposal. The program exacts stringent recordkeeping and reporting requirements on generators, transporters, and operators of treatment, storage and disposal facilities handling hazardous waste. RCRA was amended in 1984 to include the hazardous and solid waste act, which affirmed and extended the "cradle to grave" system of regulating hazardous waste and specifically prohibits the use of certain techniques for the disposal of some hazardous wastes.

Occupational Safety and Health Act of 1970 (OSHA). OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries.

Toxic Substances Control Act The toxic substances control act regulates the use and management of PCBs in electrical equipment and sets forth detailed safeguards to be followed during the disposal of such items.

State

CCR Title 26. Regulations for the movement of hazardous materials in California are contained in title 26 of the CCR. Federal and state regulations related to hazardous materials are enforced by the California Highway Patrol (CHP) and the California Department of Transportation (CALTRANS). The CHP enforces labeling and packing requirements through vehicle inspections and shipping documents, and by issuing hazardous material carrying licenses. CALTRANS is responsible for cleanup response in the event of a spill.

California Occupational Safety and Health Act (Cal-OSHA) Regulations (8 CCR). In California, workplace safety regulations are developed and enforced by Cal-OSHA. Cal-OSHA regulations mandate accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Hazard communication program regulations require appropriate labeling and communication of hazardous substances and their handling, including preparation and the availability of Materials Safety Data Sheets.

Asbestos Regulations. Projects with potential asbestos hazards are subject to approval from several agencies in California, including the BAAQMD, Cal-OSHA, and the DTSC. The BAAQMD is vested with the authority to regulate airborne pollutants, including asbestos, and must be notified prior to any demolition or abatement work. Under section 19827.5 of the California health and safety code, demolition or alteration permits cannot be issued until the applicant has demonstrated compliance with these notification requirements. Cal-OSHA must also be notified of asbestos abatement, and contractors must follow applicable state regulations contained in 8 CCR 1529 and 8 CCR 341.6 through 341.14. Asbestos removal contractors must be appropriately licensed. DTSC is responsible for issuing a Hazardous Waste Generator Number for asbestos abatement projects, which may also require a

Hazardous Waste Manifest for transport and disposal of asbestos containing materials.

Creosote-treated Materials. As the state agency responsible for enforcing federal regulations related to hazardous materials, DTSC has developed management standards for creosote-treated piles and structures. These standards, contained in Title 22 of the CCR, Division 4.5, Chapter 34, regulate the storage, transport, and disposal of creosote-treated waste. In accordance with these standards, contractors who handle or come into contact with creosote-treated waste must be appropriately trained. Reuse of creosote-treated piles and materials are generally not allowed, with limited exemptions.

Local

San Francisco Health Code. The San Francisco health code includes a series of regulations that address potential effects of hazardous materials present in soils and hazardous building materials. Article 21 of the code requires certification of registration and implementation of a hazardous materials business plan for any persons or businesses that handle, sell, store, or otherwise use specified quantities of hazardous materials. Under Article 21A, such persons or businesses must register with the San Francisco Department of Public Health (DPH) and prepare a Risk Management Plan. Article 22 addresses the handling of hazardous wastes in the City, and authorizes DPH to implement state hazardous waste regulations. In addition, Article 22A (Maher ordinance) mandates that projects located bayward of the historic high tide line, which includes piers 3, 31½, and 41, must include preparation of a site history report to identify potential on-site contamination. If contamination is identified, a Site Mitigation Plan must be prepared. Upon completion of site mitigation, the site owner must submit certification that the project has received certification or verification for the appropriate state or federal agency that mitigation is complete.

San Francisco Building Code Section 3425. San Francisco building code section 3425 addresses potential hazards associated with lead-based paint by requiring specific notification and work standards. According to section 3425, all buildings originally constructed prior to 1979 are presumed to have lead-based paint on their surfaces, unless proven otherwise. During construction on said structures, contamination from lead-based paint must be avoided to the maximum extent possible, including adherence to stringent cleanup standards. Furthermore, written notice of project activities must be provided to the San Francisco Department of Building Inspection, in addition to signage and other notification procedures.

Environmental Consequences

INTRODUCTION

The chapter presents the analyses of potential resource-specific environmental consequences, or impacts, of the No Action and action alternatives, including the Project elements that are common to all action alternatives.

This section introduces the general methodology (and terminology) used to assess impacts, as well as the approach used to assess cumulative impacts. Resource-specific impact assessment methodologies are presented in subsequent "Environmental Consequences" sections.

GENERAL METHODOLOGY FOR ASSESSING IMPACTS

Potential impacts are generally described in terms of context, duration, intensity, and type, which are generally defined below, as appropriate.

Context describes the area or location (site-specific, local, parkwide, or regional) in which the impacts would occur. The following resource-specific sections define the appropriate study area for each analysis.

Duration describes the length of time that an impact would occur, either short- or long-term. Short-term impacts are those caused by construction activities (from the start to the end of the construction period) or short-term changes in operations, and impacted resources would return to or resume their previous conditions following these activities. Long-term impacts would last well beyond the construction period or the operational change, and impacted resources may not resume their previous condition.

Intensity describes the degree, level, or strength of an impact. Intensity levels can be categorized as follows:

- Negligible: The impact would occur at or below the lowest levels of detection
- Minor: The impact would be slight, but detectable
- Moderate: The impact would be readily apparent
- Major: The impact would be substantial

Impact types can be either beneficial or adverse. A beneficial impact would be a positive change in the condition of the resource or a change that would move a resource toward a desired condition. An adverse impact would be a change that would move the resource away from a desired condition or would detract from its condition.

NPS policy and NEPA also require that direct and indirect impacts be considered, but not specifically identified. A direct impact would occur at the same time and place as the action. An indirect impact would be caused by an action but would be later in time or farther removed in distance, but would still be reasonably foreseeable within the general vicinity of the study area.

APPROACH TO ANALYZING IMPACTS OF THE NO ACTION ALTERNATIVE

While any pier on the San Francisco waterfront that is within a reasonable crossing time from Alcatraz Island and that has adjacent departure, ticketing, and visitor assembly facilities could feasibly become the ferry embarkation site under the No Action Alternative, the existing site at Pier 31½ is used as a surrogate (or representative set of conditions) for the No Action Alternative, for the purposes of analyzing impacts of this alternative in the EIS. For more information, see the discussion in the Alternatives chapter.

APPROACH TO PROPOSING MITIGATION

Where typical or feasible mitigation measures could be identified to reduce impacts—regardless of intensity, duration, or type—caused by the alternatives under evaluation, the Park Service has proposed undertaking such mitigation measures. This conservative approach ensures that all impacts are mitigated to be as minimal as feasible in all instances. A table summarizing all mitigation measures proposed in this Draft EIS is included at the end of this chapter.

CUMULATIVE IMPACT SCENARIO

The CEQ regulations that implement the provisions of NEPA require that cumulative impacts be assessed in the decisionmaking process for federal projects. Cumulative impacts are defined by the CEQ regulations as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. DO-12 states that, "a complete picture of forces already acting upon a particular environmental resource is essential in making reasonable decisions about the management of that resource."

Cumulative impacts can result in unintended adverse environmental effects despite efforts to mitigate for individual actions' specific direct and indirect impacts. The purpose of a cumulative impacts analysis is thus to identify the potential for incremental increased environmental effects caused by a series of actions.

Similar to the scope of analysis for the Project, the geographic boundaries used for the cumulative impacts analyses vary by resource. In general, the scopes of the cumulative impact analyses are consistent with the study areas defined for each resource. The cumulative impact analyses include consideration of the past, present, and reasonably foreseeable future actions listed in Table 34 and shown on Figure 37. These actions were identified based on their potential to be connected and similar to the Project in terms of construction and operations. Cumulative impacts were then evaluated by comparing the impacts of the alternatives under evaluation, including the No Action Alternative, with those of the past, present, and reasonably foreseeable future actions identified in Table 34.

In this chapter, resource-specific cumulative impact analyses are presented alongside an alternative's direct and indirect impacts. The analyses do not specifically call out each action in Table 34 unless the impacts of the alternative under evaluation, combined with those of the action, result in a cumulative impact. The consistency with plans and policies for each alternative is described in the "Land Use" section of this chapter.

TABLE 34. CUMULATIVE SCENARIO ACTIONS: PAST, PRESENT, AND FUTURE

Action Name	Summary
Past Actions	
Pier 2 Improvements (Fort Mason Center)	The Fort Mason Center completed seismic upgrades to the substructure of Pier 2 in 2005, and in 2011, they constructed additional improvements, including exterior repairs, seismic retrofit, solar panel installation, building efficiency upgrades, and interior renovations to create a new theater, event space, and pavilion.
Fort Mason Center Parking (Fort Mason Center)	In 2006, the Fort Mason Center implemented paid parking for the Lower Fort Mason parking lot.
Exploratorium Science Museum (Port)	The Exploratorium Science Museum relocated from the Palace of Fine Arts to Piers 15 and 17 in April 2013. Significant upgrades to the piers' structures were completed to accommodate the development, including removal of infill between piers, seismic retrofit, and installation and repair of pier piles (Woolsey 2013).
34th America's Cup, James R. Herman Cruise Terminal and Northeast Wharf Plaza (City/County)	The 34th America's Cup included a series of international sailing events hosted by the City/County in 2013. The James R. Herman Cruise Terminal and Northeast Wharf Plaza, an approximately 2.5-acre public open space located along the west end of Pier 27, was constructed in association with the 34th America's Cup (San Francisco Planning Department 2011). The America's Cup was held in September 2013.
Pier 43 Promenade (Port)	In 2012, approximately 400 feet of shoreline and associated seawalls at the Pier 43 Promenade were repaired to provide a pedestrian promenade over the water, as well as other sidewalk improvements (Port 2012).
Bay Trail at Fort Mason (NPS)	In 2010, a heavily used 500-foot length of the Bay Trail near the intersection of Laguna Street and Marina Boulevard was widened to improve pedestrian and bicyclist traffic flow.
Present Actions	
Fort Mason Center Long-term Lease (NPS)	This lease shifted responsibility for preservation and maintenance of Lower Fort Mason (excluding the substructures of the piers and Building E) from the Park Service to the Fort Mason Center in 2003. The lease includes terms and conditions for management of the site, including Pier 3 (NPS 2004b). The lease includes provisions for public access.
Fort Baker Plan (NPS)	This plan was developed to guide rehabilitation and upgrades to more than 28 buildings in Fort Baker, and to provide the policies by which the site is managed. Specific improvements resulting from the plan that have been completed include establishment of the Cavallo Point Lodge and the Institute at the Golden Gate, as well as waterfront improvements and habitat restoration (NPS 1999).
Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan (NPS)	This plan involves improving multimodal connections between Marin Headlands and Fort Baker by improving roadway surfaces and configurations, drainage structures, directional signage, and safety. Completed in 2011, Phase 1 included the rehabilitation of Upper Conzelman, Lower Conzelman, McCullough, and East roads, as well as several parking areas, trails, and drainage features. Currently under construction, Phase 2 includes the reconstruction of Bunker, Mitchell, Old Bunker, and Field roads, the Alexander Avenue and West Bunker Road intersection, and several parking lots (NPS 2009b).

Action Name	Summary
Ongoing Maintenance Dredging of Port Piers (Port)	The Port conducts regular maintenance dredging of its piers between Fisherman's Wharf and Pier 96. The existing maintenance dredging contract covers dredging and disposal of more than 900,000 cubic yards of dredged sediment between 2011 and 2015 (Port 2013).
Central Subway (SFMTA)	The Central Subway extension would provide a 1.7-mile extension of Muni's T-Third Street Line from the intersection of Fourth and King streets into Union Square and Chinatown. Construction is currently underway, with the extension slated to open in 2019 (SFMTA 2013a).
Transbay Transit Center (Transbay Joint Powers Authority [TJPA])	The Transbay Transit Center project replaces the current Transbay Terminal at First and Mission streets in San Francisco with a modern regional transit hub connecting eight Bay Area counties through existing and planned bus and rail systems. Construction is underway and is expected to be complete in 2017 (TJPA 2013).
Transit Effectiveness Project (SFMTA)	This ongoing project aims to improve service reliability, reduce travel time on transit, and improve customer experiences and service efficiency by instituting changes to Muni service frequencies, service hours, route alignments, and vehicle capacity. The Draft EIR was released in September 2013 (SFMTA 2013b).
Reasonably Foreseeable Future Actions	
Municipal Pier Rehabilitation Project (NPS)	The Municipal Pier at Aquatic Park requires upgrades to address extensive deterioration. Repairs would entail removal or replacement of timber piles, severed pier piles, and wave baffle batter piles. Construction of this project is not currently scheduled.
Extension of F-Line Streetcar Service to Fort Mason Center (SFMTA)	This project would provide streetcar service to Fort Mason Center by lengthening the historic F-Line streetcar from Fisherman's Wharf. The extension includes street-running segments, a tunnel segment, transition zones, and a turnaround segment. The Final EIS was released in February 2012, but construction of the project is not scheduled due to funding constraints (NPS 2012e).
E-Embarcadero Historic Streetcar Line (SFMTA)	SFMTA is exploring options for running historic streetcar services from the Caltrain Terminal to Fisherman's Wharf. These services were temporarily provided during the 34th America's Cup in 2013.
Van Ness Avenue Bus Rapid Transit (SFMTA)	In September 2013, the SFMTA approved the BRT project on Van Ness Avenue. Dedicated BRT lanes would extend 2 miles along Van Ness Avenue, from Lombard Street to Mission Street, with service ending five blocks before the proposed Historic Streetcar alignment. Construction is scheduled to begin in 2015 for start of service in 2018 (San Francisco County Transportation Authority 2013).
Downtown San Francisco Ferry Terminal Expansion Project (WETA)	The Downtown San Francisco Ferry Terminal Expansion Project would include construction of up to three new ferry gates and additional amenities at the Ferry Building's WETA ferry terminal to accommodate existing and future users. These improvements would support WETA projects currently in the planning phase, including providing new ferry service to Richmond, Berkeley, Treasure Island, Hercules, Redwood City, Martinez, and Antioch (WETA 2013a).

Action Name	Summary
Central Bay Operations and Maintenance Facility Project (WETA)	WETA's Central Bay Operations and Maintenance Facility project would provide a Central Bay base for WETA's ferry fleet. The project, which is in the planning phase, would construct a multistory storage building and a system of floating gangways and docks near Pier 3 at Alameda Point (WETA 2013b).

Notes:
BRT = bus rapid transit
TJPA = Transbay Joint Powers Authority

FIGURE 37
CUMULATIVE SCENARIO ACTIONS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

LAND USE

METHODOLOGY AND THRESHOLDS

Impacts on land use were qualitatively evaluated based on the consistency of each alternative with applicable federal, regional, and local land use regulations described in the "Land Use" section in the "Affected Environment" chapter.

The measurement index used to evaluate land use impacts was consistency with applicable regulations, based on the proposed alternatives' locations. An alternative would be considered to have a major impact if it is inconsistent with applicable regulations and policies.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

The Port's Waterfront Plan (Port 2004) defines acceptable and unacceptable maritime, open space/public access, and commercial uses along the City's northeast waterfront, which includes Pier 31½. The allowable uses at this site include maritime support services, ferry operations, museums (including educational interpretive exhibits), visitor services, and accessory commercial services (i.e., retail and food), as well as other uses.

Without modifications to the existing basic infrastructure or facility operations, land uses under the No Action Alternative would remain consistent with the applicable federal, regional, and local land use plans and policies summarized in Table 5. Key to Port (Port 2004) and BCDC (BCDC 2005, 2010, 2012) objectives, the alternative would continue to provide visitors access to the waterfront, along with some educational interpretive exhibits focused on the Bay. The alternative would remain compatible with the City's current zoning designation (light industrial) for this area.

It is important to note that implementation of this alternative would require renewal of a lease with the Port, and as such, there are uncertainties associated with future site control, operations, and facility enhancements that have the potential to change public uses of the land. It is assumed that the No Action Alternative would be required to remain consistent with applicable land use regulations and current use of the site. Accordingly, impacts on land use would be unchanged under the No Action Alternative.

Cumulative Impact Analysis

Because the No Action Alternative would be unchanged from present land use conditions, its incremental contribution to cumulative impacts related this resource would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The No Action Alternative would result in no land use impacts.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative includes retrofit of existing structures and establishment of long-term ferry service and embarkation site

operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 31½ Alternative proposed land uses would include enhanced maritime support services, ferry operations, museums (including educational interpretive exhibits), visitor services, accessory commercial services (i.e., retail and food), and general offices. The public access and open space along the Embarcadero and directly adjacent to the site would remain unchanged, except for the addition of a dropoff area for persons with disabilities and tour buses.

The Port's Waterfront Plan (Port 2004) suggests that new activities along the northeast waterfront should, "appeal to the local and regional population, thereby providing entertainment and commercial recreation venues distinctly different from the more tourist-oriented activities in Fisherman's Wharf." Because the proposed uses of the Alcatraz ferry embarkation experience would primarily attract tourists, this alternative is unlikely to support this specific goal. However, the additional third berth and associated potential to offer service to other GGNRA sites would increase opportunities for public use and enjoyment of the Bay (a key goal for governing agencies like BCDC), and the enhanced commercial services would support plans for the northeast waterfront (piers 7 through 35; Port 2004), especially for local passersby, which suggests that commercial activities, "establish a daytime and nighttime presence" and "be expanded wherever possible." The alternative would remain compatible with the City/County's current zoning designation (light industrial) for this area.

Implementation of this alternative would require a renewed lease with the Port, similar to the No Action Alternative. As such, there would be uncertainties associated with future site control, operations, and facility enhancements that could affect public uses of the land. It is assumed that this alternative would be required to remain consistent with applicable land use plans and policies.

Construction activities required to implement the alternative would comply with City/County ordinances, and would be limited to the smallest areas feasible, although temporary disturbance to existing land uses in the area could occur. As such, there would be no impacts on land use as a result of the Pier 31½ Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would be consistent with applicable land use regulations, its incremental contribution to cumulative land use impacts would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in no land use impacts.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expanding the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 41 Alternative's proposed land uses include maritime support services, ferry operations, museums (including educational interpretive exhibits), visitor services, open

space, accessory commercial services (i.e., retail and food), and general offices.

Under the Port's Waterfront Plan, most of the proposed uses under this alternative would be unacceptable at this site (Port 2004). The plan specifically calls for maintaining Pier 41 as a fishing platform. However, the plan also recognizes and encourages new educational activities, historical and recreation facilities, and places of public assembly that would increase the appeal of Fisherman's Wharf to local residents, since, "visitor-serving facilities and services [in addition to fishing industry activities] are key to the continued success of the Wharf." The land uses proposed by the Pier 41 Alternative would likely serve as an important resource for attracting visitors to the area, thereby strengthening public awareness of the Wharf's prized fishing industry. BCDC recognizes that different types of compatible public and commercial recreation facilities should be clustered, to the extent feasible, to, "provide a greater range of choices for users" (BCDC 2012). While the proposed stretch of shared public space under this alternative (extending from the indoor/outdoor program area to the historic Pier 43 Ferry Arch) would include new educational exhibits and rest areas, there could still be opportunities for public recreational fishing. The alternative would remain compatible with the City/County's current zoning designations (commercial business/public use) for this area.

Similar to the Pier 31½ Alternative and the No Action Alternative, implementation of this alternative would require a renewed lease with the Port. As such, there are uncertainties associated with future site control, operations, and facility enhancements that could affect public uses of the land. It is assumed that this alternative would be required to remain consistent with applicable land use plans and policies.

Construction activities required to implement the alternative would comply with City/County ordinances, and would be limited to the smallest areas feasible, although temporary disturbance to existing land uses in the area could occur. As such, there would be no impacts on land use as a result of the Pier 41 Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 41 Alternative would be consistent with applicable land use regulations, its incremental contribution to cumulative land use impacts would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in no land use impacts.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative includes improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 3 Alternative's proposed land uses include maritime support services, ferry operations, museums (including educational interpretive exhibits), visitor services, open space, accessory commercial services (i.e., retail), and general offices in Lower Fort Mason. These proposed land uses would generally be consistent with the Fort Mason Center long-term lease, as well as the Fort Mason Foundation's mission statement. This alternative would support the Fort Mason Foundation's goals for Pier 3 shed rehabilitation, utility infrastructure upgrades,

and new facilities standards for interior and exterior improvements.

However, because this alternative would use a portion of the Pier 3 building for embarkation operations, it would affect the Festival Pavilion (currently a meeting space for large events). The remaining portion of the building would be available for compatible use(s), which could potentially include a reduced-size event meeting space. The Herbst Pavilion at Pier 2 would also remain a viable event meeting space.

Portions of the Pier 3 design program have the potential to conflict with the Fort Mason Center's current long-term public realm strategy, which intends to make the campus more pedestrian oriented by limiting vehicular access north of Buildings A, B, C, D, and E. As part of the Pier 3 Alternative, the shuttle would travel between Buildings C and D to area north of Buildings D and E to the embarkation site. Shuttle operations would be coordinated with the Fort Mason Center to ensure that the impacts are minimized.

No Project components are proposed in Upper Fort Mason as part of this alternative. While this alternative could result in increased pedestrian traffic in portions of Upper Fort Mason, the increases are not anticipated to conflict with the management zones outlined in the 2013 GMP.

Construction activities required to implement the alternative would be limited to the smallest areas feasible, although temporary disturbance to existing land uses in Lower Fort Mason could occur. The Park Service would strive to comply with City/County ordinances. As such, there would be no impacts on land use as a result of the Pier 3 Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 3 Alternative would be consistent with applicable land use regulations, its incremental contribution to cumulative land use impacts would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 3 Alternative would result in minor land use impacts.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprises the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to land use that would occur as a result of the Pier 31½ and Pier 41 alternatives would be consistent with those of the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element includes retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. The proposed improvements at the Fort Baker pier would

propose land uses including maritime support services, ferry operations, educational interpretive exhibits, and visitor services.

Implementing special ferry service at Fort Baker is consistent with the general goals of the governing Fort Baker Plan (NPS 1999), meeting key objectives such as future uses, pier improvements, and constructing a ferry landing. While the plan does not explicitly detail future implementation of ferry service at the existing pier, it does identify it as part of the regional water transit initiative that is beneficial for both visitors and employees. It should be noted that Park Service responses to comments on the *Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan* (NPS 2009a, 2009b) identified ferry service at Fort Baker as a potential future or cumulative project. The 2009 plan also states that the Park Service's current site presence and visitor services (described as confusing and "inadequate") need improvements, many of which could be provided by this Project element. The alternative would remain compatible with the County of Marin's current zoning designation (open space) for this area.

Implementation of this Project element would restrict existing water-based activities at the pier, like fishing and private boat launching. However, full public access to the beach would remain available, and the site would remain consistent with the objectives of the Park Service's Fort Baker Plan (NPS 1999).

Construction activities required to implement this Project element would be limited to the smallest areas feasible, although temporary disturbance to existing land uses in the area could occur. As such, the impacts on land use from completing improvements to the Fort Baker pier would be negligible.

Cumulative Impact Analysis. Because implementing the Fort Baker special ferry service would be consistent with applicable land use regulations, its incremental contribution to cumulative land use impacts would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Implementing the Fort Baker special ferry service would result in no land use impacts.

TRANSPORTATION AND CIRCULATION

METHODOLOGY AND THRESHOLDS

The methodology for assessing transportation and circulation impacts compared conditions of the alternatives under evaluation to baseline conditions using specific significance thresholds. The proposed measurement indices (i.e., significance thresholds) used to evaluate impacts to these topic areas are based on an alternative's consistency with applicable regional and local regulations and guidance.

The potential transportation and circulation impacts of each alternative were based on the indices described in the following paragraphs.

Traffic

The measurement index used to evaluate traffic impacts is change in intersection LOS. An alternative would be considered to have a major impact to a signalized intersection if it would cause intersection LOS to change from LOS D or better to LOS E or LOS F, to change from LOS E to LOS F, or it would contribute a substantial number of vehicle trips to intersections already operating at LOS E or F. Changes to unsignalized intersections are also considered major if the above criteria are met and peak hour traffic signal warrant criteria are also met. In addition to analyzing intersection impacts, the transportation study also addresses regional changes.

Near-term (project commencement) operating conditions for each of the alternatives are based on the existing conditions as shown in Table 35.

Travel demand forecasts for the alternatives were developed based on visitor forecasts provided by the Park Service, a survey conducted of existing visitors to Alcatraz to better understand their travel behavior and how it might change if the location of the embarkation facility changed, and knowledge of the study area.

The transportation analysis was conducted for existing and future year "Cumulative" 2035 conditions with and without the proposed alternatives (Table 36). Existing plus Project conditions assess the near-term impacts of the potential alternatives, while Year 2035 cumulative conditions assess the long-term impacts of the alternatives in combination with other reasonably foreseeable developments. Year 2035 represents the long-term horizon year and was selected as the future analysis year to be consistent with available long-range population and employment growth projections. Use of this horizon year is consistent with other recent transportation and environmental analyses conducted in San Francisco, including the *34th America's Cup and James R. Herman Cruise Terminal and Northeast Wharf Plaza Final EIS* (Port 2011a), which examined many of the same transportation facilities analyzed in this document. Long-term operating conditions for the No Action Alternative are based on forecasted future volumes in the study area from the City's travel demand forecasting model, plus the effect of visitor flow management strategies on Alcatraz Island that could increase visitor levels by 20%.

The forecasts for the No Action Alternative assume that the embarkation facility would remain in its existing site. Although it is possible that the site could move in the future under the No Action Alternative, it would be speculative to forecast long-term operating conditions at an alternative site because no specific alternative sites have been identified beyond those discussed in this document.

Future year 2035 conditions were developed via a two-step process that did the following:

- Used the City/County's travel demand model, the San Francisco Chained Activity Modeling Process (SF-CHAMP) to determine background traffic growth on study area roadways
- Overlaid traffic volume to reflect traffic volume turning movements associated

with developments that are not fully reflected in the SF-CHAMP model output.

Year 2035 traffic volume forecasts were estimated based on cumulative development and growth, as well as the planned transportation and infrastructure projects, using the SF-CHAMP model. The SF-CHAMP model is an activity-based travel demand model that has been validated to represent future transportation conditions in the City. The model predicts person travel for a full day based on assumptions of growth in population, housing, and employment, and then allocates that travel to different periods of the day using sub-models. The SF-CHAMP model predicts future travel demand by mode for auto, transit, walk, and bicycle trips. It also provides forecasts for vehicular traffic on regional freeways, major arterials, and local roadway networks, considering the available roadway capacity, origin-destination demand, and travel speeds.

Year 2035 intersection turning movement volumes were developed by applying growth factors calculated from traffic volume growth between the years 2010 and 2035. Traffic demand associated with development not fully reflected within the SF-CHAMP model (i.e., the anticipated 20% increase in visitors to the current embarkation site) was added to the intersection turning movement volumes. Since the SF-CHAMP model is a weekday travel demand model, Saturday midday peak hour conditions for Year 2035 were estimated based on the net growth developed for the weekday p.m. condition.

The action alternatives assume that the site would remain at one of the action alternative sites for 50 years. There are no reliable forecasts of visitation or regional housing and population growth for that duration. Thus, detailed assessment of impacts at the end of the 50-year span is not possible (this is not unlike the long-term cumulative impact assessment of most projects, which typically span 20 to 25 years, despite the life span of the project being assessed typically being much longer than 20 to 25 years). However, over a 50-year period, it is reasonable to assume that regional transportation demand will continue to increase, and operating conditions will worsen without major investments in capacity.

TABLE 35. NEAR-TERM CONDITIONS INTERSECTION LOS

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
1	Mason Street/Marina Boulevard/Yacht Road/Lyon Street	Signal	AM	B	B	B	B	B
			PM	D	D	D	D	D
			WE	D	D	D	D	D
2	Divisadero Street/Marina Boulevard	AWSC	AM	F (F)	F (F)	F (F)	F (F)	F (F)
			PM	F (F)	F (F)	F (F)	F (F)	F (F)
			WE	E (E)	E (E)	E (F)	E (E)	E (E)
3	Scott Street/Cervantes Boulevard/Marina Boulevard	Signal	AM	C	C	C	C	C
			PM	B	B	B	B	B
			WE	B	B	B	B	B
4	Fillmore Street/Marina Boulevard	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	A	A	A	A	A
5	Webster Street/Marina Boulevard	AWSC	AM	D (D)	D (E)	D (E)	D (E)	D (E)
			PM	E (E)	E (E)	E (F)	E (F)	E (F)
			WE	C (C)	C (C)	C (C)	C (C)	C (C)
6	Buchanan Street/Marina Boulevard/Beach Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
7	Laguna Street/Marina Boulevard	Signal	AM	A	A	A	A	A
			PM	A	A	A	A	A
			WE	A	A	A	A	A
8	Fillmore Street/Bay Street/Cervantes Boulevard	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	B	B	B	B	B
9	Laguna Street/Bay Street	Signal	AM	D	D	D	D	D
			PM	D	D	D	D	D
			WE	C	C	C	C	C
10	Franklin Street/Bay Street	Signal	AM	B	B	B	C	C
			PM	B	B	B	B	B
			WE	B	B	B	B	B
11	Van Ness Avenue/Bay Street	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	B	B	B	B	B
12	Divisadero Street/Lombard Street	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	B	B	B	C	C

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
13	Fillmore Street/Lombard Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
14	Laguna Street/Lombard Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	C	B	B
15	Franklin Street/Lombard Street	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	E	E	E	E	E
16	Van Ness Avenue/Lombard Street	Signal	AM	D	D	D	D	D
			PM	C	C	C	C	C
			WE	C	C	C	C	C
17	Taylor Street/Jefferson Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
18	Powell Street/Jefferson Street/The Embarcadero	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	B	B	B	B	B
19	Columbus Avenue/Beach Street	SSSC	AM	A (F)	A (F)	A (F)	A (F)	A (F)
			PM	A (F)	A (F)	A (F)	A (F)	A (F)
			WE	B (F)	B (F)	C (F)	B (F)	B (F)
20	Taylor Street/Beach Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
21	Stockton Street/Beach Street	Signal	AM	C	C	B	C	C
			PM	C	C	C	B	B
			WE	C	C	C	B	C
22	Grant Street/Beach Street/The Embarcadero	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	D	D	D	C	C
23	Leavenworth Street/Columbus Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
24	Taylor Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
25	Powell Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
26	Stockton Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	A	A
			WE	B	B	B	B	B
27	Kearny Street/The Embarcadero/North Point Street	Signal	AM	D	D	D	D	D
			PM	F	F	F	E	E
			WE	F	F	F	F	F
28	Hyde Street/Bay Street	Signal	AM	A	A	A	A	A
			PM	A	A	A	A	A
			WE	A	A	A	A	A
29	Columbus Avenue/Jones Street/Bay Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
30	Taylor Street/Bay Street	Signal	AM	B	B	B	A	A
			PM	A	A	A	A	A
			WE	B	B	B	B	B
31	Powell Street/Bay Street	Signal	AM	B	B	B	B	B
			PM	A	A	A	A	A
			WE	B	B	B	B	B
32	Stockton Street/Bay Street	Signal	AM	B	B	B	B	B
			PM	A	A	A	A	A
			WE	B	B	B	B	B
33	Kearny Street/Bay Street	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	A	A	A	A	A
34	The Embarcadero/Bay Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
35	The Embarcadero/Sansome Street/Chestnut Street	Signal	AM	B	B	B	A	A
			PM	B	B	B	B	B
			WE	B	B	B	B	B
36	The Embarcadero/Battery Street/Lombard Street	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	B	B	B	B	B

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
37	The Embarcadero/Green Street	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	A	A	A	A	A
38	Sansome Street/Broadway	Signal	AM	E	E	D	D	D
			PM	B	B	B	B	B
			WE	B	B	B	B	B
39	Battery Street/Broadway	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	B	B	B	B	B
40	The Embarcadero/Broadway	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	B	B	B	B	B
41	Powell Street/Beach Street	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	B	B	B	B	B

TABLE 36. LONG-TERM YEAR 2035—INTERSECTION LOS

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
1	Mason Street/Marina Boulevard/Yacht Road/Lyon Street	Signal	AM	D	D	D	D	D
			PM	D	D	D	D	D
			WE	E	E	E	E	E
2	Divisadero Street/Marina Boulevard	AWSC	AM	F (F)	F (F)	F (F)	F (F)	F (F)
			PM	F (F)	F (F)	F (F)	F (F)	F (F)
			WE	E (F)	E (F)	E (F)	E (F)	E (F)
3	Scott Street/Cervantes Boulevard/Marina Boulevard	Signal	AM	F	F	F	F	F
			PM	B	B	B	B	B
			WE	B	B	B	B	B
4	Fillmore Street/Marina Boulevard	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	A	A	A	A	A
5	Webster Street/Marina Boulevard	AWSC	AM	F (F)	F (F)	F (F)	F (F)	F (F)
			PM	E (F)	E (F)	E (F)	F (F)	E (F)
			WE	C (C)	C (C)	C (C)	D (D)	C (D)

	Study Intersection	Traffic Control	Peak Hour	No Action	Pier 31½	Pier 41	Pier 3 (No Shuttle)	Pier 3 (Shuttle)
				LOS	LOS	LOS	LOS	LOS
6	Buchanan Street/Marina Boulevard/Beach Street	Signal	AM	C	C	C	C	C
			PM	A	A	A	A	A
			WE	B	B	B	B	B
7	Laguna Street/Marina Boulevard	Signal	AM	A	A	A	A	A
			PM	A	A	A	A	A
			WE	A	A	A	A	A
8	Fillmore Street/Bay Street/Cervantes Boulevard	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	C	C	C	C	C
9	Laguna Street/Bay Street	Signal	AM	F	F	F	F	F
			PM	F	F	F	F	F
			WE	F	F	F	F	F
10	Franklin Street/Bay Street	Signal	AM	C	C	C	C	C
			PM	B	B	B	B	B
			WE	C	C	C	C	C
11	Van Ness Avenue/Bay Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
12	Divisadero Street/Lombard Street	Signal	AM	E	E	E	D	D
			PM	D	D	E	D	D
			WE	D	D	D	D	D
13	Fillmore Street/Lombard Street	Signal	AM	D	D	D	D	D
			PM	B	B	B	B	B
			WE	D	D	D	D	D
14	Laguna Street/Lombard Street	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	C	C	C	C	C
15	Franklin Street/Lombard Street	Signal	AM	C	C	C	C	C
			PM	C	C	C	C	C
			WE	C	C	C	C	C
16	Van Ness Avenue/Lombard Street	Signal	AM	D	D	D	D	D
			PM	D	D	D	D	D
			WE	D	D	D	D	D
17	Taylor Street/Jefferson Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
18	Powell Street/Jefferson Street/The Embarcadero	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	D	D	D	D	D
19	Columbus Avenue/Beach Street	SSSC	AM	B (F)	B (F)	B (F)	B (F)	B (F)
			PM	A (F)	A (F)	A (F)	A (F)	A (F)
			WE	D (F)	D (F)	E (F)	D (F)	D (F)
20	Taylor Street/Beach Street	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	F	F	F	F	F
21	Stockton Street/Beach Street	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	C	C	D	C	C
22	Grant Street/Beach Street/The Embarcadero	Signal	AM	B	B	B	B	B
			PM	C	C	C	C	C
			WE	F	F	F	F	F
23	Leavenworth Street/Columbus Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
24	Taylor Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
25	Powell Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	C	C	C	C	C
26	Stockton Street/North Point Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	A	A
27	Kearny Street/The Embarcadero/North Point Street	Signal	AM	E	E	E	E	E
			PM	F	F	F	F	F
			WE	F	F	F	F	F
28	Hyde Street/Bay Street	Signal	AM	A	A	A	A	A
			PM	A	A	A	A	A
			WE	A	A	A	A	A
29	Columbus Avenue/Jones Street/Bay Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B

	Study Intersection	Traffic Control	Peak Hour	No Action LOS	Pier 31½ LOS	Pier 41 LOS	Pier 3 (No Shuttle) LOS	Pier 3 (Shuttle) LOS
30	Taylor Street/Bay Street	Signal	AM	A	A	A	A	A
			PM	A	A	A	A	A
			WE	A	A	A	A	A
31	Powell Street/Bay Street	Signal	AM	B	B	B	B	B
			PM	B	B	B	B	B
			WE	B	B	B	B	B
32	Stockton Street/Bay Street	Signal	AM	C	C	C	B	B
			PM	A	A	A	A	A
			WE	B	B	B	B	B
33	Kearny Street/Bay Street	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	A	A	A	A	A
34	The Embarcadero/Bay Street	Signal	AM	C	C	C	C	C
			PM	B	B	B	B	B
			WE	B	B	A	A	A
35	The Embarcadero/Sansome Street/Chestnut Street	Signal	AM	C	C	C	B	B
			PM	C	C	C	B	B
			WE	B	B	B	B	B
36	The Embarcadero/Battery Street/Lombard Street	Signal	AM	C	C	C	B	C
			PM	E	E	E	E	E
			WE	B	B	B	B	B
37	The Embarcadero/Green Street	Signal	AM	D	D	D	D	D
			PM	C	C	C	C	C
			WE	A	A	A	A	A
38	Sansome Street/Broadway	Signal	AM	F	F	F	F	F
			PM	D	D	D	D	D
			WE	B	B	B	B	B
39	Battery Street/Broadway	Signal	AM	E	E	E	E	E
			PM	D	D	D	D	D
			WE	B	B	B	B	B
40	The Embarcadero/Broadway	Signal	AM	F	F	F	F	F
			PM	E	E	E	E	E
			WE	B	B	B	B	B
41	Powell Street/Beach Street	Signal	AM	A	A	A	A	A
			PM	B	B	B	B	B
			WE	B	B	B	B	B

Transit

The measurement index to evaluate transit impacts is capacity utilization. An alternative would be considered to have a minor impact if it increases ridership but capacity utilization does not exceed 85% for Muni. An alternative would be considered to have a moderate impact if it increases ridership such that capacity utilization exceeds 85% for Muni, or increases capacity utilization by 1% or more if capacity utilization exceeds 85% without the Project. An alternative would be considered to have a major impact if it increases ridership such that capacity utilization exceeds 100% for Muni, or increases capacity utilization by 1% or more if capacity utilization exceeds 100% without the Project. Year 2035 transit ridership for the Muni and regional transit screenlines was based on the analysis conducted for the Transit Effectiveness Project EIR for Year 2035 conditions. Tables 37a, b, and c and 38a, b, and c present the transit analysis results.

TABLE 37A. NEAR-TERM MUNI CAPACITY UTILIZATION ANALYSIS—A.M. PEAK HOUR

Line/Screenline	No Action Alternative (Near-Term)						Action Alternatives (Near-Term)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
47 Van Ness	294	378	78%	276	378	73%	301	378	80%	276	378	73%
F-Line	289	700	41%	162	627	26%	296	700	42%	162	627	26%
Powell-Mason Cable Car	220	378	58%	92	378	24%	224	378	59%	92	378	24%
8X Bayshore Express	616	752	82%	504	752	67%	621	752	83%	504	752	67%
Total	1,418	2,208	64%	1,034	2,135	48%	1,442	2,208	65%	1,034	2,135	48%
Pier 41 Alternative Screenlines												
North/South Screenline	1,070	1,382	77%	1,000	1,382	72%	**1,216**	**1,382**	**88%**	1,000	1,382	72%
Downtown Screenline	855	1,347	63%	553	1,247	44%	1,032	1,347	77%	482	1,247	39%
Waterfront Screenline	289	700	41%	162	627	26%	196	700	28%	162	627	26%
Total	2,213	3,429	65%	1,715	3,256	53%	2,444	3,429	71%	1,643	3,256	50%
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	1,280	1,881	68%	1,094	1,881	58%	1,430	1,881	76%	1,094	1,881	58%
West Screenline	471	693	68%	365	630	58%	503	693	73%	365	630	58%
East Screenline	514	1,118	46%	726	1,291	56%	514	1,118	46%	694	1,291	54%
Total	2,266	3,692	61%	2,184	3,802	57%	2,446	3,692	66%	2,152	3,802	57%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	1,280	1,881	68%	1,094	1,881	58%	1,430	1,881	76%	1,094	1,881	58%
West Screenline	471	693	68%	365	630	58%	503	693	73%	365	630	58%
East Screenline	514	1,118	46%	726	1,291	56%	514	1,118	46%	694	1,291	54%
Total	2,266	3,692	61%	2,184	3,802	57%	2,446	3,692	66%	2,152	3,802	57%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

TABLE 37B. NEAR-TERM MUNI CAPACITY UTILIZATION ANALYSIS—P.M. PEAK HOUR

Line/Screenline	No Action Alternative (Near-Term)						Action Alternatives (Near-Term)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
47 Van Ness	276	378	73%	258	378	68%	280	378	74%	264	378	70%
F-Line	249	700	36%	**718**	**700**	**103%**	252	700	36%	**724**	**700**	**103%**
Powell-Mason Cable Car	356	473	75%	**411**	**473**	**87%**	358	473	76%	**415**	**473**	**88%**
8X Bayshore Express	408	752	54%	416	752	55%	410	752	55%	420	752	56%
Total	1,289	2,303	56%	1,803	2,303	78%	1,301	2,303	56%	1,823	2,303	79%
Pier 41 Alternative Screenlines												
North/South Screenline	856	1,382	62%	798	1,382	58%	929	1,382	67%	925	1,382	67%
Downtown Screenline	1,433	2,193	65%	1,556	2,169	72%	1,459	2,193	67%	1,675	2,169	77%
Waterfront Screenline	249	700	36%	**718**	**700**	**103%**	202	700	29%	**637**	**700**	**91%**
Total	2,537	4,275	59%	3,071	4,251	72%	2,590	4,275	61%	3,237	4,251	76%
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	1,111	1,871	59%	1,181	1,871	63%	1,186	1,871	63%	1,311	1,871	70%
West Screenline	282	378	75%	282	378	75%	298	378	79%	310	378	82%
East Screenline	1,423	1,924	74%	909	1,948	47%	1,394	1,924	72%	892	1,948	46%
Total	2,816	4,173	67%	2,371	4,196	57%	2,878	4,173	69%	2,513	4,196	60%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	1,111	1,871	59%	1,181	1,871	63%	1,186	1,871	63%	1,311	1,871	70%
West Screenline	282	378	75%	282	378	75%	298	378	79%	310	378	82%
East Screenline	1,423	1,924	74%	909	1,948	47%	1,394	1,924	72%	892	1,948	46%
Total	2,816	4,173	67%	2,371	4,196	57%	2,878	4,173	69%	2,513	4,196	60%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

TABLE 37C. NEAR-TERM MUNI CAPACITY UTILIZATION ANALYSIS—WEEKEND MIDDAY PEAK HOUR

Line/Screenline	No Action Alternative (Near-Term)						Action Alternatives (Near-Term)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
47 Van Ness	220	378	58%	220	378	58%	226	378	60%	225	378	59%
F-Line	**803**	**700**	**115%**	307	700	44%	**808**	**700**	**115%**	311	700	44%
Powell-Mason Cable Car	**428**	**473**	**90%**	**428**	**473**	**90%**	**430**	**473**	**91%**	**430**	**473**	**91%**
8X Bayshore Express	556	705	79%	335	705	48%	559	705	79%	338	705	48%
Total	**2,007**	**2,256**	**89%**	1,290	2,256	57%	**2,024**	**2,256**	**90%**	1,304	2,256	58%
Pier 41 Alternative Screenlines												
North/South Screenline	888	1,459	61%	699	1,459	48%	973	1,459	67%	774	1,459	53%
Downtown Screenline	1,160	1,415	82%	1,165	1,415	82%	**1,247**	**1,415**	**88%**	**1,231**	**1,415**	**87%**
Waterfront Screenline	**803**	**700**	**115%**	307	700	44%	**738**	**700**	**105%**	250	700	36%
Total	2,851	3,574	80%	2,171	3,574	61%	2,959	3,574	83%	2,255	3,574	63%
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	825	1,758	47%	923	1,758	53%	900	1,758	51%	988	1,758	56%
West Screenline	202	564	36%	216	564	38%	238	564	42%	248	564	44%
East Screenline	514	1,170	44%	**1,005**	**1,170**	**86%**	490	1,170	42%	978	1,170	84%
Total	1,541	3,492	44%	2,145	3,492	61%	1,628	3,492	47%	2,214	3,492	63%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	825	1,758	47%	923	1,758	53%	900	1,758	51%	988	1,758	56%
West Screenline	202	564	36%	216	564	38%	238	564	42%	248	564	44%
East Screenline	514	1,170	44%	**1,005**	**1,170**	**86%**	490	1,170	42%	978	1,170	84%
Total	1,541	3,492	44%	2,145	3,492	61%	1,628	3,492	47%	2,214	3,492	63%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

TABLE 38A. LONG-TERM (YEAR 2035) MUNI CAPACITY UTILIZATION ANALYSIS—A.M. PEAK HOUR

Line/Screenline	No Action Alternative (Long-Term/Year 2035)						Action Alternatives (Long-Term/Year 2035)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
F-Line	156	560	28%	129	560	23%	163	560	29%	129	560	23%
Powell-Mason Cable Car	257	378	68%	122	378	32%	262	378	69%	122	378	32%
8X Bayshore Express	1,157	1,504	77%	627	752	83%	1,161	1,504	77%	627	752	83%
E Embarcadero	216	280	77%	69	280	24%	218	280	78%	69	280	24%
11 Downtown Connector	**299**	**315**	**95%**	141	315	45%	**306**	**315**	**97%**	141	315	45%
Total	2,085	3,037	69%	1,088	2,285	48%	2,109	3,037	69%	1,088	2,285	48%
Pier 41 Alternative Screenlines												
North/South Screenline	104	252	41%	99	252	39%	**274**	**252**	**109%**	99	252	39%
Downtown Screenline	1,394	1,877	74%	872	1,776	49%	**1,666**	**1,877**	**89%**	800	1,776	45%
Waterfront Screenline	465	840	55%	197	840	23%	414	840	49%	197	840	23%
Total	1,963	2,969	66%	1,168	2,868	41%	2,355	2,969	79%	1,096	2,868	38%
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	**2,568**	**2,359**	**109%**	**2,165**	**2,359**	**92%**	**2,741**	**2,359**	**116%**	**2,165**	**2,359**	**92%**
West Screenline	399	756	53%	545	756	72%	437	756	58%	545	756	72%
East Screenline	736	1,860	40%	1,368	1,961	70%	736	1,860	40%	1,381	1,961	70%
Total	3,703	4,975	74%	4,078	5,075	80%	3,913	4,975	79%	4,091	5,075	81%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	**2,568**	**2,359**	**109%**	**2,165**	**2,359**	**92%**	**2,741**	**2,359**	**116%**	**2,165**	**2,359**	**92%**
West Screenline	399	756	53%	545	756	72%	437	756	58%	545	756	72%
East Screenline	736	1,860	40%	1,368	1,961	70%	736	1,860	40%	1,381	1,961	70%
Total	3,703	4,975	74%	4,078	5,075	80%	3,913	4,975	79%	4,091	5,075	81%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

TABLE 38B. LONG-TERM (YEAR 2035) MUNI CAPACITY UTILIZATION ANALYSIS—P.M. PEAK HOUR

Line/Screenline	No Action Alternative (Long-Term/Year 2035)						Action Alternatives (Long-Term/Year 2035)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
F-Line	430	840	51%	**1,063**	**840**	**127%**	434	840	52%	**1,070**	**840**	**127%**
Powell-Mason Cable Car	377	473	80%	**947**	**473**	**200%**	379	473	80%	**951**	**473**	**201%**
8X Bayshore Express	398	752	53%	1,211	1,504	81%	400	752	53%	1,215	1,504	81%
E Embarcadero	80	280	29%	139	280	50%	81	280	29%	140	280	50%
11 Downtown Connector	186	315	59%	**367**	**315**	**117%**	190	315	60%	**373**	**315**	**118%**
Total	1,471	2,660	55%	**3,728**	**3,412**	**109%**	1,483	2,660	56%	**3,749**	**3,412**	**110%**
Pier 41 Alternative Screenlines												
North/South Screenline	147	252	58%	93	252	37%	**232**	**252**	**92%**	**241**	**252**	**96%**
Downtown Screenline	1,364	1,730	79%	**2,057**	**1,730**	**119%**	1,438	1,730	83%	**2,259**	**1,730**	**131%**
Waterfront Screenline	557	1,120	50%	**1,284**	**1,120**	**115%**	531	1,120	47%	**1,240**	**1,120**	**111%**
Total	2,068	3,102	67%	**3,433**	**3,102**	**111%**	2,202	3,102	71%	**3,740**	**3,102**	**121%**
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	**2,075**	**2,321**	**89%**	**2,307**	**2,321**	**99%**	**2,161**	**2,321**	**93%**	**2,458**	**2,321**	**106%**
West Screenline	260	420	62%	338	420	81%	279	420	66%	**371**	**420**	**88%**
East Screenline	**1,657**	**1,905**	**87%**	927	1,905	49%	**1,669**	**1,905**	**88%**	934	1,905	49%
Total	**3,992**	**4,646**	**86%**	3,573	4,646	77%	**4,109**	**4,646**	**88%**	3,763	4,646	81%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	**2,075**	**2,321**	**89%**	**2,307**	**2,321**	**99%**	**2,161**	**2,321**	**93%**	**2,458**	**2,321**	**106%**
West Screenline	260	420	62%	338	420	81%	279	420	66%	**371**	**420**	**88%**
East Screenline	**1,657**	**1,905**	**87%**	927	1,905	49%	**1,669**	**1,905**	**88%**	934	1,905	49%
Total	**3,992**	**4,646**	**86%**	3,573	4,646	77%	**4,109**	**4,646**	**88%**	3,763	4,646	81%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

TABLE 38C. LONG-TERM (YEAR 2035) MUNI CAPACITY UTILIZATION ANALYSIS—WEEKEND MIDDAY PEAK HOUR

Line/Screenline	No Action Alternative (Long-Term/Year 2035)						Action Alternatives (Long-Term/Year 2035)					
	Inbound			Outbound			Inbound			Outbound		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Pier 31½ Alternative Screenlines												
F-Line	306	840	36%	**737**	**840**	**88%**	311	840	37%	**741**	**840**	**88%**
Powell-Mason Cable Car	**453**	**473**	**96%**	**980**	**473**	**207%**	**456**	**473**	**96%**	**983**	**473**	**208%**
8X Bayshore Express	543	705	77%	840	1,410	60%	546	705	77%	842	1,410	60%
E Embarcadero	58	280	21%	97	280	35%	59	280	21%	98	280	35%
11 Downtown Connector	136	315	43%	254	315	81%	140	315	44%	258	315	82%
Total	1,495	2,613	57%	2,908	3,318	**88%**	1,512	2,613	58%	**2,922**	**3,318**	**88%**
Pier 41 Alternative Screenlines												
North/South Screenline	95	376	25%	81	376	22%	207	376	55%	178	376	47%
Downtown Screenline	1,282	1,730	74%	**1,891**	**1,730**	**109%**	1,429	1,730	83%	**2,009**	**1,730**	**116%**
Waterfront Screenline	429	1,120	38%	890	1,120	79%	392	1,120	35%	858	1,120	77%
Total	1,806	3,226	56%	**2,862**	**3,226**	**89%**	2,027	3,226	63%	**3,045**	**3,226**	**94%**
Pier 3 Alternative Screenlines—No Shuttle Scenario												
North/South Screenline	1,580	1,946	81%	**1,765**	**1,946**	**91%**	1,669	1,946	86%	**1,844**	**1,946**	**95%**
West Screenline	196	564	35%	278	564	49%	239	564	42%	315	564	56%
East Screenline	1,035	1,905	54%	570	1,905	30%	1,035	1,905	54%	570	1,905	30%
Total	2,811	4,415	64%	2,614	4,415	59%	2,943	4,415	67%	2,729	4,415	62%
Pier 3 Alternative Screenlines—Shuttle Scenario												
North/South Screenline	1,580	1,946	81%	**1,765**	**1,946**	**91%**	**1,669**	**1,946**	**86%**	**1,844**	**1,946**	**95%**
West Screenline	196	564	35%	278	564	49%	239	564	42%	315	564	56%
East Screenline	1,035	1,905	54%	570	1,905	30%	1,035	1,905	54%	570	1,905	30%
Total	2,811	4,415	64%	2,614	4,415	59%	2,943	4,415	67%	2,729	4,415	62%

Notes:
Source: SFMTA Ridership Counts, 2011
SFMTA typically refers to "inbound" and "outbound" with respect to service to downtown (i.e., inbound routes travel toward downtown and outbound routes travel away from downtown). However, for purposes of this report, "inbound" and "outbound" refer to the direction of travel relative to the Project site.
Bold text indicates screenlines operating above the 85% capacity utilization threshold.

Bicycle Facilities

The measurement indices to evaluate impacts to bicycle access and circulation are changes in either access or modal conflicts. An alternative would be considered to have a major impact if it would result in substantial adverse changes in bicycle accessibility and circulation or would substantially increase conflicts between bicycles and pedestrians.

Pedestrian Facilities

The measurement index used to evaluate pedestrian impacts is change in pedestrian LOS. An alternative would be considered to have a major impact to a pedestrian facility if it would cause LOS to change from LOS D or better to LOS E or LOS F, to change from LOS E to LOS F, or it would contribute a substantial number of pedestrian trips to crosswalks already operating at LOS E or F. Pedestrian access and circulation are also evaluated for either access or modal conflicts. An alternative would be considered to have a major impact if it would result in substantial adverse changes in pedestrian accessibility and circulation or would substantially increase conflicts between pedestrians and other modes, such as pedestrians and vehicles. Tables 39 and 40 present pedestrian impacts at each of the alternative locations.

TABLE 39. NEAR-TERM CONDITIONS—PEDESTRIAN LOS (INTERSECTION DELAY AND CROSSWALK SPACE)

Intersection	Crosswalk Location	No Action Alternative (Near-Term)			Action Alternatives (Near-Term)		
		Weekday a.m. Peak Hour	Weekday p.m. Peak Hour	Weekend Peak Hour	Weekday a.m. Peak Hour	Weekday p.m. Peak Hour	Weekend Peak Hour
		Space LOS	Space LOS	Space LOS	Space LOS	Space LOS	Space LOS
Pier 31½							
Embarcadero/ Bay Street	North (Embarcadero)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	West (Bay)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
Embarcadero/ Chestnut Street/ Sansome Street	South (Embarcadero)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	West (Chestnut)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	West (Sansome)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
Embarcadero/ Lombard Street/ Battery Street	North (Embarcadero)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	West (Lombard)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	West (Battery)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
Pier 41							
Taylor Street/ Jefferson Street	North (Taylor)	>60 / A	37 / C	18 / D	54 / B	26 / C	**12 / E**
	South (Taylor)	>60 / A	44 / B	25 / C	>60 / A	30 / C	18 / D
	East (Jefferson)	>60 / A	>60 / A	43 / B	>60 / A	43 / B	21 / D
	West (Jefferson)	>60 / A	>60 / A	>60 / A	>60 / A	43 / B	25 / C
Powell Street/ Jefferson Street	North (Embarcadero)	>60 / A	**12 / E**	**6 / F**	39 / C	**9 / E**	**5 / F**
	South (Powell)	>60 / A	54 / B	59 / B	>60 / A	24 / D	21 / D
	East (Embarcadero)	>60 / A	46 / B	32 / C	29 / C	17 / D	**12 / E**
	West (Jefferson)	>60 / A	36 / C	36 / C	51 / B	17 / D	**14 / E**
Pier 3 (No F Line or Shuttle)							
Laguna Street/ Beach Street	South (Laguna)	>60 / A	>60 / A	>60 / A	33 / C	22 / D	21 / D
	West (Beach)	>60 / A	>60 / A	>60 / A	31 / C	21 / D	223 / D

Intersection	Crosswalk Location	No Action Alternative (Near-Term)			Action Alternatives (Near-Term)		
		Weekday a.m. Peak Hour	**Weekday p.m. Peak Hour**	**Weekend Peak Hour**	**Weekday a.m. Peak Hour**	**Weekday p.m. Peak Hour**	**Weekend Peak Hour**
		Space LOS	**Space LOS**	**Space LOS**	**Space LOS**	**Space LOS**	**Space LOS**
Buchanan Street/Beach Street—Marina Boulevard	North (driveway)	>60 / A	>60 / A	57 / B	>60 / A	>60 / A	28 / C
	South (Buchanan)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	East (Marina)	>60 / A	>60 / A	>60 / A	37 / C	26 / C	28 / C
Pier 3 (F Line)							
Laguna Street/ Beach Street	South (Laguna)	>60 / A	>60 / A	>60 / A	47 / B	31 / C	29 / C
	West (Beach)	>60 / A	>60 / A	>60 / A	44 / B	31 / C	32 / C
Buchanan Street/Beach Street—Marina Boulevard	North (driveway)	>60 / A	>60 / A	57 / B	>60 / A	>60 / A	34 / C
	South (Buchanan)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	East (Marina)	>60 / A	>60 / A	>60 / A	52 / B	36 / C	39 / C
Pier 3 (Shuttle)							
Laguna Street/ Beach Street	South (Laguna)	>60 / A	>60 / A	>60 / A	55 / B	36 / C	31 / C
	West (Beach)	>60 / A	>60 / A	>60 / A	51 / B	36 / C	35 / C
Buchanan Street/ Beach Street—Marina Boulevard	North (driveway)	>60 / A	>60 / A	57 / B	>60 / A	>60 / A	36 / C
	South (Buchanan)	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A	>60 / A
	East (Marina)	>60 / A	>60 / A	>60 / A	>60 / A	42 / B	43 / B

Notes:
Bold indicates pedestrian LOS beyond established threshold.

TABLE 40. NEAR-TERM CONDITIONS—PEDESTRIAN LOS (WALKWAYS)

Analysis Location and Day of Week	No Action Alternative (Near-Term)			Action Alternatives (Near-Term)		
	Hourly Flow Volumes / LOS			Hourly Flow Volumes / LOS		
	Weekday a.m. Peak Hour	Weekday p.m. Peak Hour	Weekend Midday Peak Hour	Weekday a.m. Peak Hour	Weekday p.m. Peak Hour	Weekend Midday Peak Hour
Pier 31½ Alternative - Embarcadero Promenade (between Bay and Chestnut Streets); 18-foot Walkway						
Volume/LOS	834/B	777/B	1,711/C	906/B	876/B	1,846/C
Pier 41 Alternative - Embarcadero Promenade (east of Taylor Street); 12-foot Walkway						
Volume/LOS	611/C	817/C	1,692/D	1,247/C	1,692/D	**2,885/E**
Pier 3 Alternative (all scenarios) - Bay Trail west of Fort Mason Pier 4; 12-foot Walkway						
Volume/LOS	218/A	241/A	380/C	854/C	1,116/C	1,573/D

Note:
Bold indicates pedestrian LOS beyond established threshold.

Parking Facilities

The measurement index used to evaluate parking impacts is parking utilization. An alternative would be considered to have a major impact if it would cause the projected parking occupancy to increase to more than 95% of supply in the study area (indicating the parking is effectively at capacity), or, if parking is already at 95% utilization or higher, the Project would increase demand by more than 1% of existing supply. Tables 41 and 42 present parking impacts at each of the alternative locations.

TABLE 41. NEAR-TERM PARKING SUPPLY AND OCCUPANCY (WEEKDAYS)

Embarkation Site / Parking Area	Supply	No Action Alternative (Near-Term)								Action Alternatives (Near-Term)							
		Occupancy				Parking Utilization				Occupancy				Parking Utilization			
		9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9
Pier 31½																	
Off-Street	1,126	674	748	613	296	60%	66%	54%	26%	681	755	620	299	60%	67%	55%	27%
On-Street	687	562	**707**	**651**	438	82%	**103%**	**95%**	64%	563	**708**	**652**	438	82%	**103%**	**95%**	64%
Total	1,813	1,236	1,455	1,264	734	68%	80%	70%	40%	1,244	1,463	1,272	737	69%	81%	70%	41%
Pier 41																	
Off-Street	3,325	1,025	1,730	1,713	1,195	31%	52%	52%	36%	1,146	1,851	1,834	1,243	34%	56%	55%	37%
On-Street	2,886	1,500	1,905	1,760	-	52%	66%	61%	-	1,532	1,937	1,792	-	53%	67%	62%	-
Total	6,211	2,525	3,632	3,473	-	41%	59%	56%	**-**	2,678	3,785	3,626	-	43%	61%	58%	-
Pier 3 – No Shuttle																	
Fort Mason Area	3,770	2,293	2,456	2,751	2,584	61%	65%	73%	69%	2,505	2,668	2,963	2,669	66%	71%	79%	71%
Pier 3 – Shuttle																	
Fort Mason Area	3,770	2,293	2,456	2,751	2,584	61%	65%	73%	69%	2,431	2,594	2,889	2,639	64%	69%	77%	70%
Other Area (Fisherman's Wharf)	3,325	1,025	1,730	1,713	1,195	31%	52%	52%	36%	1,113	1,818	1,801	1,230	33%	55%	54%	37%

Notes:
Bold indicates parking utilization rate beyond established threshold.
No data was collected for the cells with dashes.

TABLE 42. NEAR-TERM PARKING SUPPLY AND OCCUPANCY (SATURDAY)

Embarkation Site / Parking Area	Supply	No Action Alternative (Near-Term)								Action Alternatives (Near-Term)							
		Occupancy				Parking Utilization				Occupancy				Parking Utilization			
		9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9	9-12	12-3	3-6	6-9
Pier 31½																	
Off-Street	1,126	307	536	678	501	27%	48%	60%	44%	314	543	685	504	28%	48%	61%	45%
On-Street	687	205	265	294	321	30%	39%	43%	47%	206	266	295	322	30%	39%	43%	47%
Total	1,813	512	801	972	822	28%	44%	54%	45%	520	809	980	825	29%	45%	54%	46%
Pier 41																	
Off-Street	3,325	916	1,970	2,630	2,209	28%	59%	79%	66%	1,075	2,129	2,789	2,273	32%	64%	84%	68%
On-Street	2,886	1,732	2,597	2,597	-	60%	90%	90%	-	1,765	2,630	2,630	-	61%	91%	91%	-
Total	6,211	2,648	4,567	5,227	-	43%	74%	84%	-	2,840	4,759	5,419	-	46%	77%	87%	-
Pier 3—No Shuttle																	
Fort Mason Area	3,770	2,777	3,330	3,501	2,982	74%	88%	93%	79%	3,023	**3,576**	**3,747**	3,080	80%	**95%**	**99%**	82%
Pier 3—Shuttle																	
Fort Mason Area	3,770	2,777	3,330	3,501	2,982	74%	88%	93%	79%	2,934	3,487	**3,658**	3,045	78%	92%	**97%**	81%
Other Area (Fisherman's Wharf)	3,325	916	1,970	2,630	2,209	28%	59%	79%	66%	1,020	2,074	2,734	2,251	31%	62%	82%	68%

Notes:
Bold indicates parking utilization rate beyond established threshold.
No data was collected for the cells with dashes.

Assessment Criteria for Construction Impacts

Construction impacts were assessed by comparing the construction vehicle trips and employee trips to regulatory guidelines. Construction impacts are generally considered minor due to their temporary and limited duration.

Assessment Criteria for Operational Impacts

Project impacts were assessed by comparing conditions under the potential alternatives to conditions under the No Action Alternative using the above-described indices.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative. As is noted in the "Alternatives" chapter, the Park Service estimates that there could be a 20% increase in visitation to Alcatraz by 2036, assuming that changes in visitor management on Alcatraz Island are implemented to allow for the site to accommodate increased visitors.

Construction

There would be no construction in the No Action Alternative. Therefore, the No Action Alternative would have no construction-related impact.

Operation

Traffic. As noted in the "Transportation and Circulation" section of the "Affected Environment" chapter, under the No Action Alternative, in the near term, the same intersections that currently exceed the City/County's established LOS threshold of LOS D conditions or better would continue to do so. Specifically, the following intersections would operate at LOS E or F:

- Divisadero Street/Marina Boulevard (a.m., p.m., Saturday midday peak hours)
- Franklin Street/Lombard Street (Saturday midday peak hour)
- Kearny Street/The Embarcadero/North Point Street (p.m., Saturday midday peak hours)
- Sansome Street/Broadway (a.m. peak hour)

The stop-controlled intersections of Marina Boulevard/Webster Street and Columbus Street/Beach Street also exceed the LOS D threshold; however, they do not meet peak hour signal warrant criteria, and thus, are considered to operate acceptably.

Transit. Transit service to all of the study facilities would operate acceptably within the City's 85% capacity utilization threshold during the a.m. peak hour under the No Action Alternative. In the p.m. peak hour, the F-Line streetcar and the Powell-Mason Cable Car, which provide service to Pier 31½, would continue to operate above the 85% capacity utilization threshold in the outbound direction (i.e., away from Pier 31½, toward downtown). All other routes and screenlines in the study area would operate within the City's 85% capacity utilization threshold in the p.m. peak hour in the near-term under the No Action Alternative. During the Saturday midday peak hour, transit service on the F-Line streetcar in the inbound direction and the Powell-Mason Cable Car in both directions would continue to exceed the threshold. Near Pier 41, the east screenline (which consists of the F-Line streetcar) would exceed the City's threshold in the inbound direction. All other transit routes and screenlines would operate within the City's threshold during the Saturday midday peak hour.

Bicycle Facilities. Existing bicycle facilities were described in "Transportation and Circulation" section of the "Affected

Environment" chapter. Under the No Action Alternative, these facilities would be expected to remain similar to their existing conditions, and use associated with the Embarkation Facility would be expected to remain similar to existing conditions.

Pedestrian Facilities. All pedestrian facilities in the study area would continue to operate within acceptable LOS thresholds, with the exception of the crosswalk on the north leg of Powell and Jefferson streets, which currently operates acceptably in the a.m. peak hour, but operates at LOS E in the p.m. peak hour and LOS F in the Saturday midday peak hour. These overcrowded conditions would be expected to continue in the No Action Alternative.

Parking Facilities. There would continue to be adequate parking supply to meet demand in the near-term under the No Action Alternative during the weekday a.m. and p.m. peak hours near all three study areas. Near piers 31½ and 41, parking supply would also continue to be adequate during the Saturday midday peak hour. However, parking supply would continue to remain overcapacity near the Pier 3 location during the Saturday midday peak hour.

Cumulative Impact Analysis

Traffic. In the long-term, congestion in the area would be expected to increase associated with increased development within the City. This would cause additional intersections to exceed established thresholds. Specifically, the following intersections would exceed the City's thresholds in the long-term under the No Action Alternative:

- Mason Street/Marina Boulevard/Yacht Road/Lyon Street (Saturday midday peak hour)
- Divisadero Street/Marina Boulevard (a.m., p.m., and Saturday midday peak hours)
- Scott Street/Cervantes Boulevard/Marina Boulevard (a.m. peak hour)
- Laguna Street/Bay Street (a.m., p.m., and Saturday midday peak hours)
- Divisadero Street/Lombard Street (a.m. peak hour)
- Taylor Street/Beach Street (Saturday midday peak hour)
- Grant Street/Beach Street/the Embarcadero (Saturday midday peak hour)
- Kearny Street/the Embarcadero/North Point Street (a.m., p.m., and Saturday midday peak hours)
- The Embarcadero/Battery Street/Lombard Street (p.m. peak hour)
- Sansome Street/Broadway (a.m. peak hour)
- Battery Street/Broadway (a.m. peak hour)
- The Embarcadero/Broadway (a.m. and p.m. peak hours)

The unsignalized intersections of Webster Street/Marina Boulevard (a.m. and p.m. peak hours) and Columbus Avenue/Beach Street (a.m., p.m., and Saturday midday peak hours) would exceed the LOS D threshold, but would not meet peak hour signal warrants, and are therefore considered to operate acceptably.

Transit. In the long-term under the No Action Alternative, near Pier 31½, the 11-Downtown Connector would be expected to exceed the 85% capacity utilization threshold in the inbound direction during the a.m. peak hour and in the outbound direction during the p.m. peak hour. The F-Line streetcar would be expected to exceed the threshold in the outbound direction during the p.m. and Saturday midday peak hours. The Powell-Mason cable car line would be expected to exceed the threshold in the outbound direction during the p.m. peak hour and in both directions during the Saturday midday peak hours. All other transit lines serving the Pier 31½ area would be expected to operate within established thresholds under the No Action Alternative.

Near Pier 41, the Downtown and Waterfront Screenlines would be expected to exceed established thresholds in the outbound

direction during the p.m. peak hour. Additionally, the Downtown Screenline would be expected to exceed the threshold in the outbound direction during the Saturday midday peak hour. All other screenlines serving the Pier 41 area would be expected to remain within established thresholds during all peak hours under the No Action Alternative.

Near Pier 3, the North/South Screenline would be expected to exceed established thresholds in both directions during the a.m. and p.m. peak hours and in the outbound direction during the Saturday midday peak hour. The East Screenline would be expected to exceed the threshold in the inbound direction during the p.m. peak hour. All other screenlines serving the Pier 3 area would be expected to remain within established thresholds during all peak hours under the No Action Alternative.

Bicycle Facilities. Bicycling trips may increase in the long-term under the No Action Alternative due to the increasing effectiveness of bicycle facilities (such as accessible bicycle parking on-site, and the improvement of on-street bicycle facilities citywide, in accordance with the San Francisco Bicycle Plan). However, these increases are expected to result from improved infrastructure, and therefore, the citywide increase in bicycle usage is not expected to create conditions that are unsafe for cyclists.

There is an anticipated increase in background automobile traffic between the near- and long-term conditions, as shown in the cumulative traffic forecasts. This would result in an increase in conflicts between automobiles and cyclists on roadways in the study area. While there would be a general increase in vehicle traffic that would be expected through the future cumulative scenario, the No Action Alternative would not create potentially hazardous conditions for bicycles, or otherwise interfere with bicycle accessibility to the site and adjoining areas.

Pedestrian Facilities. The San Francisco Waterfront study area has very good pedestrian facilities, and most streets and intersections have adequate facilities to serve demand. In general, based on the extensiveness of the existing network, including the wide promenade along the Embarcadero, the increased development in the area would not result in additional overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians under the cumulative conditions. Future sidewalk and intersection crossing improvements, should they be implemented, would improve pedestrian conditions by facilitating safe and easy pedestrian crossings, by providing safe spaces for pedestrians, by slowing traffic, and by increasing pedestrian visibility to drivers.

Walk trips may increase in the long-term with the addition of cumulative development due to the addition of complimentary land uses, such as residential, retail and office space, to the area. Because transit users would walk between transit stops and their destinations, measures to further promote effective use of transit could increase the number of pedestrians traveling through the study areas over time, although not to the level that would induce overcrowding of sidewalks under the cumulative conditions.

There is an anticipated increase in background automobile traffic between near- and long-term cumulative conditions, as shown in the cumulative traffic forecasts. This would result in an increase in automobile-pedestrian conflicts at intersections and driveways in the study area. While there would be a general increase in vehicle traffic that would be expected through the future scenario, cumulative pedestrian-automobile conflicts would be similar to near-term conditions. The No Action Alternative would not create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

Parking Facilities. The analysis indicates that the No Action Alternative would not have a substantial effect on parking conditions in the study areas in the near-term. Considering

cumulative parking conditions, parking demand and competition for on- and off-street parking would be likely to increase over time due to the land use development and increased density anticipated within San Francisco. Additionally, through the implementation of the City's Transit-First policy and the City's Better Streets program and related projects, especially along commercial corridors, some on-street parking may be removed to promote alternative modes of travel and more sustainable street designs. Therefore, under the No Action Alternative, cumulative parking conditions would be likely to become more challenging.

Mitigation

No mitigation is proposed.

Conclusion

Under the No Action Alternative, facilities that currently exceed established thresholds would continue to do so, resulting in short- and long-term, minor, adverse impacts to traffic, transit bicycle facilities, pedestrian facilities and parking facilities.

IMPACTS OF PIER 31½ ALTERNATIVE

As detailed in the "Alternatives" chapter, the Pier 31½ Alternative would involve retrofitting the existing structures and establishing long-term ferry service and embarkation site operations at Pier 31½. Construction and operational traffic and circulation resulting from the Pier 31½ Alternative are assessed separately below.

Construction

Consistent with other recent construction activities along the northern San Francisco waterfront (i.e., the Exploratorium at Pier 15), construction-related activities would generally occur Monday through Friday between 7:00 a.m. and 4:00 p.m. Construction would not be anticipated to regularly occur on weekends or major legal holidays, but may occur on an as-needed basis.

Construction staging would primarily occur within the site and on barges in the adjacent water. Pedestrian circulation would be maintained along the Embarcadero throughout the construction process. The Park Service does not anticipate the need to close automobile or bicycle lanes on the Embarcadero given the amount of staging area at the site. However, if a need does arise, the closure would likely be short-term. If traffic, bicycle, parking, or sidewalk closures are needed, they would be coordinated with the City to minimize the effects on local circulation. In general, lane and sidewalk closures are subject to review and approval by the San Francisco Department of Public Works (DPW) and the SFMTA.

During construction, a number of construction-related trucks would travel into and out of the site. It is anticipated that the addition of the worker-related vehicle or transit trips would not substantially affect transportation conditions, as increases on local intersections or the transit network would be relatively small in relation to existing traffic levels, and would be temporary in nature.

Construction workers who drive to the site would cause a temporary increase in parking demand and decrease in supply, as construction workers would need to park either on-street or in parking facilities that currently have availability during the day. However, parking shortfalls would be temporary and relatively minor due to the limited scope of construction.

Under the Pier 31½ Alternative, construction would occur simultaneously with and adjacent to the operation of the existing embarkation facility, which may increase conflicts with pedestrians and visitors to the site. The Park Service will work to ensure that safe staging areas for visitors would be provided and maintained at all times.

Therefore, the Pier 31½ Alternative's construction impacts would be short-term, minor, and adverse.

Operation

Traffic. Short-term intersection turning movement volumes would increase slightly due to the addition of a third ferry berth, which could accommodate additional ferry service to Fort Baker and Fort Mason. The Pier 31½ Alternative would cause the all-way stop controlled intersection of Webster Street/Marina Boulevard to deteriorate from LOS D to LOS E in the a.m. peak hour. However, the volumes do not meet the peak hour traffic signal warrant criteria, and therefore, the impact would be considered short-term, minor, and adverse.

Otherwise, under the Pier 31½ Alternative, the same intersections would operate at LOS E or F as under the No Action Alternative. However, traffic volumes would only increase slightly compared to existing conditions because the site is currently generating a substantial number of trips already. The relatively small increases in traffic associated with the third berth would not contribute considerably to intersections already operating at such levels (i.e., increases to critical movements operating at LOS E or F at these intersections would be less than 5%), nor would they cause any intersections that would operate acceptably under the No Action Alternative to deteriorate, other than Webster Street/Marina Boulevard, as noted above. Therefore, traffic impacts associated with the Pier 31½ Alternative would be considered short-term, minor, and adverse.

Transit. Under the Pier 31½ Alternative, all transit lines serving the study area would operate within the 85% capacity utilization threshold in the weekday a.m. peak hour in the near-term. However, in the weekday p.m. peak hour, the F-Line streetcar and Powell-Mason cable car would operate above the threshold in the outbound (i.e., away from Pier 31½) direction under both the No Action and Pier 31½ alternatives. The growth in transit ridership associated with this alternative (compared to the No Action Alternative) would be less than 1% of the capacity of the lines, and therefore, would not be considerable. During the weekend midday peak hour, the F-Line streetcar would exceed the City's capacity utilization standard in the inbound direction, and the Powell-Mason cable car would exceed the standard in both directions under both the No Action and Pier 31½ alternatives. Similar to the weekday p.m. peak hour conditions, the Pier 31½ Alternative's increase to transit ridership on these lines would be less than 1% of the total capacity of the lines, and would not be considerable. Therefore, the Pier 31½ Alternative would have a short-term, minor, adverse impact on transit capacity.

Bicycle Facilities. The Pier 31½ Alternative would be expected to generate new bicycle trips. Cyclists have access to multiple routes on both roadways and shared use paths. Since many of the major bicycle facilities are shared-use paths, changes in bicycle and pedestrian activity levels directly affect one another. Specifically, pedestrian walkway LOS results presented in this report are also somewhat indicative of bicycle conditions.

Under the Pier 31½ Alternative, bicycling would largely remain similar to the No Action Alternative, except that a modest increase in visitorship associated with the third berth would result in a commensurately moderate increase in cycling to the site. However, as noted earlier, bicycle infrastructure in the Pier 31½ area is relatively good, with both Class I and Class II facilities serving the Project site. On busy weekend days, particularly in the summer or when weather is warm and sunny, the Embarcadero is quite crowded with pedestrians and cyclists, increasing conflicts between the two. However, the decision to establish a more permanent home at Pier 31½ would not be likely to increase these conflicts substantially, and the Pier 31½ Alternative's impacts to bicycle circulation would be considered short-term, minor, and adverse.

Pedestrian Facilities. The Project is expected to generate new pedestrian trips. For the Pier

31½ Alternative, all trip types would require walking at least a short distance to the site except for tour bus and taxi trips, which would be assumed to be dropped off curbside or within the site. The Pier 31½ Alternative is projected to add approximately 85 pedestrians to the study area during the weekday p.m. peak hour, which is the analysis period that experiences the greatest pedestrian demand. These additional pedestrian trips are associated with the increases in visitor levels brought about by the proposed third berth. Since implementation of the Project at this location would represent a net increase in visitation over current use of the same facility (because much of the existing demand for the facility is reflected in the No Action Alternative Baseline counts), the change in pedestrian activity due to this alternative would be slight compared to other alternatives. It is likely that some of the new pedestrian traffic would use crosswalks at the intersections of Embarcadero/Bay Street, Embarcadero/Chestnut Street/Sansome Street, and Embarcadero/Lombard Street/Battery Street to travel between the embarkation site and nearby parking facilities, transit stops, or other destinations. Project pedestrian trips were assigned to crosswalks based on local knowledge, area land uses, and other transportation facilities (e.g., transit, parking facilities, etc.).

This alternative is estimated to add approximately 100 net new pedestrian trips to the Embarcadero Promenade near Pier 31½ during the weekend midday peak hour, which is the most congested analysis period. However, even with the additional pedestrian trips, the walkway would operate at an acceptable LOS.

Overall, implementation of the Pier 31½ Alternative would have a short-term, minor, adverse impact on pedestrian circulation.

Parking Facilities. The Project is expected to increase parking demand. Tables 41 and 42 present parking utilization with implementation of the Project for weekday and weekend conditions, respectively.

Both off- and on-street parking demand near Pier 31½ is greater during the week than on the weekends. As described above, since implementation of the Project at this location would represent a relatively modest increase in visitation over baseline conditions at the existing site, the change in parking utilization between the No Action Alternative Baseline conditions and the Pier 31½ Alternative would be slight compared to other alternatives.

On weekdays, between 12:00 and 6:00 p.m., on-street parking utilization would be expected to exceed the 95% utilization threshold under both the No Action and Pier 31½ alternatives. However, overall parking utilization in the area (including on- and off-street parking) would remain below the established threshold. This alternative is forecast to increase peak demand by less than ten parking spaces on weekdays and weekends at any given time between 9:00 a.m. and 6:00 p.m.

Although on-street parking in the area is expected to be fully utilized during the week, when on-street parking supply reaches capacity, drivers would seek out off-street facilities where parking vacancy is sufficient to support demand. Because the total parking supply is sufficient to meet Project demand, the Pier 31½ Alternative's impacts to parking would be considered short-term, minor, and adverse.

Cumulative Impact Analysis

Traffic. In 2035, traffic conditions in the study area are projected to get more congested with the combined effect of planned and reasonably foreseeable development. Compared to the No Action Alternative, the long-term effects of the Pier 31½ Alternative would be such that the same intersections that are projected to operate above threshold conditions under the No Action Alternative would continue to operate above threshold conditions. The Pier 31½ Alternative would not cause additional intersections to exceed established LOS thresholds, nor would it contribute

considerably to intersections projected to operate above threshold conditions in the No Action Alternative. Therefore, cumulative traffic impacts associated with the Pier 31½ Alternative would be considered long-term, minor, and adverse.

Transit. In the long-term cumulative conditions, the combination of changes to planned transit service in the study area, and overall growth in transit ridership associated with these changes, as well as increased development in the area, would contribute to increased transit utilization. In the a.m. peak hour in the inbound direction and the p.m. peak hour in the outbound direction, the 11-Downtown Connector (a new route that will be established as part of the Transit Effectiveness Project) is forecasted to exceed the 85% capacity utilization threshold under the No Action Alternative in the inbound direction in the a.m. peak hour and the outbound direction in the p.m. peak hour. The Pier 31½ Alternative would exacerbate this condition by increasing ridership on this route in the inbound and outbound directions by more than 1% of its capacity.

The Pier 31½ Alternative would contribute a substantial amount of riders to one transit line, exceeding the 85% capacity utilization threshold. In the a.m. peak hour, the impact would be isolated to just one transit line out of five that serve the Project site, and the line would continue to operate below 100% capacity. However, in the p.m. peak hour, the 11-Downtown Connector would be expected to exceed 100% of its capacity, and the Pier 31½ Alternative would contribute substantially to increases on this line. This means that, during the p.m. peak hour, the impact would not just be a less comfortable and more crowded ride, but instead, riders would not be able to get on the desired transit lines and would be forced to either wait until a less crowded vehicle arrived (i.e., delay their trip) or switch modes. Therefore, the cumulative impact of the Pier 31½ Alternative would be considered long-term, major, and adverse**.** Implementation of a supplemental shuttle service as described under mitigation measure Transportation-MM-1 may reduce this alternative's impacts on transit service. However, the details of such a system, including its effectiveness and costs, would require further coordination, planning, and outreach, and therefore, it cannot be guaranteed at this time. Therefore, the cumulative impact would be considered to remain major with mitigation in the long-term.

All other lines would operate within the 85% capacity utilization threshold, and the Pier 31½ Alternative would have a cumulatively minor adverse impact on those lines.

Bicycle Facilities. Cycling trips may increase between the completion of the Project and the long-term scenario due to the increasing effectiveness of bicycle facilities (such as accessible bicycle parking on-site and the improvement of on-street bicycle facilities citywide in accordance with the San Francisco Bicycle Plan). However, these increases are expected to result from improved infrastructure, and therefore, the increase in bicycle usage citywide would not be expected to create conditions that are unsafe for cyclists.

There would be an anticipated increase in background automobile traffic between the near- and long-term conditions, as shown in the cumulative traffic forecasts. This would result in an increase in automobile-bicycle conflicts on roadways in the study area. While there would be a general increase in vehicle traffic that would be expected through the future cumulative scenario, the action alternatives would not create potentially hazardous conditions for bicycles, or otherwise interfere with bicycle accessibility to the site and adjoining areas. For the above reasons, the Pier 31½ Alternative, in combination with past, present and reasonably foreseeable development in the City, would have long-term, minor, adverse, cumulative bicycle impacts.

Pedestrian Facilities. The San Francisco Waterfront, in proximity to Pier 31½, has very good pedestrian facilities, and most streets and intersections have adequate facilities to serve demand. In general, based on the

extensiveness of the existing network, including the wide promenade along the Embarcadero, the increased development in the area along would not result in overcrowding of sidewalks nor would it create new potentially hazardous conditions for pedestrians under cumulative conditions. Future sidewalk and intersection crossing improvements, should they be implemented, would improve pedestrian conditions by facilitating safe and easy pedestrian crossings, by providing safe spaces for pedestrians, by slowing traffic, and by increasing pedestrian visibility to drivers.

Walk trips may increase after the completion of the Pier 31½ Alternative, with the addition of cumulative development due to the addition of complimentary land uses, such as residential, retail, and office space, to the local area. Because transit users would walk between transit stops and the Pier 31½ Alternative site, measures to further promote effective use of transit could increase the number of pedestrians accessing the Pier 31½ Alternative site over time, although not to the level that would induce overcrowding of sidewalks under the cumulative condition.

There would be an anticipated increase in background automobile traffic between near- and long-term cumulative conditions, as shown in the cumulative traffic forecasts. This would result in an increase in automobile-pedestrian conflicts at intersections and driveways in the study area. While there would be a general increase in vehicle traffic that would be expected through the future scenario, cumulative pedestrian-automobile conflicts would be similar to near-term conditions. The Pier 31½ Alternative would not create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas. For the above reasons, the Pier 31½ Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would have long-term, minor, adverse, cumulative pedestrian impacts.

Parking Facilities. The analysis indicates that the Pier 31½ Alternative would have a minor impact on parking in the near-term, primarily because it would permanently establish the embarkation facility at its current, temporary location and would not represent a substantial change from existing conditions. Considering cumulative parking conditions, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase over time. Additionally, through the implementation of the City's Transit-First policy and the City's Better Streets program and related projects, especially along commercial corridors, some on-street parking may be removed to promote alternative modes of travel and more sustainable street designs. Therefore, under cumulative conditions, on-street parking conditions would be likely to become more challenging; however, the Pier 31½ Alternative's contribution to these conditions would be likely to remain relatively small, and the Alternative's cumulative parking impacts would be expected to be long-term, minor, and adverse.

Mitigation

Traffic. No mitigation is proposed.

Transit. The following mitigation measure is being proposed to address cumulative major transit impacts.

Transportation-MM-1—The SFMTA routinely monitors and adjusts its transit service to respond to changing demands and travel patterns over time. While it may be likely that SFMTA would adjust transit service in response to this alternative such that impacts to transit capacity utilization would be reduced, the Park Service cannot guarantee that this would occur. Thus, the Park Service should consider operating a supplemental shuttle service connecting key park destinations with major hotel and regional transit connections. However, the details of such a system, including its effectiveness and costs, would require further coordination,

planning, and outreach, and therefore, it cannot be guaranteed at this time.

Bicycle Facilities. No mitigation is proposed.

Pedestrian Facilities. No mitigation is proposed.

Parking Facilities. No mitigation is proposed

Conclusion

The Pier 31½ Alternative may cause long-term, major, adverse impacts to transit. The Pier 31½ Alternative would result in short-term, minor, adverse impacts to transit and short-and long-term, minor, adverse impacts to traffic, bicycle facilities, pedestrian facilities and parking facilities.

IMPACTS OF PIER 41 ALTERNATIVE

Construction

Similar to the Pier 31½ Alternative, it is anticipated that the Pier 41 Alternative's duration and disruptions levels would be similar to other recent construction activities along the northern San Francisco waterfront. Construction-related activities would generally occur Monday through Friday, between 7:00 a.m. and 4:00 p.m. Construction is not anticipated to regularly occur on weekends or major legal holidays, but may occur on an as-needed basis.

Construction staging would primarily occur within the site and on barges in the water adjacent to the site. Pedestrian circulation would be maintained along the Embarcadero throughout the construction process. The Park Service does not anticipate the need to close auto or bicycle lanes on the Embarcadero, given the amount of staging area on the Project site. However, if a need does arise, the closure would likely be short-term. If traffic, bicycle, parking, or sidewalk closures are needed, they would be coordinated with the City to minimize the effects on local circulation. In general, lane and sidewalk closures are subject to review and approval by the DPW and the SFMTA.

During construction, a number of trucks would travel into and out of the site. It is anticipated that the addition of worker-related vehicle- or transit-trips would not substantially affect transportation conditions, as increases on local intersections or the transit network would be relatively small in relation to existing traffic levels and would be temporary in nature.

Construction workers who drive to the site would cause a temporary increase in parking demand and a decrease in supply. Construction workers would need to park either on-street or in parking facilities that currently have availability during the day. However, parking shortfalls would be temporary and would likely be substantially less than those associated with buildout of the Pier 41 Alternative.

Under the Pier 41 Alternative, this construction would occur simultaneously with and adjacent to a major tourism area, with very high levels of pedestrians and bicycles, which may increase conflicts with pedestrians and visitors to the site. As noted above, detailed construction plans have not yet been prepared, but the Park Service would work to ensure that safe staging areas for visitors would be provided and maintained at all times.

Therefore, the proposed Project's construction impacts were determined to be short-term, minor, and adverse.

Operation

Traffic. Under the Pier 41 Alternative, traffic currently associated with the Pier 31½ site would shift to the Pier 41 site, in addition to anticipated growth in visitor levels. The same intersections would operate at LOS E or F as under the No Action Alternative, except for the intersection of Sansome Street and Broadway.

Currently, the intersection of Sansome Street and Broadway operates at LOS E in the weekday a.m. peak hour. With the Pier 41 Alternative, traffic currently associated with the Pier 31½ site would shift to Pier 41, reducing traffic volumes at this intersection such that it would improve to acceptable LOS D in the a.m. peak hour. This would be considered a short-term, moderate, beneficial impact associated with the Pier 41 Alternative.

The Pier 41 Alternative would cause the all-way stop controlled intersection of Webster Street and Marina Boulevard to deteriorate from LOS D to LOS E in the a.m. peak hour. However, the volumes do not meet the peak hour traffic signal warrant criteria, and therefore the impact would be considered short-term, minor, and adverse.

The Pier 41 Alternative would not considerably contribute to other intersections already operating above threshold levels (i.e., increases to critical movements operating at LOS E or F at these intersections would be less than 5%), nor would it cause any intersections that would operate acceptably under the No Action Alternative to deteriorate to. Therefore, traffic impacts at other locations would be short-term, minor, and adverse.

Transit. Under the Pier 41 Alternative, in the a.m. peak hour, ridership on the North/South screenline in the inbound direction (i.e., toward Pier 41) would increase from 77 to 88% occupancy. Because it would cause the line to exceed the City's thresholds, but would still operate within 100% of its capacity, the Pier 41 Alternative would cause a short-term, moderate, adverse impact.

All other screenlines would operate within acceptable levels during the a.m. peak hour with the Pier 41 Alternative. This would be a short-term, minor, adverse impact to all other screenlines during the a.m. peak hour.

In the p.m. peak hour, the Waterfront screenline in the outbound direction would exceed the 85% capacity utilization standard under the No Action and the Pier 41 alternatives. The Pier 41 Alternative would reduce capacity utilization on this screenline by relocating some existing trips to Pier 31½ to Pier 41; however, the screenline would still exceed the 85% threshold. Because all other screenlines would operate within acceptable levels, and the Pier 41 Alternative would reduce ridership on the overcapacity Waterfront screenline, but not to within acceptable levels, the Pier 41 Alternative would have a short-term, minor, adverse impact on transit in the p.m. peak hour.

In the weekend midday peak hour, the Pier 41 Alternative would cause the Downtown screenline to exceed the City's capacity utilization threshold in both the inbound and outbound directions. Because it would cause the line to exceed the City's thresholds, but would still operate within 100% of its capacity, the Pier 41 Alternative would cause a short-term, moderate, adverse impact during the Saturday midday peak hour.

With the Pier 41 Alternative, ridership on the Waterfront screenline would decrease in the inbound direction from above threshold levels of 115% capacity utilization under the No Action Alternative to 105% capacity utilization. All other screenlines would operate within the 85% capacity utilization threshold. Because all other screenlines would operate within acceptable levels and the Pier 41 Alternative would reduce ridership on the overcapacity Waterfront screenline, but not to within acceptable levels, the Pier 41 would have a short-term, minor, beneficial impact on the North/South and Waterfront screenlines during the weekend midday peak hour.

The moderate impacts above were identified for one out of three transit screenlines in the a.m. peak hour and the weekend midday peak hour. In both cases, the transit screenlines would exceed the 85% threshold, but would operate below 100% capacity, indicating that, although it may be uncomfortable, adequate capacity does exist to physically accommodate all forecasted demand. Transit users inconvenienced by the crowding may accept less comfortable conditions or shift to other options, including using alternate transit lines,

walking, cycling, or taxis. Therefore, because the Pier 41 Alternative would not cause any screenlines to exceed 100% of capacity, the overall impact of the Pier 41 Alternative on transit under near-term conditions would be considered short-term, moderate, and adverse.

Bicycle Facilities. Under the Pier 41 Alternative, the relocation of the embarkation site from Pier 31½ to Pier 41 would increase the overall number of visitors to the Fisherman's Wharf area, which would increase cycling. However, similar to the Pier 31½ Alternative, Fisherman's Wharf is relatively well-served by bicycle infrastructure. The Class II bicycle lane provided along the Embarcadero (as part of Route 5) currently terminates at North Point Street. However, the Class I portion of the Embarcadero, which also is part of the Bay Trail, continues until Pier 41, providing a continuous Class I connection between this site and downtown San Francisco. Relocating the embarkation facility from Pier 31½ to Pier 41 may increase conflicts between pedestrians and cyclists in the vicinity of Pier 41; however, the area provides good bicycle infrastructure, and the impacts would be considered short-term, minor, and adverse.

Pedestrian Facilities. The area surrounding Pier 41 is a major tourist area of San Francisco, and thus, experiences very high pedestrian volumes. The Pier 41 Alternative is projected to add up to 1,509 pedestrians to study area intersections during the weekday p.m. peak hour, which is the analysis period that experiences the greatest pedestrian demand. It is likely that some of the Project pedestrian traffic would use crosswalks at the intersections of Taylor and Jefferson streets and Powell and Jefferson streets to travel to and from the embarkation site. Project pedestrian trips were assigned to crosswalks based on local knowledge, area land uses, and other transportation facilities (e.g., transit, parking facilities, etc.).
As shown in Table 39, the addition of Project trips to study crosswalks would degrade conditions at four locations to above threshold level:

- Taylor Street/Jefferson Street (north crosswalk, crossing Jefferson Street)—weekend midday peak hour (LOS E)
- Powell Street/Jefferson Street (north crosswalk, crossing Embarcadero)—weekday p.m. peak hour (LOS E) and weekend midday peak hour (LOS F)
- Powell Street/Jefferson Street (east crosswalk, crossing Embarcadero)—weekend midday peak hour (LOS E)
- Powell Street/Jefferson Street (west crosswalk, crossing Jefferson)—weekend midday peak hour (LOS E)

As shown in Table 40, the Pier 41 Alternative would also create congestion along the Embarcadero Promenade, just east of Taylor Street in front of the potential embarkation site, associated with visitor arrivals and departures, as well as queuing. Specifically, these increases would degrade the promenade during the weekend midday peak hour from LOS D to LOS E.

The weekend midday peak hour has the highest impact, with three crosswalks impacted at the same intersection. As a whole, the pedestrian network would likely still perform reasonably well despite the Project impact. Further, given that the embarkation facility operated at Pier 41 for many years, conditions would not likely be substantially worse than was previously the case. Pedestrians inconvenienced by the crowding may shift to crossing at other intersections, including the other study intersection, which has excess pedestrian capacity. Therefore, the Project's increases in pedestrian traffic at these crossing locations would be considered a short-term, moderate, adverse impact. Implementation of Transportation-MM-2 and 3 may reduce this alternative's impacts on pedestrian facilities. However, the effectiveness and feasibility of these measures cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.
Parking Facilities. Both off- and on-street parking demand near Pier 41 is greater on the weekend than during the week, except for off-street facilities between 9:00 a.m. and 12:00 p.m. As presented in the "Transportation and

Circulation" section of the "Affected Environment" chapter, this alternative is forecast to require up to 153 and 192 parking spaces on weekdays and weekends, respectively. Off-street, on-street and combined total parking supply would be expected to be sufficient to support Project demand during all analysis periods. This alternative would also reduce the parking demand in the area surrounding Pier 31½. Overall, the Pier 41 Alternative would have a short-term, moderate, beneficial impact on parking.

Cumulative Impact Analysis

Traffic. In the long-term, traffic volumes are generally projected to increase over near-term conditions. Although the Pier 41 Alternative would contribute additional traffic to a number of intersections that are projected to operate at above threshold LOS in the long-term No Action Alternative, the increases are not projected to be cumulatively considerable, with one exception.

The Pier 41 Alternative would cause the intersection of Divisadero and Lombard streets to deteriorate from acceptable LOS D to above threshold LOS E during the p.m. peak hour. The impact at this intersection would be isolated to one study intersection and would not be an indication of how the vehicular network would function as a whole. The heightened delay at the intersection may cause some inconvenience and may cause drivers to divert to a less congested route, using the street network more efficiently. It may also cause drivers to switch to other modes of transportation, such as transit. Overall, although important in the context of a specific intersection, the impact of the Pier 41 Alternative under long-term cumulative conditions on overall vehicular network performance would be considered relatively small. Therefore, this would be considered a long-term, moderate, and adverse cumulative impact. (The intersection is projected to operate at above threshold LOS E in the a.m. peak hour under the No Action and Pier 41 alternatives). Implementation of a supplemental shuttle service as described under mitigation measure Transportation-MM-1 may reduce this alternative's impacts on traffic. However, the details of such a system, including its effectiveness and costs, would require further coordination, planning, and outreach, and therefore, it cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

All other intersections are either projected to operate acceptably, or the Pier 41 Alternative would not be projected to contribute cumulatively considerable volumes at these locations. Therefore, cumulative impacts to other intersection locations would be considered long-term, minor, and adverse.

Transit. In the long-term, the Pier 41 Alternative would cause the following screenlines that are projected to operate within the 85% capacity utilization threshold under the No Action Alternative to exceed the threshold:

- North/South Screenline (a.m. peak hour: inbound direction, p.m. peak hour: inbound and outbound directions)
- Downtown Screenline (a.m. peak hour: inbound direction)

Further, the Pier 41 Alternative would increase ridership by more than 1% of the capacity of the following screenlines projected to operate above the 85% capacity utilization threshold under the No Action Alternative:

- Downtown Screenline (p.m. peak hour: outbound direction, weekend midday peak hour: outbound direction)

The impacts identified above would either cause some screenlines to exceed 100% of their capacity or substantially worsen crowding on screenlines projected to exceed 100% capacity utilization without the Project. This would mean that the impact would not just be a less comfortable ride, but riders would not physically be able to get on the

desired transit lines and would be forced to either wait until a less crowded vehicle arrived (i.e., delay their trip) or switch modes. Therefore, the impact of the Pier 41 Alternative under cumulative transit conditions would be considered long-term, major, and adverse. Implementation of a supplemental shuttle service as described under mitigation measure Transportation-MM-1 may reduce this alternative's impacts on transit service. However, the details of such a system, including its effectiveness and costs, would require further coordination, planning, and outreach, and therefore, it cannot be guaranteed at this time. Therefore, the impact would be considered to remain major with mitigation in the long-term.

All other transit screenlines would operate acceptably within the 85% capacity utilization threshold, or the Pier 41 Alternative would not contribute considerably to above threshold operations, and cumulative impacts to other screenlines would therefore be considered long-term, minor, and adverse.

Bicycle Facilities. Cycling trips may increase between the completion of the Project and the long-term scenario due to increasing effectiveness of bicycle facilities (such as accessible bicycle parking on-site, and the improvement of on-street bicycle facilities citywide, in accordance with the San Francisco Bicycle Plan). However, these increases would be expected to result from improved infrastructure and are therefore the increase in bicycle usage citywide would not be expected to create conditions that are unsafe for cyclists.

There would be an anticipated increase in background automobile traffic between the near- and long-term conditions, as shown in the cumulative traffic forecasts. This would result in an increase in automobile-bicycle conflicts on roadways in the study area. While there would be a general increase in vehicle traffic that would be expected through the future cumulative scenario, the action alternatives would not create potentially hazardous conditions for bicycles, or otherwise interfere with bicycle access to the site and adjoining areas. For the above reasons, the Pier 41 Alternative, in combination with past, present and reasonably foreseeable developments in San Francisco, would have long-term, minor, adverse cumulative bicycle impacts.

Pedestrian Facilities. The San Francisco Waterfront in proximity to Pier 41, has very good pedestrian facilities, and most streets and intersections have adequate facilities to serve demand. However, as noted earlier, the Pier 41 Alternative would be expected to create short-term, moderate, adverse impacts, primarily in the vicinity of the embarkation facility itself, where visitors would arrive to and depart from the site, mixing with already heavy pedestrian volumes.

Walk trips may increase between the completion of the Pier 41 Alternative with the addition of cumulative developments due to the addition of complimentary land uses, such as residential, retail, and office space, to the local area. Because transit users would walk between transit stops and the Pier 41 Alternative site, measures to further promote effective use of transit could increase the number of pedestrians accessing the Pier 41 Alternative site over time.

Further, there would be an anticipated increase in background automobile traffic between near- and long-term cumulative conditions, as shown in the cumulative traffic forecasts. This would result in an increase in automobile-pedestrian conflicts at intersections and driveways in the study area.

Therefore, because the Pier 41 Alternative would create long-term, moderate, adverse pedestrian impacts, and pedestrian volumes are expected to increase in the area, the Pier 41 Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would have long-term, moderate, adverse cumulative pedestrian impacts. Implementation of mitigation measures Transportation-MM-2 and 3 may reduce this alternative's impacts on pedestrian facilities. However, the effectiveness and feasibility of these measures

cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

Parking Facilities. The analysis indicates that the Pier 41 Alternative would have a long-term, minor, adverse impact on parking, primarily due to the substantial number of parking garages in the vicinity. Considering cumulative parking conditions due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking would be likely to increase over time. Additionally, through the implementation of the City's Transit-First policy and the City's Better Streets program and related projects, especially along commercial corridors, some on-street parking may be removed to promote alternative modes of travel and more sustainable street designs. Therefore, under cumulative conditions, on-street parking conditions are likely to become more challenging; however, the Pier 41 Alternative's contribution to these conditions would be likely to remain relatively small, and the Alternative's cumulative parking impacts are expected to be minor and adverse.

Mitigation

Traffic. Mitigation measures that would generally increase auto capacity are typically in conflict with the City's Transit-First policy because of their negative effects to transit service and pedestrian and bicycle circulation, all of which are prioritized over auto circulation and capacity. Therefore, even if the Park Service had the ability to implement auto capacity enhancements to mitigate the Pier 41 Alternative's long-term moderate adverse impacts to the intersection of Divisadero and Lombard streets, those enhancements would likely be inconsistent with City policy, and thus would be generally considered infeasible.

Implementation of mitigation measure Transportation-MM-1, as described above under the Pier 31½ Alternative, would reduce the Pier 41 Alternative's auto mode share and could reduce the effect of auto traffic at this study intersection.

Transit. Mitigation measure Transportation-MM-1, as described above under the Pier 31½ Alternative, may reduce the transit impacts associated with the Pier 41 Alternative. However, the details of such a system would require further coordination, planning, and outreach, and therefore, cannot be guaranteed at this time.

Bicycle Facilities. No mitigation is proposed.

Pedestrian Facilities. The following mitigation measures are being proposed to address long-term, moderate adverse impacts on pedestrian facilities.

Transportation-MM-2—The Park Service should work with the City to identify and fund pedestrian capacity and safety improvements for the intersections of Taylor and Jefferson streets and Powell and Jefferson streets to improve pedestrian conditions in the area. Because these improvements would need to be constructed in cooperation with the City, DPW, and SFMTA, their implementation cannot be guaranteed.

Transportation-MM-3—The final design for the Pier 41 Alternative would include dedicated queuing areas for arriving visitors and clear wayfinding signage so that visitors do not linger in the middle of the promenade, blocking access and circulation for other pedestrians. While these measures would decrease the conflicts with other pedestrians, it is uncertain whether they would be fully effective in improving LOS to acceptable levels.

Parking Facilities. No mitigation is proposed.

Conclusion

The Pier 41 Alternative may cause moderate, adverse impacts to near-term transit and pedestrian facilities and long-term intersection traffic and pedestrian facilities. The Pier 41 alternative would also create long-

term, major, adverse impacts to transit conditions. The Pier 41 Alternative would result in short- and long-term, minor, adverse impacts to bicycle facilities and parking facilities.

IMPACTS OF PIER 3 ALTERNATIVE

Construction

Similar to the Pier 31½ Alternative, it is anticipated that the Pier 3 Alternative's duration and disruptions levels would be similar to other recent construction activities along the northern San Francisco waterfront. Construction-related activities would generally occur Monday through Friday between 7:00 a.m. and 4:00 p.m. Construction is not anticipated to occur on weekends or major legal holidays, but may occur on an as-needed basis.

Construction staging would primarily occur within the Lower Fort Mason area and on barges in the water adjacent to the site. Pedestrian circulation would largely be unaffected. The Park Service does not anticipate the need to close auto lanes, sidewalks, or bicycle lanes on public right of way, given the amount of staging area within Lower Fort Mason. However, if a need does arise, the closure would likely be short-term. If traffic, bicycle, parking, or sidewalk closures are needed, they would be coordinated with the City to minimize effects on local circulation. In general, lane and sidewalk closures are subject to review and approval by the DPW and SFMTA.

During construction, a number of construction-related trucks would travel into and out of the site. It is anticipated that the addition of the worker-related vehicle or transit trips would not substantially affect transportation conditions, as increases on local intersections or the transit network would be relatively small in relation to existing traffic levels and would be temporary in nature.

Construction workers who drive to the site would cause a temporary increase in parking demand and a decrease in supply. Construction workers would need to park either on-street or in parking facilities that currently have availability during the day. However, parking shortfalls would be temporary and relatively minor due to the limited scope of construction.

Therefore, this alternative's construction impacts would be determined to be short-term, minor, and adverse.

Operation

Traffic. This scenario essentially retains the current transportation system in the area. Under this scenario, traffic currently associated with the Pier 31½ site would shift to Lower Fort Mason along with anticipated growth in visitor levels. The same intersections would operate at above threshold LOS E or F as under the No Action Alternative, with two exceptions.

Currently, the intersection of Kearny Street, the Embarcadero, and North Point Street operates at LOS F in the weekday p.m. and weekend midday peak hours. Traffic volumes would reduce at this intersection such that it would continue to operate at LOS F during the weekend midday peak hour but would improve from LOS F to LOS E during the weekday p.m. peak hour. This would be considered a short-term, moderate, beneficial impact associated with the Pier 3 Alternative.

In addition, the intersection of Sansome Street and Broadway currently operates at LOS E during the weekday a.m. peak hour. Traffic volumes would reduce at this intersection such that it would improve to acceptable LOS D during the a.m. peak hour. This would be considered a short-term, moderate, beneficial impact associated with the Pier 3 Alternative.

The Pier 3 Alternative would cause the all-way stop controlled intersection of Webster Street and Marina Boulevard to deteriorate from LOS D to LOS E during the a.m. peak hour.

However, the volumes do not meet the peak hour traffic signal warrant criteria and therefore the impact would be considered short-term, minor, and adverse.

The Pier 3 Alternative would not considerably contribute to other intersections already operating at unacceptable levels (i.e., increases to critical movements operating at LOS E or F at these intersections would be less than 5%), nor would it cause any intersections that would operate acceptably under the No Action Alternative to deteriorate. Therefore, traffic at other locations would result in a short-term, minor, adverse impact.

Transit. Under the Pier 3 Alternative, all transit lines would operate within the City's capacity utilization threshold during all study periods. Therefore, this alternative would have a short-term, minor, adverse impact on transit capacity utilization.

Bicycle Facilities. Under the Pier 3 Alternatives, the relocation of the embarkation site from Pier 31½ to Lower Fort Mason would increase the number of visitors cycling to Lower Fort Mason compared to existing conditions. There is relatively good bicycle infrastructure in the area, as the Bay Trail travels on McDowell Avenue (which is closed to cars except for emergency vehicles) through Upper Fort Mason, touching down at the intersection of Beach Street and Laguna Avenue, near the entrance to Lower Fort Mason.

As noted earlier, there are currently a considerable number of cyclists traveling through this area making a popular loop from Fisherman's Wharf, along the waterfront to the Golden Gate Bridge, and across the bridge to Sausalito, returning to San Francisco via ferry. This high volume of cyclists has created some substantial conflicts at the intersection of Beach Street and Laguna Avenue, where cyclists and pedestrians converge in a relatively small, 7-foot landing area. The combination of large volumes of people waiting in a relatively small space and bicycles traveling downhill at generally higher speeds, creates the potential for increased collisions, as well as a generally uncomfortable experience for all users. Relocating the Alcatraz embarkation facility to Lower Fort Mason would likely increase the number of cyclists and pedestrians at this location, which may be a hazard.

However, the impact to bicycling conditions is isolated to one location. This location is not representative of the Bay Trail within San Francisco or the San Francisco bicycle network as a whole. Although this alternative would increase usage of this facility, the site represents an existing deficiency, and not a substantial change to bicycle safety in the Lower Fort Mason area as a whole. Therefore, because the Pier 3 Alternative would be increasing usage at an existing deficiency and not creating a new safety problem, the impact of the Pier 3 Alternative would be considered short-term, moderate, and adverse. Mitigation measure Transportation-MM-4 may reduce this alternative's impacts on bicycle facilities. However, the effectiveness and feasibility of this measure cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

Pedestrian Facilities. The Pier 3 Alternative is projected to add up to 1,490 pedestrians to study area intersections during the weekday p.m. peak hour, which is the analysis period that experiences the greatest pedestrian demand. It is likely that some of the Project pedestrian traffic will use crosswalks at the intersections of Laguna and Beach streets and Buchanan Street and Beach Street—Marina Boulevard to travel to and from the embarkation site. Project pedestrian trips were conservatively assigned to crosswalks based on local knowledge, area land uses, and other transportation facilities (e.g., transit, parking facilities, etc.). As shown in Table 39, the addition of Project trips to study crosswalks does not degrade conditions to above threshold levels.

As shown in Table 40, this alternative would be estimated to increase pedestrian volumes the Bay Trail near Pier 4 during the weekend midday peak hour, which is the most

congested analysis period. However, even with the additional pedestrian trips, the walkway operates at an acceptable LOS.

Therefore, the Pier 3 Alternative would be expected to have a short-term, minor, adverse impact.

Parking Facilities. Both off- and on-street parking demand near Fort Mason are generally greater on the weekend than during the week. As presented in the "Transportation and Circulation" section of the "Affected Environment" chapter, this alternative would be forecast to require up to 212 and 246 parking spaces on weekdays and weekends, respectively.

The Fort Mason area's parking supply consists of multiple parking types and areas: SFMTA-managed public off-street parking garages (approximately 320 spaces), on-street unmetered parking (approximately 1,990 spaces), off-street surface parking lots at Marina Green (approximately 670 spaces), off-street surface parking lot at Lower Fort Mason (approximately 440 spaces), and off-street surface parking lots at Upper Fort Mason (approximately 350 spaces). The existing conditions analysis concluded that individual parking facilities are already heavily used on weekends. Specifically, the Lower Fort Mason parking lot is over 100% capacity between 12:00 and 6:00 p.m.; Upper Fort Mason is over 100% capacity between 3:00 and 6:00 p.m.; and on-street parking is near or at 95% capacity between 12:00 and 9:00 p.m. In contrast, the surface lot in Marina Green is less utilized and is likely to be the location where Project-related vehicles would find parking unless restrictions are enacted to control the type of parking at the lot.

However, with the implementation of the Pier 3 Alternative, overall parking utilization in the area would be expected to exceed the threshold (95% utilization) during the following two analysis periods: on weekends between 12:00. and 3:00 p.m., and between 3:00. and 6:00 p.m. The total parking supply in the Fort Mason area is insufficient to meet project demand and still achieve parking utilization below 95%.

Since this impact was analyzed for the entire parking supply in the area, the parking deficiencies are expected to be felt areawide, and not isolated to a single location, and it would be difficult for drivers to find reasonable parking alternatives in the area. Therefore, the Pier 3 Alternative would result in a short-term, major, adverse impact to parking supply. Implementation of mitigation measure Transportation-MM-5 may reduce this alternative's impacts on parking facilities. However, the effectiveness and feasibility of these measures cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

Cumulative Impact Analysis

Traffic. In the longer-term, traffic volumes are generally projected to increase over near-term conditions. Although the Pier 3 Alternative would contribute traffic to a number of intersections that are projected to operate at above threshold LOS in the long-term No Action Alternative, the increases are not projected to be cumulatively considerable, with one exception.

The Pier 3 Alternative would contribute a considerable volume to critical movements operating at above threshold LOS at the intersection of Laguna and Bay streets, which is projected to operate at above threshold LOS F under the No Action and Pier 3 alternatives. This impact would be isolated to one study intersection. The vehicular network would not be drastically affected by the Project, as a whole. Additionally, on a regional scale, the impact is somewhat offset by the beneficial impacts at other locations, and reflects the fact that congestion would be shifted from near the current embarkation facility to the Fort Mason area. The heightened delay at the intersection may cause some inconvenience and may cause drivers to divert to a less congested route, using the street network more efficiently. It may also cause drivers to

switch to other modes of transportation. Overall, the impact of the Pier 3 Alternative under cumulative conditions on overall vehicular network performance would be considered moderate and adverse. Implementation of a supplemental shuttle service as described under mitigation measure Transportation-MM-1 may reduce this alternative's impacts on traffic. However, the details of such a system, including its effectiveness and costs, would require further coordination, planning, and outreach, and therefore, it cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

All other intersections are either projected to operate acceptably, or the Pier 3 Alternative is not projected to contribute cumulatively considerable volumes at these locations. Therefore, cumulative impacts to other intersection locations would be considered long-term, minor, and adverse.

Transit. In the long-term, the Pier 3 Alternative would cause the following screenlines to exceed the 85% capacity utilization threshold that would exist under the No Action Alternative:

- West Screenline (p.m. peak hour: outbound direction)

Further, the Pier 3 Alternative would increase ridership by more than 1% of the capacity of the following screenlines projected to operate above the 85% capacity utilization threshold under the No Action Alternative:

- North/South Screenline (a.m. peak hour: inbound direction, p.m. peak hour: inbound and outbound directions, weekend midday peak hour: outbound direction)

The impacts identified above would contribute substantial ridership to capacity utilization of two of three screenlines during the p.m. peak hour. Specifically, this alternative would either cause some screenlines to exceed 100% capacity utilization or would substantially increase capacity utilization on screenlines projected to operate above 100% utilization without the Project, meaning that riders would either have to wait for a less-crowded vehicle (i.e., delay their trip) or would have to switch to other modes. Therefore, the impact of the Pier 3 Alternative under cumulative conditions would be considered long-term, major, and adverse.

All other transit screenlines would operate within the 85% capacity utilization threshold, or the Pier 3 Alternative would not contribute considerably to above threshold operations, and cumulative impacts to other screenlines would therefore be considered long-term, minor, and adverse. Implementation of a shuttle between Fisherman's Wharf and Fort Mason as described in Transportation-MM-5 was considered as a way to reduce this alternative's impacts on transit capacity by providing an alternative method of transportation. However, further analysis found that implementation of a shuttle may increase transit impacts. Therefore, Transportation-MM-5 would result in long-term major, adverse cumulative impacts on transit.

This document also includes a separate discussion of the potential effects of a possible cumulative project, the F-Line Extension, on transit capacity at Pier 3. The F-Line Extension project has been approved but not funded and therefore cannot be assumed to be in place for this project. Because it provides increased transit supply to the Pier 3 area, the F-Line streetcar extension would increase the number of visitors who use transit to access Pier 3. As a result, the F-Line streetcar extension would increase the number of transit screenlines that would be adversely affected by the Pier 3 Alternative (see the "Special Pier 3 Analysis: Effects of the F-Line Streetcar Extension on the Pier 3 Alternative" section in this chapter).

Bicycle Facilities. In the long-term, effects on biking facilities would be similar to as described above under project impacts. This alternative would increase usage of this facility

in the long term but would not result in a substantial change to bicycle safety in the Lower Fort Mason area as a whole. Therefore, because the Pier 3 Alternative would be increasing usage at an existing deficiency and not creating a new safety problem, the impact of the Pier 3 Alternative would be considered a long-term, moderate, adverse impact. Implementation of Transportation-MM-4 may reduce this alternative's impacts on bicycle facilities. However, the effectiveness and feasibility of this measure cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term.

Pedestrian Facilities. In the long-term, effects on pedestrian facilities would be similar to as described above under project impacts. It is likely that some of the Project pedestrian traffic will use crosswalks at the intersections of Laguna and Beach streets and Buchanan Street and Beach Street—Marina Boulevard to travel to and from the embarkation site. As shown in Table 40, this alternative would be estimated to increase pedestrian volumes the Bay Trail near Pier 4 during the weekend midday peak hour, which is the most congested analysis period. However, even with the additional pedestrian trips, the walkway operates at an acceptable LOS. Therefore, the Pier 3 Alternative would be expected to have a long-term, minor, adverse impact.

Parking Facilities. Both off- and on-street parking demand near Fort Mason are generally greater on the weekend than during the week. The Fort Mason area's parking supply consists of multiple parking types and areas: SFMTA-managed public off-street parking garages (approximately 320 spaces), on-street unmetered parking (approximately 1,990 spaces), off-street surface parking lots at Marina Green (approximately 670 spaces), off-street surface parking lot at Lower Fort Mason (approximately 440 spaces), and off-street surface parking lots at Upper Fort Mason (approximately 350 spaces). With the implementation of the Pier 3 Alternative, overall parking utilization in the area would be expected to exceed the threshold (95% utilization) during the following two analysis periods: on weekends between 12:00. and 3:00 p.m., and between 3:00. and 6:00 p.m. The total parking supply in the Fort Mason area is insufficient to meet project demand and still achieve parking utilization below 95%.

Since this impact was analyzed for the entire parking supply in the area, the parking deficiencies are expected to be felt area-wide, and not isolated to a single location, and it would be difficult for drivers to find reasonable parking alternatives in the area. Therefore, the Pier 3 Alternative would result in a long-term, major, adverse impact to parking supply. Implementation of Transportation-MM-5 may reduce this alternative's impacts on parking facilities. However, the effectiveness and feasibility of these measures cannot be guaranteed at this time. Therefore, the impact would be considered to remain moderate with mitigation in the long-term

Mitigation

Traffic. Mitigation measures that would generally increase auto capacity are typically in conflict with the City's Transit-First policy because of their negative effects to transit service and pedestrian and bicycle circulation, all of which are prioritized over auto circulation and capacity. Therefore, even if the Park Service had the ability to implement auto capacity enhancements to mitigate the Pier 41 Alternative's long-term moderate adverse impacts to the intersection of Divisadero and Lombard streets, those enhancements would likely be inconsistent with City policy, and thus would be generally considered infeasible.

Implementation of mitigation measure Transportation-MM-5, as described below, would reduce the Pier 3 Alternative's auto mode share and could reduce the effect of auto traffic at this study intersection.

Transit. Implementation of mitigation measure Transportation-MM-5, as described below, was considered as a way to reduce this

alternative's impacts on transit capacity by providing an alternative method of transportation. However, further analysis found that implementation of a shuttle may increase transit impacts.

Pedestrian and Bicycle Facilities. The following mitigation measure is being proposed to address long-term, moderate adverse impacts to pedestrian and bicycle facilities.

Transportation-MM-4—Improvements to the bicycle and pedestrian facilities at the intersection of Laguna and Beach streets should be incorporated as part of the final design for the Pier 3 Alternative to increase space for cyclists and pedestrians at this congested location. However, these improvements would likely need to be constructed in cooperation with the City, DPW, and SFMTA, and thus, their implementation cannot be guaranteed.

Parking. The following mitigation measure is being proposed to address long-term, major adverse parking impacts.

Transportation-MM-5—Implementation of a transit connection between Fisherman's Wharf and Lower Fort Mason would reduce the number of vehicles attempting to park in the Fort Mason area by providing an incentive to use transit, as well as taking advantage of large parking structures near Fisherman's Wharf.

As discussed below, the F-Line extension is a potential future cumulative project that could serve as a transit connection. The F-Line streetcar has already been approved and, with the cooperation of SFMTA, could happen independently of this document. However, the extension is not yet funded. Therefore, this EIS also analyzed an independent shuttle. If an independent shuttle were operated, it would generally operate at approximately the same service hours as ferry service to/from Alcatraz (between 8:30 a.m. and 9:30 p.m. during peak seasons, with shorter hours during off-peak seasons). A shuttle option is fully analyzed as an alternative in the Transportation Study (NPS 2014b).

Implementation of mitigation measure Transportation-MM-5 would be expected to decrease the Pier 3 Alternative's contribution to parking shortfalls in the vicinity of Pier 3 by providing a direct shuttle connection between Fort Mason and Fisherman's Wharf. With implementation of mitigation measure Transportation-MM-5, a number of vehicles would park near Fisherman's Wharf and use the shuttle to access the Project at Pier 3. However, although implementation of mitigation measure Transportation-MM-5 would reduce the Pier 3 Alternative's parking impact, the parking utilization is still expected to exceed the threshold (95% utilization) during the weekend 3:00 to 6:00 p.m. analysis period. The total parking supply in the Fort Mason area is insufficient to meet Project demand and still achieve parking utilization below 95%; therefore, even with implementation of mitigation measure Transportation-MM-5, the Pier 3 Alternative would result in a long-term, major, adverse cumulative impact to parking in the Lower Fort Mason area.

Implementation of a shuttle may increase transit impacts. In the long-term, the same screenlines that are projected to operate within the 85% capacity utilization threshold under the No Action Alternative would exceed the threshold under the Pier 3 Alternative without the shuttle, plus one additional screenline:

- North/South Screenline (weekend midday peak hour: inbound direction)

Further, the Pier 3 Alternative with mitigation measure Transportation-MM-5 would increase ridership by more than 1% of the capacity at the same screenlines projected to operate above the 85% capacity utilization threshold under the No Action Alternative compared to the Pier 3 Alternative without the shuttle. Therefore, Transportation-MM-5 would result in long-term major, adverse cumulative impacts on transit.

Implementation of a shuttle may slightly decrease traffic volumes near the Pier 3 area. However, the Pier 3 Alternative would continue to have a beneficial impact at the intersections of Kearny Street, The Embarcadero, and North Point Street during the weekday p.m. and weekend midday peak hours, and the intersection of Sansome Street and Broadway during the weekday a.m. peak hour, similar to conditions under the Pier 3 Alternative without a shuttle.

Implementation of mitigation measure Transportation-MM-5 would not substantially change the Pier 3 Alternative's impacts to bicycle circulation. Mitigation measure Transportation-MM-4 would still be required, but because its implementation cannot be guaranteed, the cumulative impacts to bicycle circulation would be considered long-term, moderate, and adverse.

Implementation of mitigation measure Transportation-MM-5, is projected to result in approximately 40% fewer pedestrians to the surrounding pedestrian network than the Pier 3 Alternative with no shuttle. It is likely that some of the Project pedestrian traffic would use crosswalks at the intersections of Laguna and Beach streets and Buchanan Street and Beach Street—Marina Boulevard to travel to and from the embarkation site.

Conclusion

The Pier 3 Alternative may cause short-term, minor, adverse impacts to construction, traffic, transit, and pedestrian circulation. The alternative may also cause moderate, adverse impacts to bicycle facilities, and major, adverse impacts to parking facilities. The Pier 3 Alternative would cause long-term, moderate, adverse traffic impacts and long-term, major, adverse transit impacts, and would continue to cause long-term, moderate, adverse bicycle impacts, long-term, major, adverse parking impacts, and long-term, minor, adverse pedestrian impacts.

Special Pier 3 Analysis: Effects of the F-Line Streetcar Extension on the Pier 3 Alternative (Potential Cumulative Project)

Because of potential issues related to parking, transit and access under Alternative 3, an in-depth analysis was conducted that examined the alternative under long-term cumulative conditions, with the planned extension of the F-Line streetcar to Lower Fort Mason from its current terminus near Fisherman's Wharf. This analysis is included as part of the Transportation Study under the 'F-Line Extension Only Scenario' (NPS 2014b). In general, extension of the F-Line streetcar would reduce the number of visitors driving to the Pier 3 area, and increase the number of visitors who use transit, although a number would continue to use automobiles to access parking areas near Fisherman's Wharf and use the F-Line to reach Pier 3 from Fisherman's Wharf.

Traffic. Despite the reduction in traffic to the Pier 3 area, extension of the F-Line to Lower Fort Mason would not result in a substantial change to the Pier 3 Alternative's traffic impacts. Specifically, the Pier 3 Alternative would continue to create a short-term, moderate, adverse cumulative impact at the intersection of Laguna and Bay streets.

Transit. Because it provides increased transit supply to the Pier 3 area, the F-Line streetcar extension would increase the number of visitors who use transit to access Pier 3. As a result, the F-Line streetcar extension would increase the number of transit screenlines that would be adversely affected by the Pier 3 Alternative. In addition to the long-term, major, adverse transit impacts identified above for Pier 3 with no F-Line streetcar extension, the Pier 3 Alternative would cause the North/South screenline in the inbound direction during Saturday midday peak hour to exceed the City's threshold, and would considerably contribute to the East screenline in the inbound direction during the p.m. peak hour, which would already exceed the City's threshold under the No Action Alternative. This impact would be considered

cumulatively major and adverse, because one or more of the screenlines would operate above 100% capacity utilization, meaning that users would not just have a less comfortable ride, but may not physically be able to get on their bus or train of choice.

Bicycle Facilities. Extension of the F-Line streetcar would not affect bicycle conditions as they relate to the Pier 3 Alternative, and cumulative impacts would remain moderate and adverse.

Pedestrian Facilities. Extension of the F-Line streetcar into Lower Fort Mason would result in approximately 30% fewer pedestrians accessing Pier 3 from outside of Fort Mason compared to a scenario without the F-Line streetcar extension. This is primarily due to the addition of the additional access option offered by the F-Line streetcar, itself. Thus, pedestrian crowding in the surrounding area would be somewhat less with the F-Line streetcar extension, and the Pier 3 Alternative's cumulative impacts to pedestrian facilities would remain minor and adverse.

Parking Facilities. Extension of the F-Line streetcar into Lower Fort Mason would reduce parking demand in the Lower Fort Mason area, as visitors would have the option to reach the site via the F-Line streetcar, which would not require driving. Parking demand would return to within acceptable levels during the weekend midday period between 12:00 and 3:00 p.m. Parking supply during the 3:00 to 6:00 p.m. period would remain above acceptable levels, although it would be lower than conditions without the F-Line extension. Because the overall parking demand would remain above 95% of supply for at least part of the weekend peak period, the cumulative impact would remain major and adverse.

FORT MASON SPECIAL FERRY SERVICE

Under all alternatives, special ferry service to Fort Mason could be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that would comprise the physical elements of this development is inherently accounted for in the alternative's impact analysis. The discussion below is a summary of how the impact analysis presented above would change if ferry service were implemented at Fort Mason in combination with the Pier 31½ or Pier 41 alternatives.

Impact Analysis

Short-term impacts associated with the Pier 31½ Alternative would remain the same with the addition of special ferry service to Lower Fort Mason.

Short-term impacts associated with construction, bicycle facilities, pedestrian facilities, and parking facilities would be the same for the Pier 41 Alternative with the addition of Fort Mason special ferry service. The Pier 41 Alternative with special ferry service to Fort Mason would result in an additional traffic impact at the intersection of Divisadero Street and Marina Boulevard, which would be a short-term, moderate, adverse impact. Implementation of Transportation MM-6 has the potential to reduce impacts. However, because the Park Service cannot guarantee implementation of this mitigation measure, the impact would be considered to remain moderate and adverse.

The Pier 41 Alternative would also have an additional transit impact at the Fort Mason East screenline, which would be a moderate, adverse impact because the screenline would still operate below 100% capacity utilization.

Cumulative Impact Analysis

The Pier 31½ Alternative with the introduction of special ferry service at Lower Fort Mason would have the same long-term cumulative impacts as the Pier 31½ Alternative discussed earlier, with the exception of transit. The addition of special ferry service to Lower Fort Mason would cause the Pier 31½

Alternative to create an additional long-term transit impact on the Lower Fort Mason North/South transit screenline. This would be an additional major, adverse transit impact, as the screenline would operate above 100% capacity utilization.

The addition of special Lower Fort Mason ferry service to the Pier 41 Alternative would have the same long-term impacts as the Pier 41 Alternative described above, except for transit. The addition of special ferry service to Lower Fort Mason would cause the Pier 41 Alternative to have an additional long-term, adverse transit impact at the Fort Mason North/South screenline, which would be a major, adverse impact because the screenline would exceed 100% capacity utilization.

Mitigation

Traffic. The following mitigation measure is being proposed to address an additional traffic impact at the intersection of Divisadero Street and Marina Boulevard.

Transportation-MM-6—The Park Service should work with the City to analyze the potential for a new traffic signal at the intersection of Divisadero Street and Marina Boulevard and, if appropriate, fund the creation of the signal. Installation of a traffic signal at this intersection would improve the intersection LOS to LOS B during the weekend midday peak hour. However, this recommendation is based on a general correlation between the amount of new traffic generated by the Project and the need for new traffic signals. The ultimate decision as to whether a new traffic signal is an appropriate treatment at this location would be made by the City Traffic Engineer, based on a full examination of traffic signal warrants and other factors that they may deem appropriate.

Transit. Implementation of mitigation measure Transportation-MM-5, as described above under Pier 3 analysis was considered as a way to reduce this alternative's impacts on transit capacity by providing an alternative method of transportation. However, further analysis found that implementation of a shuttle may increase transit impacts.

Bicycle Facilities. No mitigation is proposed.

Pedestrian Facilities. No mitigation is proposed.

Parking Facilities. No mitigation is proposed.

Conclusion

The addition of special ferry service to the Pier 31½ Alternative would generally have the same impacts as the Pier 31½ Alternative without the special ferry service, except for an additional long-term, major, adverse transit impact.

The addition of special ferry service to the Pier 41 Alternative would generally have the same impacts as the Pier 41 Alternative without the special ferry service, except for an additional short-term, moderate, adverse traffic impact, an additional short-term, moderate, adverse transit impact, and an additional long-term, major, adverse transit impact.

FORT BAKER SPECIAL FERRY SERVICE

This Project element also includes retrofit of the pier substructure and the construction of a pedestrian path, as well as the establishment of special ferry service at Fort Baker as detailed in the "Alternatives" chapter.

Impact Analysis

Construction activities at the Fort Baker pier would generally be away from major activity nodes in Fort Baker, and would not likely impact the surrounding circulation network. Therefore, construction impacts associated with retrofit of the Fort Baker Pier would be considered short-term, minor, and adverse.

Traffic impacts associated with the special ferry service to Fort Baker would likely be short-term, minor, and adverse, as there would not be regularly scheduled ferry service that might generate automobile traffic. Rather, the service would likely result in less traffic because it would shuttle passengers between destinations where they currently use cars, vans, or shuttle buses.

Transit impacts associated with the special ferry service to Fort Baker are likely to be short-term, minor, and adverse because there is no substantial transit service currently serving Fort Baker, and, if anything, the ferry service would function as additional (unscheduled, special event) transit service.

Bicycle and pedestrian impacts associated with the Fort Baker pier and special event ferry service are likely to be beneficial due to the improved connection between the pier and the more active uses at Fort Baker. The number of bicycles and pedestrians on a typical day is not likely to increase, so the improvements to Fort Baker are likely to reduce conflicts, if anything.

Parking conditions at Fort Baker are not likely to be substantially affected by the Fort Baker Pier retrofit and special event ferry service. Service would likely be provided to visitors at off-peak times (time periods when the area receives the least number of visitors, such as evenings), when parking in the Fort Baker area is ample, and not during peak times (e.g., midday weekends, when the Bay Area Discovery Museum is generating peak parking demands). If special service is proposed, the Park Service would determine whether it would coincide with a peak parking period at Fort Baker and would take that into account when approving the service.

Cumulative Impact Analysis

In the long-term, there is very little anticipated development in the Fort Baker area, which means that there would likely be few changes to transportation conditions compared to the near-term impact analysis. Therefore, there would not likely be any additional cumulative impacts associated with the Fort Baker special event ferry service.

Mitigation

Traffic. No mitigation is proposed.

Transit. No mitigation is proposed.

Bicycle Facilities. No mitigation is proposed.

Pedestrian Facilities. No mitigation is proposed.

Parking Facilities. No mitigation is proposed.

Conclusion

The addition of special event ferry service to Fort Baker would not likely create additional adverse transportation impacts.

Table 43 shows a summary of the impact findings described in this section.

TABLE 43. SUMMARY OF TRANSPORTATION AND CIRCULATION IMPACT FINDINGS

Impact Area	Pier 31½ Alternative	Pier 41 Alternative	Lower Fort Mason Alternative (No F-Line Extension or Shuttle Scenario)	Lower Fort Mason Alternative (F-Line Extension Only Scenario)	Lower Fort Mason Alternative (Shuttle Only Scenario)
Intersection Traffic (Near-term)	Minor	Minor	Beneficial/Minor	N/A	Beneficial/Minor
Intersection Traffic (Long-term)	Minor	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Transit (Near-term)	Minor	**Moderate**	Minor	N/A	Minor
Transit (Long-term)	**Major**	**Major**	**Major**	**Major**	**Major**
Bicycle Facilities (Near-term)	Minor	Minor	**Moderate**	N/A	**Moderate**
Bicycle Facilities (Long-term)	Minor	Minor	**Moderate**	**Moderate**	**Moderate**
Pedestrian Facilities (Near-term)	Minor	**Moderate**	Minor	N/A	Minor
Pedestrian Facilities (Long-term)	Minor	**Moderate**	Minor	Minor	Minor
Parking Facilities (Near-term)	Minor	Minor	**Major**	N/A	**Major**
Parking Facilities (Long-term)	Minor	Minor	**Major**	**Major**	**Major**
Construction	Minor	Minor	Minor	Minor	Minor

Note:
Moderate and major adverse impacts are marked in **bold** text.

AIR QUALITY

METHODOLOGY AND THRESHOLDS

Construction

Sources of construction emissions would include tugboats, workboats, offroad construction equipment, and onroad vehicles. The following assumptions were made in quantifying construction emissions:

- Construction equipment size, activity, schedule, and utilization are presented in Appendix B.
- Construction would take between 7 and 20 months, depending on the action alternative. The Pier 31½ action alternative would take approximately 7 months in 2016, whereas the Pier 41 and Pier 3 alternatives would take up to 20 months and occur in years 2016 and 2017. Construction at Fort Baker, common to all action alternatives, would take approximately 11 months and would occur in 2016.
- Default California Emissions Estimator Model (CalEEMod) off-road construction equipment age and onroad fleet mix were used. Tugboat and workboat emission factors and characteristics were derived from the CARB Harbor Craft Model default fleet mix in the Bay Area (CARB 2010).
- BAAQMD recommends that the Basic Construction Mitigation Measures (Table 44) be applied to all projects, regardless of whether construction emissions exceed significance (BAAQMD 2011). Since the BAAQMD recommends implementation of the Basic Construction Mitigation Measures for all proposed projects, this analysis considers the Basic Construction Mitigation Measures as part of the Project and not as mitigation measures.

TABLE 44. BASIC CONSTRUCTION MITIGATION MEASURES

Basic Construction Mitigation Measures
1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt trackout onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading, unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure title 13, CCR section 2485). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. A publicly visible sign shall be posted with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Notes:
BAAQMD CEQA Guidelines (BAAQMD 2011)
These basic construction mitigation measures are recommended by BAAQMD, as a way to meet the BMP threshold for fugitive dust in Table 45, regardless of whether or not construction-related emissions exceed applicable thresholds.

TABLE 45. RELEVANT AIR QUALITY SIGNIFICANCE THRESHOLDS

	Construction	Operation	
BAAQMD Mass Daily Regional Thresholds (net increase)			
Pollutant	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
VOC	54	54	10
NOx	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
PM_{10} and $PM_{2.5}$ (fugitive dust)	Implementation of BAAQMD-mandated BMPs	None	
BAAQMD Localized Thresholds			
CO	None	9.0 ppm (8-hour average) 20.0 ppm (1-hour average) Or the following screening criteria: Consistency with local CMP and traffic volumes at affected intersections below 44,000 vehicles per hour or 24,000 vehicles per year in tunnel-like conditions	
BAAQMD Odor Threshold			
Odor	None	Five confirmed complaints per year averaged over three years	
BAAQMD Cumulative Thresholds[1]			
ROG, NOx, PM_{10}, $PM_{2.5}$	If individual emissions from a project would result in an increase that exceeds the project-level significance criteria, then the project would also be considered to contribute considerably to a significant cumulative effect.		
Plan Bay Area Safe Siting Distance			
Ferry Terminals	500 feet (152 meters)		
GHG CEQ Reference Point[2]			
GHG	25,000 mty		

Notes:
lb/day = pounds per day
mty = metric tons per year
ROG = reactive organic gas
tpy = tons per year

1 Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. BAAQMD holds that, by its nature, air pollution is largely a cumulative impact and that no single project is sufficient in size to result in nonattainment of ambient air quality standards by itself. Instead, a project's individual emissions contribute to existing cumulatively adverse air quality impacts. If a project exceeds the identified thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary (BAAQMD 2011).

2 In 2010, the CEQ provided guidance for federal agencies to assess the effects of federal actions on GHG and climate change under NEPA. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 mty or more of CO_2e GHG emissions, agencies should consider this an indicator that a detailed consideration under NEPA is warranted. CEQ did not propose a reference point for indirect GHG emissions. It should be noted that CEQ's guidance did not propose the 25,000 mty reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather as a minimum standard for reporting emissions under the CAA (CEQ 2010).

Operations

Sources of operational emissions would include marine ferries and on-road vehicles, such as visitor and employee vehicles, shuttles, tour buses, and delivery vehicles, in support of the ferry service. The following assumptions were made in quantifying operational emissions:

- Emissions were calculated for operational years 2018 and 2035. Year 2018 was chosen as the first year following completion of construction and year 2035 was chosen as the long-term future year. These years are consistent with the Transportation and Circulation Study (NPS 2014b).
- Ferry assumptions:
  - Ferry engine characteristics were based on the existing Alcatraz ferry fleet, provided by Hornblower (Hornblower 2013) and primarily consist of diesel-fueled ferries with Tier 2, 700 hp propulsion engines, equipped with selective catalytic reduction and diesel oxidation catalyst control technologies. Ferry characteristics are included in the Appendix B tables.
  - The distance traveled by ferries to Alcatraz would decrease slightly for the Pier 3 Alternative. In addition, all action alternatives would include additional service to non-Alcatraz destinations, increasing overall transit distance. Assumed transit distances and speed are included in the Appendix B tables.
  - Ferry operators currently turn off ferry engines or plug ferries into shore power when it is available at the ferry terminal. The analysis conservatively accounts for incidental idling and assumes that ferries idle at the ferry terminal for 5 minutes at the start and end of each trip.

Thresholds

The BAAQMD developed guidelines to assist lead agencies in complying with requirements of CEQA (BAAQMD 2011). These guidelines provide reference thresholds for considering whether a project would have a significant air quality impact and also provide recommended procedures for evaluating potential air quality impacts during the environmental review process.[2] Although the BAAQMD guidelines were developed to assist with the CEQA process, they are often used for NEPA projects in the SFBAAB.

The BAAQMD's thresholds for construction and operational emissions represent the levels below which a project's individual emissions of criteria air pollutants or precursors would not result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions.

Tables 45 and 46 present the thresholds used in the analysis.

[2] On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds in the BAAQMD CEQA Guidelines. The court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was itself a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD had complied with CEQA. The BAAQMD has appealed the Alameda County Superior Court's decision. The appeal is currently pending in the Court of Appeal of the State of California, First Appellate District. Since the technical merits of the guidelines were not questioned in the Court judgment, this air quality standard uses the Guidelines methodology and thresholds.

TABLE 46. CONFORMITY DE MINIMIS LEVELS

Chemical of Concern	San Francisco Bay Area	
	Attainment Status	Conformity De Minimis Level (tpy)
8-hour O_3	marginal nonattainment	100 (NOx), 50 (VOC)
CO	attainment	N/A
NO_2	attainment	N/A
SO_2	attainment	N/A
PM_{10}	attainment	N/A
$PM_{2.5}$	attainment	N/A

Notes:
Source: 40 CFR Part 93 §193

Criteria Pollutants

- In assessing impacts of PM_{10} and $PM_{2.5}$ emissions from construction activities, BAAQMD requires that only exhaust PM_{10} and $PM_{2.5}$ emissions be quantified and compared to quantitative thresholds.
- BAAQMD's screening methodology for operational CO was used to provide a conservative indication of whether the implementation of the action alternatives would result in CO emissions that exceed BAAQMD's localized CO threshold, presented in Table 45. The BAAQMD screening criteria are appropriate for projects with predominantly mobile sources, such as on-road vehicles. The Transportation and Circulation Study (NPS 2014b) was used to assess traffic volumes at affected intersections for comparison with the CO screening criteria presented in Table 45.
- The CalEEMod was used for typical construction and operational equipment, per BAAQMD guidelines, to quantify combustion exhaust emissions from offroad equipment and onroad vehicles, entrained road dust, construction dust, and fugitive emissions associated with architectural coatings (CAPCOA 2013). Emissions from nontypical sources, such as tugboats and ferries, were quantified outside of CalEEMod because CalEEMod is not well suited to these types of sources. These sources were quantified using the CARB's Off-Road database for harbor craft and regulatory requirements (CARB 2010) and combined with emissions quantified in CalEEMod for impacts assessment.

TACs

Health impacts for sensitive individuals were assessed by comparing the distance from the ferry terminal to the Plan Bay Area safe siting distance in Table 45. In this air quality standard, distances to sensitive receptors from each of the action alternatives were estimated using Google Earth. These distances were compared to the 500 feet (152 meters) maximum distance identified in the Plan Bay Area EIR as the distance beyond which cancer risk to sensitive receptors would drop below the level of cumulative significance.

Federal Conformity

USEPA created de minimis emission levels, which are based on the attainment status of the area under the NAAQS, to limit the need to conduct conformity determinations for actions with minimal emission increases. A project or action is not subject to a conformity determination when the total direct and indirect emissions (including construction and operations) from the project or action are below the de minimis levels. The defined de minimis levels in the SFBAAB are listed in

Table 46 (USEPA 2011). Federal actions with emissions below these levels are not obligated to perform a conformity determination.

GHG Emissions

GHG emissions were quantified for construction and operational activities. Impacts were assessed by subtracting emissions associated with the No Action Alternative from emissions for each action alternative and comparing the incremental emissions to the CEQ reference point of 25,000 mty.

Odors

The potential for odors at sensitive receptors in the vicinity of the proposed action alternatives was assessed qualitatively.

The Park Service assesses impacts in terms of type, context, duration, intensity, and whether the impact is direct or indirect as summarized in Table 47.

TABLE 47. PARK SERVICE IMPACT CLASSIFICATION

Classification	Description
Type	Impacts can be either beneficial or adverse. A beneficial impact would be a positive change in air quality or a change that would move air quality toward a desired condition. An adverse impact would be a change that would move air quality away from a desired condition or would detract from its condition.
Duration	Duration describes the length of time over which an impact would occur. Short-term impacts are those caused by construction activities or temporary changes in operations; air quality would return to conditions prevalent prior to the commencement of these activities once these activities have ceased. Long-term impacts would last well beyond the construction period or the temporary operational change, and air quality may not return to previous conditions.
Intensity	Intensity describes the degree, level, or strength of an impact. Intensity levels used in this air quality standard are based on USEPA's Air Quality Index (AQI) that correlates criteria pollutant concentrations to associated health concern categories. The Park Service's 2011 Air Quality Guidance (NPS 2011c) recommends the use of the AQI methodology and NAAQS thresholds for characterizing impact levels for assessing human health. Because BAAQMD is the air quality district of authority in the study area, the thresholds for alternatives are based, for the most part, on the AQI methodology and the BAAQMD thresholds.[1] Intensity levels are categorized as follows: • Negligible: The impact would occur at or below the lowest levels of detection and for the purposes of this air quality standard, is defined as no change from existing conditions. • Minor: The impact would be slight, but detectable. For the purposes of this air quality standard, an alternative would result in minor impacts if emissions exceed the negligible impact intensity, but are less than 50% of the corresponding air quality threshold in Table 45. • Moderate: The impact would be readily apparent. For the purposes of this air quality standard, an alternative would result in moderate impacts if emissions are between 51 and 99% of the corresponding air quality threshold in Table 45. • Major: The impact would be substantial. For the purposes of this air quality standard, a major impact would equal or exceed the air quality thresholds in Table 45.

Notes:
Source: EIS, Chapter 4.
1 BAAQMD thresholds for criteria pollutants were used to identify impacts associated with criteria pollutant emissions from the alternatives. Per lead agency guidance, thresholds for health impacts, used in this air quality standard, were based on the safe siting distances determined by the Metropolitan Transportation Commission and the ABAG in the 2013 Plan Bay Area (MTC & ABAG 2013a, 2013b).

Assessment Criteria for Construction Impacts

Construction impacts were assessed by comparing construction emissions to the above indices. Construction impacts are generally considered minor due to their temporary and limited duration.

Assessment Criteria for Operational Impacts

Assessment criteria for operational impacts on the Project were assessed by comparing conditions with the proposed Project action alternatives to the No Action Alternative conditions using the above indices.

Special Considerations for the Air Quality Impact Analyses

Because regulatory criteria pollutant thresholds are different for construction and operational impact, impact conclusions are presented separately in the alternative-specific impact analyses sections below.

In addition, the air quality analysis conducted for each alternative modeled the potential impacts of the primary Alcatraz ferry embarkation site operations combined with those resulting from special ferry service at Fort Baker and Fort Mason. This overlapping impact approach to completing the analyses was taken to ensure that this EIS presents the most conservative conclusions possible. As such, unlike the other resource topics analyzed in this EIS, this section does not include a separate "Impacts of Activities Common to All Action Alternatives" subsection.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative. As is noted in the "Alternatives" chapter, the Park Service estimates that there could be a 20% increase in visitation to Alcatraz by 2036, assuming that changes in visitor management on Alcatraz Island are implemented to allow for the site to accommodate increased visitors.

Construction

Impact Analysis. Construction activities would not occur; therefore, no impacts would occur.

Mitigation. No mitigation is proposed.

Conclusion. The No Action Alternative would result in no construction-related impacts.

Operation

Impact Analysis. Criteria pollutant and GHG emissions associated with the No Action Alternative are presented in Tables 48a and b for maximum annual and average daily criteria pollutant and GHG emissions, respectively. Table 48c presents the number of vehicle trips and screening thresholds. These tables reflect values that would continue without federal action.

There would be no new federal action under the No Action Alternative; therefore, a conformity determination is not applicable.

Cumulative Impact Analysis

Emissions from the No Action Alternative would not result in an increase that exceeds the Project-level thresholds for criteria pollutants in Table 45. This alternative would result in cumulative, negligible impacts.

TABLE 48A. NO ACTION ALTERNATIVE CRITERIA POLLUTANT AND GHG MAXIMUM ANNUAL EMISSIONS

Source Category	ROG (tpy)	NOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (mty)
Construction	0	0	0	0	0
Operations					
Onroad Vehicles	0.3	0.9	0.5	0.1	486
Offroad Equipment	0.0	0.0	0.0	0.0	7
Ferries	0.1	1.5	0.3	0.3	619
Total	0.4	2.4	0.8	0.4	1,112
No Action Alternative	0.4	2.4	0.8	0.4	1,112
NEPA Increment	0.0	0.0	0.0	0.0	0.0
Threshold/Reference Point[1]	10	10	15	10	25,000

Notes:
Numbers may not add precisely due to rounding.
1 There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).

TABLE 48B. NO ACTION ALTERNATIVE CRITERIA POLLUTANT AND GHG AVERAGE DAILY EMISSIONS

Year	Average Daily	(lb/day)	(lb/day)	(lb/day)	(lb/day)
2018	Onroad Vehicles	1.5	4.9	2.8	0.8
	Offroad Equipment	0.0	0.2	0.0	0.0
	Ferries	0.7	8.1	1.7	1.5
	2018 Total	2.3	13.1	4.5	2.4
	No Action Alternative	2.3	13.1	4.5	2.4
	NEPA Increment	0.0	0.0	0.0	0.0
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
2035	Onroad Vehicles	0.8	2.9	3.3	1.0
	Offroad Equipment	0.0	0.0	0.0	0.0
	Ferries	0.1	8.1	0.3	0.3
	2035 Total	1.0	11.0	3.6	1.3
	No Action Alternative	1.0	11.0	3.6	1.3
	NEPA Increment	0.0	0.0	0.0	0.0
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.

TABLE 48C. NO ACTION ALTERNATIVE VEHICLE TRIPS

Year	Vehicles and Thresholds	Vehicle Trips (peak hour)
2018	Onroad Vehicles	169
	Screening Threshold	44,000
	Above Threshold?	No
2035	Onroad Vehicles	203
	Screening Threshold	44,000
	Above Threshold?	No

Mitigation. No mitigation is proposed

Conclusion. The No Action Alternative would result in long-term, minor, adverse impacts.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would retain the current Alcatraz ferry embarkation site at Pier 31½ and improve the existing facility to better accommodate visitors and retrofit aged infrastructure. This alternative would construct a third berth at Pier 31½, which would increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. As noted above in the "Special Considerations for the Air Quality Impact Analyses" section, this alternative is also assumed to include special ferry service at Fort Baker and at Fort Mason.

Construction

Impact Analysis. Construction at Pier 31½ would occur in 2016 and would take approximately 5 months. Construction activities are not anticipated in 2017 under this alternative. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles.

Table 49 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016. Table 49 also shows that construction impacts for ROG, PM_{10} exhaust, $PM_{2.5}$ exhaust, and fugitive dust would be less than 50% of applicable thresholds in 2017. Construction impacts for the Pier 31½ Alternative would therefore be classified as follows:

- 2016 NOx—Construction impacts would be short-term, adverse, and major
- 2016 ROG, PM_{10}, and $PM_{2.5}$—Construction impacts would be short-term, adverse, and minor

Table 50 shows that implementation of mitigation measures Air-MM-1, 2 and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016 resulting in a short-term, major, adverse impact.

TABLE 49. CONSTRUCTION EMISSIONS, PIER 31½ ALTERNATIVE, UNMITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	7.9	60.3	2.3	2.2
	Marine Sources	3.0	29.9	1.1	1.0
	2016 Total	**10.9**	**90.2**	**3.5**	**3.2**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No

Note:
Numbers may not add precisely due to rounding.

Cumulative Impact Analysis. Construction emissions from the Pier 31½ Alternative would result in a short-term increase that exceeds the NOx threshold in Table 45.

Construction emissions from this alternative would therefore contribute considerably to an adverse cumulative impact for NOx.

Table 50 shows that implementation of mitigation measures Air-MM-1, 2, and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016 resulting in a cumulative, major, adverse impact.

Mitigation. BAAQMD guidelines recommend specific mitigation measures for projects that exceed construction thresholds (BAAQMD 2011). The following mitigation measures will be applied to reduce NOx emissions associated with construction. Some mitigation measures have the benefit of reducing emissions of other criteria pollutants in addition to reducing NOx emissions.

Air-MM-1—The idling time of diesel powered construction equipment will be minimized to 2 minutes.
Air-MM-2—The Project shall develop a plan demonstrating that the offroad equipment (greater than 50 hp) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a projectwide fleet-average of 20% NOx reduction and 45% PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and other options as they become available.

Air-MM-3—The Project shall use tugboats with Tier 3 propulsion engines in 2016, Tier 4 propulsion engines in 2017, and Tier 3 auxiliary engines in 2016 and 2017.

Conclusion. Assuming implementation of the mitigation measures described above, construction impacts for the Pier 31½ Alternative would result in a short-term, major, adverse impact in 2016 for NOx emissions and a short-term, minor, adverse impact for ROG, PM_{10}, and $PM_{2.5}$.

TABLE 50. CONSTRUCTION EMISSIONS, PIER 31½ ALTERNATIVE, MITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	7.9	48.2	1.3	1.2
	Marine Sources	2.9	29.9	1.1	1.0
	2016 Total	**10.8**	**78.2**	**2.4**	**2.2**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No

Notes:
Numbers may not add precisely due to rounding.

Operation

Impact Analysis. Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Tables 51a and b present maximum annual and average daily operational emissions associated with the Pier 31½ Alternative, respectively, and they show that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035, resulting in long-term, minor, adverse impacts.

GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year, resulting in long-term, minor, adverse impacts.

Table 51c shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour, and the alternative would therefore result in a

localized CO concentration below the CO threshold shown in Table 45, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 31½ and Fort Baker would be 220 meters to the south and 450 meters to the north-northwest, as presented in Table 15, which is further than the 152 meters safe siting distance identified as a threshold in Table 45, resulting in long-term, minor, adverse impacts.

Operation of the alternative would cause combustion of diesel and gasoline fuel and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard, and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 31½ and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels, resulting in long-term, minor, adverse impacts.

Table 52 shows that the federal project would be below conformity de minimis levels for SFBAAB. The federal action, as designed, is therefore not subject to a general conformity determination and will conform to the purpose of the approved SIP.

Operational impacts for the Pier 31½ Alternative would therefore be long-term, adverse, and minor.

Cumulative Impact Analysis. Operational emissions from the Pier 31½ Alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 45. Operational emissions from this alternative would therefore not contribute considerably to an adverse cumulative impact, and would result in a cumulative, minor, adverse impact.

Mitigation. No mitigation is proposed.

Conclusion. Operational impacts of the Pier 31½ Alternative would be long-term, minor and adverse.

TABLE 51A. MAXIMUM ANNUAL CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 31½ ALTERNATIVE

Source Category	ROG (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2e (mty)
Onroad Vehicles	0.4	1.4	0.7	0.2	654
Offroad Equipment	0.0	0.0	0.0	0.0	7
Ferries	0.2	1.7	0.4	0.3	731
Total	0.5	3.2	1.1	0.5	1392
No Action Alternative	0.4	2.4	0.8	0.4	1112
NEPA Increment	**0.1**	**0.8**	**0.2**	**0.1**	**280**
Threshold/Reference Point[1]	10	10	15	10	25,000
Above Threshold?	No	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.
1 There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).

TABLE 51B. AVERAGE DAILY CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 31½ ALTERNATIVE

Year	Average Daily	(lb/day)	(lb/day)	(lb/day)	(lb/day)
2018	Onroad Vehicles	1.9	7.9	3.3	1.0
	Offroad Equipment	0.1	0.2	0.0	0.0

	Ferries	0.9	9.5	2.0	1.8
	2018 Total	2.9	17.6	5.3	2.8
	No Action Alternative	2.3	13.1	4.5	2.4
	NEPA Increment	**0.7**	**4.5**	**0.8**	**0.5**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
2035	Onroad Vehicles	1.0	4.1	3.8	1.1
	Offroad Equipment	0.1	0.0	0.0	0.0
	Ferries	0.2	9.5	0.4	0.4
	2035 Total	1.3	13.6	4.2	1.5
	No Action Alternative	1.0	11.0	3.6	1.3
	NEPA Increment	0.4	2.6	0.5	0.2
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.

TABLE 51C. PIER 31½ ALTERNATIVE VEHICLE TRIPS

Year	Vehicles and Thresholds	Vehicle Trips (peak hour)
2018	Onroad Vehicles	179
	Screening Threshold	44,000
	Above Threshold?	No
2035	Onroad Vehicles	213
	Screening Threshold	44,000
	Above Threshold?	No

TABLE 52. CONFORMITY ANALYSIS, PIER 31½ ALTERNATIVE AND FORT BAKER SPECIAL FERRY SERVICE, UNMITIGATED

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016	Construction Equipment and Onroad Vehicles	11	1
	Marine Sources	5	1
	Total	**16**	**2**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018	Offroad Equipment	0	0
	Ferries	2	0
	Total	2	0
	No Action Alternative	2	0
2018	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035	Offroad Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	No Action Alternative	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No

Notes:
De minimis thresholds are for SFBAAB.
Numbers may not add precisely due to rounding.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would move the embarkation site to Pier 41. This alternative would expand and retrofit the existing building structure at Pier 41 to accommodate the proposed elements, would demolish and rebuild the older pier, and would retrofit the newer pier at the Pier 41 site. This alternative, similar to the Pier 31½ Alternative, would create a third berth, which would increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. As noted above in the "Special Considerations for the Air Quality Impact Analyses" section in this chapter, this alternative is also assumed to include special ferry service at Fort Baker and at Fort Mason.

Construction

Impact Analysis. Construction at Pier 41 would occur in 2016 and 2017, take approximately 19 months, and overlap with construction at Fort Baker, which would occur over 11 months in 2016. Sources of construction emissions would include tugboats, offroad construction equipment, and onroad vehicles.

Table 53 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016 and 2017. Table 53 also shows that construction impacts for ROG, PM_{10} exhaust, $PM_{2.5}$ exhaust, and fugitive dust would be less

than 50% of applicable thresholds in 2016 and 2017. Construction impacts for this alternative would therefore be classified as follows:

- 2016 NOx—Construction impacts would be short-term, major, and adverse
- 2017 NOx—Construction impacts would be short-term, major, and adverse
- 2016 and 2017 ROG, PM_{10}, and $PM_{2.5}$—Construction impacts would be short-short-term, minor, and adverse

Mitigation measures Air-MM-1, 2 and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016 resulting in a short-term, major, adverse impact.

Cumulative Impact Analysis. Construction emissions from this alternative would result in a short-term increase that exceeds the NOx threshold in Table 45. Construction emissions from the Pier 41 Alternative would therefore considerably contribute to an adverse cumulative impact for NOx resulting in a cumulative, major, adverse impact.

Table 54 shows that implementation of mitigation measures Air-MM-1, 2 and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016, resulting in a cumulative, major, adverse impact

Mitigation. BAAQMD guidelines recommend specific mitigation measures for projects that exceed construction thresholds (BAAQMD 2011). The following mitigation measures will be applied to reduce NOx emissions associated with construction. Some mitigation measures have the benefit of reducing emissions of other criteria pollutants in addition to reducing NOx emissions.

Air-MM-1—The idling time of diesel powered construction equipment would be minimized to 2 minutes.

Air-MM-2—The Project would develop a plan demonstrating that the offroad equipment (greater than 50 hp) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average of 20% NOx reduction and 45% PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and other options as such become available.

Air-MM-3—The Project would use tugboats with Tier 3 propulsion engines in 2016, Tier 4 propulsion engines in 2017, and Tier 3 auxiliary engines in 2016 and 2017.

Conclusion. Following the implementation of mitigation measures Air-MM-1 and 2, NOx impacts would be reduced, but would remain above the applicable threshold in 2016. In 2017, NOx impacts would be reduced to more than 50% of the applicable threshold, but less than the threshold itself. Construction impacts, following mitigation, for the Pier 41 Alternative would therefore be classified as short-term, major, and adverse for NOx emissions and short-term, minor, and adverse for ROG, PM_{10}, and $PM_{2.5}$ emissions.

TABLE 53. CONSTRUCTION EMISSIONS, PIER 41 ALTERNATIVE, UNMITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	6.3	65.6	2.6	2.4
	Marine Sources	1.9	18.9	0.7	0.6
	2016 Total	**8.2**	**84.5**	**3.3**	**3.0**
	Threshold	54	54	82	54
	Above Threshold?	No	Yes	No	No
2017	Construction Equipment and Onroad Vehicles	5.1	40.9	1.8	1.7
	Marine Sources	2.4	22.6	0.8	0.7
	2017 Total	**7.5**	**63.5**	**2.6**	**2.4**
	Threshold	54	54	82	54
	Above Threshold?	No	Yes	No	No

Notes:
PM_{10} and $PM_{2.5}$ emissions and thresholds are for exhaust; fugitive dust emissions are addressed with BMPs.

TABLE 54. CONSTRUCTION EMISSIONS, PIER 41 ALTERNATIVE, MITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	6.3	52.5	1.4	1.3
	Marine Sources	1.9	18.9	0.7	0.6
	2016 Total	**8.1**	**71.4**	**2.1**	**1.9**
	Threshold	54	54	82	54
	Above Threshold?	No	Yes	No	No
2017	Construction Equipment and Onroad Vehicles	5.1	32.7	1.0	0.9
	Marine Sources	1.1	10.4	0.3	0.2
	2017 Total	**6.2**	**43.1**	**1.3**	**1.2**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
PM_{10} and $PM_{2.5}$ emissions and thresholds are for exhaust; fugitive dust emissions are addressed with BMPs.
BAAQMD BMP measures applied as mitigation to construction equipment exhaust: 20% reduction for NOx, 45% reduction for PM.
Three times per day watering affects fugitive dust emissions.
Tier 3 tugboat auxiliary engines in 2016. Tier 4 tugboat main engines in 2017. No mitigation for workboats.

Operation

Impact Analysis. Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Tables 55a and b present maximum annual and average daily operational emissions associated with the Pier 41 Alternative, respectively, and they show that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035, resulting in a long-term, minor, adverse impact.

GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year, resulting in a long-term, minor, adverse impact.

Table 55c shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour, and the alternative would therefore result in a

localized CO concentration below the CO threshold in Table 45, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 41 and Fort Baker would be 225 meters to the south and 450 meters to the north-northwest, respectively, as presented in Table 15, which is further than the 152 meters safe siting distance identified as a threshold in Table 45, resulting in a long-term, minor, adverse impact.

Operation of the alternative would cause combustion of diesel and gasoline fuel, and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard, and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 41 and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels, resulting in a long-term, minor, adverse impact.
Table 56 shows that emissions associated with the federal project for the Pier 41 Alternative would be below conformity de minimis levels for SFBAAB. The federal action, as designed, is therefore not subject to a general conformity determination and will conform to the purpose of the approved SIP.

Cumulative Impact Analysis. Operational emissions from this alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 45. Operational emissions from the Pier 41 Alternative would therefore not contribute considerably to an adverse cumulative impact, and would result in a cumulative, minor, adverse impact.

Mitigation. Mitigation is not required.

Conclusion. Operational impacts of the Pier 41 Alternative would result in a long-term, minor adverse impact.

TABLE 55A. MAXIMUM ANNUAL CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 41 ALTERNATIVE

Source Category	ROG (tpy)	NOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (mty)
Onroad Vehicles	0.4	1.6	0.8	0.2	748
Offroad Equipment	0.0	0.0	0.0	0.0	7
Ferries	0.2	1.7	0.4	0.3	731
Total	0.6	3.4	1.2	0.6	1,485
No Action Alternative	0.4	2.4	0.8	0.4	1,112
NEPA Increment	0.2	1.0	0.4	0.1	373
Threshold/Reference Point[1]	10	10	15	10	25,000
Above Threshold?	No	No	No	No	No

Notes:
1 There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).
Numbers may not add precisely due to rounding.

TABLE 55B. AVERAGE DAILY CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 41 ALTERNATIVE

Year	Average Daily	(lb/day)	(lb/day)	(lb/day)	(lb/day)
2018	Onroad Vehicles	2.2	8.7	3.9	1.2
	Offroad Equipment	0.0	0.2	0.0	0.0
	Ferries	0.9	9.5	2.0	1.8
	2018 Total	3.2	18.4	5.9	3.0
	No Action Alternative	2.3	13.1	4.5	2.4
	NEPA Increment	0.9	5.2	1.4	0.6
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
2035	Onroad Vehicles	1.2	4.6	4.5	1.3
	Offroad Equipment	0.0	0.0	0.0	0.0
	Ferries	0.2	9.5	0.4	0.4
	2035 Total	1.4	14.2	4.9	1.7
	No Action Alternative	1.0	11.0	3.6	1.3
	NEPA Increment	0.5	3.2	1.3	0.4
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.

TABLE 55C. PIER 41 ALTERNATIVE VEHICLE TRIPS

Year	Vehicles and Thresholds	Vehicle Trips (peak hour)
2018	Onroad Vehicles	238
	Screening Threshold	44,000
	Above Threshold?	No
2035	Onroad Vehicles	283
	Screening Threshold	44,000
	Above Threshold?	No

TABLE 56. CONFORMITY ANALYSIS, PIER 41 ALTERNATIVE AND FORT BAKER SPECIAL FERRY SERVICE, UNMITIGATED

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016	Construction Equipment and Onroad Vehicles	12	1
	Marine Sources	3	0
	Total	**15**	**1**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2017	Construction Equipment and Onroad Vehicles	7	1
	Marine Sources	4	0
	Total	**12**	**1**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018	Offroad Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	No Action Alternative	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035	Offroad Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	No Action Alternative	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No

Notes:
De minimis thresholds are for SFBAAB.
Numbers may not add precisely due to rounding.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would locate the ferry embarkation site at Fort Mason, Pier 3. Construction would include the retrofit of existing Pier 3 substructure, upgrade and improvement of the existing Pier 3 building shed to accommodate proposed elements, and the creation of a third berth to increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This alternative is inherently inclusive of the activities associated with special ferry service at Fort Mason, and this analysis also assumes inclusion of special ferry service to Fort Baker. In contrast to the No Action Alternative, a shuttle service from Fisherman's Wharf to Fort Mason would be required to manage parking constraints.

Construction

Impact Analysis. Construction at Pier 3 would occur in 2016 and 2017, take approximately 20 months, and overlap with construction at Fort Baker, which would occur over 11 months in 2016. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles.

Table 57 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016. Table 57 shows that construction impacts would not exceed the significance threshold for NOx in 2017, but would be greater than 50% of the applicable threshold. Table 57 also shows that construction impacts for ROG, PM_{10} exhaust, $PM_{2.5}$ exhaust, and fugitive dust would be less than 50% of applicable thresholds in 2016 and 2017. Construction impacts for this alternative would therefore be classified as follows:

- 2016 NOx—Construction impacts would be short-term, adverse, and major
- 2017 NOx—Construction impacts would be short-term, adverse, and moderate.
- 2016 and 2017 ROG, PM_{10}, and $PM_{2.5}$—Construction impacts would be short-term, adverse, and minor.

Table 58 shows that implementation of mitigation measures Air-MM-1, 2 and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016 resulting in a short-term, major, adverse impact.

Cumulative Impact Analysis. Construction emissions from the Pier 3 Alternative would result in a short-term increase that exceeds the NOx threshold in Table 45. Construction emissions from this alternative would therefore contribute considerably to an adverse cumulative impact for NOx resulting in a cumulative, major, adverse impact.

Table 58 shows that implementation of mitigation measures Air-MM-1, 2 and 3 would reduce NOx impacts, but NOx emissions would remain above the applicable threshold in 2016 resulting in a cumulative, major, adverse impact.

Mitigation. BAAQMD guidelines recommend specific mitigation measures for projects that exceed construction thresholds (BAAQMD 2011). The following mitigation measures would be applied to reduce NOx emissions associated with construction. Some mitigation measures have the benefit of reducing emissions of other criteria pollutants in addition to reducing NOx emissions.

Air-MM-1—The idling time of diesel powered construction equipment would be minimized to 2 minutes.

Air-MM-2—The Project would develop a plan demonstrating that the offroad equipment (greater than 50 hp) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average of 20% NOx reduction and 45% PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices, such as particulate filters, and other options as they become available.

Air-MM-3—The Project would use tugboats with Tier 3 propulsion engines in 2016, Tier 4 propulsion engines in 2017, and Tier 3 auxiliary engines in 2016 and 2017.

Conclusion. Following the implementation of mitigation measures Air-MM-1 and 2, NOx impacts would be reduced, but would remain above the applicable threshold in 2016. In 2017, NOx impacts would be reduced to more than 50% of the applicable threshold, but less than the threshold itself. Construction impacts, following mitigation, for the Pier 3 Alternative would therefore be classified as short-term, major, and adverse for NOx emissions; and short-term, minor, and adverse for ROG, PM_{10}, and $PM_{2.5}$ emissions.

TABLE 57. CONSTRUCTION EMISSIONS, PIER 3 AND FORT BAKER, UNMITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	4.5	44.6	1.8	1.7
	Marine Sources	4.2	41.0	1.5	1.4
	2016 Total	**8.6**	**85.7**	**3.4**	**3.1**
	Threshold	54	54	82	54
	Above Threshold?	No	Yes	No	No
2017	Construction Equipment and Onroad Vehicles	6.5	15.6	0.6	0.6
	Marine Sources	2.6	24.1	0.8	0.7
	2017 Total	**9.0**	**39.7**	**1.4**	**1.3**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.

TABLE 58. CONSTRUCTION EMISSIONS, PIER 3 AND FORT BAKER, MITIGATED (AVERAGE LB/DAY)

Year	Source Category	ROG	NOx	PM_{10}	$PM_{2.5}$
2016	Construction Equipment and Onroad Vehicles	4.5	35.7	1.0	0.9
	Marine Sources	4.0	41.0	1.5	1.4
	2016 Total	**8.5**	**76.7**	**2.5**	**2.3**
	Threshold	54	54	82	54
	Above Threshold?	No	Yes	No	No
2017	Construction Equipment and Onroad Vehicles	6.5	12.5	0.3	0.3
	Marine Sources	1.2	10.9	0.3	0.2
	2017 Total	**7.6**	**23.5**	**0.6**	**0.6**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Notes:
Numbers may not add precisely due to rounding.

Operation

Impact Analysis. Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Tables 59a and b present maximum annual and average daily operational emissions associated with the Pier 3 Alternative, respectively, and they show that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035, resulting in a long-term, minor, adverse impact.

GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year, resulting in a long-term, minor, adverse impact.

Table 59c shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour, and the alternative would result in a localized CO concentration below the CO threshold in Table 45, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 3 and Fort Baker would be 330 meters to the southwest and 450 meters to the north-northwest,

respectively, as presented in Table 15, which is further than the 152 meters safe siting distance identified as a threshold in Table 45, resulting in a long-term, minor, adverse impact.

Operation of the alternative would cause combustion of diesel and gasoline fuel, and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard, and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 3 and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels, resulting in a long-term, minor, adverse impact.

Table 60 shows that the federal project associated with the Pier 3 Alternative would be below conformity de minimis levels for SFBAAB. The federal action, as designed, is therefore not subject to a general conformity determination and would conform to the purpose of the approved SIP.

Cumulative Impact Analysis. Operational emissions from the Pier 3 Alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 45. Operational emissions from this alternative would therefore not contribute considerably to an adverse cumulative impact, and would result in a cumulative, minor, adverse impact.

Mitigation. Mitigation is not proposed.

Conclusion. Operational impacts of the Pier 3 Alternative would be long-term, minor and adverse.

TABLE 59A. MAXIMUM ANNUAL CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 3 ALTERNATIVE

Source Category	ROG (tpy)	NOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (mty)
Onroad Vehicles	0.8	3.8	1.2	0.4	1494
Offroad Equipment	0.0	0.0	0.0	0.0	7
Ferries	0.1	1.4	0.3	0.3	599
Total	1.0	5.3	1.5	0.6	2,100
No Action Alternative	0.4	2.4	0.8	0.4	1,112
NEPA Increment	**0.5**	**2.9**	**0.7**	**0.2**	**988**
Threshold/Reference Point[1]	10	10	15	10	25,000
Above Threshold?	No	No	No	No	No

Notes:
1 There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).
Numbers may not add precisely due to rounding.

TABLE 59B. MAXIMUM ANNUAL CRITERIA POLLUTANT AND GHG EMISSIONS, PIER 3 ALTERNATIVE

Average Daily		(lb/day)	(lb/day)	(lb/day)	(lb/day)
2018	Onroad Vehicles	4.4	21.1	5.9	1.8
	Offroad Equipment	0.1	0.2	0.0	0.0
	Ferries	0.7	7.8	1.6	1.5
	2018 Total	**5.2**	**29.1**	**7.5**	**3.3**
	No Action Alternative	2.3	13.1	4.5	2.4
	NEPA Increment	3.0	15.9	3.1	1.0
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
2035	Onroad Vehicles	2.5	10.2	6.7	2.0
	Offroad Equipment	0.0	0.0	0.0	0.0
	Ferries	0.1	7.8	0.3	0.3
	2035 Total	**2.6**	**18.0**	**7.0**	**2.3**
	No Action Alternative	1.0	11.0	3.6	1.3
	NEPA Increment	1.7	7.0	3.4	1.0
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No

Note:
Numbers may not add precisely due to rounding.

TABLE 59C. VEHICLE TRIPS, PIER 3 ALTERNATIVE

Year	Vehicles and Thresholds	Vehicle Trips (peak hour)
2018	Onroad Vehicles	327
	CO Screening Threshold	44,000
	Above Threshold?	No
2035	Onroad Vehicles	389
	CO Screening Threshold	44,000
	Above Threshold?	No

TABLE 60. CONFORMITY ANALYSIS, PIER 3 ALTERNATIVE AND FORT BAKER SPECIAL FERRY SERVICE, UNMITIGATED

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016	Construction Equipment and Onroad Vehicles	8	1
	Marine Sources	7	1
	Total	**16**	**2**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2017	Construction Equipment and Onroad Vehicles	3	1
	Marine Sources	4	0
	Total	7	2
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018	Offroad Equipment	0	0
	Ferries	1	0
	Total	1	0
	No Action Alternative	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035	Offroad Equipment	0	0
	Ferries	1	0
	Total	1	0
	No Action Alternative	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No

Notes:
De minimis thresholds are for SFBAAB.
Numbers may not add precisely due to rounding.

NOISE AND VIBRATION

METHODOLOGY AND THRESHOLDS

Potential noise and vibration impacts from short-term construction and long-term operation of the Project were analyzed in compliance with DO-47 (NPS 2000), the FTA's *Transit Noise and Vibration Impact Assessment* (FTA 2006), and the City's noise ordinance (City/County 2008).

The proposed measurement index used to evaluate noise and vibration impacts was based on an alternative's consistency with noise and vibration thresholds identified in these guidance documents. An alternative was considered to have a major impact if it exceeded the thresholds.

Assessment Criteria for Construction Impacts

This section evaluates noise and vibration impacts on upland receptors; potential impacts to in-water resources from sound and vibration are presented in the "Aquatic Biological Resources Section" of this chapter.

The FTA requires that noise levels from construction be maintained below 100 dBA at 50 feet from the source in commercial/ industrial zones, and below 90 dBA in residential zones. Additionally, the City/County requires that noise emissions from nonimpact construction not exceed 80 dBA at 100 feet or more from the source. For this analysis, the source of construction noise is assumed to propagate from construction equipment, which is assumed to occur along the outer boundary of the proposed sites.

While the City/County does not provide specific guidance for ground vibration, the FTA suggests that maintaining a "safe level" of 0.12 PPV or below at 25 feet from the source is appropriate for construction occurring nearby fragile buildings. Like noise, this analysis assumed that the source of construction vibration would be generated from construction equipment assumed to occur along the outer boundary of the proposed sites.

To evaluate each alternative's consistency with governing regulations, noise and vibration impacts from short-term construction were assessed using the following:

- **Existing Noise and Vibration Levels at the Proposed Sites.** Ambient noise data was obtained through noise monitoring surveys conducted for this Project (as described in the "Noise and Vibration" section of the "Affected Environment" chapter) and the Fort Baker Plan (NPS 1999). Vibration data for each site was obtained from environmental documents recently published by the Park Service (NPS 1999, 2012e) and Port (Port 2011a).
- **Proximity of Sensitive Receptors to Construction Noise.** For this analysis, construction equipment was assumed to be the source of construction noise. Per FTA guidance regarding fixed facilities spread over a large area, the distance from sensitive receptors to construction equipment was measured from the outer boundary of the receptor to the outer boundary of the proposed site where construction activities are likely to occur (FTA 2006). These boundaries are depicted in Figures 22 through 25.
- **Noise and Vibration Levels of Proposed Construction Equipment.** Using data and formulas provided by the FTA, noise and vibration levels were calculated for this Project's proposed construction equipment, as summarized in the following paragraphs.

Table 61 depicts the typical noise levels for proposed construction equipment based on noise data published by the FTA, and assuming an attenuation rate of 6 dBA per

doubling of distance (FTA 2006). Similarly, Table 62 depicts typical vibration levels.

TABLE 61. TYPICAL NOISE LEVELS OF PROPOSED CONSTRUCTION EQUIPMENT

Equipment	Noise Level (dBA)[1]	
	At 50 feet	At 100 feet
Roller	74	68
Pump	76	70
Saw	76	70
Backhoe	80	74
Air Compressor	81	75
Generator	81	75
Compactor	82	76
Concrete Pump	82	88
Shovel	82	76
Mobile Crane	83	77
Scarifier	83	77
Concrete Mixer	85	79
Dozer	85	79
Grader	85	79
Impact Wrench	85	79
Loader	85	79
Suction Dredge[2]	85	79
Jackhammer	88	82
Truck	88	82
Paver	89	83
Scraper	89	83
Pile Driver, Vibratory	96	90
Pile Driver, Impact	101	95

Notes:
[1] The typical noise levels of construction equipment at 50 feet are based on data provided in Table 12-1 of the FTA's 2006 *Transit Noise and Vibration Impact Assessment*. Per FTA guidance, the noise levels of proposed construction equipment at other distances (i.e., 100 feet) were calculated assuming an attenuation rate of 6 dBA per doubling of distance (or Ni = No – 30 [log Di/Do], where Ni = the attenuated noise level and No = the reference noise level).
[2] Noise data for the suction dredge was unavailable from the FTA and subsequently obtained from the USACE (USACE 2002).

TABLE 62. TYPICAL VIBRATION LEVELS OF PROPOSED CONSTRUCTION EQUIPMENT

Equipment	Vibration Level (PPV)[1]			
	At 10 feet	At 25 feet	At 50 feet	At 100 feet
Small Bulldozer	0.012	0.003	0.001	0.000
Jackhammer	0.138	0.035	0.012	0.004
Loaded Trucks	0.300	0.076	0.027	0.010
Large Bulldozer	0.352	0.089	0.031	0.011
Pile Driver, Vibratory	0.672	0.170	0.060	0.021
Pile Driver, Impact	2.546	0.644	0.228	0.081

Note:
[1] The typical vibration levels (PPV) of construction equipment at 25 feet are based on data provided in Table 12-2 of the FTA's 2006 *Transit Noise and Vibration Impact Assessment*. Per FTA guidance, the vibration levels of proposed construction equipment at other distances (i.e., 10, 50, and 100 feet) were calculated using the following equation: PPV at Distance D = PPV (at 25 feet) x ([25/D]$^{1.5}$).

To calculate noise levels generated by the proposed construction equipment, this analysis used the FTA's General Assessment as recommended, "for projects in an early stage when the equipment roster and schedule are undefined" (FTA 2006). Based on this type of assessment, noise levels were calculated assuming a 50-foot emission level of the two noisiest pieces of proposed equipment during full power operation over a 1-hour time period, as, "most construction equipment operates continuously for periods of one hour or more at some point in the construction period." Additionally, this 1-hour period was assumed to occur exclusively between the daytime hours of 7:00 a.m. to 10:00 p.m. and along the outer boundary of the proposed sites (shown in Figures 22 through 25). Free-field conditions were also assumed, and ground effects were ignored. From the list of proposed construction equipment shown in Table 61, the impact and vibratory pile drivers are anticipated to generate the loudest noise with a combined dBA of 102 at 50 feet from the source (or proposed site's outer boundary) and an attenuation rate of 6 dBA per doubling of distance (see Appendix C for detailed logarithmic calculations).

To calculate vibration emitted from proposed construction equipment, this analysis evaluated impacts based on the 25-foot emission level of the most significant source of vibration, as instructed by the FTA. Based on the proposed construction equipment for this Project, the impact pile driver is anticipated to generate the highest PPV of 0.644 at 25 feet from the source (or proposed site's outer boundary).

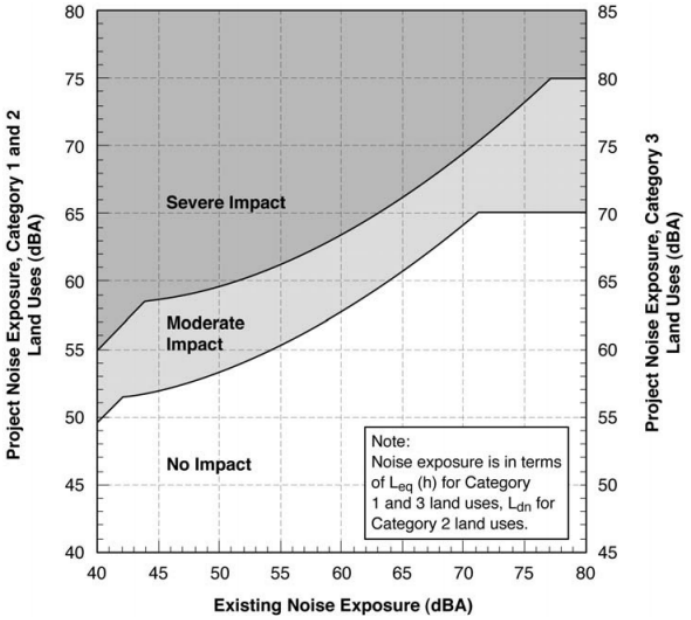
Assessment Criteria for Operational Impacts

A primary goal of DO-47 is to reduce or eliminate noise impacts within park areas to the greatest extent feasible (NPS 2000). To limit impacts at sensitive receptors, the FTA provides guidance for operational noise levels from transit projects (with Project) as they relate to existing ambient noise levels (without Project). The three types of sensitive receptors considered include the following:

- Category 1: Where quiet is essential (i.e., recording studios and concert halls)
- Category 2: Residences and buildings were people normally sleep (including hotels)
- Category 3: Industrial land uses with primary daytime and evening use

Graph 1 depicts the appropriate noise levels from Project operations at these three types of receptors. Per FTA guidance, commercial land uses are considered compatible with higher transit-related noise levels and are not recognized as a sensitive land use for purposes of noise analysis. Similarly, while historically

significant sites are often treated as noise-sensitive, "if [these] buildings or structures are used for commercial or industrial purposes and are located in busy commercial areas, they are not considered noise-sensitive and noise impact criteria do not apply." Public parks are addressed in the same light.



GRAPH 1. OPERATIONAL NOISE IMPACT CRITERIA FOR TRANSIT PROJECTS

The City/County does not explicitly address noise within its municipal code in relation to stationary sources. Generally, cities defer to the state's effort to address vehicle noise through vehicle code sections 23130 and 23130.5, which provide onroad vehicle noise limits enforced by police departments, sheriffs, and the CHP (NPS 2012e). The General Plan, however, suggests appropriate L_{dn} noise levels at the following locations:

- 60 dBA for residences and hotels
- 70 dBA for playgrounds, parks, office buildings, and some commercial uses (i.e., retail, theaters, and restaurants)
- 75 dBA for water-based recreation areas
- 77 dBA for other commercial uses such as wholesale, some retail, industrial/ manufacturing, transportation, communications, and utilities

Regarding vibration, the FTA provides guidance on acceptable vibration impacts from new transit projects, depending on the frequency of an event from the same source in one day. The FTA defines "frequent events" as more than 70 events per day, "occasional events" as 30 to 70 events per day, and "infrequent events" as less than 30 events per day. Table 63 depicts the appropriate vibration levels at sensitive receptors (as categorized) depending on the frequency of events.

TABLE 63. MAXIMUM VIBRATION LEVELS AT SENSITIVE RECEPTORS

Sensitive Receptor Category	Ground Vibration Impact Levels (VdB)		
	Frequent Events	Occasional Events	Infrequent Events
Category 1	65	65	65
Category 2	72	75	80
Category 3	75	78	83

Each alternative is assumed to accommodate approximately 36 ferry trips per peak day. Each occurrence of ferry boat arrival and departure at the embarkation site was assumed to be an "event." As such, 36 ferry trips results in 72 events per day. The Fort Baker element of the Project is assumed to accommodate approximately 14 ferry trips, or 28 events per day.

Under the Pier 3 Alternative as mitigation measure Transportation-MM-5, the Park Service would operate a shuttle from Fisherman's Wharf to Fort Mason. It is assumed that there would be 15 shuttle trips per peak day. Each occurrence of shuttle arrival and departure at Pier 3 would be assumed to be an "event." As such, 15 shuttle trips would result in 30 events per day.

Based on the criteria in Table 63, the appropriate maximum vibration levels during Project operation are 72 VdB at residential uses and 75 VdB at commercial uses. The City does not address vibration within its municipal code.

To evaluate each alternative's consistency with FTA and City regulations, as well as NPS plans and policies, noise impacts from long-term operations were logarithmically calculated using the FTA's Noise Impact Assessment Spreadsheet (see Appendix C) which accounted for the following:

- **Existing noise and vibration levels at the proposed sites (receiver parameter).** Ambient noise data was obtained through noise monitoring surveys conducted for the Project (as described in the "Noise and Vibration" section of the "Affected Environment" chapter) and the Fort Baker Plan (NPS 1999).
- **Proximity of sensitive receptors to operational noise (noise source parameter).** The single noise source of long-term operation proposed at all alternatives is a ferry terminal with a foghorn. The midpoint of this stationary source is assumed to be the ferry berth. To consistently analyze impacts at each site, distance was measured from the outer boundary of a receptor to the closest ferry berth proposed by an alternative. For the Pier 3 Alternative, long-term operational noise also includes operation of the shuttle as a mitigation measure, and the midpoint of this noise source is assumed to be the shuttle stop. The locations of these boundaries and midpoints are shown in Figures 38 through 41.
- **Future noise from embarkation site operations (noise source parameter).** Future (with Project) daytime noise (7:00 a.m. to 10:00 p.m.) from the ferry terminal was calculated assuming 2.4 landings per hour (or 36 landings over a 15-hour period) at the Pier 31½, Pier 41, and Pier 3 alternatives, and 0.93 landings per hour at the Fort Baker site (or 14 landings over a 15-hour period). Similarly, for the Pier 3 Alternative's shuttle-related impacts, future daytime noise from the shuttle transit center was calculated assuming one shuttle per hour (or 15 shuttles over a 15-hour period).
- **Noise barriers (noise source parameter).** To provide a conservative baseline for this analysis, neither noise barriers nor intervening rows of

buildings (both of which reduce noise and are likely to occur) were accounted for in the spreadsheet.

Vibration impacts from long-term operations were evaluated based on future (with Project) vibration from shuttle operations under the Pier 3 Alternative and its consistency with FTA. Groundborne vibration is caused when vibrating objects come in contact with the ground. Ferry vibrations would not be in contact with ground surfaces and would therefore not create a source of groundborne vibration to sensitive receptors (WETA 2006). Any vibration from a ferry absorbed by the proposed piers would be far less than any seismic loads the piers are designed to withstand.

0 240 Feet

FIGURE 38
PIER 31½ ALTERNATIVE OPERATIONAL NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

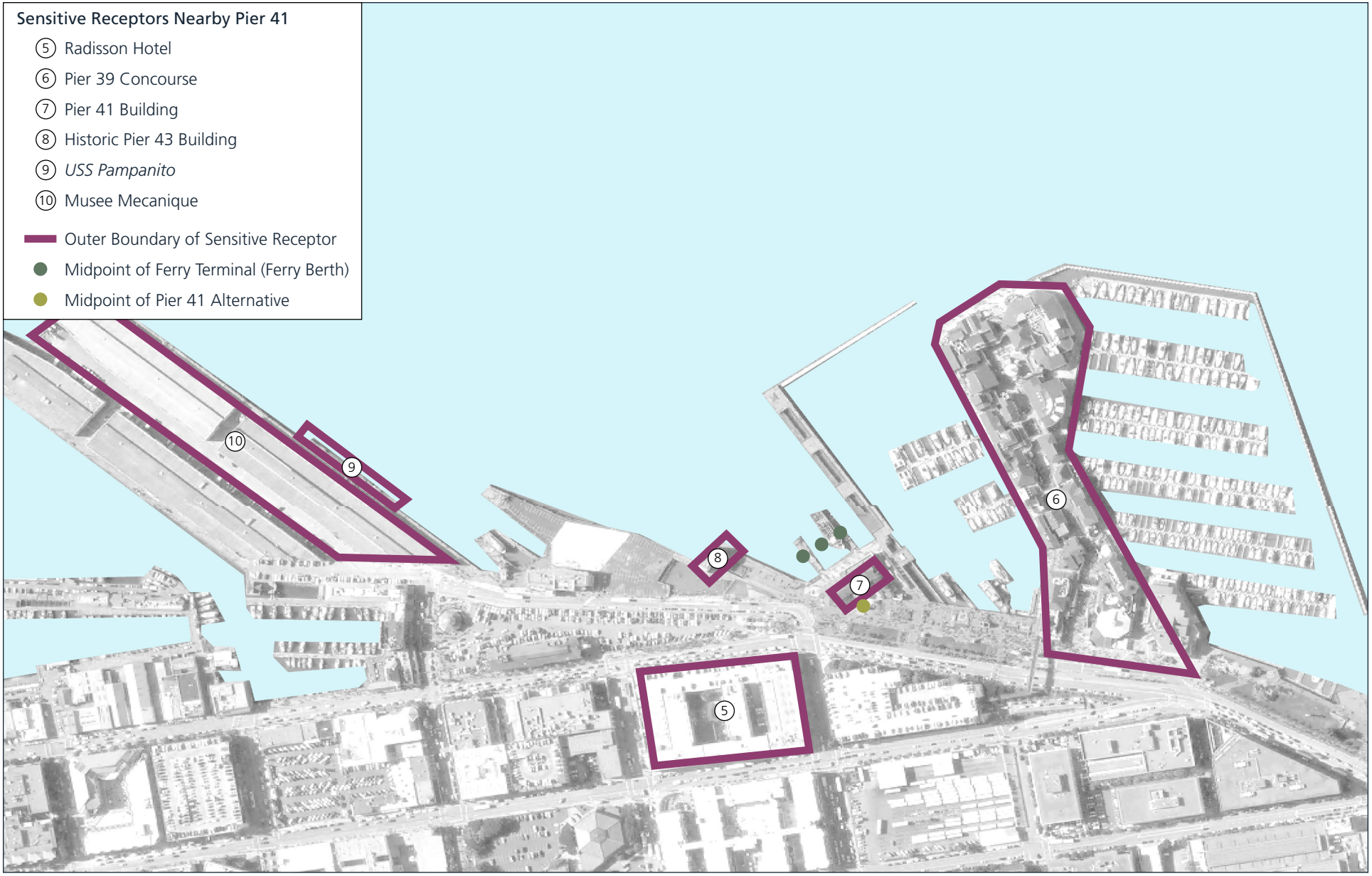


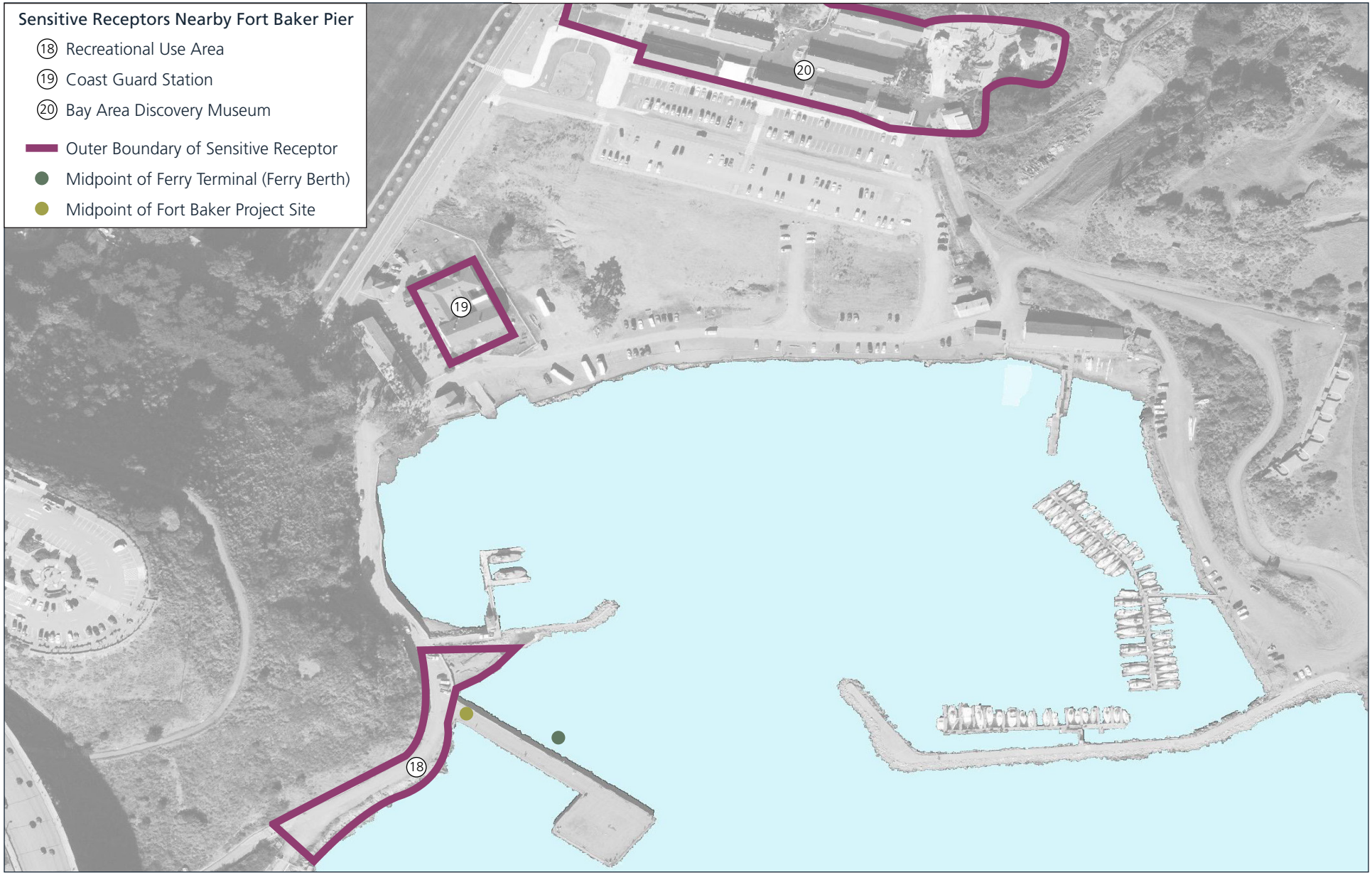
FIGURE 39
PIER 41 ALTERNATIVE OPERATIONAL NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior

January 2015

0 300 Feet

FIGURE 40
PIER 3 ALTERNATIVE OPERATIONAL NOISE
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior

January 2015



0 200 Feet

FIGURE 41
FORT BAKER PROJECT SITE OPERATIONAL NOISE

Golden Gate National Recreation Area

National Park Service/U.S. Department of the Interior

January 2015

The new bus transit center proposed by the Pier 3 Alternative is likely to involve rubber tire shuttles, which could cause groundborne vibration if there is an uneven road surface such as a speed bump or pothole. As indicated by the FTA, "buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps in the road," and, "human response to vibration is not usually significant unless the vibration exceeds 70 VdB" (FTA 2006). A VdB of 70 is equivalent to a PPV of 0.012 based on the FTA's calculation of:

$$VdB = 20 \times \log_{10}(PPV/PPV_{ref})$$

where:
$PPV_{ref} = 1 \times 10^{-6}$ in/s.

Using the FTA's equation for determining PPV levels at different distances (detailed in Appendix C), fragile buildings located more than 10 feet away from the shuttle midpoint would have a PPV of less than 0.012 and would therefore not be impacted by vibration from long-term operations.

In summary, the analysis considered the potential for an alternative to be inconsistent with guiding regulations (and therefore have a major impact) based on whether or not an alternative's noise and vibration sources exceed the following thresholds:

- During construction:
  - 100 dBA at 50 feet from the source in commercial/industrial zones, and below 90 dBA in residential zones
  - 80 dBA at 100 feet or more from the source for non-impact construction equipment
  - 0.12 PPV at 25 feet from the vibration source
- During operations:
  - The FTA's dBA levels shown in Graph 1
  - The City's dBA levels discussed in the "Noise and Vibration" section of the "Affected Environment" chapter
  - 70 VdB or 0.12 PPV at 25 feet from the source

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Construction

Impact Analysis. Under the No Action Alternative, there would be no construction and a relatively small increase in the numbers of ferry trips to accommodate the background growth in passengers (currently 20 roundtrips per day to 22 roundtrips per day by 2036). Therefore, the No Action Alternative would result in minor increases of new noise and vibration.

Cumulative Impact Analysis. Because the No Action Alternative would be relatively unchanged from present noise and vibration conditions, its incremental contribution to cumulative impacts on noise would not be major.

Mitigation. No mitigation is proposed.

Conclusion. The No Action Alternative proposes noise and vibration levels consistent with existing conditions, as well as federal and local regulations that govern the site.

IMPACTS OF PIER 31½ ALTERNATIVE

As detailed in the "Alternatives" chapter, the Pier 31½ Alternative would involve retrofitting the existing structures and establishing long-term ferry service and embarkation site operations at Pier 31½. Construction and operational noise and

vibration resulting from the Pier 31½ Alternative are assessed separately below.

Construction

Impact Analysis. This alternative would require using equipment (listed in Table 61) during different phases of construction, which could increase noise and vibration levels at the four sensitive receptors within the vicinity of Pier 31½. Following FTA guidance, the potential exposure of these receptors to construction noise was calculated assuming an attenuation rate of 6 dBA per doubling of distance from the construction equipment assumed to occur along the outer boundary of the proposed site (see Figure 22). The results of these calculations (detailed in Appendix C) and their consistency with FTA regulations are presented in Table 64.

TABLE 64. CONSTRUCTION NOISE FROM PIER 31½ ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Historic Pier 33 Bulkhead Building	Businesses Directly Across the Street	Historic Pier 29 Building	Nearest Residential Zone
Applicable FTA Daytime Construction Noise Criterion (dBA)	100	100	100	90
Distance from Outer Boundary of Receptor to Outer Boundary of Alternative Site (feet)	0	120	340	530
Existing Noise Level without Project (dBA, L_{dn})	68	68	68	63
L_{max} Contribution from Construction (dBA)	108	94	67	44
Predicted Noise Level with Construction (dBA, L_{dn})	108	94	71	63
Exceeds Applicable FTA Criteria?	Yes	No	No	No

The maximum noise contribution from the simultaneous operation of the two loudest pieces of equipment is anticipated to be 102 dBA at 50 feet from site's outer boundary. Assuming an attenuation rate of 6 dBA per doubling of distance, noise from this alternative's construction activities would not be anticipated to exceed the FTA's maximum daytime construction noise level (of 100 dBA for commercial/industrial uses and 90 dBA for residential uses) at nearby receptors. The only exception would be at the historic Pier 33 bulkhead building, where construction is likely to occur within the building (essentially zero feet from the boundary) with the purpose of upgrading the structure. As such, the predicted noise level at this receptor during construction could exceed the FTA's criteria by 8 dBA. However, this exceedance is minimal and reflects a worst-case scenario in which the two loudest pieces of construction equipment would be operated simultaneously. Additionally, implementation of the mitigation measure Noise-MM-1 would be anticipated to decrease the severity of construction noise at the Pier 33 building to a level compliant with FTA criteria.

At a local level, the City's noise ordinance prohibits the operation of nonimpact construction equipment that emits noise in excess of 80 dBA at 100 feet from the source or proposed site's outer boundary. Based on the proposed construction equipment shown in Table 61, the truck and paver are the only pieces of nonimpact construction equipment that would exceed the City's criteria. However, an exceedance of 2 to 3 dBA at 100 feet from the source/boundary would be minimal, and would be anticipated to be

negligible following implementation of mitigation measure Noise-MM-1.

Regarding vibration impacts during construction, the FTA suggests a level of 0.12 PPV or less be maintained at buildings extremely susceptible to vibration damage (i.e., historic buildings or vibration-sensitive manufacturing facilities). Based on the PPV levels of the proposed construction equipment, the FTA's criteria for even the most fragile of buildings would be anticipated to be maintained so long as these buildings are distanced 80 feet or more from the vibration source or alternative site's outer boundary. As such, vibration impacts at off-site receptors are not anticipated, as the closest off-site receptor is 120 feet away. However, the historic Pier 33 bulkhead building could be impacted by vibration, considering that construction activities are likely to occur in and around the building (essentially zero feet from the vibration source or alternative site's outer boundary). While the Park Service would implement mitigation measure Vibration-MM-1 to minimize damage to this structure, impacts from vibration would still be considered short-term, major, and adverse given that thresholds may be exceeded at this receptor. Impacts on historic structures under section 106 of the NHPA are considered in the "Cultural Resources" section of this chapter.

Cumulative Impact Analysis. Construction-related noise and vibration levels are anticipated to remain within acceptable levels at off-site receptors and would therefore cause no cumulative impact at these locations. Construction-related vibration may exceed recommended thresholds at the historic Pier 33 bulkhead building, which could lead to vibration-related damage during construction. However, due to the temporary nature of construction, implementation of mitigation measure Vibration-MM-1, and a primary goal of construction being to renovate and upgrade the facility's sub-structure, any cumulative impacts would be minor.

Mitigation.

Noise-MM-1—The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities between 7:00 a.m. to 8:00 p.m. Monday through Saturday

Vibration-MM-1—The Park Service would conduct vibration monitoring when construction activities occur within 50 feet of the historic Pier 33 bulkhead.

Conclusion. The Pier 31½ Alternative would result in short-term, negligible construction impacts at off-site receptors and potential short-term, major, adverse impacts at the historic Pier 33 bulkhead building.

Operation

Impact Analysis. Pier 31½ serves as the existing Alcatraz embarkation site and currently operates 20 ferry trips per day for travel to Alcatraz Island. This alternative would increase ferry trips to 36 per day. As such, increased operations at this location may result in increased noise and vibration within the surrounding area. To evaluate existing (without Project) versus future (with Project) noise levels at sensitive receptors, the FTA's Noise Impact Assessment Spreadsheet was used to account for the potential increase in noise from the additional 16 ferry landings per day (or 1.07 ferry landings per hour during daytime hours). The results of this assessment are presented in Table 65.

TABLE 65. OPERATIONAL NOISE FROM THE PIER 31½ ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Historic Pier 33 Bulkhead Building	Businesses Directly Across the Street	Pier 29 Building	Nearest Residential Zone
Land Use Category	3	3	3	2
Distance from Outer Boundary of Receptor to Closest Proposed Ferry Berth (feet)	180	360	440	730
Existing Noise Level without Project (dBA, L_{dn})	68	68	68	63
Predicted Noise Level Contribution from Project	45	37	35	28
Predicted Noise Level with Project (dBA, L_{dn})	68	68	68	63
Total Noise Level Increase (Existing vs. Predicted; dBA)	0	0	0	0
Criteria for Moderate Impact (dBA)	68	68	68	63
Criteria for Severe Impact (dBA)	73	73	73	68
Impact?	None	None	None	None

Based on the results, sensitive receptors in the vicinity of Pier 31½ would not be impacted by noise generated from long-term operations. In fact, the predicted noise level from the Project would not increase the existing noise level at any of the receptors. Moreover, the site is currently an active ferry facility and home to the existing Alcatraz embarkation site. While the number of trips may increase, the peak noise levels generated by ferry operations are not anticipated to change.

For new projects, the City suggests that noise levels be maintained below 77 dBA at commercial uses (i.e., transportation) and 60 dBA at residential uses. Noise surveys conducted for this Project determined that the existing ambient noise levels at Pier 31½ range between 56 to 68 dBA. Based on the location of the Project midpoint (as shown in Figure 22) and its proximity to the closest ferry berth, future (with Project) noise levels at this site are predicted to remain the same and comply with the applicable local guidance. Similarly, the future noise levels at sensitive receptors would also remain the same and comply with City guidance. The only exception is at the nearest residences (at Sansome and Chestnut streets), where the existing noise level already exceeds the appropriate noise level for residential use. However, noise contributions from the

Project are not anticipated to increase this level.

Cumulative Impact Analysis. Pier 31½ is the existing site for the Alcatraz ferry service and is surrounded by similar operations. While there could be an increase in visitors and ferry trips, noise generated from operations would remain within applicable guidance and consistent with the site's ongoing uses, as well as nearby past, present, and foreseeable future actions. As such, no major cumulative noise or vibration impacts from long-term operation at this site are anticipated.

Mitigation. No mitigation is proposed.

Conclusion. Noise and vibration levels from long-term operation of the Pier 31½ Alternative would remain below governing thresholds and would be consistent with the ongoing use of the site. Therefore, there would be no operational noise or vibration impacts due to the implementation of the Pier 31½ Alternative.

IMPACTS OF PIER 41 ALTERNATIVE

As detailed in the "Alternatives" chapter, the Pier 41 Alternative would involve expanding the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41. Construction and operational noise resulting from the Pier 41 Alternative are assessed separately below.

Construction

Impact Analysis. This alternative would require operating equipment (listed in Table 61) during different phases of construction, which could increase noise and vibration levels at the five sensitive receptors within the vicinity of Pier 41. Following FTA guidance, the potential exposure of these receptors to construction noise was calculated assuming an attenuation rate of 6 dBA per doubling of distance from construction equipment assumed to occur along the outer boundary of the proposed site (see Figure 23). The results of these calculations (detailed in Appendix C) and their consistency with FTA regulations are presented in Table 66.

TABLE 66. CONSTRUCTION NOISE FROM THE PIER 41 ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Radisson Hotel	Pier 39 Concourse	Pier 41 Building	Historic Pier 43 Building	*USS Pampanito*	Musée Mécanique
Applicable FTA Daytime Construction Noise Criterion (dBA)	90	100	100	100	100	100
Distance from Outer Boundary of Receptor to Outer Boundary of Alternative Site (feet)	180	300	0	220	900	870
Existing Noise Level without Project (dBA, L_{dn})	65	68	68	68	68	68
L_{max} Contribution from Construction (dBA)	86	72	108	82	0	0
Predicted Noise Level with Construction (dBA, L_{dn})	86	73	108	82	68	68
Exceeds Applicable FTA Criteria?	No	No	Yes	No	No	No

The maximum noise contribution of the simultaneous operation of the two loudest pieces of equipment is anticipated to be 102 dBA at 50 feet from the site's outer boundary. Assuming an attenuation rate of 6 dBA per doubling of distance, noise from construction activities at Pier 41 would not be anticipated to exceed the FTA's maximum daytime construction noise level (of 100 dBA for commercial/industrial uses and 90 dBA for residential uses) at the identified nearby receptors. The only exception is at the Pier 41 building, where construction would be likely to occur within the building (essentially zero feet from the boundary) with the purpose of upgrading the structure. As such, the predicted noise level at this receptor during construction could exceed the FTA's criteria by 8 dBA. However, this exceedance is minimal and reflects a worst-case scenario in which the two loudest pieces of construction equipment would be operated simultaneously. Additionally, implementation of the Noise-MM-1 mitigation measure would be anticipated to decrease the severity of construction noise at the Pier 41 building to a level compliant with FTA criteria.

In addition to FTA criteria for construction noise, the City noise ordinance prohibits the operation of nonimpact construction equipment that emits noise in excess of 80 dBA at 100 feet from the source or proposed site's outer boundary. Based on the proposed construction equipment shown in Table 61, the truck and paver are the only pieces of non-impact construction equipment that would exceed the City's criteria. However, an exceedance of 2 to 3 dBA at 100 feet from the source/boundary would be minimal and assumed to be negligible following implementation of the Noise-MM-1 mitigation measure.

Regarding vibration impacts during construction, the FTA suggests a level of 0.12 PPV or less nearby fragile buildings. Based on the PPV levels of the proposed construction equipment, the FTA's criteria for even the most fragile of buildings is anticipated to be maintained so long as these buildings are distanced 80 feet or more from the vibration source (assumed to occur at the outer boundary of the alternative site). As such, vibration impacts at off-site sensitive receptors are not anticipated, as the closest receptor is located 170 feet away. In contrast, vibration impacts could occur at the Pier 41 building, considering that construction activities would be likely to occur in and around the building (essentially zero feet from the vibration source) with the primary purpose being to upgrade and seismically retrofit the building. While the Park Service would implement mitigation measure Vibration-MM-1 to minimize damage to this structure, impacts from vibration would still be considered short-term, major, and adverse, given that thresholds may be exceeded at this receptor.

Cumulative Impact Analysis. Construction-related noise and vibration levels are anticipated to remain within acceptable levels at off-site receptors, and would, therefore, cause no major cumulative impact at these locations. Construction-related vibration may exceed recommended thresholds at the Pier 41 building, which could lead to vibration-related damage during construction. However, due to the temporary nature of construction, the implementation of Vibration-MM-1, and a primary goal of construction being to upgrade the facility, any cumulative impacts would be minor.

Mitigation.

Noise-MM-1—The Park Service will ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the

source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities to 7:00 a.m. to 8:00 p.m. Monday through Saturday

Vibration-MM-1—The Park Service would conduct vibration monitoring when construction activities occur within 50 feet of the Pier 41 building.

Conclusion. Following implementation of mitigation measures Noise-MM-1 and Vibration-MM-1, there would be short-term, negligible construction impacts at off-site receptors, and potential short-term, major, adverse impacts at the Pier 41 building.

Operation

Impact Analysis. This alternative would operate a long-term ferry embarkation service to Alcatraz Island from Pier 41. Pier 41 is presently located in a high-density tourist hub and serves as a ferry embarkation point for both the Blue & Gold Fleet and WETA ferry services. To evaluate existing (without Project) versus future (with Project) noise levels at sensitive receptors, the FTA's Noise Impact Assessment Spreadsheet was used to account for the increase in noise from the proposed 36 ferry landings per day (or 2.4 ferry landings per hour). The results of this assessment and their consistency with FTA regulations are presented in Table 67. Detailed spreadsheets are provided in Appendix C.

TABLE 67. OPERATIONAL NOISE FROM THE PIER 41 ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Radisson Hotel	Pier 39 Concourse	Pier 41 Building	Historic Pier 43 Building	*USS Pampanito*	Musée Mécanique
Land Use Category	2	3	3	3	3	3
Distance from Outer Boundary of Receptor to Closest Proposed Ferry Berth (feet)	250	530	60	210	1,010	900
Existing Noise Level without Project (dBA, L_{dn})	65	68	68	68	68	68
Predicted Noise Level Contribution from Project	43	37	60	47	30	31
Predicted Noise Level with Project (dBA, L_{dn})	65	68	69	68	68	68
Total Noise Level Increase (Existing vs. Predicted; dBA)	0	0	1	0	0	0
Criteria for Moderate Impact (dBA)	61	68	68	68	68	68
Criteria for Severe Impact (dBA)	66	73	73	73	73	73
Impact?	None	None	None	None	None	None

Based on the results, sensitive receptors in the vicinity of Pier 41 would not be impacted by noise generated from long-term operations. In fact, the only receptor that would result in an increased noise level would be the Pier 41 building. Even so, noise at this location would only increase by 1 dBA. The site is currently an active ferry facility and, while the number of ferry trips may increase, the peak noise levels generated by ferry operations are not anticipated to change.

For new projects, the City suggests that noise levels be maintained below 77 dBA for commercial uses. Noise surveys conducted for this Project determined that the existing ambient noise levels at Pier 41 range between 64 and 68 dBA. Based on the location of the Project midpoint (as shown in Figure 23) and its proximity to the closest ferry berth, future (with Project) noise levels at this site are predicted to remain the same, and would, therefore, comply with local guidance for commercial uses. While the existing noise level at the Radisson Hotel already exceeds the appropriate noise level for residential use (without Project), the Project is not anticipated to increase this level even further. As such, future noise levels (with Project) at sensitive receptors are anticipated to remain within the City's noise thresholds.

Cumulative Impact Analysis. Pier 41 is an active ferry site with two existing ferry services. While there could be an increase in visitors and ferry trips at the site, especially in combination with any WETA service that would remain at the site, noise generated from long-term operation would be within applicable guidance and would be consistent with the site's ongoing uses, as well as nearby past, present, and foreseeable future actions. As such, no major cumulative noise or vibration impacts from long-term operation at this site are anticipated.

Mitigation. No mitigation is proposed.

Conclusion. Noise and vibration levels from long-term operation at Pier 41 would remain below governing thresholds and would be consistent with the ongoing use of the site. Therefore, there would be no operational noise or vibration impacts due to implementation of the Pier 41 Alternative.

IMPACTS OF PIER 3 ALTERNATIVE

As detailed in the "Alternatives" chapter, the Pier 3 Alternative would involve improving the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3. Construction and operational noise resulting from the Pier 3 Alternative are assessed separately below.

Construction

Impact Analysis. This alternative would require operating equipment (listed in Table 61) during different phases of construction, which could increase noise and vibration levels at sensitive receptors within the vicinity of Pier 3. Following FTA guidance, the potential noise levels at these receptors were calculated assuming an attenuation rate of 6 dBA per doubling of distance from construction equipment assumed to occur along the outer boundary of the proposed site (see Figure 24). The results of these calculations (detailed in Appendix C) and their consistency with FTA regulations are presented in Table 68.

TABLE 68. CONSTRUCTION NOISE FROM THE PIER 3 ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Firehouse and Landmark Buildings A through E	Great Meadow	Marina Green	Residences			
				Beach and Buchanan streets	North Point and Buchanan streets	North Point and Laguna streets	Upper Fort Mason
Applicable FTA Daytime Construction Noise Criterion (dBA)	100	100	100	90	90	90	90
Distance from Outer Boundary of Alternative Site (feet)	25	100	760	930	1,300	1,030	280
Existing Noise Level without Project (dBA, L_{dn})	46	46	46	55	56	58	46
Maximum Noise Level Contribution from Construction (dBA)	105	96	17	0	0	0	74
Predicted Noise Level with Construction (dBA, L_{dn})	105	96	46	55	56	58	74
Exceeds Applicable FTA Criteria?	Yes	No	No	No	No	No	No

The maximum noise contribution from the simultaneous operation of the two loudest pieces of equipment is anticipated to be 102 dBA at 50 feet from the site's outer boundary. Assuming an attenuation rate of 6 dBA per doubling of distance, noise from this alternative's construction activities at sensitive receptors is not anticipated to exceed the FTA's maximum daytime construction noise levels (of 100 dBA for commercial/ industrial uses and 90 dBA for residential uses). The only exception is at the Firehouse and Landmark Buildings A through E currently occupied by Fort Mason Center tenants. These buildings, which are immediately adjacent to the proposed site's outer boundary, may be less than 50 feet away from construction activities at various times throughout construction and could experience a noise level of 105 dBA, which is 5 dBA above the FTA threshold. As such, this exceedance would be considered to cause a short-term, major, adverse impact. However, this exceedance is minimal and reflects a worst-case scenario in which the two loudest pieces of construction equipment would be operated simultaneously. Additionally, implementation of mitigation measure Noise-MM-1 would be anticipated to decrease the severity of construction noise potentially experienced by Fort Mason Center tenants.

In addition to FTA criteria for construction noise, the City's noise ordinance prohibits the operation of nonimpact construction equipment that emits noise in excess of 80 dBA at 100 feet from the source or proposed site's outer boundary. Based on the proposed construction equipment shown in Table 61, the truck and paver are the only pieces of non-impact construction equipment that would exceed the City's criteria. However, an exceedance of 2 to 3 dBA at 100 feet from the source/boundary is minimal and assumed to be negligible following the implementation of mitigation measure Noise-MM-1.

Regarding vibration impacts during construction, the FTA suggests a level of 0.12 PPV or less at fragile buildings. Based on the PPV levels of the proposed construction equipment, the FTA's criteria for even the most fragile of buildings is anticipated to be maintained so long as buildings are distanced 80 feet or more from the vibration source or the proposed site's outer boundary. As such, vibration impacts at sensitive off-site receptors are not anticipated, as the closest off-site receptor is located 100 feet away. However, the Firehouse and Landmark Buildings A through E may be impacted due to their proximity to the outer boundary. While the Park Service would implement mitigation measure Vibration-MM-1 to monitor and minimize construction-related effects, impacts from vibration would still be considered short-term, major, and adverse, given that thresholds may be exceeded at the Firehouse and Landmark Buildings A through E. Impacts on historic structures under section 106 of the NHPA are considered in the "Cultural Resources" section of this chapter.

Cumulative Impact Analysis. Construction-related noise and vibration levels are anticipated to remain within acceptable levels at off-site receptors, and would, therefore, cause no cumulative impact at these locations. Construction-related noise may exceed recommended thresholds at the Firehouse and Landmark Buildings A through E. Construction-related vibration may also exceed recommended thresholds and could lead to vibration-related damage during construction. These exceeded levels may represent a major cumulative impact to the degradation of existing structures at the NHL.

Mitigation.

Noise-MM-1—The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer

- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities to 7:00 a.m. to 8:00 p.m. Monday through Saturday

Vibration-MM-1—The Park Service would do the following:

- Avoid operating construction equipment within 100 feet of the Firehouse and Landmark Buildings A through E, if feasible
- Conduct vibration monitoring when construction activities occur within 100 feet or less of the Firehouse and Landmark Buildings A through E

Conclusion. Following implementation of the Noise-MM-1 and Vibration-MM-1 mitigation measures listed above, there would be short-term, negligible construction impacts at off-site receptors, and potential short-term, major, adverse impacts at the Firehouse and Landmark Buildings A through E.

Operation

Impact Analysis. This alternative would operate a long-term ferry embarkation service to Alcatraz Island from Pier 3, which, as a new operation at the site, could result in impacts on current nearby noise and vibration levels. To evaluate existing (without Project) versus future (with Project) noise levels at sensitive receptors, the FTA's Noise Impact Assessment Spreadsheet was used to account for the increase in noise from 36 ferry trips (or 2.4 ferry landings per hour) and 15 shuttle trips (or 1.0 shuttle per hour). The results of this assessment and their consistency with FTA guidance are presented in Table 69. Detailed spreadsheets are provided in Appendix C.

TABLE 69. OPERATIONAL NOISE FROM THE PIER 3 ALTERNATIVE AT SENSITIVE RECEPTORS

Receptor	Fort Mason Center Tenants	Great Meadow	Marina Green	Residences			
				Beach and Buchanan streets	North Point and Buchanan streets	North Point and Laguna streets	Upper Fort Mason
Land Use Category	3	3	3	2	2	2	2
Distance from Outer Boundary of Receptor to Closest Proposed Ferry Berth (feet)	140	650	850	1,130	1,400	1,220	580
Distance from Outer Boundary of Receptor to Closest Proposed Shuttle Stop (feet)	50	320	1,240	1,340	1,630	1,300	280
Existing Noise Level without Project (dBA, L_{dn})	46	46	46	55	56	55	46
Predicted Noise Level Contribution from Project	55	36	32	27	24	26	36
Predicted Noise Level with Project (dBA, L_{dn})	55	46	46	55	56	55	46
Total Noise Level Increase (Existing vs. Predicted; dBA)	9	0	0	0	0	0	0
Criteria for Moderate Impact (dBA)	57	57	57	55	56	55	52
Criteria for Severe Impact (dBA)	64	64	64	61	62	61	59
Impact?	None	None	None	None	None	None	None

Based on the results shown in Table 69, none of the sensitive receptors in the vicinity of Pier 3 would be affected from ferry and shuttle operations at this site.

For new projects, the City suggests that noise levels be maintained below 77 dBA at commercial uses and 60 dBA at residential uses. Noise surveys conducted for this Project determined that the existing ambient noise levels at Pier 3 range between 46 and 57 dBA. Based on the location of the Project midpoint (as shown in Figure 24) and its proximity to the closest ferry berth and shuttle stop, future (with Project) noise levels at this site are predicted to range between 52 and 58 dBA. These levels are below 77 dBA and, therefore, comply with local guidance for commercial uses. Similarly, future noise levels at sensitive receptors would also comply with applicable City guidance.

Most projects that do not include steel-wheel trains do not cause significant vibration impacts (FTA 2006). The proposed shuttle at the Pier 3 Alternative site is anticipated to generate a vibration level of 70 VdB. This level is below the FTA criteria of 75 and 78 VdB for human annoyance caused by occasional events at residential and commercial uses, respectively. Regarding building damage, a VdB of 70 converts to a PPV of .003 (see Appendix C for calculations), which is also well below the FTA's criteria of 0.12 for fragile buildings.

Cumulative Impact Analysis. Operation of the proposed ferry service at Fort Mason would increase ambient noise at Lower Fort Mason, but not to a level above governing thresholds. However, this increase, combined with impacts from other nearby projects (specifically, the F-Line streetcar extension, which is anticipated to have a moderate impact at Lower Fort Mason [NPS 2012e]) could represent a major cumulative impact.

Mitigation. No mitigation is proposed.

Conclusion. No noise or vibration impacts from long-term operation at Pier 3 are anticipated, as levels would remain below governing thresholds.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprise the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Construction.

Impact Analysis—The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to noise and vibration that would occur as a result of the Pier 31½ and Pier 41 alternatives would be consistent with those described for the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

Construction.

Impact Analysis—This alternative would require use of equipment (listed in Table 61) during different phases of construction, which could increase noise and vibration levels at sensitive receptors within the vicinity of the Fort Baker pier. Following FTA guidance, the potential noise levels (with Project) at these receptors were calculated assuming an attenuation rate of 6 dBA per doubling of distance from construction equipment assumed to occur along the out boundary of the proposed site (see Figure 25). The results of these calculations (detailed in Appendix C)

and their consistency with FTA regulations are presented in Table 70.

TABLE 70. CONSTRUCTION NOISE FROM ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Receptor	Recreational Use Area	USCG Station	Bay Area Discovery Museum
Applicable FTA Daytime Construction Noise Criterion (dBA)	100	100	100
Distance from Outer Boundary of Alternative Site (feet)	0	600	1,150
Existing Noise Level without Project (dBA, L_{dn})	55	55	55
L_{max} Contribution from Construction (dBA)	108	36	0
Predicted Noise Level with Construction (dBA, L_{dn})	108	55	55
Exceeds Applicable FTA Criteria?	Yes	No	No

The maximum noise contribution from construction as a result of this alternative is 102 dBA at 50 feet from the source. Assuming an attenuation rate of 6 dBA per doubling of distance, noise from construction activities is not anticipated to exceed the FTA's maximum daytime construction noise level (of 100 dBA for commercial/industrial uses and 90 dBA for residential uses) at identified sensitive off-site receptors. However, an exceedance of 2 dBA is minimal and reflects a worst-case scenario in which the two loudest pieces of construction equipment would be operated simultaneously.

At a local level, the County of Marin suggests appropriate hours of operation for construction equipment but does not provide guidance on appropriate noise levels (Marin County 2005).

The FTA restricts vibration levels from construction equipment to remain below 0.12 PPV at 25 feet from the source. Based on the PPV levels of the proposed construction equipment, the FTA's criteria would be maintained at a distance of 80 feet or more from a vibration source. Considering the closest building to the outer boundary of site is more than 400 feet away, no vibration impacts are anticipated.

Cumulative Impact Analysis—Because there would be no construction related noise or vibration impacts, there would be no cumulative impacts due to construction.

Mitigation—No mitigation is proposed.

Conclusion—The Fort Baker pier improvements would not exceed any recommended thresholds for construction related noise or vibration.

Operation.

Impact Analysis—This alternative would improve the pier at Fort Baker and provide a ferry landing for future occasional ferry embarkation service. As such, the current noise and vibration levels at this location and within the surrounding area may be impacted by changes proposed by long-term operation at this site, although as described, the service would be occasional and intermittent. To evaluate existing (without Project) versus future (with Project) noise levels at sensitive receptors, the FTA's Noise Impact Assessment Spreadsheet was used to account for the increase in noise from the occasional ferry service based on a conservative estimate of 14 ferries per day (or 0.93 landings per hour). The results of this assessment are presented in Table 71.

TABLE 71. OPERATIONAL NOISE FROM ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Receptor	Recreational Use Area	USCG Station	Bay Area Discovery Museum
Land Use Category	3	3	3
Distance from Outer Boundary of Receptor to Closest Proposed Ferry Berth (feet)	160	800	1,290
Existing Noise Level without Project (dBA, L_{dn})	55	55	55
Predicted Noise Level Contribution from Project	45	28	23
Predicted Noise Level with Project (dBA, L_{dn})	55	55	55
Total Noise Level Increase (Existing vs. Predicted; dBA)	0	0	0
Criteria for Moderate Impact (dBA)	60	60	60
Criteria for Severe Impact (dBA)	66	66	66
Impact?	None	None	None

Based on the results, no sensitive receptors in the vicinity of the Fort Baker pier are anticipated to be impacted by long-term operation of this Project. All predicted noise levels would remain below FTA criteria for commercial uses. Additionally, based on the location of the Project midpoint (as shown in Figure 25) and its proximity to the ferry berth, the future (with Project) noise level at this site is predicted to remain the same. At a local level, the Marin County does not provide guidance for operational noise.

Cumulative Impact Analysis—Because the Fort Baker pier improvements would be consistent with applicable noise and vibration regulations, and service is expected to be only occasional, there would be no cumulative impacts due to long-term operation at this site.

Mitigation—No mitigation is proposed.

Conclusion—Predicted operational noise and vibration levels at Fort Baker are below recommended thresholds determined by the FTA and the City, and as such there would be no impacts.

GEOLOGY, SOILS, AND SEISMICITY

METHODOLOGY AND THRESHOLDS

Impacts on or associated with geological conditions were qualitatively evaluated based on the potential for the alternatives to temporarily or permanently alter the geology of the study area. In addition, because geological hazards such as earthquakes happen independently of the Project, the potential for damage to proposed structures or increased risk of injury due to geologic and seismic hazards were also qualitatively evaluated. The geology, soils, and seismicity analysis was based upon existing information available for the Bay Area.

The measurement index for evaluating impacts associated with geology, soils, or seismicity is risk to the public or the environment from geologic processes. An alternative would be considered to have a major impact if it would result in substantial changes in risks to the public and the environment throughout the study area.

The analysis considered the potential for an alternative to do the following:

- Expose people or structures to potential substantial risks due to geologic hazards, including fault rupture, ground shaking, liquefaction, subsidence and settlement, landslide or slope failure, and expansive soils
- Adversely affect mineral resources in the study area

Based on the environmental setting of the study area and the features of the alternatives, there would be no adverse impacts specific to the following issues:

- **Impacts from ground rupture from a known earthquake fault.** As discussed in the "Geology, Soils, and Seismicity" section of the "Affected Environment" chapter, no active or potentially active faults cross the study area. While strong ground shaking at any of the alternatives' locations could occur as a result of regional fault activity, ground rupture is highly unlikely. Therefore, ground rupture along a known earthquake fault would not represent a hazard to the study area.
- **Construction impacts associated with geology, soils, and seismicity.** Construction of the alternatives could require soil surface disturbance, resulting in erosion. During construction, erosion control measures would be implemented that would utilize best management practices (BMPs) to avoid or minimize soil erosion and off-site transport. Construction would proceed in adherence with all applicable regulations, including NPDES Permit and Stormwater Pollution Prevention Plan (SWPPP) requirements, as well as Cal-OSHA requirements related to earthquakes and other hazards. In addition, construction hazards would not affect the public, as construction sites would be restricted from public access. As a result, implementation of the alternatives would not result in construction-related, adverse impacts associated with geology, soils, and seismicity.

Potential impacts related to tsunamis and seiches are discussed in the "Water Quality and Hydrology" section of this chapter.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

The Pier 31½ site and greater San Francisco waterfront area would experience violent or very strong ground shaking (Modified Mercalli Intensity Unit VIII to IX) in the event of a large seismic event along the San Andreas or Hayward faults (modeled as magnitude 7.5 and 6.9, respectively; ABAG 2003). Additionally, the area has been mapped as a high liquefaction hazard area, with liquefaction likely to be triggered by strong ground shaking (Figure 27). Seismically induced ground shaking or liquefaction may result in structural damage and possible injury or loss of life. Given the age of the existing piers and structures at Pier 31½, it is anticipated that a large seismic event could potentially result in damage to existing structures and potential harm to users. The expected damage or potential harm would constitute a long-term, major, adverse impact under the No Action Alternative.

Fill materials and bay muds expected to underlie Pier 31½ may be susceptible to seismically induced settlement. In the absence of site-specific subsurface information, the precise potential for ground subsidence is not known. Most fills along this section of the San Francisco waterfront are old and were not constructed using engineering methods that are currently required. However, because of the site's relative age, most fill compression has likely occurred as a result of natural compression. In the event of a large seismic event, there may be some localized settlement associated with liquefaction. Therefore, impacts due to seismically induced settlement would be expected to be long-term, minor, and adverse under the No Action Alternative.

Fill materials are not expected to have expansive properties, and damage due to soil expansion is unlikely. The San Francisco waterfront is relatively flat in the vicinity of Pier 31½. Therefore, landslides in this area are not likely, and the site has not been delineated as within an earthquake-induced landslide zone. Impacts associated with landslides or slope failure are unlikely. Therefore, there would be no impacts due to expansive soils or landslides from the No Action Alternative.

Ferry service to Alcatraz associated with the No Action Alternative would not interfere or conflict with ongoing sand mining operations. There are no other mineral resources occurring within the study area. As such, there would be no impacts on mineral resources under the No Action Alternative.

Cumulative Impact Analysis

Because the No Action Alternative would be unchanged from present conditions with respect to this resource, its incremental contribution to cumulative impacts related to geologic, soils, and seismic hazards would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The No Action Alternative would result in long-term, major, adverse impacts due to seismically induced ground shaking or liquefaction; long-term, minor, adverse impacts due to seismically induced settlement; and no impacts related to expansive soils, landslides, and mineral resources.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include a retrofit of existing structures and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 31½ Alternative would include a retrofit of existing structures to address

seismic hazards and minimize their potential impacts. The design and construction of these improvements would proceed in adherence with applicable laws and policies related to seismic safety requirements. Seismic hazards associated with the Pier 31½ Alternative would be similar to those described in the No Action Alternative, as they are located at the same site. The site is susceptible to very strong or violent ground shaking and liquefaction (Figure 27), which could damage structures or cause injury as a result of a large seismic event. The expected damage or potential harm would constitute a long-term, major, adverse impact; however, with implemented retrofits and improvements to the structure, the Pier 31½ Alternative would show reduced potential for a major impact than under the No Action Alternative.

Fill materials and bay muds expected to underlie the site may be susceptible to seismically induced settlement, most likely associated with seismically induced liquefaction. In the event of a large seismic event, there may be some localized settlement associated with liquefaction. Based on retrofits and improvements to structures, impacts due to settling and subsidence from the Pier 31½ Alternative would be long-term, minor, and adverse, though reduced compared to the No Action Alternative.

For the same reasons as the No Action Alternative, there would be no impacts related to landslides, expansive soils, and mineral resources from the Pier 31½ Alternative.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in reduced impacts on this resource compared to the No Action Alternative, its incremental contribution to cumulative impacts on geology, soils, and seismicity would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in long-term, major, adverse impacts due to seismically induced ground shaking or liquefaction (though reduced compared to the No Action Alternative); long-term, minor, adverse impacts due to seismically induced settlement, which would be reduced compared to the No Action Alternative; and no impacts related to expansive soils, landslides, and mineral resources.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the “Alternatives” chapter.

Impact Analysis

The design and construction of improvements under the Pier 41 Alternative would proceed in adherence with applicable laws and policies related to seismic safety requirements. Similar to the other alternatives under evaluation, this site is susceptible to violent ground shaking and liquefaction (Figure 27), which could potentially damage structures or cause injury during a large seismic event. Similar to the Pier 31½ Alternative, with implemented retrofits and improvements to the structure, the Pier 41 Alternative would show reduced potential for long-term, major, adverse impacts than under the No Action Alternative.

Fill materials and bay muds expected to underlie Pier 41 may be susceptible to seismically induced settlement, most likely associated with seismically induced liquefaction. In the event of a large seismic event, there may be some localized settlement associated with liquefaction.

Based on retrofits and improvements to structures, impacts due to settling and

subsidence from the Pier 41 Alternative would be long-term, minor, and adverse, though reduced compared to the No Action Alternative.

Fill materials underlying the site are not expected to have expansive properties, and damage due to soil expansion is unlikely. Pier 41 is located in a relatively flat area, and is not within or adjacent to any steep slopes delineated as within earthquake-induced landslide zones. Therefore, there would be no impacts due to expansive soils or landslides as a result of the Pier 41 Alternative compared to the No Action Alternative.

The Pier 41 Alternative would not interfere or conflict with ongoing sand mining operations. There are no other mineral resources located within the study area; as such, there would be no impacts on mineral resources as a result of the Pier 41 Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in reduced impacts on this resource compared to the No Action Alternative, its incremental contribution to cumulative impacts on geology, soils, and seismicity would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in long-term, major, adverse impacts due to seismically induced ground shaking or liquefaction, although reduced compared to the No Action Alternative; long-term, minor, adverse impacts due to seismically induced settlement, again reduced as compared to the No Action Alternative; and no impacts related to expansive soils, landslides, and mineral resources.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative includes improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Under the Pier 3 Alternative, the design and construction of site improvements would proceed in adherence with applicable laws and policies related to seismic safety requirements. The Pier 3 Alternative would be located in an area susceptible to very strong ground shaking and liquefaction (Figure 27), which could potentially damage structures or cause injury during a large seismic event. To properly inform the design and construction of the seismic retrofits to Pier 3, a geotechnical investigation of the site would be completed, and seismic standards for construction would be applied, which would reduce the potential for damage to structures or harm to people resulting from ground shaking and liquefaction. The expected damage or potential harm would constitute a long-term, major, adverse impact; however, with implemented retrofits and improvements to the structure, the Pier 3 Alternative would show reduced potential for a major impact than under the No Action Alternative.

Fill materials and bay muds expected to underlie Pier 3 may be susceptible to settling and subsidence. However, because of the site's relative age, most fill compression has likely occurred as a result of natural compression. In the event of a large seismic event, there may be some localized settlement associated with liquefaction. Impacts from the Pier 3 Alternative associated with settling and subsidence would be long-term, minor, and adverse, though reduced compared to the No Action Alternative due to structure retrofits and improvements.

Pier 3 is located in a relatively flat area, although the Fort Mason Green to the east of

the site contains steep slopes that have been delineated as within an earthquake-induced landslide zone. According to Public Resources Code Section 2693(c), development in landslide zones must be consistent with established practices that will reduce seismic risks to acceptable levels. Based on the topography, and with implemented retrofits and improvements to structures, impacts due to landslides would be long-term, negligible, and adverse, though reduced compared to the No Action Alternative.

Fill materials underlying Pier 3 are not expected to have expansive properties, and damage due to soil expansion is unlikely. Therefore, there would be no impacts due to expansive soils as a result of the Pier 3 Alternative compared to the No Action Alternative.

The Pier 3 Alternative would not interfere or conflict with ongoing sand mining operations. There are no other mineral resources located within the study area, and as such, there would be no impacts on mineral resources as a result of the Pier 3 Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 3 Alternative would result in reduced impacts on this resource compared to the No Action Alternative, its incremental contribution to cumulative impacts on geology, soils, and seismicity would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 3 Alternative would result in long-term, major, adverse impacts due to seismically induced ground shaking or liquefaction, though reduced compared to the No Action Alternative; long-term, minor, adverse impacts due to seismically induced settlement, again reduced compared to the No Action Alternative; long-term, negligible impacts due to landslides, also reduced compared to the No Action Alternative; and no impacts related to expansive soils and mineral resources.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprise the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to subsidence, settlement, landslides, mineral resources, and seismic hazards that would occur as a result of the Pier 31½ and Pier 41 alternatives would be consistent with those described for the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element includes retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. All structural improvements would be designed and constructed in adherence with applicable seismic safety codes and regulations. Implementation of this alternative would improve the performance of structures in terms of withstanding a seismic

event. Fort Baker would experience moderate to very strong ground shaking (Modified Mercalli Intensity Unit VI-VIII) in the event of a large seismic event along the San Andreas or Hayward faults (modeled as magnitude 7.5 and 6.9, respectively; ABAG 2003). Earthquake-induced ground shaking could potentially damage structures and result in injury. The expected damage or potential harm would constitute a long-term, major, adverse impact; however, with implemented retrofits and improvements to the structure, this Project element would show reduced potential for a major impact than under the No Action Alternative.

The Fort Baker pier area has a very low susceptibility to liquefaction (Figure 27; ABAG 2013b). Therefore, there would be no impacts due to liquefaction from improving the Fort Baker pier compared to the No Action Alternative.

Underlying materials at Fort Baker include natural deposits of gravelly loam and fill materials, which may be susceptible to seismic-induced settlement (NRCS 2012). However, because of their age, most fill compression at Fort Baker has likely occurred already, as evidenced by a relative lack of apparent distress in areas likely underlain by fill. Nonetheless, potential seismically induced settlement as a result of implementing special ferry service at Fort Baker represents a long-term, minor, adverse impact. However, with implemented retrofits and improvements to structures, the Fort Baker pier would have less potential for seismically induced settlement impacts than under the No Action Alternative.

Gravelly loams and fill materials in the Fort Baker pier vicinity do not exhibit expansive properties, and impacts from soil expansion are not anticipated. Therefore, there would be no impacts due to expansive soils from improving the Fort Baker pier compared to the No Action Alternative.

While the area surrounding the Fort Baker Pier is flat, there are moderate to steep slopes surrounding the study area. The site is not within a mapped earthquake-induced landslide area as defined by ABAG (ABAG 2013c). The hillside area surrounding Fort Baker has been mapped as an area of "few" rainfall-induced landslides. The Fort Baker Plan (NPS 1999) identifies two historic areas of slope instability (at Seiter Road and Alexander Avenue and at the Merill Street cul-de-sac). As these sites are not in close proximity to the proposed pathway or the pier, adverse impacts are unlikely. Therefore, there would be no impacts due to landslides from improving the Fort Baker Pier compared to the No Action Alternative.

Implementing special ferry service to Fort Baker would not interfere or conflict with ongoing sand mining operations. There are no other mineral resources located within the study area. Therefore, there would be no impacts due to mineral resources from improving the Fort Baker pier compared to the No Action Alternative.

Cumulative Impact Analysis. Because the Fort Baker special ferry service would result in reduced impacts on this resource compared to the No Action Alternative, its incremental contribution to cumulative impacts on geology, soils, and seismicity would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Implementing Fort Baker special ferry service would result in long-term, major, adverse impacts due to seismically induced ground shaking, though reduced compared to the No Action Alternative; long-term, minor, adverse impacts due to seismically induced settlement, although though reduced compared to the No Action Alternative; and no impacts related to liquefaction, expansive soils, landslides, and mineral resources.

WATER QUALITY AND HYDROLOGY

METHODOLOGY AND THRESHOLDS

Impacts on or associated with water quality and hydrology were qualitatively evaluated based on the potential for in-water and land-based construction activities, as well as future operations to be noncompliant with applicable federal, state, and local water quality and stormwater management regulations and policies noted in the "Water Quality and Hydrology" section of the "Affected Environment" chapter.

The proposed measurement index for evaluating water quality impacts is consistency with these regulations and policies. An alternative would be considered to have a major impact if construction or operational activities are found to be potentially inconsistent with applicable regulations and policies.

The analysis considered the potential for an alternative to do the following:

- Violate any water quality standards or waste discharge requirements
- Create or contribute runoff water that would provide substantial additional sources of polluted runoff
- Otherwise substantially degrade water quality
- Place structures that would impede or redirect flood within the 100-year flood hazard area
- Expose people or structures to potential substantial risks due to tsunamis and seiches
- Expose people or structures to potentially substantial risks due to sea level rise

Based on the environmental setting of the study area and the features of the alternatives, there would be no adverse impacts specific to the following water quality and hydrology issues:

- **Substantially deplete groundwater supplies or interfere with groundwater recharge.** The Project does not involve excavation to depths that would affect aquifer systems or groundwater movement. They would not involve the construction of substantial new impervious surfaces that would impede groundwater recharge. Therefore, no long-term impacts related to groundwater would occur and these effects are not discussed further.
- **Expose people or structures to a significant risk of loss, injury, or death involving mudflow, failure of a levee, or failure of a dam.** The study area is not located near geologic conditions that would generate mudflow, in an area where there are levees and dam, or in a dam inundation zone. Therefore, exposure to these risks is not applicable to the alternatives under evaluation and these effects are not discussed further.
- **Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map.** The Project would not construct any housing. Therefore, exposure to these risks is not applicable to the alternatives under evaluation and these effects are not discussed further.

Related potential impacts associated with water quality and hydrology are also discussed in the context of other resource sections in this chapter, including:

- Creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater drainage systems; discussed in the "Public Services and Utilities" section
- Substantial degradation of water quality, as related to invasive species;

discussed in the "Aquatic Biological Resources" section
- Substantial degradation of water quality, as related to airborne pollutant emissions; discussed in the "Air Quality" section
- Substantial degradation of water quality and effects on recreational uses including swimming; discussed in the "Recreation" section

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

Because no construction is proposed, the No Action Alternative would result in no construction-related impacts related to water quality or hydrology.

Ferry operations have the potential to impact water quality from potential pollutant discharges of hazardous materials, including chemicals and solvents used onboard, boat cleaning and maintenance materials, fuels, bilge or ballast water, sewage from toilets, and gray water. Ferry operations would continue to occur in adherence with plans and policies designed to address potential water quality impacts. This includes implementation of the existing SWPPP (Alcatraz Cruises 2012), which identifies and requires site-specific BMPs to reduce or prevent pollutants associated with industrial activities in stormwater discharged and authorized nonstormwater discharges. The site operator would also continue to maintain a Spill Prevention Control and Countermeasure Plan (SPCC; Incident and Risk Management Services 2012), a Hazardous and Universal Waste Management Program (Alcatraz Cruises 2011a), and a Hazards Communications Plan (Alcatraz Cruises 2011b) that identify hazardous materials on-site, describe appropriate hazardous materials storage and handling procedures, and address the emergency cleanup of any hazardous material. Therefore, water quality impacts from operational use of potentially hazardous materials under the No Action Alternative would be long-term, negligible, and adverse.

Vessel fueling by Alcatraz Cruises occurs weekly using a fuel truck and is performed by qualified engineers in adherence with an established vessel fueling plan and checklist that includes safety checks and procedures for spill prevention and cleanup (Alcatraz Cruises 2008, 2009). Fueling occurs in adherence with USCG regulations (33 CFR 156.120 and 33 CFR 155.320). Any spills would be cleaned up immediately using spill response equipment as identified in the SPCC. The USCG maintains a Marine Environmental Protection Division whose primary mission includes containment and cleanup of oil discharges and hazardous substances introduced into navigable waters in coordination with other local, state, and federal agencies. Therefore, water quality impacts from vessel fueling under the No Action Alternative would be long-term, negligible, and adverse.

Ferries do not typically take on or discharge large quantities of ballast water. Nonetheless, any such actions would occur in compliance with federal and state regulations, including the VGP and ballast water management for control of nonindigenous species act. These actions would minimize the potential for introducing invasive aquatic species, which is a section 303(d)-listed pollutant, and protect Bay waters from other pollutants present in ballast water. Therefore, water quality impacts associated with ballast discharge would be long-term, negligible, and adverse under the No Action Alternative.

Sanitary sewage from ferries would be subject to the requirements of the MARPOL convention and section 312 of the CWA, which include requirements for onboard MSDs as well as for storage and discharge of sewage, treatment of sewage, and disinfection of sewage. Under existing conditions and

operation by Alcatraz Cruises, sewage systems onboard the ferries are all self-contained and pump off into the SFPUC system at Pier 33. Under the No Action Alternative, sewage from ferries would continue to be treated in adherence with applicable rules and regulations. Therefore, water quality impacts associated with sewage from ferries would be long-term, negligible, and adverse under the No Action Alternative.

The disposal of trash, a section 303(d)-listed pollutant, would proceed in compliance with federal, state, and local regulations which prohibit its discharge into the Bay. The No Action Alternative would not significantly increase trash generation. For these reasons, water quality impacts associated with trash on board ferries would be long-term, negligible, and adverse.

Sewage from land-based restroom facilities would continue to be conveyed to the SFPUC combined sewer system (described in detail in the "Public Services and Utilities" section of this chapter). The existing SFPUC combined sewer system has sufficient capacity to manage sewage from current operations at Pier 31½. The No Action Alternative would not generate new sources of sewage or significantly increase sewage generation. Therefore, the generation of land-based sewage would have no impact on water quality under the No Action Alternative.

Due to the proximity of Pier 31½ to the Bay, litter from visitors at the site could potentially enter the Bay. Under the No Action Alternative, site operation would proceed in adherence with all applicable federal, state, and local regulations for waste management and disposal. Solid waste collection and disposal services would continue to be provided by Recology. These regulations and existing services are discussed in detail in the "Public Services and Utilities" section of this chapter. The No Action Alternative would not create new sources of trash or significant increases in trash generation. For these reasons, generation of upland trash would have no impact on water quality under the No Action Alternative.

Pier 31½ is within a FEMA-delineated 100-year flood plain, and waterfront flooding could occur in this area. The level of flood risk is partially determined by the nature of the facility; ferry service under the No Action Alternative would be for planned recreational purposes. If flooding were to occur, ferry patrons and employees would avoid this area. Because the No Action Alternative does not include site improvements, existing flood flows would not be impeded or redirected. Therefore, impacts related to siting within a 100-year flood hazard area would be long-term, negligible, and adverse under the No Action Alternative.

Pier 31½ is within the tsunami inundation area as delineated on the tsunami inundation maps (California Emergency Management Agency 2009a, 2009b). The primary tsunami threat in the Bay is from distant earthquakes along subduction zones elsewhere in the Pacific basin. By the time a tsunami enters the Bay, its impacts would be reduced compared to those on the open coast, likely involving just a few feet of inundation. In an extreme worst case scenario involving a rupture of the Alaska-Aleutians subduction zone, waves at Pier 31½ could reach as high as 10.17 feet (City/County 2011). Based on the low likelihood of a significant seiche or tsunami event at Pier 31½, and taking into consideration NOAA's tsunami warning system and the City/County's emergency response plan, impacts from seiche or tsunami would be long-term, negligible, and adverse under the No Action Alternative.

Under the USGS sea level rise scenario of 100 cm (29 inch), the proposed outdoor program area at Pier 31½ would be vulnerable to inundation during a 100-year flood event. The area vulnerable to inundation would further increase under the USGS sea level rise scenario of 150 cm (59 inch; USGS 2013). Because the No Action Alternative does not include site improvements, water levels during such a scenario would not be impeded or redirected. Therefore, impacts related to inundation vulnerability resulting from sea level rise would be long-term, negligible, and adverse under the No Action Alternative.

Cumulative Impact Analysis

Because the No Action Alternative would be unchanged from present conditions with respect to water quality and hydrology, there would be no cumulative impacts related to these issues as a result of this alternative.

Mitigation

No mitigation is proposed.

Conclusion

The No Action Alternative would result in no water quality impacts from construction; long-term, negligible water quality impacts from operations; and negligible impacts on hydrology.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Driving of eight new piles and other underpier repair activities may disturb sediments and result in temporary localized increases in turbidity, releases of chemicals in the sediment, increases in dissolved oxygen (DO), and changes to pH in the water column. Any potential impacts on water quality would be short-term, and conditions would quickly return to baseline levels after pile driving activities were completed. In addition, this alternative would comply with all local, state, and federal permit requirements, including any agency-required water quality monitoring requirements. Given the relatively high natural turbidity of the study area, the localized nature of impacts, and compliance with all laws and regulations, construction impacts would represent a short-term, negligible impact compared to the No Action Alternative.

Fuels and other chemicals used during construction, as well as hazardous building materials (i.e., lead-based paint, asbestos, and PCB-containing materials) encountered during demolition, could potentially degrade Bay water quality if improperly handled or spilled. Although improvements would require minimal excavation, disturbed soils could also be conveyed to the Bay via stormwater runoff. In accordance with the requirements of the Project's NPDES permit, the Park Service would be required to prepare and implement a SWPPP to minimize construction water quality impacts. The SWPPP would identify pollutant sources within the construction area and provide site-specific BMPs regarding control of sediments in runoff, avoidance measures to minimize turbidity, and storage and use of hazardous materials to prevent discharge of pollutants into stormwater. Accordingly, construction of the Pier 31½ Alternative would result in short-term, negligible impacts associated with hazardous materials compared to the No Action Alternative.

Specific to section 303(d) listed pollutants for the Central Bay (Table Pollutants), while heavy metals and PCB-containing materials may be found in fill soils or building materials on-site, the Pier 31½ Alternative would not entail significant grading or soil disturbance, and construction activities would include implementation of a SWPPP and additional measures to minimize associated water quality impacts. As such, there would be no impacts on water quality from construction of the Pier 31½ Alternative related to section 303(d)-listed pollutants.

While the Pier 31½ Alternative would result in minor increases in the number of ferry trips to the site compared to the No Action Alternative, water quality impacts associated with long-term operations of this alternative would be similar to those described in the No Action Alternative.

Ferry operations under the Pier 31½ Alternative would proceed in adherence with a site-specific SPCC or equivalent plan(s) that would address protecting water quality through implementation of BMPs, hazardous materials storage and handling protocols, and spill prevention and cleanup procedures. Ferry operations would also occur in compliance with applicable federal, state, and local regulations, including fueling regulations administered by USCG, open-water waste management and disposal regulations, and ballast water regulations (VGP and ballast water management for control of nonindigenous species act). Ferries servicing the site would only operate in the Bay; as such, water quality impacts associated with increased invasive marine species would not be expected. Compliance with regulations associated with the prevention of in-water trash prevention and the spread of invasive marine species would address the applicable section 303(d)-listed pollutants with the potential to be affected by ferry operations. Sanitary sewage from ferries would be subject to the requirements of the MARPOL convention and section 312 of the CWA. Sewage systems onboard the ferries would be self-contained and would pump off into the SFPUC system. Therefore, water quality impacts from ferry operations under the Pier 31½ Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

Site improvements under the Pier 31½ Alternative would not significantly increase the area of impermeable surfaces. New construction and other improvements would be designed and constructed with drainage infrastructure that complies with stormwater regulations. There would be no changes to land-based sewage collection, and the increased number of visitors at the site would not be expected to notably increase trash generation. Existing restrooms would be used, with sewage conveyed to the SFPUC combined sewer system. Solid waste collection and disposal services would continue to be provided by Recology. Trash management at the embarkation site would continue to proceed in compliance with all applicable federal, state, and local regulations for waste management and disposal. Therefore, embarkation site operations under the Pier 31½ Alternative would have no impact on water quality compared to the No Action Alternative.

Pier 31½ is within a FEMA-delineated 100-year flood plain, and waterfront flooding could occur in this area. The Pier 31½ Alternative would not expand the size of the site or otherwise increase exposure of individuals to flood risk. Therefore, impacts related to flood risk as a result of the Pier 31½ Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

Tsunami or seiche hazards at the site would be identical to those of the No Action Alternative. Taking into consideration NOAA's tsunami warning system and the City/County's tsunami emergency response plan, any potential impacts from seiche or tsunami as a result of the Pier 31½ Alternative would be unchanged from the No Action Alternative.

Under the USGS predicted sea level rise scenario of 100 cm (29 inch), the proposed outdoor program area at Pier 31½ would be vulnerable to inundation during a 100-year flood event. The area vulnerable to inundation would further increase under the USGS sea level rise scenario of 150 cm (59 inch; USGS 2013).The Pier 31½ Alternative would not expand the size of the site or otherwise increase exposure of individuals to flood risk under this or other sea level rise scenarios as projected by USGS. Planned improvements at the site would not increase the elevation of the bulkhead. Floating elements such as new gangway and float structures would not be impacted, and would be designed to accommodate changes in sea level. Therefore, impacts related to inundation vulnerability resulting from sea level rise would be unchanged as compared to the No Action Alternative.

Cumulative Impact Analysis

None of the projects in Table 34 would result in major water quality impacts. Because the Pier 31½ Alternative would result in negligible to no impacts on this resource, the alternative's incremental contribution to any cumulative impacts on water quality would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in short-term, negligible water quality impacts from construction; long-term, negligible water quality impacts from operations; long-term, negligible impacts associated with flood risk; and no increased impacts related to tsunamis and seiches compared to the No Action Alternative.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expanding the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Due to similarities in construction activities, construction-related impacts on water quality under the Pier 41 Alternative would be consistent with those described for the Pier 31½ Alternative, with the exception that additional pile driving would occur. Under the Pier 41 Alternative, between 58 and 108 new piles would be installed. Given the relatively high natural turbidity of the study area, the localized nature of impacts, and the fact that the Park Service would comply with all laws and regulations, construction impacts would represent a short-term, negligible impact compared to the No Action Alternative.

Potential water quality impacts associated with ferry operations under the Pier 41 Alternative would be entirely consistent with those described for the Pier 31½ Alternative.

Potential water quality impacts associated with embarkation site operations under the Pier 41 Alternative would be entirely consistent with those described for the Pier 31½ Alternative.

Potential hydrology impacts associated with flood risk under the Pier 41 Alternative would be consistent with those of the Pier 31½ Alternative.

Potential impacts from seiche or tsunami inundation would be similar to those of the other alternatives. The Pier 41 site's bayward orientation reduces its susceptibility to seiche or tsunami impacts resulting from a major distance seismic event. Taking into consideration NOAA's tsunami warning system and the City/County's tsunami emergency response plan, any potential impacts from seiche or tsunami as a result of the Pier 41 Alternative would be unchanged from the No Action Alternative.

Under the USGS predicted sea level rise scenario of 100 cm (29 inch), the existing outdoor program area, outdoor covered program area, and proposed building expansion area at Pier 41 would be vulnerable to inundation during a 100-year flood event (USGS 2013). The Pier 41 Alternative would not expand the size of the site or otherwise increase exposure of individuals to flood risk under this or other sea level rise scenarios, as projected by USGS. Planned improvements at the site would not increase the elevation of the bulkhead. Floating elements, such as new gangway and float structures, would not be impacted and would be designed to accommodate changes in sea level. Therefore, impacts related to inundation vulnerability resulting from sea level rise would be

unchanged as compared to the No Action Alternative.

Cumulative Impact Analysis

None of the projects in Table 34 would result in major water quality impacts. Because the Pier 41 Alternative would result in negligible to no impacts on this resource, the alternative's incremental contribution to any cumulative impacts on water quality would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in short-term, negligible water quality impacts from construction; long-term, negligible water quality impacts from operations; long-term, negligible impacts associated with flood risk; and no increased impacts related to tsunamis and seiches compared to the No Action Alternative.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Construction-related impacts on water quality under the Pier 3 Alternative would be consistent with those described for the Pier 31½ Alternative, with the exception that additional pile driving would occur. Under the Pier 3 Alternative, between 16 and 20 new piles would be installed. Given the relatively high natural turbidity of the study area, the localized nature of impacts, and the fact that the Park Service would comply with all laws and regulations, construction impacts would represent a short-term, negligible impact compared to the No Action Alternative.

Potential water quality impacts associated with ferry operations under the Pier 3 Alternative would be entirely consistent with those described for the Pier 31½ Alternative.

Potential hydrology impacts associated with flood risk under the Pier 3 Alternative would be consistent with those described for the Pier 31½ Alternative.

Potential impacts from seiche or tsunami inundation would be similar to those of the other alternatives. The Pier 3 site's bayward orientation reduces its susceptibility to seiche or tsunami impacts resulting from a major-distance seismic event. Taking into consideration NOAA's tsunami warning system and the City/County's tsunami emergency response plan, any potential impacts from seiches or tsunamis as a result of the Pier 3 Alternative would be unchanged from the No Action Alternative.

Under the USGS no sea level rise scenario, the riprap armored bank adjacent to the proposed third berth at Pier 3 would be vulnerable to inundation during a 100-year flood event, in addition to a small area on the east side of the Pier 3 Shed building. Under the USGS-predicted sea level rise scenario of 100 cm (29 inch), the entire east side of the Pier 3 Shed building would also be vulnerable to inundation. The area vulnerable to inundation would further increase under the USGS sea level rise scenario of 150 cm (59 inch; USGS 2013). The Pier 3 Alternative would not expand the size of the site or otherwise increase exposure of individuals to flood risk under any of the sea level rise scenarios as projected by USGS. Planned improvements at the site would not increase the elevation of the bulkhead. Floating elements, such as new gangway and float structures, would not be impacted, and would be designed to accommodate changes in sea level. Therefore, impacts related to inundation vulnerability

resulting from sea level rise would be unchanged as compared to the No Action Alternative.

Cumulative Impact Analysis

None of the projects in Table 34 would result in major water quality impacts. Because the Pier 3 Alternative would result in negligible to no impacts on this resource, the alternative's incremental contribution to any cumulative impacts on water quality would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 3 Alternative would result in short-term, negligible water quality impacts from construction; long-term, negligible water quality impacts from operations; long-term, negligible impacts associated with flood risk; and no increased impacts related to tsunamis and seiches compared to the No Action Alternative.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between piers 1 and 2 that comprise the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Impact Analysis. This Project element and the Pier 3 Alternative have overlapping geographic boundaries and similar (although reduced) required in-water work activities Therefore, construction and operational impacts on water quality and hydrology are equivalent to those identified in the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

Impact Analysis. This Project element includes retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of special ferry service at Fort Baker as detailed in the "Alternatives" chapter.

Construction-related impacts on water quality associated with Fort Baker special ferry service would be entirely consistent with those described for the Pier 31½ Alternative. Eight new piles would be installed for this Project element.

Ferry service to Fort Baker would be limited to special event service. Ferry operations would proceed in adherence with a site-specific SPCC or equivalent plan(s) and in compliance with applicable federal, state, and local regulations. Ferries servicing the site would operate only in the Bay; as such, water quality impacts associated with increased invasive marine species would not be expected. Compliance with regulations associated with the prevention of in-water trash prevention and the spread of invasive marine species addresses the applicable section 303(d)-listed pollutants with the potential to be affected by ferry operations. Sanitary sewage from ferries would be subject to the requirements of the MARPOL convention and section 312 of the CWA. Sewage systems onboard the ferries would be self-contained and would pump off into existing municipal sewer systems for treatment. Therefore, water quality impacts from ferry operations associated with Fort Baker special ferry service would be long-term, negligible, and adverse compared to the No Action Alternative.

No upland infrastructure would be installed to support this service. Upland impacts

associated with special ferry service operations would generally be minimal. Ferry patrons would use existing restroom facilities at Fort Baker, with sewage conveyed via the existing sewer system to SMCSD's wastewater treatment plant for treatment and disposal. Any increase in sewage system demand associated with Fort Baker special ferry service is expected to be minimal and significantly less than that associated with visitor use during holidays or other special events, and would not exceed system capacity. Fort Baker special ferry service would minimally increase demand on trash management, which would be accommodated by existing service providers. Therefore, land-based operations associated with Fort Baker special ferry service would have no impact on water quality compared to the No Action Alternative.

FEMA flood maps do not include information for the Fort Baker pier area; however, waterfront areas in adjacent Sausalito and the Marin Headlands are mapped by FEMA as occurring with the 100-year flood zone (FEMA 2009). As such, the Fort Baker pier area would likely be subject to similar inundation. The level of flood risk is partially determined by the nature of the facility; ferry service to Fort Baker would be limited to special event service for planned recreational purposes. If flooding were to occur, ferry patrons and employees would avoid this area. Proposed site improvements do not include construction of structures that would impede or redirect flood flows. Therefore, impacts related to flood risk as a result of the Fort Baker special ferry service would be long-term, negligible, and adverse compared to the No Action Alternative.

The Fort Baker site's bayward orientation minimizes its susceptibility to seiche or tsunami impacts resulting from a major distance seismic event. Taking into consideration NOAA's tsunami warning system and the County of Marin's tsunami emergency response plan, any potential impacts from seiches or tsunamis as a result of Fort Baker special ferry service would be unchanged compared to the No Action Alternative.

Under the USGS no sea level rise scenario, the beach area immediately northeast of the Fort Baker Pier would be vulnerable to inundation during a 100-year flood event. Under the USGS predicted sea level rise scenario of 100 cm (29 inch), the beach area immediately southwest of the Fort Baker Pier would also be vulnerable to inundation during a 100-year flood event. The existing pier is located within the 100-year flood zone. The improved pier, as well as floating elements such as new gangway and float structures, would not be impacted, and would be designed to accommodate changes in sea level. Therefore, impacts related to inundation vulnerability resulting from sea level rise would be unchanged as compared to the No Action Alternative. Therefore, impacts related to inundation vulnerability resulting from sea level rise would be long-term, negligible, and adverse compared to the No Action Alternative.

Cumulative Impact Analysis. None of the projects in Table 34 would result in major water quality impacts. Because Fort Baker special ferry service would result in negligible to no impacts on water quality, the alternative's incremental contribution to any cumulative impacts on water quality would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Fort Baker special ferry service would result in short-term, negligible water quality impacts from construction; long-term, negligible water quality impacts from operations; long-term, negligible impacts associated with flood risk; and no increased impacts related to tsunamis and seiches compared to the No Action Alternative.

AQUATIC BIOLOGICAL RESOURCES

METHODOLOGY AND THRESHOLDS

Impacts on aquatic resources, including marine habitats, fish, marine mammals, and other aquatic species, were qualitatively evaluated based on the habitat preferences for various species known or suspected to be in the study area, as well as the quantity and quality of existing habitat. Potential impacts were analyzed using recent CDFW, NMFS, and USFWS lists for special status species with the potential to inhabit the study area, literature reviews, and professional expertise and judgment in evaluating how the alternatives could interact with and impact aquatic biological resources.

The proposed measurement indices used to evaluate impacts on biological resources include impacts on aquatic species and/or their habitat. An alternative would be considered to have a major impact if it would be inconsistent with applicable regulations and policies protecting aquatic resources.

The analysis considered the potential for an alternative to do the following:

- Result in changes to aquatic biological community size, continuity, or integrity
- Result in changes to the amount, distribution, connectivity, or integrity of special-status aquatic species populations
- Result in changes to the amount, distribution, connectivity, or integrity of any sensitive natural communities identified in local or regional plans, policies, or regulations
- Result in changes to the amount, distribution, connectivity, or integrity of any native aquatic wildlife nursery sites
- Substantially interfere with the movement of migratory fish or other aquatic wildlife species with established migratory corridors

Based on the environmental setting of the study area and the features of the alternatives, there would be no adverse impacts specific to the following issues:

- **Invasive and nonnative species.** Invasive organisms are most commonly introduced to Bay waters via ballast water discharge from shipping vessels that travel between waterbodies. Other methods of introduction include fouling organisms on ship hulls, accidental releases from the aquarium trade or food industry, and intentional introduction. Ferry operations would occur entirely within the Bay, and the risk for introducing invasive nonnative species is extremely low.

ESA, CESA, EFH, and MMPA Impact Determinations

In addition to NEPA impact determinations, this section includes the Park Service's effects determinations specific to section 7 of the ESA, the CESA, the M-SFCMA, and the MMPA. The following sections define the various impact terminologies for these regulations.

ESA Section 7 Impact Determinations. The USFWS and NMFS use the following terminology to assess impacts on federally listed species under section 7 of the ESA uses (USFWS & NMFS 1998):

- *No effect* means that the proposed action and its interrelated and interdependent actions will not directly or indirectly affect listed species or destroy or adversely modify designated critical habitat. Formal section 7 consultation is not required when the no effect conclusion is reached.
- *May affect, but not likely to adversely affect* means that effects to the species or critical habitat are expected to be beneficial, discountable, or

insignificant. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact (and should never reach the scale where take occurs), while discountable effects are those that are extremely unlikely to occur.

- *May affect, and likely to adversely affect* means that adverse effects to listed species or critical habitat may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable or insignificant (see the definition of "is not likely to adversely affect"). In the event that the overall effect of the proposed action is beneficial to the listed species or critical habitat, but may also cause some adverse effect on individuals of the listed species or segments of the critical habitat, then the determination should be "is likely to adversely affect." Such a determination requires formal section 7 consultation.

CESA Impact Determinations. Section 2080 of the Fish and Game Code prohibits "take" of any CESA-listed species. Take is defined in Section 86 of the Fish and Game Code as, "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects, through issuance of Incidental Take permits.

M-SFCMA Impact Determinations. NMFS uses the following definitions for potential impacts on EFH (50 CFR 600.810)

- *Temporary and minimal effects* means temporary impacts are those that are limited in duration and that allow the particular environment to recover without measurable impact. Minimal impacts are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions (62 FR 66538).
- *Adverse effect* means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of or injury to benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within or outside of EFH, and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

MMPA Impact Determinations. Per the 1994 amendments to the MMPA, harassment is statutorily defined as any act of pursuit, torment, or annoyance, which amended the following (16 USC 1371(a)(5)):

- *Level A Harassment* has the potential to injure a marine mammal or marine mammal stock in the wild
- *Level B Harassment* has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding, or sheltering, but does not have the potential to injure a marine mammal or marine mammal stock in the wild.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

Because there would not be any construction to the existing Pier 31½ site under the No

Action Alternative, there would be no construction-related impacts.

Plankton. Any increases in ferry operations would occur intermittently and in the same manner as existing conditions, and would not affect plankton. Therefore, the No Action Alternative would have no impact on plankton.

Plants and Macroalgae. Any increases in ferry operations would occur intermittently and in the same manner as existing conditions, and would not affect plants and macroalgae. Therefore, the No Action Alternative would have no impact on plants and macroalgae.

Invertebrates. Any increases in ferry operations would occur intermittently and in the same manner as existing conditions, and would not affect the existing hard substrates or benthic soft substrate at Pier 31½. Therefore, the No Action Alternative would have no impact on invertebrate communities.

Common Fish Species. Ferry operations associated with the No Action Alternative could intermittently increase over time and result in incrementally increased risk of fish entrainment and low-level increases in turbidity from vessel wake. These impacts would be intermittent and highly localized, and, given the Bay's natural turbid conditions, would not notably affect fish. Therefore, the No Action Alternative would have no impacts on common fish species.

EFH. The potential impacts on EFH would be consistent with those on common fish species. Potential impacts would be intermittent and highly localized, and, given the Bay's natural turbid conditions, would not notably affect EFH. As such, the No Action Alternative would have no effect on designated EFH.

Protected Marine Species. The potential impacts on ESA- and CESA-listed species from the No Action Alternative would be consistent with those on common fish species. Potential impacts would be intermittent and highly localized, and, given the Bay's natural turbid conditions, would not notably affect protected fish species. As such, the No Action Alternative would have no effect on protected ESA- and CESA-listed fish species.

Marine Mammals. Pinnipeds (harbor seals and sea lions) that commonly inhabit the region along the San Francisco waterfront, as well as less frequent transient marine mammal species, are adapted to vessel traffic within the Central Bay. Any increases in ferry operations would occur in the same manner as existing conditions. Therefore, the No Action Alternative would have no effect on marine mammals.

Cumulative Impact Analysis

Because the No Action Alternative would be largely unchanged from present conditions with respect to this resource, its incremental contribution to cumulative impacts related aquatic biological resources would not be major.

Mitigation

No mitigation is proposed.

Conclusion and Determinations Under the ESA, CESA, M-SFCMA, and MMPA

The No Action Alternative would result in no impacts on plankton, plants and macroalgae, invertebrates, fish, EFH, and ESA- and CESA-listed fish species and marine mammals; and no effect on any designated EFH, protected species or marine mammal under the ESA, M-SFCMA, or the MMPA.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative includes retrofit of existing structures and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Specific construction activities would include repairing and installing up to eight new piles, installing a new gangway and float, and improving the deck and concrete bulkhead wall. Specifically, the following types and sizes of piles would be driven, likely by impact hammer:

- Guide piles for floats (main and third berth): eight 36-inch-diameter steel piles (four piles for each float)

No new piles are anticipated to be needed for retrofit of the existing pier structure (jacketing/wrapping retrofit of existing piles) or replacement of the older pier section under the bulkhead building. Installation of the float, gangway, and guide piles would result in permanent increases in overwater shading of approximately 4,100 square feet.

The Pier 31½ Alternative would result in minor increases in the number of ferry trips arriving at and departing from the embarkation site compared to the No Action Alternative.

Plankton. During pile driving, planktonic organisms may be affected by turbidity as a result of decreased light levels available for phytoplankton photosynthesis and from clogging of the filter feeding mechanisms of zooplankton. These potential impacts would be short-term and inconsequential because of the limited scope of bottom-disturbing activities and area of impact. Suspended particulate levels would rapidly return to normal levels shortly after pile driving is complete. Long-term shading impacts on plankton would be insignificant due to the size of the increased shading area relative to existing overwater structures and the abundance of suitable neighboring habitat. In addition, the highly turbid nature of the Bay strongly influences light availability and associated photosynthetic production (Zimmerman et al. 1991). Increases in ferry operations would occur intermittently and in the same manner as the No Action Alternative, and would not affect plankton. Therefore, construction and operations of the Pier 31½ Alternative would have no impact on plankton compared to the No Action Alternative.

Plants and Macroalgae. Eelgrass or other submerged aquatic vegetation has not been observed along at Pier 31½ (USACE 2011a; NMFS 2007). As such, construction and operations of the Pier 31½ Alternative would have no impact on protected eelgrass or submerged aquatic vegetation beds compared to the No Action Alternative.

Algal species commonly associated with Central Bay soft bottom substrates (red, green, and brown algae) may be affected by decreased light transmission as a result of shading from new overwater structures and from increased turbidity or direct impacts during pile driving, if present. The installation of eight piles under this alternative would result in the loss of a negligible amount of benthic habitat for algal species, which would be offset by the potential to attach to new piles. Long-term shading impacts on these algal species would be insignificant due to the size of the increased shading area relative to existing overwater structures and the abundance of suitable neighboring habitat. Increases in ferry operations would occur intermittently and in the same manner as the No Action Alternative. As such, construction and operations of the Pier 31½ Alternative would have short-term, negligible impacts on plants and macroalgae compared to the No Action Alternative.

Invertebrates. No natural hard substrate features on which invertebrates would be expected to inhabit exist at Pier 31½ (e.g., boulders, rock outcrops, etc.); hard substrate features are limited to manmade structures such as pilings and seawalls. Removal or repair of existing piles and other in-water structures as part of the Pier 31½ Alternative could temporarily impact encrusting invertebrate communities. Loss of invertebrates would occur over a very small area, and these species would be expected to rapidly recolonize existing and new in-water structures in the area. Increases in ferry

operations would occur intermittently and in the same manner as the No Action Alternative, and would not affect invertebrates. Therefore, construction and operations of the Pier 31½ Alternative would have no impacts on invertebrates associated with hard substrates compared to the No Action Alternative.

Common Fish Species. Pile driving may temporarily disturb benthic sediments and increase suspended sediment levels in the immediate vicinity of the Pier 31½ during construction. During construction, increased suspended sediment levels and associated loss of benthic or encrusting organisms may temporarily impact foraging opportunities. Temporary increases in suspended sediment may cause clogging of gills and feeding apparatuses of fish and filter feeders, if present; however, studies have shown that projects involving similar but larger-scale sediment and benthos disturbance (e.g., dredging) did not have long-term adverse effects on fish populations (Chambers Group 1998). In addition, the Bay has relatively high suspended sediment levels under baseline conditions (Jassby et al. 2002). Therefore, the Pier 31½ Alternative would have short-term, negligible impacts on fish from increased suspended sediment levels during construction compared to the No Action Alternative.

Underwater sound pressure generated by construction operations, including pile driving, may temporarily affect fish behavior. Fish are likely to be temporarily disturbed or leave the immediate Project area during certain phases of construction. Due to the temporary nature and limited area of in-water work activities, noise impacts during construction are not expected to have notable or lasting impacts on fish. Driving up to eight new steel piles would likely occur over no more than 2 to 3 days, and mitigation measures Aquatic-MM-1 and 2, which involve obtaining and complying with permits, and implementing construction-related avoidance and minimization measures (described further below), would be implemented under this alternative to reduce impacts. Therefore, the Pier 31½ Alternative would have short-term, minor, adverse impacts on fish from underwater sound pressure resulting from pile driving during construction compared to the No Action Alternative.

Long-term overwater shading from docks and piers has historically been viewed as relatively neutral with respect to fish communities (NAVFACSW & Unified Port of San Diego 2011); seasonal variance would likely have a much stronger effect on fish community composition compared to relatively minor changes in light gradients from gangways and floats. The addition of manmade hard substrates may minimally increase habitat area for encrusting organisms on which fish feed. Increased ferry operations could result in incrementally increased risk of entrainment and localized increases in turbidity from vessel wake; however, due to the minor increases in ferry operations compared to the No Action Alternative and the naturally turbid conditions of the Bay, effects on fish are not expected to be notable. Therefore, the Pier 31½ Alternative would have long-term, negligible impacts on fish from operations compared to the No Action Alternative.

EFH. Potential construction impacts on EFH would include the temporary removal of habitat that provides shelter and/or prey resources, minor increased suspended sediment levels and turbidity relative to background conditions, and behavioral disturbance due to increased underwater sound pressure levels. Although the Pier 31½ Alternative would result in permanent shading of approximately 4,100 square feet, the new piles and floats could increase invertebrate habitat and species diversity, thereby increasing foraging opportunities for fish. Long-term shading impacts on EFH would be insignificant, due to the size of the increased shading area relative to existing overwater structures and the abundance of suitable neighboring habitat in the area. Mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce construction-related impacts. Increased ferry operations could result in incrementally increased risk of entrainment and localized

increases in turbidity from vessel wake; however, due to the minor increases in ferry operations compared to the No Action Alternative, the current use of the site for ferry operations and other ferry operations in the vicinity, and the naturally turbid conditions of the Bay, effects on EFH are expected to be temporary and minimal. Therefore, for effects to EFH under the M-SFCMA, including the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs, all impacts from construction and operations of the Pier 31½ Alternative would be *temporary and minimal*. The Park Service has requested that NMFS provide concurrence with its findings under the M-SFCMA.

Protected Marine Species. Potential impacts on special status fish species would be similar to impacts on common fish species present in the vicinity of Pier 31½. During construction, increases in turbidity and underwater sound pressure levels as a result of pile driving may affect fish behavior. These effects would be localized and temporary, limited to the construction vicinity for a period of up to 3 days (for driving of up to eight steel piles). Potential long-term impacts of this alternative would include approximately 4,100 square feet of increased overwater shading, which would be insignificant due to the size of the increased shading area relative to existing overwater structures and the abundance of suitable neighboring habitat in the area. There is the potential for increased risk of entrainment, and increases in turbidity from vessel wake associated with increased ferry operations, although the site and surrounding areas are currently heavily used for ferry operations.

Given the localized nature of these construction and operational effects, the availability of additional suitable habitat for protected species throughout the Bay, the current use of the site for ferry operations, as well as the ongoing use of neighboring sites, and the overall ongoing commercial and recreational use of the area, associated impacts on protected fish species would be minimal, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Therefore, for ESA-listed species, including green sturgeon southern DPS, central California coast ESU coho salmon, central California coast DPS steelhead trout, Central Valley DPS steelhead trout, Sacramento River winter-run ESU Chinook salmon, and Central Valley spring-run ESU Chinook salmon, the Pier 31½ Alternative *may affect, but is not likely to adversely affect* these listed species or their critical habitat. The Park Service has requested that NMFS provide concurrence with its findings under the ESA.

This alternative's effects on CESA-listed fish species, including the above listed species and the state threatened longfin smelt, would not meet the CESA definition of take, and an Incidental Take permit would not be required. The Park Service has requested that CDFW provide concurrence with its findings.

Marine Mammals. Pinnipeds, including California sea lions and harbor seals, may haulout on buoys in the vicinity of Pier 31½, and other marine mammal species may be infrequent transient visitors. Any marine mammals present in the general vicinity of the site during construction would be able to detect the increased underwater sound pressure levels resulting from pile driving, and may temporarily avoid the construction area. Impact driving of steel piles may produce sound pressures that reach Level A harassment within the local vicinity of the Project. Marine mammals have large home ranges, and therefore, are capable of avoiding use of some areas for short periods of time. Given the limited use of the immediate Project area by these animals, as well as the short duration of construction, the alternative would be unlikely to adversely affect marine mammals.

Nonetheless, there remains a low likelihood for Project construction to harass mammals, as defined under the MMPA. Project-related disturbance would be expected to have no more than a minor effect on individual animals range and no effect on migration, breathing, nursing, breeding, feeding, sheltering, or populations of these species,

and the Park Service would implement mitigation measures Aquatic-MM-1 and 2 to reduce impacts. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the noise source. Therefore, for impacts on marine mammals under the MMPA, the Park Service has determined that there should be no more than incidental harassment resulting from the Pier 31½ Alternative. The Park Service has requested an Incidental Harassment Authorization (IHA) and that NMFS provide concurrence with its findings under the MMPA.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in only temporary minor impacts with respect to marine biological resources, its incremental contribution to cumulative impacts on aquatic biological resources would not be major.

Mitigation

Aquatic-MM-1. The Park Service would obtain and comply with all required resource agency permit conditions, including any required work windows.

Aquatic-MM-2: The Park Service would ensure that the contractor does the following:

- Maintains a 500-meter safety zone around sound sources in the event that the sound level is unknown or cannot be adequately predicted.
- Halts work activities when a marine mammal enters the 500-meter safety zone.
- Brings loud mechanical equipment online slowly.

Conclusion and Determinations under the ESA, CESA, M-SFCMA, and MMPA

The Pier 31½ Alternative would result in short-term, minor, adverse impacts on marine mammals; short- and long-term, negligible to minor, adverse impacts on plants and macroalgae, common fish species, EFH, and protected species; and no impacts on plankton, protected eelgrass, or submerged aquatic vegetation beds, or encrusting invertebrates. Based on the analysis presented above, including implementing mitigation measures Aquatic-MM-1 and 2, the Pier 31½ Alternative *may affect, but is not likely to adversely affect* ESA-listed species or their critical habitat; would result in *temporary and minimal effects* to EFH; and may result in incidental harassment of marine mammals. Impacts resulting from this alternative would not meet the CESA definition of take, and an Incidental Take permit from CDFW would not be required.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41 as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 41 Alternative would involve an expansion of the existing building footprint, spanning both piers. The old pier (and adjacent concrete bulkhead) would be demolished and replaced, while the timber bulkhead wall of the newer pier would be replaced, and piles under the existing building would be reinforced. A new gangway and float would be installed, and steel guide piles would be installed on the sides of the floats (four guide piles per float). Most of the pier improvements would be performed from floats. Specifically, the following types and sizes of piles would be driven, likely by impact hammer:

- Guide piles for floats (main and third berth): eight 36-inch-diameter steel piles (four piles for each float)

- Replacement of existing older pier and additional lateral piles: between 50 and 100 24-inch concrete piles

The Pier 41 Alternative would result in a permanent net increase of 4,100 square feet of overwater coverage.

Consistent with the impacts described for the Pier 31½ Alternative, the Pier 41 Alternative would result in minor increases in the number of ferry trips arriving at and departing from the embarkation site compared to the No Action Alternative.

Permanent and temporary impacts associated with the Pier 41 Alternative would be similar to the Pier 31½ Alternative, as the habitat types and associated communities are generally the same, and Project activities, including construction and operations, are similar in scope. Therefore, the impact analysis provided for aquatic biological resources at Pier 31½ largely applies to the Pier 41 Alternative. One key difference is that Pier 41 is in close proximity to a known sea lion haulout at Pier 39, which may be more affected by pile-driving noise, and the overall potential duration of pile driving is longer when including concrete pile installation. The following paragraphs provide a brief summary of this alternative's impacts as they apply to the various aquatic biological communities.

Plankton. Bottom-disturbing activities during construction may result in increased turbidity, which could adversely affect planktonic production. Due to the temporary duration of construction and the small area of impact relative to open water habitat available in the Bay, the Pier 41 Alternative would have no impacts on plankton compared to the No Action Alternative.

Plants and Macroalgae. Permanent installation of piles may displace common algal species (red, green, and brown algae) associated with Central Bay soft bottom habitat, and increased shading from dock and gangway installation may affect plant productivity. These impacts would occur over a very small area, and common algal species are not a valued resource in the Bay. Increased turbidity from pile driving or other bottom-disturbing activities may temporarily decrease light transmission and adversely affect algal plant growth. These effects would be temporary and highly localized. Furthermore, adverse effects on algal species would be offset by the potential to attach to new piles. Therefore, the Pier 41 Alternative would result in short-term, negligible impacts on plants and macroalgae compared to the No Action Alternative. Eelgrass and other submerged aquatic vegetation are not known to inhabit the Pier 41 site, and accordingly, would not be affected.

Invertebrates. Removal, replacement, and repair of existing piles may result in temporary loss of encrusting invertebrate communities associated with these hard structures. Loss of invertebrates would occur over a very small area, and these species would be expected to rapidly recolonize the Project area following construction. Installation of new piles would provide additional habitat that would be rapidly colonized, providing a net benefit. Therefore, the Pier 41 Alternative would have no impacts on invertebrates associated with habitat at Pier 41 compared to the No Action Alternative.

Common Fish Species. Temporary construction-related impacts on fish communities would include short-term disturbance of benthic sediments and habitat, which may locally increase turbidity and adversely affect fish species associated with the Project area. Additionally, underwater sound pressure generated by Project construction, including pile driving of both steel and concrete piles, may temporarily affect fish behavior. In general, fish are likely to be temporarily disturbed or leave the immediate Project area during certain phases of construction. Installation of 50 to 100 new piles would likely require up to 40 days of pile driving, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Turbidity and underwater sound pressure impacts during the construction phase would be minor, short term, and localized. Therefore,

the Pier 41 Alternative would have short-term, minor, adverse impacts on common fish species from sound pressure generated by construction compared to the No Action Alternative.

A net increase of 4,100 acres of overwater coverage would occur as a result of this alternative. Shading from docks and piers has historically been viewed as relatively neutral with respect to fish communities. Installation of additional piles would increase the amount of habitat available for encrusting communities and would likely improve foraging opportunities for fish species. Given the minor effects associated with increased shading, and potential benefits from increased foraging opportunities, long-term impacts on fish from the Pier 41 Alternative would be negligible and adverse compared to the No Action Alternative.

EFH. The Pier 41 site is within designated EFH for assorted fish species managed under the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs. As described in the preceding analysis of impacts on fish, it is anticipated that the Pier 41 Alternative would have temporary and minimal impacts on fish species, including those associated with EFH, from construction and permanent installation of overwater structures and piles, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Therefore, for effects to EFH under the M-SFCMA, including the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs, all impacts from the Pier 41 Alternative would be *temporary and minimal*. The Park Service has requested that NMFS provide concurrence with its findings under the M-SFCMA.

Protected Marine Species. The Pier 41 site is within critical habitat areas for winter- and spring-run Chinook salmon, coho salmon, steelhead trout, and green sturgeon. Winter-run Chinook salmon and longfin smelt may also inhabit the vicinity of the site, although critical habitat for these species has not been dedicated.

Similar to the preceding analysis of impacts on fish, it is anticipated that the Pier 41 Alternative would have minor impacts on protected marine species from construction and permanent installation of overwater structures and piles, and mitigation measures Aquatics-MM-1 and 2 would be implemented under this alternative to reduce impacts. Therefore, for ESA-listed species, including green sturgeon southern DPS, central California coast ESU coho salmon, central California coast DPS steelhead trout, Central Valley DPS steelhead trout, Sacramento River winter-run ESU Chinook salmon, Central Valley fall-run/late fall-run Chinook salmon, and longfin smelt, the Pier 41 alternative *may affect, but is not likely to adversely affect* these listed species or their critical habitat. The Park Service has requested that NMFS provide concurrence with its findings under the ESA.

The alternative's effects on CESA-listed fish species, including the above listed species and the state threatened longfin smelt, would not meet the CESA definition of take, and an Incidental Take permit would not be required. The Park Service has requested that CDFW provide concurrence with its findings.

Marine Mammals. Pinnipeds, including California sea lions and harbor seals, may haulout on buoys in the vicinity of Pier 41, and particularly at the popular haul out near Pier 39. Other marine mammal species may be infrequent transient visitors. Any marine mammals present in the general vicinity of the site during construction would be able to detect the increased underwater sound pressure levels resulting from pile driving, and may temporarily avoid the construction area. Impact driving of steel piles may produce sound pressures that reach Level A harassment within the local vicinity of the Project. Concrete pile driving is likely to produce only Level B harassment. Marine mammals have large home ranges, and therefore, are capable of avoiding use of some areas for short periods of time. Given the limited use of the immediate Project area by these animals, as well as the short duration of construction, the alternative would be unlikely to adversely affect marine mammals.

Nonetheless, there remains a low likelihood for Project construction to harass mammals, as defined under the MMPA. Project-related disturbance would be expected to have no more than a minor effect on individual animals range, and no effect on migration, breathing, nursing, breeding, feeding, sheltering, or populations of these species, and the Park Service would implement mitigation measures Aquatic-MM-1 and 2 to reduce impacts. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the noise source. Therefore, for impacts on marine mammals under the MMPA, the Park Service has determined that there should be no more than incidental harassment as a result of the Pier 41 Alternative. The Park Service has requested an IHA and that NMFS provide concurrence with its findings under the MMPA.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in short-term, minor, adverse impacts with respect to marine biological resources, its incremental contribution to cumulative impacts on aquatic biological resources would not be major.

Mitigation

Aquatic-MM-1. The Park Service would obtain and comply with all required resource agency permit conditions, including any required work windows.

Aquatic-MM-2. The Park Service would ensure that the contractor does the following:

- Maintains a 500-meter safety zone around sound sources in the event that the sound level is unknown or cannot be adequately predicted.
- Halts work activities when a marine mammal enters the 500-meter safety zone.
- Brings loud mechanical equipment online slowly.

Conclusion and Determinations under the ESA, CESA, M-SFCMA, and MMPA

The Pier 41 Alternative would result in short-term, minor, adverse impacts on marine mammals; short- and long-term, negligible to minor, adverse impacts on plants and macroalgae, common fish species, EFH, and protected species; and no impacts on plankton, protected eelgrass or submerged aquatic vegetation beds, or encrusting invertebrates. Based on the analysis presented above, including implementing mitigation measures Aquatic-MM-1 and 2, the Pier 41 Alternative *may affect, but is not likely to adversely affect* ESA-listed species or their critical habitat; would result in *temporary and minimal effects* to EFH; and may result in incidental harassment of marine mammals. Impacts resulting from this alternative would not meet the CESA definition of take, and an Incidental Take permit from CDFW would not be required.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

The Pier 3 Alternative includes a number of construction activities that could potentially affect aquatic biological resources, including retrofitting the existing Pier 3 substructure. Existing piles supporting the pier would be repaired, and new piles would be installed for the fixed concrete landings (four to six piles for each landing). A new gangway and float would be installed, and eight steel guide piles would be installed on the sides of the floats (four guide piles per float). Specifically, the

following types and sizes of piles would be driven, likely by impact hammer:

- Piles for fixed concrete landings (main berth and third berth): eight to twelve 30-inch steel piles filled with concrete (four to six piles for each landing)
- Guide piles for floats (main and third berth): eight 36-inch-diameter steel piles (four piles for each float)
- Fender piling: 12- to 14-inch-diameter composite plastic fiberglass piling

No new piles are anticipated to be needed for the existing pier structure (jacketing/wrapping retrofit of existing piles) based on the Pier 2 upgrade. The Pier 3 Alternative would result in a permanent net increase of approximately 3,000 square feet overwater coverage.

Consistent with the impacts described for the Pier 31½ Alternative, the Pier 3 Alternative would result in minor increases in the number of ferry trips arriving at and departing from the embarkation site compared to the No Action Alternative.

Potential impacts on aquatic biological resources associated with the Pier 3 Alternative would be similar to those associated with other action alternatives, as habitat types and associated communities are generally the same, and Project activities, including construction and operations, are similar in scope. Therefore, the impact analyses provided for aquatic biological resources at piers 31½ and 41 are largely similar. Black Point, which represents a remnant stretch (albeit short) of pristine San Francisco rocky reef shoreline, is located directly to the east (and outside) of the Fort Mason portion of the study area. In addition, vessel activity associated with introducing ferry service at Pier 3 would represent a new source of operational impacts relative to the current use of Pier 3. The following paragraphs provide a brief summary of this alternative's impacts as they apply to the various aquatic biological communities.

Plankton. Bottom-disturbing activities during construction may result in increased turbidity, which could adversely affect planktonic production. Due to the temporary duration of construction and the small area of impact relative to open water habitat available in the Bay, the Pier 3 Alternative would have no impacts on plankton compared to the No Action Alternative.

Plants and Macroalgae. Permanent installation of piles may displace common algal species (red, green, and brown algae) associated with Central Bay soft bottom habitat, and increased shading from dock and gangway installation may affect plant productivity. These impacts would occur over a very small area, and common algal species are not a valued resource in the Bay. Increased turbidity from pile driving or other bottom-disturbing activities may temporarily decrease light transmission and adversely affect algal plant growth. These effects would be temporary and highly localized. Furthermore, adverse effects on algal species would be offset by the potential to attach to new piles. Therefore, the Pier 3 Alternative would result in short-term, negligible impacts on plants and macroalgae compared to the No Action Alternative. Eelgrass and other submerged aquatic vegetation are not known to inhabit the Pier 3 site, and accordingly would not be affected.

Invertebrates. Removal, replacement, and repair of existing piles may result in temporary loss of encrusting invertebrate communities associated with these hard structures. Loss of invertebrates would occur over a very small area, and these species would be expected to rapidly recolonize the Project area following construction. Installation of new piles would provide additional habitat that would be rapidly colonized, providing a net benefit. Black Point is outside the scope of potential impacts for this alternative. Therefore, the Pier 3 Alternative would have no impact on invertebrates associated with habitat at the site.

Common Fish Species. Temporary construction-related impacts on fish communities would include short-term disturbance of benthic sediments and habitat,

which may locally increase turbidity and adversely affect fish species. Additionally, underwater sound pressure generated by construction, including pile driving of both concrete and steel piles, may temporarily affect fish behavior. In general, fish are likely to be temporarily disturbed or leave the immediate Project area during certain phases of construction. Driving between 16 and 20 new piles will likely require approximately 4 to 8 days of pile driving, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Turbidity and underwater sound pressure impacts during the construction phase would be short-term, minor, and localized. Therefore, the Pier 3 Alternative would have short-term, minor, adverse impacts on common fish species from sound pressure generated by construction compared to the No Action Alternative.

A net increase of 3,000 acres of overwater coverage would occur as a result of this alternative. Shading from docks and piers has historically been viewed as relatively neutral with respect to fish communities. Installation of additional piles would increase the amount of habitat available for encrusting communities and would likely improve foraging opportunities for fish species. Given the minor effects associated with increased shading, and potential benefits from increased foraging opportunities, long-term impacts on fish from the Pier 3 Alternative would be negligible and adverse compared to the No Action Alternative.

EFH. The Pier 3 site is within designated EFH for assorted fish species managed under the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs. As described in the preceding analysis of impacts on fish, it is anticipated that the Pier 3 Alternative would have temporary and minimal impacts on fish species, including those associated with EFH, from construction and permanent installation of overwater structures and piles, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Therefore, for effects to EFH under the M-SFCMA, including the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs, all impacts from the Pier 3 Alternative would be *temporary and minimal*. The Park Service is requesting that NMFS provide concurrence with this determination. The Park Service has requested that NMFS provide concurrence with its findings under the M-SFCMA.

Protected Marine Species. The Pier 3 site is within critical habitat areas for winter- and spring-run Chinook salmon, coho salmon, steelhead trout, and green sturgeon. Winter-run Chinook salmon and longfin smelt may also inhabit the vicinity of Pier 3, although critical habitat for these species has not been dedicated.

Similar to the preceding analysis of impacts on fish, it is anticipated that the Pier 3 Alternative would have minor impacts on protected marine species from construction and permanent installation of overwater structures and piles, and mitigation measures Aquatic-MM-1 and 2 would be implemented under this alternative to reduce impacts. Therefore, for ESA-listed species, including green sturgeon southern DPS, central California coast ESU coho salmon, central California coast DPS steelhead trout, Central Valley DPS steelhead trout, Sacramento River winter-run ESU Chinook salmon, Central Valley fall-run/late fall-run Chinook salmon, and longfin smelt, this alternative *may affect, but is not likely to adversely affect* these listed species or their critical habitat. The Park Service has requested that NMFS provide concurrence with its findings under the ESA.

This alternative's effects on CESA-listed fish species, including the above listed species and the state threatened longfin smelt, would not meet the CESA definition of take, and an Incidental Take permit would not be required. The Park Service has requested that CDFW provide concurrence with its findings.

Marine Mammals. Pinnipeds, including California sea lions and harbor seals, may transit the area or haulout in the vicinity of Pier 3, and other marine mammal species may be infrequent transient visitors. Any marine

mammals present in the general vicinity of the site during construction would be able to detect the increased underwater sound pressure levels resulting from pile driving, and may temporarily avoid the construction area. Impact driving of steel piles may produce sound pressures that reach Level A harassment within the local vicinity of the Project. Concrete pile driving and installation of fiberglass fender piles is likely to produce only Level B harassment. Marine mammals have large home ranges, and therefore are capable of avoiding the use of some areas for short periods of time. Given the limited use of the immediate Project area by these animals, as well as the short duration of construction, the alternative would be unlikely to adversely affect marine mammals.

Nonetheless, there remains a low likelihood for Project construction to harass mammals, as defined under the MMPA. Project-related disturbance would be expected to have no more than a minor effect on individual animals range and no effect on migration, breathing, nursing, breeding, feeding, sheltering, or populations of these species, and the Park Service would implement mitigation measures Aquatic-MM-1 and 2 to reduce impacts. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the noise source. Therefore, for impacts on marine mammals under the MMPA, the Park Service has determined that there should be no more than incidental harassment as a result of the Pier 3 Alternative. The Park Service has requested an IHA and that NMFS provide concurrence with its findings under the MMPA.

Cumulative Impact Analysis

Because the Pier 3 Alternative would only result in short-term, negligible to minor impacts with respect to marine biological resources, its incremental contribution to cumulative impacts on aquatic biological resources would not be major.

Mitigation

Aquatic-MM-1. The Park Service would obtain and comply with all required resource agency permit conditions, including any required work windows.

Aquatic-MM-2. The Park Service would ensure that the contractor does the following:

- Maintains a 500-meter safety zone around sound sources in the event that the sound level is unknown or cannot be adequately predicted.
- Halts work activities when a marine mammal enters the 500-meter safety zone.
- Brings loud mechanical equipment online slowly.

Conclusion and Determinations under the ESA, CESA, M-SFCMA, and MMPA

The Pier 3 Alternative would result in short-term, minor, adverse impacts on marine mammals; short- and long-term, negligible to minor adverse impacts on plants and macroalgae, common fish species, EFH, and protected species; and no impacts on plankton, protected eelgrass or submerged aquatic vegetation beds, or encrusting invertebrates. Based on the analysis presented above, including implementing mitigation measures Aquatic-MM-1 and 2, the Pier 3 Alternative *may affect, but is not likely to adversely affect* ESA-listed species or their critical habitat; would result in *temporary and minimal effects* to EFH; and may result in incidental harassment of marine mammals. Impacts resulting from this alternative would not meet the CESA definition of take, and an Incidental Take permit from CDFW would not be required.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, Fort Mason special ferry service would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprise the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Impact Analysis. Fort Mason special ferry service would result in a permanent net increase of approximately 2,200 square feet of overwater coverage, and installation of ten 36-inch steel piles.

This Project element and the Pier 3 Alternative have overlapping geographic boundaries and similar (although reduced) required in-water work activities. Therefore, construction and operational impacts on aquatic biological resources are equivalent to those identified in the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, mitigation measures, conclusions, and determinations under the ESA, M-SFCMA, and MMPA would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element includes retrofit of the pier substructure and the construction of a pedestrian path, as well as the establishment of special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. Providing Fort Baker special ferry service would require a retrofit of the existing concrete pier. The retrofit would include installation of a new gangway and float, which may affect the marine environment. A total of four piles would be installed for the gangway landing, and four steel guide piles would be installed for the float. Additional piles would need to be repaired. Most of the pier improvements are underpier activities and would be performed from floats staged under the pier. Specifically, the following types and sizes of piles would be driven, likely by impact hammer:

- Piles for gangway landing: four 30-inch steel piles filled with concrete
- Guide piles for float: four 36-inch diameter steel piles

No new piles are anticipated to be needed for the existing pier structure (jacketing/wrapping retrofit of existing piles). This Project element would result in a permanent net increase of approximately 2,100 square feet of overwater coverage.

Ferry service operations at Fort Baker would be intermittent and low level relative to existing vessel activity in the Bay.

The following provides a brief summary of those impacts as they apply to the various aquatic biological communities.

Plankton—Bottom-disturbing activities during construction may result in increased turbidity, which could adversely affect planktonic production. Due to the temporary duration of construction and the small area of impact relative to open water habitat available in the Bay, Fort Baker special ferry service would have no impacts on plankton compared to the No Action Alternative.

Plants and Macroalgae—Permanent installation of piles may displace common algal species (red, green, and brown algae) associated with Central Bay soft bottom habitat, as well as species associated with rocky intertidal areas of Fort Baker (kelp, sea lettuce, and turkish towel). In addition, increased shading from gangway and float installation may affect plant productivity. Increased turbidity from pile driving or other bottom-disturbing activities may temporarily decrease light transmission and may adversely affect aquatic plant growth. These impacts would occur over a very small area, and common aquatic plant species found at Fort Baker are not a valued resource in the Bay.

Furthermore, adverse effects on algal species would be offset by the potential to attach to new piles. Therefore, Fort Baker special ferry service would result in short-term, negligible impacts on plants and macroalgae compared to the No Action Alternative.

Eelgrass has been observed in Horseshoe Bay adjacent to the Fort Baker site, but outside the Project footprint (Figure 28). Project activities would not affect these areas. Other protected submerged aquatic vegetation, including surfgrass, sago pondweed, and widgeon grass, has not been observed in the vicinity of Fort Baker (NMFS 2007). Therefore, Fort Baker special ferry service would not affect eelgrass or other protected submerged aquatic vegetation.

Invertebrates—Removal, replacement, and repair of existing piles may result in temporary loss of encrusting invertebrate communities associated with these hard structures. Loss of invertebrates would occur over a very small area, and these species would be expected to rapidly recolonize the Project area following construction. Installation of new piles would provide additional habitat that would be rapidly colonized, providing a net benefit. Therefore, Fort Baker special ferry service would have no impacts on invertebrates associated with habitat at the site compared to the No Action Alternative.

Common Fish Species—Temporary construction-related impacts on fish communities would include short-term disturbance of benthic sediments and habitat, which may locally increase turbidity and adversely affect fish species associated with the Project area. Additionally, underwater sound pressure generated by construction, including pile driving, may temporarily affect fish behavior. In general, fish are likely to be temporarily disturbed or leave the immediate Project area during certain phases of construction. Driving up to eight new piles would likely require no more than 2 to 3 days of pile driving, at most, and mitigation measures Aquatic-MM-1 and 2 would be implemented to reduce impacts. Turbidity and sound pressure impacts during the construction phase would be minor, short-term, and localized. Therefore, Fort Baker special ferry service would have short-term, minor, adverse effects on fish from sound pressure generated by construction compared to the No Action Alternative.

A net increase of approximately 2,100 square feet of overwater coverage would occur as a result of this Project element. Shading from docks and piers has historically been viewed as relatively neutral with respect to fish communities. Installation of additional piles would increase the amount of habitat available for encrusting communities and would likely improve foraging opportunities for fish species. Given the minor effects associated with increased shading, and potential benefits from increased foraging opportunities, long-term impacts on fish from Fort Baker special ferry service would be negligible and adverse compared to the No Action Alternative.

EFH—The Fort Baker waterfront is within designated EFH for assorted fish species managed under the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs. As described in the preceding analysis of impacts on fish, it is anticipated that the Fort Baker special ferry service would have temporary and minimal impacts on fish species, including those associated with EFH, from construction and permanent installation of overwater structures and piles. As well, mitigation measures Aquatic-MM-1 and 2 would be implemented to reduce impacts. Therefore, for effects to EFH under the M-SFCMA, including the Coastal Pelagic, Pacific Groundfish, and Pacific Coast Salmon FMPs, all impacts would be *temporary and minimal* as a result of this project element. The Park Service has requested that NMFS provide concurrence with its findings under the M-SFCMA.

Protected Marine Species—The Fort Baker waterfront area is within critical habitat areas for winter- and spring-run Chinook salmon, coho salmon, steelhead trout, and green sturgeon. Winter-run Chinook salmon and longfin smelt may also inhabit the vicinity of

Fort Baker, although critical habitat for these species has not been dedicated.

As described in the preceding analysis of impacts on fish, it is anticipated that Fort Baker special ferry service would have minor impacts on protected ESA- and CESA-listed species from construction and permanent installation of overwater structures and piles, and mitigation measures Aquatic-MM-1 and 2 would be implemented. Therefore, for ESA-listed species, including green sturgeon southern DPS, central California coast ESU coho salmon, central California coast DPS steelhead trout, Central Valley DPS steelhead trout, Sacramento River winter-run ESU Chinook salmon, and Central Valley fall-run/late fall-run Chinook salmon, this project element *may affect, but is not likely to adversely affect* these listed species or their critical habitat. The Park Service has requested that NMFS provide concurrence with its findings under the ESA.

This alternative's effects on CESA-listed fish species, including the above listed species and the state threatened longfin smelt, would not meet the CESA definition of take, and an Incidental Take permit would not be required. The Park Service has requested that CDFW provide concurrence with its findings.

Marine Mammals—Pinnipeds, including California sea lions and harbor seals, may utilize the pier at Fort Baker, and other marine mammal species may be infrequent transient visitors. Any marine mammals present in the general vicinity of the site during construction would be able to detect the increased underwater sound pressure levels resulting from pile driving, and may temporarily avoid the construction area. Impact driving of steel piles may produce sound pressures that reach Level A harassment within the local vicinity of the Project. Marine mammals have large home ranges, and therefore, are capable of avoiding use of some areas for short periods of time. Given the limited use of the immediate Project area by these animals, as well as the short duration of construction, the alternative would be unlikely to adversely affect marine mammals.

Nonetheless, there remains a low likelihood for Project construction to harass mammals, as defined under the MMPA. Project-related disturbance would be expected to have no more than a minor effect on individual animals range and no effect on migration, breathing, nursing, breeding, feeding, sheltering, or populations of these species, and the Park Service would implement mitigation measures Aquatic-MM-1 and 2 to reduce impacts. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the noise source. Therefore, for impacts on marine mammals under the MMPA, the Park Service has determined that there should be no more than incidental harassment as a result of this project element. The Park Service has requested an IHA and that NMFS provides concurrence with its findings under the MMPA, as described below.

Cumulative Impact Analysis. Because Fort Baker special ferry service would result in negligible to minor short-term impacts with respect to marine biological resources, its incremental contribution to cumulative impacts on aquatic biological resources would not be major.

Mitigation.

Aquatic-MM-1—The Park Service would obtain and comply with all required resource agency permit conditions, including any required work windows.

Aquatic-MM-2—The Park Service would ensure that the contractor does the following:

- Maintains a 500-meter safety zone around sound sources in the event that the sound level is unknown or cannot be adequately predicted.
- Halts work activities when a marine mammal enters the 500-meter safety zone.
- Brings loud mechanical equipment online slowly.

Conclusion and Determinations under the ESA, CESA, M-SFCMA, and MMPA. Fort Baker special ferry service would result in no effect on protected eelgrass, submerged aquatic vegetation beds, or encrusting invertebrates; and negligible to minor effects with respect to plankton, plants and macroalgae, fish, EFH, ESA and CESA marine species, and marine mammals, resulting from permanent shading impacts and loss of benthic habitat, as well as construction impacts, including temporary loss of habitat, increased turbidity, and sound pressure, compared to the No Action Alternative. Based on the analysis presented above, including implementing mitigation measures Aquatic-MM-1 and 2, Fort Baker special ferry service *may affect, but is not likely to adversely affect* ESA-listed species or their critical habitat; would result in *temporary and minimal effects* to EFH; and may result in incidental harassment of marine mammals. Impacts resulting from this alternative would not meet the CESA definition of take, and an Incidental Take permit from CDFW would not be required.

TERRESTRIAL BIOLOGICAL RESOURCES

METHODOLOGY AND THRESHOLDS

Potential impacts on terrestrial biological resources were qualitatively evaluated based on the potential for the alternatives to temporarily or permanently alter or impact terrestrial biological resources within the study area. The terrestrial biological resource analysis was based upon existing database records maintained by the CDFW, USFWS, and CNPS, as well as literature review.

The proposed measurement indices used to evaluate impacts on biological resources include impacts on terrestrial species and/or their habitat. An alternative would be considered to have a major impact if it would be inconsistent with applicable regulations and policies protecting terrestrial biological resources.

The analysis considered the potential for an alternative to do the following:

- Result in changes in plant community size, continuity, or integrity
- Result in changes to the amount, distribution, connectivity, or integrity of wildlife habitat or populations
- Result in changes to the amount, distribution, connectivity, or integrity of special status wildlife habitat or populations

This analysis is limited to terrestrial vegetation, wildlife, and special status species with the potential to be affected by the Project. Impacts on marine biological resources are addressed in the "Aquatic Biological Resources" section of this chapter.

ESA and CESA Impact Determinations

In addition to NEPA impact determinations, this section includes the Park Service's effects determinations specific to section 7 of the ESA, and specific to CESA under Section 2080 of the Fish and Game Code. Effects determinations are presented using the same standardized terminology that is used by USFWS, and using the definition of "take" that is used by CDFW, which are presented in the "Aquatic Biological Resources" section of this chapter (USFWS & NMFS 1998).

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

Vegetation. There would be no tree or vegetation removal under the No Action Alternative; therefore, there would be no impact on vegetation.

Common Wildlife Species. Common wildlife species likely to be present at Pier 31½ are expected to tolerate operational noise levels consistent with an urban environment that is already highly utilized and developed. Because no construction would occur, and operations would only slightly increase, there would be no impacts on wildlife under the No Action Alternative.

Special Status Species. There is no suitable habitat for terrestrial special status species at Pier 31½; therefore, there would be no effect on special status species under the No Action Alternative.

Cumulative Impact Analysis

Because there would be no impacts of the No Action Alternative to terrestrial biological resources, there would be no cumulative impacts of the No Action Alternative.

Mitigation

No mitigation is proposed.

Conclusion and Determination under the ESA and CESA

The No Action Alternative would result in no impacts on terrestrial vegetation or wildlife, and would have no effect on any ESA-listed terrestrial species. This alternative would not result in the take of any CESA-listed terrestrial species.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Vegetation. There would be no tree or vegetation removal or planting under the Pier 31½ Alternative; therefore, there would be no impacts on vegetation compared to the No Action Alternative.

Common Wildlife Species. While common urban species may frequent or forage the site, the entirety of improvements and operations associated with the Pier 31½ Alternative would be constructed on existing developed and highly utilized areas that provide little to no existing habitat for wildlife. Areas surrounding Pier 31½ are similarly developed and devoid of significant wildlife habitat. Therefore, the Pier 31½ Alternative would result in no impacts on common terrestrial wildlife during construction compared to the No Action Alternative. Implementation of mitigation measure Noise-MM-1, which involves methods for reducing construction-related noise, would further reduce potential noise impacts.

The frequency of ferry operations at the embarkation site at Pier 31½ would increase, but would generally operate the same compared to the No Action Alternative. Common wildlife species likely to be present are expected to withstand activity consistent with the urban environment, including noise levels associated with existing ferry and embarkation site operations. Therefore, embarkation site and ferry operations associated with the Pier 31½ Alternative would result in no impacts on wildlife compared to the No Action Alternative.

Special Status Species. There is no suitable habitat for terrestrial special status species at Pier 31½; therefore, there would be no effect on special status species compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in no impacts with respect to this resource, its incremental contribution to cumulative impacts on terrestrial biological resources would not be major.

Mitigation

Noise-MM-1. The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings

- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities from 7:00 a.m. to 8:00 p.m. Monday through Saturday

Conclusion and Determination under the ESA and CESA

The Pier 31½ Alternative would result in no impacts on common terrestrial wildlife species during construction; no long-term impacts on common terrestrial wildlife species; and no impacts on terrestrial vegetation or special status species.
Based on the analysis presented above, the Park Service has made the determination that the Pier 31½ Alternative would have *no effect* on any listed terrestrial species or their critical habitat. This alternative would not result in the take of any CESA-listed terrestrial species.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Vegetation. There would be no tree or vegetation removal or planting under the Pier 41 Alternative; therefore, there would be no impacts on vegetation compared to the No Action Alternative.

Common Wildlife Species. Similar to the Pier 31½ Alternative, all improvements associated with the Pier 41 Alternative would be constructed and operated on existing developed areas that provide little habitat for wildlife. Areas surrounding Pier 41 are similarly developed and devoid of significant wildlife habitat. Any common urban species that frequent or forage the site would be expected to withstand noise levels comparable to that of an urban environment. Therefore, the Pier 41 Alternative would result in no impacts on common wildlife species during construction compared to the No Action Alternative. Implementation of mitigation measure Noise-MM-1, which involves methods for reducing construction-related noise, would further reduce potential noise impacts.

Embarkation site and ferry operations are unlikely to adversely affect wildlife in the area, as operations would entirely occur on developed portions of Fisherman's Wharf. Pier 41 and the surrounding area experience a high level of activity under existing conditions, including Blue & Gold Fleet's existing embarkation site and ferry service operations. As such, the proposed Alcatraz Island embarkation site and ferry service operations are not anticipated to create conditions that would significantly differ from existing conditions or affect wildlife in the vicinity of the site. Therefore, embarkation site and ferry operations associated with the Pier 41 Alternative would result in long-term, negligible impacts on common wildlife species compared to the No Action Alternative.

Special Status Species. There is no suitable habitat for special status terrestrial species at the Pier 41 site; therefore, there would be no effect on special status terrestrial species compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in no impacts with respect to this resource, its incremental contribution to cumulative impacts on terrestrial biological resources would not be major.

Mitigation

Noise-MM-1. The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities from 7:00 a.m. to 8:00 p.m. Monday through Saturday

Conclusion and Determination under the ESA and CESA

The Pier 41 Alternative would result in no impacts on common terrestrial wildlife species during construction; no long-term impacts on common terrestrial wildlife species; and no impacts on terrestrial vegetation or special status species. Based on the analysis presented above, the Park Service has made the determination that the Pier 41 Alternative would have *no effect* on any ESA-listed terrestrial species or their critical habitat. This alternative would not result in the take of any CESA-listed terrestrial species.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Vegetation. There would be no tree or vegetation removal or planting under the Pier 3 Alternative; therefore, there would be no impacts on vegetation compared to the No Action Alternative.

Common Wildlife Species. All improvements associated with the Pier 3 Alternative would be constructed on existing developed areas that would provide minimal habitat for wildlife. Common urban species, such as raccoon, striped skunk, house sparrow, and Brewer's blackbird, may frequent or forage in undeveloped areas of Fort Mason; nesting or roosting habitat for birds and bats may be present in the Fort Mason tunnel; and trees in Upper Fort Mason may provide nesting or roosting habitat for bird species. While these species are expected to withstand noise levels consistent with urban environments, if present, they may be temporarily disturbed by construction-related noise. Therefore, the Pier 3 Alternative could result in short-term, negligible impacts on common terrestrial wildlife species during construction compared to the No Action Alternative. Implementation of mitigation measure Noise-MM-1, which involves methods for reducing construction-related noise, would reduce potential noise impacts.

Embarkation site operations are unlikely to adversely affect wildlife in the area because operations would entirely occur on developed land and over water. Common wildlife species associated with the urban environment at Fort Mason are currently subjected to high levels of disturbance from existing Fort Mason Center operations, Upper Fort Mason visitors, and vehicle traffic on Marina Boulevard and

neighboring roads. Therefore, embarkation site and ferry operations associated with the Pier 3 Alternative would result in long-term, negligible impacts on terrestrial biological resources compared to the No Action Alternative.

Special Status Species. Special status bats, such as the Townsend's big-eared bat, could roost within the Fort Mason tunnel, and trees in upper Fort Mason may provide habitat to bird species protected by the MBTA. These species are unlikely to inhabit the immediate vicinity of Pier 3 because there is limited foraging habitat and trees.

The Fort Mason tunnel is located away from the immediate construction and operation area, and the earthen hillside and concrete walls provide acoustical shading from any Project noise. Therefore, there would be no impact on bat species associated with construction and operations of the Pier 3 Alternative compared to the No Action Alternative.

USFWS has utilized an hourly equivalent noise level; or L_{eq} of 60 dBA as a target threshold for reducing the effects of noise from construction activities on endangered passerine birds during NEPA consultation (Bowles and Wisdom 2005). While ESA-listed bird species are not expected to occur at the Pier 3 Alternative site, trees in the study area at Upper Fort Mason may provide nesting or roosting habitat for bird species protected under the MBTA, as described in the "Affected Environment" chapter. Construction noise levels at Upper Fort Mason, where bird roosting habitat may be present, could be increased by up to 32 dBA for a predicted construction L_{dn} of 78 dBA (based on an hourly L_{eq} of 78 dBA), as shown on Table 69. This estimate reflects a worst-case scenario as described in the "Noise and Vibration" section of this chapter, in which the two loudest pieces of construction equipment would be operating simultaneously. Given these conditions, while there may be up to a 32 dBA increase occurring intermittently during construction, owing to the temporary nature of construction, the Pier 3 Alternative is anticipated to result in short-term, minor, adverse impacts to MBTA-protected bird species during construction compared to the No Action Alternative. While implementation of mitigation measure Noise-MM-1, which involves methods for reducing construction-related noise, would reduce potential noise impacts, impacts would remain short-term, minor, and adverse.

A 60-dBA noise level, based on continuous exposure in a controlled environment, is expected to affect avian vocal communication (CALTRANS 2007). Operational noise levels at Upper Fort Mason, where bird roosting habitat may be present, could be increased by up to 2 dBA to a predicted operational level of 48 dBA, per the analysis in the "Noise and Vibration" section of this chapter. The increase is primarily related to horns and other intermittent noises, as explained in the "Noise and Vibration" section. The new total level remains below 60 dBA. Therefore, operations associated with the Pier 3 Alternative would result in long-term, negligible noise impacts on special status bird species.

The endangered mission blue butterfly and San Bruno elfin butterfly are strongly associated with their respective host plants, stonecrop and perennial lupines, which inhabit coastal scrub habitat. Coastal scrub habitat does not occur within the study area surrounding Pier 3. As such, there would be no effect on these ESA-listed species associated with construction and operations of the Pier 3 Alternative compared to the No Action Alternative.

Cumulative Impact Analysis

None of the projects in Table 37 would result in major impacts on terrestrial biological resources within the Pier 3 study area. Because the Pier 3 Alternative would result in minor to negligible impacts with respect to this resource, its incremental contribution to cumulative impacts on terrestrial biological resources would not be major.

Mitigation

Noise-MM-1. The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities from 7:00 a.m. to 8:00 p.m. Monday through Saturday

Conclusion and Determination under the ESA and CESA

The Pier 3 Alternative would result in short-term, minor, adverse impacts and long-term, negligible impacts on MBTA-protected bird species; long-term, negligible impacts on common terrestrial wildlife species; no impacts on terrestrial vegetation or special status bat species; and no effect on any ESA-listed species. This alternative would not result in the take of any CESA-listed terrestrial species.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprise the physical elements of this development would be inherently accounted for in the alternative's impact analysis.

Impact Analysis. Because of the overlapping geographic boundaries and similar (though reduced) required construction activities and operations of this Project element and the Pier 3 Alternative, the incremental impacts of its construction and operations with respect to terrestrial biological resources that would occur as a result of the Pier 31½ and Pier 41 alternatives would be equivalent to those of the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element would include retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis.

Vegetation—Construction of the pedestrian pathway would displace existing vegetation along the proposed alignment. Existing ground cover in this area consists of disturbed or ornamental grass species and ruderal vegetation. Removal of this vegetation would result in no impacts because of the nonsensitive nature of the habitat, and because of the small area of impact and the quality of the vegetation. Ferry operations would not result in any greater impacts on vegetation. Therefore, Fort Baker special ferry

service would result in no impacts on vegetation compared to the No Action Alternative.

Common Wildlife Species—All improvements associated with Fort Baker special ferry service would be constructed on existing developed, barren, or landscaped areas that provide little habitat for wildlife. However, common urban species, such as scrub jays, American robins, mice, rats, sparrows, and pigeons, may frequent or forage in these areas, and nesting or roosting habitat for birds and bats may also be present in abandoned buildings and trees at Fort Baker.

Construction and operations of special ferry service at Fort Baker would not require tree removal or trimming, and would not adversely affect abandoned buildings or other structures that may be used by birds or bats. While common wildlife species are expected to withstand noise levels consistent with that of a developed environment, if present, they may be temporarily disturbed by construction-related noise, particularly from pile driving activities. Therefore, Fort Baker special ferry service could result in short-term, negligible impacts on common terrestrial wildlife species during construction compared to the No Action Alternative. Implementation of mitigation measure Noise-MM-1, which involves methods for reducing construction-related noise, would reduce the magnitude of this impact compared to the No Action Alternative.

Fort Baker special ferry service operations are unlikely to adversely affect wildlife in the area because operations would entirely occur on developed land. While ferry operations do not currently occur at Fort Baker, the special ferry service would have minimal effects on upland habitats and associated terrestrial species compared to existing upland Fort Baker operations. Therefore, embarkation site and ferry operations associated with Fort Baker special ferry service would result in long-term, negligible impacts on common terrestrial wildlife as a result of Project operations compared to the No Action Alternative.

Special Status Species—Special status bats, such as the Townsend's big-eared bat, pallid bat, western red bat, and big free-tailed bat, may roost in trees or abandoned buildings at Fort Baker. Several migratory bird species may nest in oak woodlands or the grassland/coastal scrub areas at Fort Mason. Cliff swallows nest on the buildings at Fort Baker, and the California least tern has been observed feeding in Horseshoe Bay and next to the jetties. California least terns are not known to nest at Fort Baker (CDFG 2012a, 2012b). Construction and operations associated with Fort Baker special ferry service would not adversely affect buildings or structures and beachfront areas that may be utilized by special status bird or bat species. Construction would include pile driving, which could increase turbidity in the area immediately around the pier, although such impacts would likely be minimal, localized, and negligible in comparison with existing site conditions. As least tern are not known to nest at the site, and given the extent of available foraging habitat in close proximity, there would be short-term, negligible impacts on this species.

Potential impacts on special status bird species (apart from the turbidity impacts on foraging bird species described in the preceding paragraph) would be limited to increased noise levels. Construction noise levels at the Fort Baker pier and adjacent coastal scrub areas where special status bird species may be present (including the endangered California least tern and MBTA-listed species described in the "Affected Environment" chapter) could be increased by up to 62 dBA to a predicted construction L_{dn} of 102 dBA (based on an hourly L_{eq} of 102 dBA) as shown on Table 71. This estimate reflects a worst-case scenario in which the two loudest pieces of construction equipment would be operating simultaneously, as described in the "Noise and Vibration" section of this chapter. This Project element includes implementation of mitigation measure Noise-MM-1 to reduce potential noise impacts during construction. Given these conditions, while there may be up to a 62 dBA increase intermittently during construction, owing to the temporary nature

of construction, Fort Baker special ferry service is anticipated to result in short-term, minor, adverse impacts to MBTA-protected bird species during construction compared to the No Action Alternative. Project construction *may affect, but is not likely to adversely affect* the California least tern. The Park Service is requesting that USFWS provide concurrence with this determination.

Background noise levels at Fort Baker are expected to be in the range of 55 to 60 dBA (NPS 1999), which represents a baseline condition that is relatively equal to the commonly cited standard of 60 dBA (CALTRANS 2007). When special ferry service is operating, noise levels are anticipated to increase by up to 4 dBA to a predicted noise level of 64 dBA at the Fort Baker pier and adjacent coastal scrub areas where special status bird species may inhabit, including the California least tern and MBTA-protected species. Given the baseline noise levels and infrequent nature of ferry operations at the site, operational noise from Fort Baker special ferry service would result in long-term, minor, adverse impacts to MBTA-protected bird species. Project operational noise *may affect, but is not likely to adversely affect* the California least tern. The Park Service is requesting that USFWS provide concurrence with this determination.

Buildings at Fort Baker are located away from the area of direct impact associated with this Project element. As is noted in the "Noise and Vibration" section of this chapter, the nearest building (USCG Station) would not experience any noise increase as a result of Fort Baker special ferry service construction or operations. Western red bats have not been recorded at Fort Baker, and while the species may roost in trees, there is limited tree habitat within the area that may be impacted by noise. Although unlikely, construction-related noise may temporarily affect western red bat, if present. Therefore, there could be short-term, minor, adverse impacts on western red bat associated with construction of Fort Baker special ferry service compared to the No Action Alternative. Due to the lower projected noise levels, impacts on western red bat associated with operations would be long-term, negligible, and adverse compared to the No Action Alternative.

The American badger is known to inhabit coastal scrub habitat within the vicinity of Fort Baker. Operational and construction noise effects from Fort Baker special ferry service would have minimal noise impacts on surrounding coastal scrub and grassland habitats. As well, noise impacts are not a primary threat to the American badger (Reid and Helgen 2008). Therefore, construction and operations associated with Fort Baker special ferry service would have no impact on the American badger compared to the No Action Alternative.

The endangered mission blue butterfly is known to inhabit coastal chaparral and grasslands in close association with lupine. These habitats do not occur within the study area (Urban Wildlands Group 2012). Therefore, construction and operations associated with Fort Baker special ferry service would have no effect on the mission blue butterfly.

Cumulative Impact Analysis. None of the projects in Table 34 would result in major impacts on terrestrial biological resources. Because Fort Baker special ferry service would result in minor to negligible impacts with respect to this resource, its incremental contribution to cumulative impacts on terrestrial biological resources would not be major.

Mitigation.

Noise-MM-1—The Park Service would ensure that the contractor does the following:

- Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers
- Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks
- Installs noise mufflers to stationary equipment and impact tools that are no

less effective than those provided by the manufacturer
- Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors
- Uses construction equipment with low noise emission ratings
- Locates equipment, materials, and staging areas as far as practicable from sensitive receptors
- Prohibits unnecessary idling of vehicles or equipment
- Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site
- Restricts construction activities from 7:00 a.m. to 8:00 p.m. Monday through Saturday

Conclusion and Determination under the ESA and CESA. Fort Baker special ferry service would result in short- and long-term, minor, adverse impacts on special status bird species; short-term, minor, adverse impacts on western red bat; short- and long-term, negligible impacts on common terrestrial wildlife; long-term, negligible impacts on western red bat; and no impacts on terrestrial vegetation or American badger. Based on the analysis presented above, the Park Service has made the determination that this Project element may affect, but is not likely to adversely affect the California least tern, and would have no effect on the mission blue butterfly or San Bruno elfin butterfly. This alternative would not result in the take of any CESA-listed terrestrial species.

VISUAL RESOURCES

METHODOLOGY AND THRESHOLDS

The potential visual resource impacts associated with the Project were evaluated based on NPS EIS and EA examples, supplemented with methods from the Bureau of Land Management's VCR system. These methods include the following:

- Quantitative impacts measured through using baseline and proposed daytime view graphics and using grid cells calculating the percentage change in the view. This measurement is used for daytime views only. Design proposals for nighttime views are not modeled qualitatively, but will be described as such via the narrative below.
- Qualitative impacts narrated based on the design element foundation of the VCR system, including changes in form, line, color, and texture. This description is provided for both daytime and nighttime views.

The proposed measurement indices used to evaluate impacts on visual resources are changes to viewpoints and viewsheds. An alternative would be considered to have a major impact if it would cause severe changes to daytime or nighttime/dark sky views from representative viewpoints. Negligible or minor impacts do not constitute an adverse effect, while moderate and major impacts do.

Daytime Views

Daytime view photorealistic perspectives were developed using three-dimensional modeling software (Revit & Sketch-Up) and representative photographs of design features (Figures 42 through 45). These input features were combined over existing base photos using Adobe Photoshop.

Nighttime Views/Dark Skies

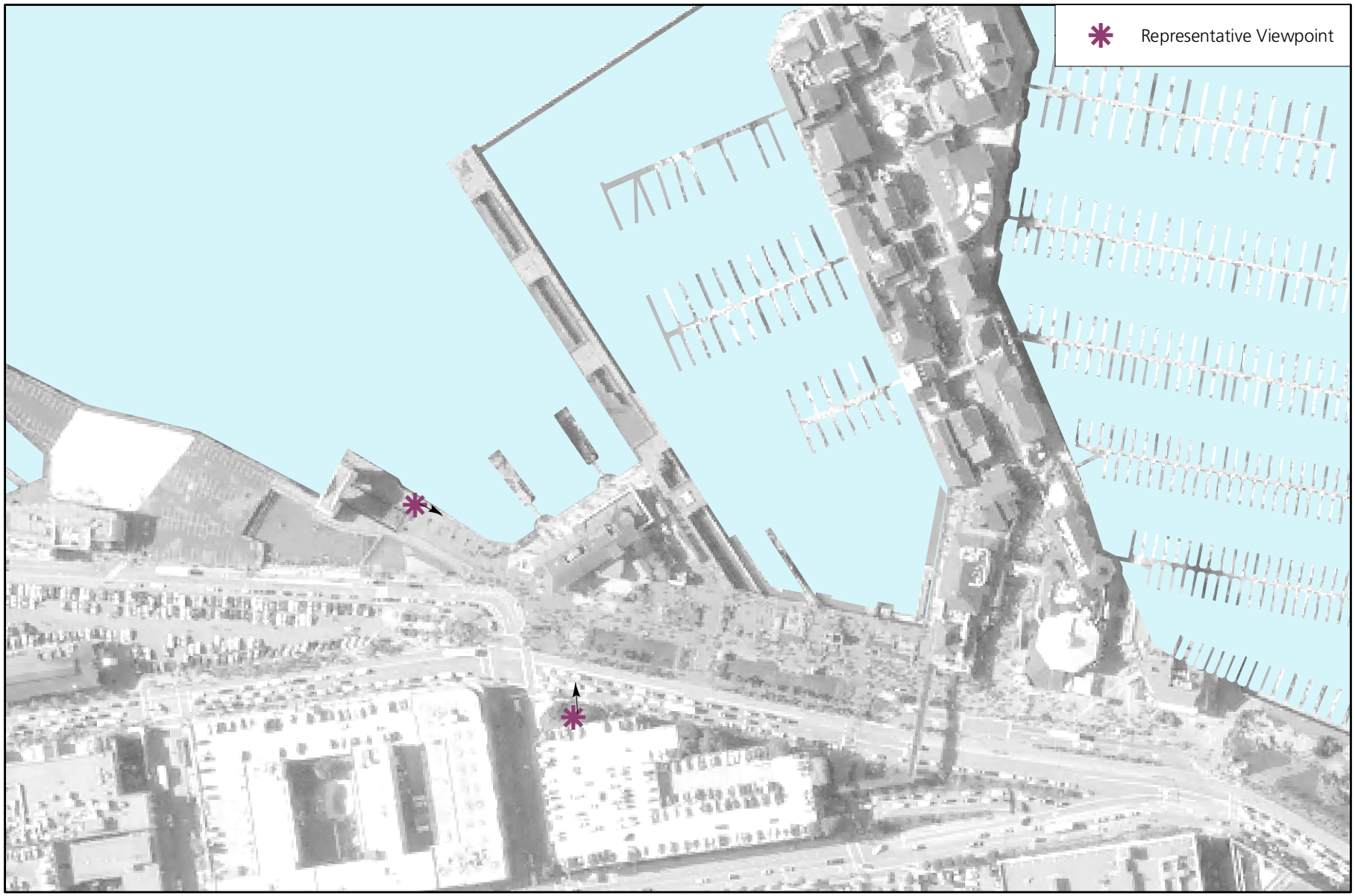
Lighting can have an impact on the visual conditions of a site during the night. Most lighting of the Alcatraz embarkation site will likely be based on site security and safety needs. However, spotlighting may be used to market the Alcatraz tour by illuminating interpretive features, building features, and gateways. The current embarkation site at Pier 31½ provides lit features that can be used to project the amount of lighting at this and the other embarkation alternative sites. The photo of Pier 31½ (Photo 22) shows the nighttime view at Pier 31½, with the lighting character and purpose labeled. Current designs for each alternative call for similar amounts of security and spotlighting; therefore, Photo 22 is representative of the nighttime views of all alternatives under evaluation.

The types of nighttime lighting include the following:

- Safety/security lighting on vessels and docks and at walkways and sidewalks
- Identification/marketing lighting at gateways and lighting interpretive features (signs along ticket booth and interpretive exhibits)

0 400 Feet

FIGURE 42
VISUAL RESOURCES, PIER 31½ REPRESENTATIVE VIEWPOINTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015



0 200 Feet

FIGURE 43
VISUAL RESOURCES, PIER 41 REPRESENTATIVE VIEWPOINTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

0 200 Feet

FIGURE 44
VISUAL RESOURCES, PIER 3 REPRESENTATIVE VIEWPOINTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

0 200 Feet

FIGURE 45
VISUAL RESOURCES, FORT BAKER REPRESENTATIVE VIEWPOINTS
Golden Gate National Recreation Area
National Park Service/U.S. Department of the Interior
January 2015

1

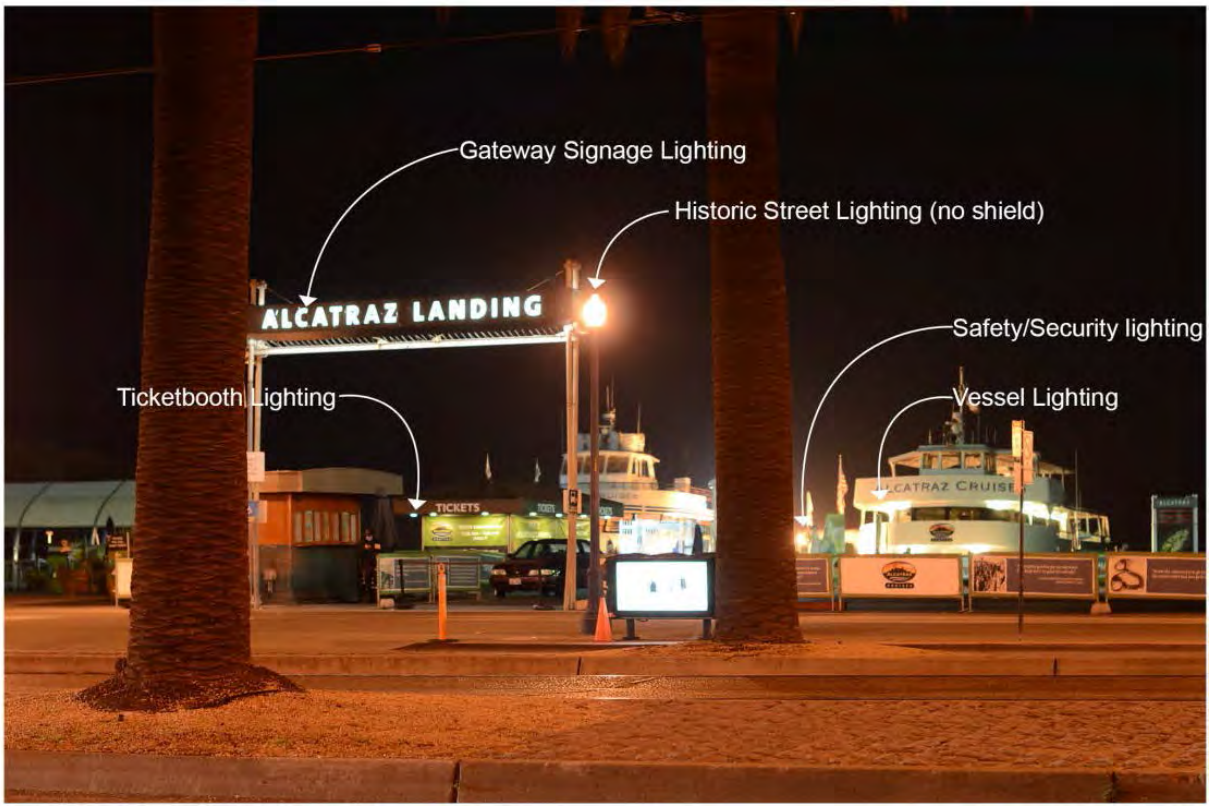


Photo 22.
Pier 31½—Nighttime. Lighting character and purpose at current Alcatraz embarkation site.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from the present location at Pier 31½ without any modifications to the existing facilities.

Impact Analysis

Because there would be no construction or modifications to buildings or uses within the study area under the No Action Alternative, there would be no construction-related impacts on visual resources.

While visitor levels to the embarkation site could increase incrementally compared to existing conditions, existing visual resources under the No Action Alternative would remain unchanged. Lighting would continue to meet demand generated by visitors and employees within the study area, and there would be no additional structural changes to the visual landscape. Therefore, there would be no impacts on visual resources as a result of the No Action Alternative.

Cumulative Impact Analysis

Because the No Action Alternative would be unchanged from present conditions with respect to visual resources, there would be no cumulative impacts as a result of this alternative.

Mitigation

No mitigation is proposed.

Conclusion

Under the No Action Alternative, no impacts on visual resources would occur.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and development of new infrastructure, as well as the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Daytime Views. Figure 42 illustrates the proposed view of Pier 31½ from Coit Tower and shows the existing view with the area of change. Approximately 6% of the total view would exhibit change. These changes would include beneficial impacts through rehabilitated paving, shelters, signage, and transportation infrastructure. There would also be negligible impacts to views of a small area of water because of the addition of a second float and gangway to accommodate the third berth under this alternative.

Nighttime Views/Dark Skies. Changes to the level and character of night lighting for security, safety, and identification within the upland portion of the site would remain unchanged, though lights would be upgraded and relocated through the design. The inclusion of a second ferry-occupied berth would likely increase the need for security and safety lighting for the additional vessel, gangway, and float. This would result in a minor impact related to nighttime views and the preservation of dark skies.

Cumulative Impact Analysis

The Pier 31½ Alternative would result in minor, beneficial impacts on daytime visual resources and minor, adverse impacts on nighttime visual resources. The alternative's incremental contribution to any cumulative impacts on these resources would not be major.

Mitigation

Visual-MM-1. All new and upgraded lighting on the Pier 31½ site would employ shields over lamps or be located under building/structure overhangs to minimize light pollution of the dark sky.

Visual-MM-2. New and upgraded float lighting within the site would employ motion activation sensors after operation hours, to minimize the amount of time lamps would be illuminated.

Visual-MM-3. Upgraded public access to water viewpoints on-site would be provided through the design.

Conclusion

Despite the fact that only minor impacts are anticipated for this Alternative, the Park Service would implement Mitigation Measures Visual-MM-1, 2, and 3 to further reduce the risks of short- and long-term impacts.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Daytime Views. Photo 16 illustrates the proposed view of Pier 41 from the Jefferson Street Parking Garage and shows the existing view with the area of change. Approximately 8% of the total view would exhibit changes.

These changes would include beneficial impacts through rehabilitation of the Pier 41 building to remain. There would also be minor impacts to views of vegetation through the expansion of the Pier 41 building. Views of the Bay, including Alcatraz and Angel Island, would not be impacted by this alternative. The design specifically retains the breezeway passage at the center of the existing Pier 41 building to preserve this view of the Bay. The removal of the ornamental overhang on the existing building may also open up this view of the Bay and provide a beneficial impact.

Nighttime Views/Dark Skies. No increase in lit areas is anticipated through this alternative. Lighting fixtures will be upgraded with the rehabilitation of Pier 41, but more stringent shielding would be required, resulting in a beneficial impact to dark skies and nighttime views.

Cumulative Impact Analysis

The Pier 41 Alternative would result in minor, beneficial impacts on daytime visual resources and no or beneficial impacts on nighttime visual resources. The alternative's incremental contribution to any cumulative impacts on these resources would not be major.

Mitigation

Visual-MM-4. Trees removed for the Pier 41 expansion would be replaced within the alternative boundary. The replacement location would not result in a loss of views to the Bay.

Conclusion

Despite the fact that only minor impacts are anticipated for this Alternative, the Park Service would implement Mitigation Measure Visual-MM-4 to further reduce risks of short- and long-term impacts.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter. Fort Mason Special Ferry service would include additional gangways, floats, and vessels between Piers 1 and 2.

Impact Analysis

Daytime Views. Photo 18 illustrates the proposed view of Pier 3 and special ferry service at Fort Mason from the Bay Trail Viewpoint and shows the existing view with the area of change. Approximately 6% of the total view would exhibit changes. These changes would include beneficial impacts through rehabilitated paving, a rehabilitated Festival Pavilion, and the updated and relocated shelter beneath the retaining wall. There would also be minor impacts to views of two small areas of water due to new gangways, floats, and moored vessels at Pier 3 and between Piers 1 and 2. However, the inclusion of these berths at Fort Mason is consistent with the historic use of Pier 4 at the Fort for transport to Alcatraz Island.

Nighttime Views/Dark Skies. Light levels in this location have the potential to increase through the use of security and safety lighting at the new gangways and floats and on moored vessels. This could result in a moderate impact to nighttime views and dark skies.

Cumulative Impact Analysis

The Pier 3 Alternative with Fort Mason Special Ferry service would result in minor, beneficial impacts on daytime visual resources and moderate impacts on nighttime visual resources. New gangways, floats, and moored vessels within the site have the potential to impact nighttime views/dark skies and could contribute to cumulative impacts. Mitigation

measures Visual-MM-1 and 2 would be implemented as described below, which would minimize the likelihood that the Project would contribute to cumulative impacts.

Mitigation

Visual-MM-1. All new and upgraded lighting on the Pier 3 and Fort Mason Special Ferry site would employ shields over lamps or be located under building/vessel/structure overhangs to minimize light pollution of the dark sky.

Visual-MM-2. New and upgraded float lighting within the site would employ motion activation sensors after operation hours, to minimize the amount of time lamps are illuminated.

Visual-MM-3. Upgraded public access to water viewpoints on-site would be provided through the design.

Conclusion

Despite the fact that only minor to moderate impacts are anticipated for this Alternative, the Park Service would implement Mitigation Measures Visual-MM-1, 2, and 3 to further reduce risks of short and long-term impacts.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between piers 1 and 2 that comprises the physical element of this development is inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to visual resources that would occur as a result of the Pier 31½ and Pier 41 alternatives would be generally consistent with those of the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

Under all alternatives, special ferry service to Fort Baker would be implemented as described in the "Alternatives" chapter. This alternative would include retrofit of existing structures and development of new infrastructure, as well as the establishment of long-term intermittent ferry service and embarkation site operations at the Fort Baker Pier as detailed in the "Alternatives" chapter.

Impact Analysis.

Daytime Views—Photos 20 and 21 illustrate the proposed view of the Fort Baker pier from Moore Road and the Satterlee Breakwater and show how much of the existing view of the area would change. Approximately 25% of the total view from Moore Road would exhibit change, though about 15% of this change will be beneficial, through upgraded paving, pier piling, and guardrails. Approximately 2.4% of the total view from Satterlee Breakwater would exhibit changes. These changes would include beneficial impacts through rehabilitated paving including sidewalks along Moore Road and a rehabilitated pier with new pilings. There would also be minor impacts to views of two small areas of water and the surrounding vista, due to a new gangway and float, and a new shelter/pavilion and interpretive features.

Nighttime Views/Dark Skies—Light levels in this location have the potential to increase through the use of security and safety lighting at the new gangway and float and on moored vessels. As the new infrastructure is relatively small, and only one vessel is anticipated at this

location, this was deemed a potential minor impact to nighttime views and dark skies.

Cumulative Impact Analysis. Fort Baker special ferry service would result in beneficial and minor impacts on daytime visual resources and minor impacts on nighttime visual resources. The alternative's incremental contribution to any cumulative impacts on these resources would not be major.

Mitigation.

Visual-MM-1—All new and upgraded lighting at Fort Baker would employ shields over lamps or be located under building/vessel/structure overhangs to minimize light pollution of the dark sky.

Visual-MM-2—New and upgraded float lighting within the site would employ motion activation sensors after operation hours, to minimize the amount of time lamps are illuminated.

Conclusion. Despite the fact that only minor impacts are anticipated for this Alternative, the Park Service would implement Mitigation Measures Visual-MM-1 and 2 to further reduce risks of short- and long-term impacts.

CULTURAL RESOURCES

METHODOLOGY AND THRESHOLDS

The potential cultural resource impacts associated with the Project were evaluated based on the process established in the NHPA and 36 CFR 800. Cultural resources can be broadly divided into the following three categories:

- Historic structures that have an association with historical events or important people, or their exhibition of distinctive characteristics of type, period, and method of construction
- Archeological resources (districts and sites) that have the potential to yield information important to prehistory or history
- Cultural landscapes that can be related to use of the landscape by peoples in either precontact or historic times. The assessment of impacts on cultural landscapes can include consideration of impacts on archeological resources, ethnographic resources, and historic or prehistoric structures.

A major impact to a cultural resource is one that diminishes its historic significance or appearance. A minor impact is one that makes a change to the resource but does not diminish its historic significance or appearance.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from the present location at Pier 31½.

Impact Analysis

Historic Structures. Because there would be no construction or modifications to buildings or uses within the study area under the No Action Alternative, there would be no construction-related impacts on historic structures.

Visitor numbers at the embarkation site could increase incrementally under the No Action Alternative compared to existing conditions for the reasons outlined in the "Alternatives" chapter. Greater numbers of people traveling to and circulating through the embarkation site have the potential to put increased strain or damage to the built environment, especially if no action is taken to improve the deteriorated pier substructure. However, Port Commission resolution 04-89 requires that all major projects within the Port of San Francisco Embarcadero National Register Historic District comply with the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995). Therefore, proper management is in place to reduce or eliminate long-term impacts on historic structures, and there would be no impacts on historical architectural resources from operations under the No Action Alternative.

Archeological Resources and Cultural Landscapes. Because there would be no construction or modifications to buildings or uses within the study area under the No Action Alternative, there would be no construction-related or operational impacts on archeological resources. The No Action Alternative is not within an identified cultural landscape, there would be no impacts on cultural landscapes.

Cumulative Impact Analysis

The No Action Alternative would be largely unchanged from present conditions with respect to cultural resources, and past, present and reasonably foreseeable future projects in the vicinity of Pier 31½ would be required to comply with Port Commission resolution 04-89. Therefore, there would be no cumulative

impacts related to cultural resources as a result of the No Action Alternative.

Mitigation

No mitigation is proposed.

Conclusion

The No Action Alternative would result in no impacts on cultural resources.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures, development of new infrastructure, and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Historic Structures. Changes to the interior of the Pier 31½ bulkhead building have already been made, and the interior space does not contribute to the building's historic significance. For this reason, alterations to the building's interior have little potential to impact the historical integrity of the resource.

The exterior of the building has not been significantly altered and contributes to the structure's historic significance. Proposed changes to the exterior would include installation of an awning on the building, as well as potential replacement of the older portion of Pier 31½ (if repairs are determined not to be viable). Proposed modifications would be designed to limit introducing new entry points within the bulkhead building, avoid blocking windows on the south facade of the building from interior partitions or seismic upgrades, and avoid altering any historic circulation patterns within the building.

The Pier 31½ Alternative would introduce new built features into the Port of San Francisco Embarcadero National Register Historic District; however, these structures (an awning and ticket booth) are small in scale and reversible, and their presence would not impact the historical integrity of the district. All modifications would meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995). Therefore, construction would not diminish the historic significance or appearance of any cultural resources. Impacts would be minor.

No new transit services or modifications to existing transit services would be introduced under the Pier 31½ Alternative. Therefore, no new impacts from pedestrian or vehicular traffic or access are anticipated.

Archeological Resources. No recorded archeological resources would be affected by the Pier 31½ Alternative because no ground disturbance is planned within 100 meters (350 feet) of any recorded archeological site (CA-SFR-127H, the Mid-Embarcadero Historic Fill site, is not located within 100 meters of the area where the Pier 31½ Alternative would have direct effects). In-water ground disturbance would occur under substructure of Piers 31½ and 33. The ground disturbance has some limited potential to disturb unrecorded archeological materials, but because in-water work under and around piers is ongoing, the likelihood of intact archeological materials being present at the location of piling replacement is low. A Post-review Discovery Plan would be developed and maintained on-site, in case archeological materials are discovered during construction.

Cultural Landscapes. The Pier 31½ Alternative would not take place within an identified cultural landscape; therefore, there would be no impacts on cultural landscapes.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in minor impacts on historic structures, and

no impacts on archeological resources or cultural landscapes, the alternative's incremental contribution to any cumulative impacts on these resources would not be cumulatively significant, and would be considered unchanged from the No Action Alternative.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in no major impacts on cultural resources. There would be minor impacts to historic structures.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41 as detailed in the "Alternatives" chapter.

Impact Analysis

Historic Structures. The Pier 41 Alternative would propose modification to a nonhistoric building that sits on portions of the pier that date to two different periods. Neither portion of the pier structure has been recognized as a historic resource or deemed a contributor to any potential historic district.

Adding interpretive elements along Pier 43, which is considered a historic resource, would also be proposed as part of this alternative. These proposed interpretive elements are small and reversible, and would be consistent with similar signage found throughout the Port of San Francisco Embarcadero National Register Historic District, Aquatic Park, and other historic resources in the study area. All modifications would meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995).

These changes to Pier 43 would not diminish the historic significance or appearance. Therefore, there would be minor impacts on historic structures under the Pier 41 Alternative compared to the No Action Alternative.

Archeological Resources. No recorded archeological resources would be affected by the Pier 31½ Alternative because no ground disturbance is planned within 100 meters (350 feet) of any recorded archeological site. In-water ground disturbance has some limited potential to disturb unrecorded archeological materials, but because in-water work under and around piers is ongoing, the likelihood of intact archeological materials being present at the location of piling replacement is low. A Post-review Discovery Plan would be developed and maintained on-site, in case archeological materials are discovered during construction.

Cultural Landscapes. The Pier 41 Alternative would not take place within an identified cultural landscape; therefore, there would be no impacts on cultural landscapes.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in minor impacts on historic structures, and no impacts on archeological resources or cultural landscapes, the alternative's incremental contribution to any cumulative impacts on these resources would not be cumulatively significant, and would be considered unchanged from the No Action Alternative.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in no major impacts on cultural resources. There would be minor impacts to historic structures.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Historic Structures. The Pier 3 Alternative would include both interior and exterior modifications to the existing Pier 3 shed and substructure, as well as new interpretive exhibits in adjacent areas within The San Francisco Port of Embarkation National Historic Landmark District and the Fort Mason National Register Historic District.

The structural and architectural improvements required under the Pier 3 Alternative (described in detail in the "Alternatives" chapter) include work on character-defining features and elements within the Pier 3 shed. The 1991 Historic Structures Report for The San Francisco Port of Embarkation National Historic Landmark District states that Pier 3 has a significant passenger loading system that is one of the few remaining interior elements in its original condition (Farneth et al. 1991).

If replacement of portions of the passenger loading system or other character-defining interior features are required, construction would meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995). Meeting this standard would ensure that the historic significance and appearance of the structure would not be diminished. Therefore, impacts would be minor.

Furthermore, modifications may improve the overall condition of the Pier 3 shed and substructure, providing necessary maintenance that may not otherwise be funded. This would constitute a benefit to the resource.

The Pier 3 Alternative would involve changes to transportation and circulation throughout the site. The parking area in front of Pier 3 would become a one-way loop for shuttle buses, public transportation, and disabled visitors, and two new gangways would be installed to berths between piers 1 and 2 and piers 2 and 3. The number of parking spaces would decrease, and circulation through the Lower Fort Mason parking area would become more directed and restricted, which may decrease the potential for damage to the historic buildings from vehicular impacts. Little to no change in vibration-induced damage resulting from buses and cars is anticipated. The introduction of the one-way loop, clear directional signage, and increased barriers between the buildings and the parking area would result in long-term, minor, beneficial impacts compared to the No Action Alternative.

Archeological Resources. None of the recorded archeological sites in Fort Mason could be adversely affected by the Pier 3 Alternative because no ground disturbance is planned within 100 meters (350 feet) of any recorded archeological site. All recorded sites are buried under the current infrastructure in Fort Mason.

In-water ground disturbance has some limited potential to disturb unrecorded archeological materials, but because in-water work under and around piers is ongoing, the likelihood of intact archeological materials being present at the location of piling replacement is low.

Upland ground disturbance at the location of the proposed interpretive exhibits and possibly at other locations where signage and other minor elements may be constructed has some limited potential to disturb unrecorded archeological materials. Because of the development history of Lower Fort Mason,

which was constructed by filling the intertidal zone, prehistoric Native American resources are unlikely to be encountered. Archeological materials, such as fragments of brick, metal, or glass. may be present within the fill, but are unlikely to be significant.

A Post-review Discovery Plan would be developed and maintained on-site, in case archeological materials are discovered during construction.

Cultural Landscapes. Work would occur in the vicinity of the following contributing structures to the Lower Fort Mason and Northwest Embankment Landscape Character Areas:

- The Pier 3 Shed building
- The Transformer House
- The Lower Fort Mason retaining walls
- Light posts

Construction would meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995), as well as the standards described in the preservation brief *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes* (Birnbaum 1994) and the Fort Mason cultural landscapes report (Hoke and Foulds 2004). Meeting these standards would ensure that changes would not affect the historic significance or appearance of the cultural landscape. Therefore, impacts would be minor.

Cumulative Impact Analysis

Future development in Fort Mason would be required to adhere to the standards and guidelines described above. Because the Pier 3 Alternative would result in minor impacts on historic structures and cultural landscapes, and no impacts on archeological resources, the alternative's incremental contribution to any cumulative impacts on these resources would not be cumulatively significant, and would be considered unchanged from the No Action Alternative

Mitigation

No mitigation is proposed.

Conclusion

The Pier 3 Alternative would result in no major impacts on cultural resources. There would be minor impacts to historic structures and cultural landscapes. There may also be benefits to historic structures.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprise the physical elements of this development are inherently accounted for in the alternative's impact analysis.

Impact Analysis.

Historic Structures—The Fort Mason special ferry service includes construction of minor structures in adjacent areas within The San Francisco Port of Embarkation National Historic Landmark District and the Fort Mason National Register Historic District. Because the new structures would be entirely within the aquatic environment adjacent to an existing wharf, no impacts are anticipated.

Fort Mason special ferry service would be used intermittently for special events and would not require any new parking or transportation elements. Therefore, there are no changes to transportation and circulation through the site, and no impacts are anticipated.

Archeological Resources—None of the recorded archeological sites in Fort Mason could be adversely affected by the Project, because no ground disturbance is planned

within 100 meters (350 feet) of any recorded archeological site. All recorded sites are buried under the current infrastructure in Fort Mason.

In-water ground disturbance has some limited potential to disturb unrecorded archeological materials, but because in-water work under and around piers is ongoing, the likelihood of intact archeological materials being present at the location of piling replacement is low. A Post-review Discovery Plan would be developed and maintained on-site, in case archeological materials are discovered during construction.

Cultural Landscapes—The proposed new structures would be consistent in character with the existing aquatic-focused wharf structures in the Lower Fort Mason Landscape Character Area. No impacts are anticipated to the Fort Mason Cultural Landscape.

Cumulative Impact Analysis. Construction of the Fort Mason special ferry service does not include any modifications to buildings at Fort Mason; therefore, this element would not impact the historical integrity of the Pier 3 shed. Because the Fort Mason special ferry service would be used intermittently by small groups of visitors, cumulative impacts from increased visitor use and changes in transportation patterns are not anticipated. Therefore, no cumulative impacts are anticipated from operations.

Mitigation. No mitigation is proposed.

Conclusion. Fort Mason special ferry service would result in no impacts on cultural resources.

Fort Baker Special Ferry Service

This Project element would include retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis.

Historic Structures—Use of Fort Baker for limited ferry service would require upgrades to the waterfront infrastructure, including the pier, access roads, and adjacent parking areas.

The 1920 concrete pier dates to within the period of significance for the site and is considered a contributor to the National Register Historic District. Most of the improvements would be to the substructure, and therefore, would not be visible. Alterations to the pier would maintain the pier's current appearance and dimensions and would be consistent with the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995).

The proposed kiosk and shuttle areas would be small, reversible structures located in areas that have traditionally been parking lots or have already been modified from their appearance during the period of significance. There would be limited aesthetic changes; any changes would be reversible in nature and would not impact the historic character of the District as a whole. Construction would be consistent with the secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995).

Changes would not diminish the historic significance or appearance of the Fort Baker National Register Historic District. Therefore, impacts on historic structures would be minor compared to the No Action Alternative.

Archeological Resources—Proposed elements at Fort Baker would be constructed in the vicinity of eight identified archeological features that were recorded as part of site CA-MRN-648. Six of these are manhole covers, identified as components of Feature 8. One is a component of Feature 6 (water conveyance structures); it is an underground conveyance consisting of a pipe and two openings. The remaining feature, Feature 32, is a concrete pit of unknown origin, possibly related to a temporary barracks and kitchen/mess hall, or a hospital complex. These features have been

recorded, but their significance has not been evaluated. In other words, it has not been determined whether they would contribute to the national register-eligibility of CA-MRN-648. Prior to construction, these features would be located, and impacts on them would be avoided.

Fort Baker has been extensively archeologically surveyed, and it is unlikely that unrecorded sites are present in the area where the Project would have direct effects. A Post-review Discovery Plan would be developed and maintained on-site during construction.

Cultural Landscapes—Fort Baker special ferry service would take place within the Waterfront Landscape Character Area, and possibly the Quartermaster Warehouse Cultural Landscape Area. Contributing components to the cultural landscape that are in the immediate Project area include the pier, seawall, access routes to the waterfront, the waterfront-oriented spatial organization, and possibly landscaping related to the Quartermaster Warehouse area. Construction would meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995), as well as standards set in the preservation brief *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes* (Birnbaum 1994) and the Fort Baker cultural landscapes report (NPS 2005). Changes would not diminish the significance or appearance of the cultural landscape. Therefore, Fort Baker special ferry service would result in minor impacts on cultural landscapes as compared to the No Action Alternative.

Cumulative Impact Analysis. Future development in Fort Baker would be required to adhere to the standards and guidelines described above. Because the Fort Baker special ferry service would result in minor impacts on historic structures and cultural landscapes, and no impacts on archeological resources, the alternative's incremental contribution to any cumulative impacts on these resources would not be cumulatively significant, and would be considered unchanged from the No Action Alternative.

Mitigation. No mitigation is proposed.
Conclusion. The Fort Baker special ferry service would result in minor impacts on historic structures and cultural landscapes.

RECREATION AND VISITOR USE

METHODOLOGY AND THRESHOLDS

Potential impacts on recreation, including visitor use and experience, refers to the duration, degree, and type of impacts that would affect visitor numbers at potential embarkation sites, the quality of the Alcatraz Island tour experience and the experience at the embarkation site, and other existing recreational opportunities in the study area. The potential change to recreational opportunities and visitor use and experience associated with the proposed alternatives was qualitatively evaluated by identifying projected changes in the ability of the Park Service to adequately serve visitors, NPS employees of Alcatraz Island, and other users of the GGNRA. Other specific impacts evaluated include the availability and quality of existing recreational opportunities, such as walking, hiking, picnicking, sightseeing, sailing, fishing, kayaking and rowing, and swimming.

The measurement indices to evaluate recreational impacts include visitor usage, the quality of the Alcatraz Island tour experience, and recreational opportunities. An alternative would be considered to have a major impact if it caused substantial change in visitor use or the quality of the Alcatraz Island tour experience, or resulted in prolonged interruption to existing recreational opportunities.

The analysis considered the potential for an alternative to do the following:

- Cause a substantial change in the number of visitors
- Change the quality of the Alcatraz Island tour experience
- Interrupt an existing recreational opportunity within the study area

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

As is noted in the "Alternatives" chapter, the Park Service estimates that there could be 10 and 20% increases in visitation to Alcatraz by 2016 and 2036, respectively, assuming that changes in visitor management on Alcatraz Island are implemented to allow for the site to accommodate increased visitors. Table 72 presents existing and future visitation numbers at the existing embarkation site for both Alcatraz and non-Alcatraz Island visitors. A nonvisitor would be those individuals who are unable to obtain tickets to Alcatraz Island whose visitor use and experience is limited to that provided at the primary embarkation site, including potential connections to GGNRA parklands other than Alcatraz Island.

TABLE 72. EXISTING AND EXPECTED FUTURE EMBARKATION SITE VISITOR NUMBERS

Daily Visitation	Visitation	
	Existing (2011)	Future (2036)
Average Day		
Alcatraz Tour Visitors	5,300	6,400
Non-Alcatraz Visitors	500	1,000[1]
Peak Day		
Alcatraz Tour Visitors	5,460	6,600
Non-Alcatraz Visitors	700	800

Notes:
1 Assumes that an improved exhibit program would be developed that draws at least 1,000 visitors daily to any of the potential embarkation facility sites.
Source: ORCA 2011a

There would be no modification to existing infrastructure or facilities at the existing embarkation facility or any development of ferry berthing infrastructure at either Fort Mason or Fort Baker under the No Action Alternative.

Because no construction is proposed, the No Action Alternative would result in no construction-related impacts on recreational resources.

Due to the anticipated increased visitor capacity on Alcatraz Island, there could be an increase in visitors at the embarkation site under the No Action Alternative. If visitor capacity increases, it could lead to increased congestion, reduced circulation, and reduction in the overall quality of the visitor experience, if there are no concurrent improvements to the embarkation site.

In addition, the current process associated with competitively re-awarding the ferry service operator contract every 10 years to entities with leased pier space does not support the Project's need to create a long-term space. A permanent and identifiable ferry embarkation facility is key to providing a quality visitor experience, and this could not be achieved under the No Action Alternative.

While the Park Service would actively manage visitor use and experience at the embarkation site under the No Action Alternative, the site would not provide the characteristics deemed necessary to achieve the desired quality of recreation described in the "Purpose and Need" chapter. In addition, it would not support the Park Service's goals of providing additional ferry service connecting Fort Mason, Fort Baker, and other GGNRA sites in the Bay. Therefore, the No Action Alternative would result in long-term, moderate, adverse impacts on recreation.

Cumulative Impact Analysis

As is noted in Table 61, visitor numbers to Alcatraz Island are expected to increase by 20%, assuming on-island visitor management changes are implemented. Nonvisitor numbers at the primary embarkation site are also expected to increase. Assuming such increases, visitor circulation at the embarkation site under the No Action Alternative could become compromised, reducing the quality of the experience and contributing to a potentially major cumulative impact on recreational activities in the GGNRA and other nearby areas.

Mitigation

No mitigation is proposed.

Conclusion

Under the No Action Alternative, recreational resources could become compromised as visitor levels increase over time without concurrent improvements to the site. Therefore, the No Action Alternative would result in long-term, moderate, adverse impacts.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

During construction, portions of Pier 31½ would be closed to visitors, although overall ferry service to Alcatraz Island would be expected to remain open during the construction period. Closure of portions of Pier 31½ during construction may result in additional localized crowding, especially when ferries are loading and unloading. There may also be periods with reduced or delayed ferry service. However, it is anticipated that construction impacts on recreation would be minor and short-term, and measures would be

implemented to keep the site functioning as optimally as possible during construction. Access to the Bay Trail and other recreation facilities near the site would not be affected. Therefore, the Pier 31½ Alternative would result in short-term, minor, adverse impacts on recreation during construction compared to the No Action Alternative.

Of the action alternatives, this alternative would create the most outdoor (covered and uncovered) program area of the primary embarkation site. Outdoor program elements would include interpretive and rest areas, ticket queuing, and boat staging. Remodel of the bulkhead building would allow for expansion of the basic visitor service program functional area (including a small food service, interpretive retail, restrooms, and operations), and would provide additional and improved orientation and exhibit opportunities for visitors and nonvisitors. Similar to the No Action Alternative, visitation levels are expected to increase in future years as a result of management improvements to increase Alcatraz Island's visitation capacity. The addition of a new berth at Pier 31½ would increase operational capacity compared to the No Action Alternative and would improve the ability for visitors to experience other GGNRA sites, such as Fort Baker, via ferry from the primary embarkation site. This alternative would meet the Project's purpose and need to enhance the Alcatraz Island ferry embarkation experience and would provide new recreational opportunities for visitors, resulting in a beneficial effect on recreation. Therefore, the Pier 31½ Alternative would result in long-term, major, beneficial impacts on recreation from operations compared to the No Action Alternative.

Any ferry operations at Pier 31½ would be negligible when considered in the context of existing recreational uses of the Bay. All ferry operations would occur in compliance with all vessel right-of-way regulations designed to avoid boating accidents and vessel conflicts. Therefore, the Project would have no effect on recreational boating compared to the No Action Alternative.

Cumulative Impact Analysis

The Pier 31½ Alternative would result in short-term, minor, adverse impacts on recreation during construction, which would not be considered cumulatively major. Operational impacts of the Pier 31½ Alternative would be long-term, major, and beneficial.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in short-term, minor, adverse impacts on recreation during construction, and long-term, major, beneficial impacts on recreation from operations.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Alcatraz Island ferry embarkation operations would continue at Pier 31½ during construction of the Pier 41 Alternative; therefore, closure of portions the Pier 41 wharf and building facilities would likely have no adverse effects on Alcatraz Island visitors during construction. Construction would be localized to the Pier 41 area, and access to other recreation opportunities in the vicinity would not be affected. Therefore, the Pier 41 Alternative would result in short-term, minor, adverse impacts on recreation related to the Alcatraz tour experience during construction, compared to the No Action Alternative.

The Pier 41 Alternative would provide sufficient space to accommodate the needs of future visitors, as well as educational and interpretive exhibits for GGNRA as a whole. While the Pier 41 alternative has the smallest overall footprint, it would accommodate all program elements. Indoor program elements would include interpretive areas, retail, ticket sales, queuing, group tour area, restrooms, and operations. The existing covered breezeway would be retained and used for visitor circulation and orientation, allowing for an open view through the building to the Bay. Additional passive use interpretive rest areas, including educational exhibits and seating, would be located along the adjacent historic Pier 43, which would be treated as a shared public space area.

Similar to the No Action Alternative, visitation levels are expected to increase in future years as a result of management improvements to facilities on Alcatraz Island that would increase island visitation capacity. The addition of a third berth would increase operational capacity compared to the No Action Alternative and would allow visitors to have the opportunity to experience other GGNRA sites, such as Fort Baker, via ferry from the primary embarkation site. This alternative would meet the Project's purpose and need, resulting in a beneficial effect on recreation. Centrally located, the Pier 41 Alternative would provide easy access to parking, requiring a low investment on behalf of the Park Service to manage transportation infrastructure. Therefore, the Pier 41 Alternative would result in long-term, major, beneficial impacts on recreation from operations compared to the No Action Alternative.

The Blue & Gold Fleet, which currently operates at Pier 41, would require permanent relocation as a result of this alternative. In addition, the WETA ferry service at Pier 41 may require both temporary (during construction) and permanent relocation as a result of this alternative. Recreational opportunities supported by these services would be affected by this transition, although it is expected these services would re-establish in another location, and recreational opportunities would be preserved. The associated effects on existing users of Pier 41 would constitute a potential short-term, moderate, adverse recreational impact.

Any ferry operations at Pier 41 would be negligible when considered in the context of existing recreational uses of the Bay. All ferry operations would occur in compliance with all vessel right-of-way regulations designed to avoid boating accidents and vessel conflicts. Therefore, the Project would have no effect on recreational boating compared to the No Action Alternative.

Cumulative Impact Analysis

The Pier 41 Alternative would result in short-term, minor, adverse impacts during construction, which would not be cumulatively major. While there may be a moderate impact to recreation due to potential relocation of the Blue & Gold Fleet and WETA ferry services, both services would be expected to re-establish elsewhere. Therefore, cumulative recreational impacts are not expected to be major. In addition, long-term operational impacts of the Pier 41 Alternative to the Alcatraz tour service would be beneficial.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in short-term, minor, adverse impacts on recreation from construction; short-term, moderate, adverse impacts on recreation due to disruption of existing services; and long-term, major, beneficial impacts on recreation from operations.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Alcatraz Island ferry embarkation operations would continue at Pier 31½ during construction of the Pier 3 Alternative; therefore, closure of portions of the site would have no adverse effects on Alcatraz Island visitors during construction. The Fort Mason Center currently leases the Pier 3 shed for large special events, trade shows, exhibits, and conventions—all of which attract a large number of visitors. During construction, the shed would not be available for these purposes. It is expected that most special events that would use the Pier 3 shed could relocate to Pier 2 during this time, and that temporary loss of this space for special events would constitute a minor impact. Construction would be localized to the Pier 3 area, and access to other recreational opportunities in the vicinity of the site would not be affected. As such, the Pier 3 Alternative would result in short-term minor adverse impacts on recreation during construction compared to the No Action Alternative.

Following construction, approximately half of the Pier 3 shed would be used for Alcatraz Island ferry embarkation operations, allowing for a future compatible use in the remaining space, including special events. The overall space available at Pier 3 for special events would be reduced over existing conditions, and some large special events could no longer be accommodated at Pier 3 or the adjacent facilities at Pier 2. Although the event capacity at Pier 2 is not as great as the existing space at Pier 3, relatively large-sized special events could be accommodated at Pier 2. These smaller events would still be attractive to visitors and tenants at Fort Mason. Moreover, the use of the available space in the Pier 3 shed is assumed to be compatible and visitor-serving. Therefore, the permanent loss of this larger space for special events under the Pier 3 Alternative would constitute a long-term, minor, adverse impact to recreational opportunities compared to the No Action Alternative; however, visitors would likely take advantage of smaller events and the activities in the compatible use space. Potential socioeconomic impacts on businesses associated with this change are evaluated in the "Socioeconomics" section of this chapter.

Parking for personal vehicles at Fort Mason would generally be limited. The majority of parking available to visitors would remain at Fisherman's Wharf, which is an approximately 20 to 25 minute walk from Pier 3. This increased travel time from the primary parking location to the site would result in moderate, adverse, long-term impacts on recreation. To facilitate visitor access to the embarkation site from Fisherman's Wharf, the Park Service would implement mitigation measure Transportation-MM-5, which would involve operating a transit connection for visitors between Fisherman's Wharf and Fort Mason (described further below). The transit connection would initially be in the form of a free shuttle between the Fisherman's Wharf and Fort Mason until such time as the F-Line streetcar is extended to serve Fort Mason (additional information is provided in the "Transportation and Circulation" section of this chapter). Implementation of mitigation measure Transportation-MM-5 would reduce access-related impacts on recreation to long-term, minor, and adverse compared to the No Action Alternative. Parking impacts in the vicinity of Pier 3 are evaluated in the "Transportation and Circulation" section of this chapter.

The Pier 3 Alternative would provide sufficient space to accommodate the needs of future visitors, as well as educational and interpretive exhibits for GGNRA as a whole. Visitors to Pier 3 would be oriented to Alcatraz Island, which is visible from the site. Most of the exhibits and waiting areas would be located inside the Pier 3 shed. The only

program element outside of the Pier 3 shed would be an indoor interpretive rest area, reminiscent of the historic garages and workshops previously located along the Lower Fort Mason retaining wall. The Pier 3 Alternative would also introduce visitors to Fort Mason as part of their Alcatraz Island experience. Similar to the No Action Alternative, visitation levels would be expected to increase in future years as a result of physical modifications to increase Alcatraz Island's visitation capacity. An additional berth would increase operational capacity compared to the No Action Alternative and would allow visitors to have the opportunity to experience other GGNRA sites, such as Fort Baker, via ferry from the primary embarkation site. This alternative would result in long-term, major, beneficial impacts on recreation compared to the No Action Alternative.

Any ferry operations at Pier 3 would be negligible when considered in the context of existing recreational uses of the Bay. All ferry operations would occur in compliance with all vessel right-of-way regulations designed to avoid boating accidents and vessel conflicts. Therefore, the Pier 3 Alternative would have no effect on recreational boating compared to the No Action Alternative.

Comments were raised during public scoping regarding swimmers and rowers in the Aquatic Park area. Ferries would not enter the Aquatic Park area commonly frequented by rowers and swimmers, and the existing Aquatic Park Pier jetty and adjacent breakwaters would protect these areas from ferry wake generated wave action. Therefore, the Pier 3 Alternative would have no effect on rowing and recreational swimming in the Aquatic Park area compared to the No Action Alternative.

Furthermore, as discussed in the "Water Quality and Hydrology" section of this chapter, water quality impacts from ferry operations under the Pier 3 Alternative would be long-term, negligible, and adverse compared to the No Action Alternative. The Aquatic Park Pier partially shields the Aquatic Park swim area from Bay currents originating to the west, and the San Francisco waterfront is subject to frequent tidal flushing. The entirety of the Bay is heavily trafficked by commercial, recreational and military vessels. The City/County operates a marina west of Fort Mason, and the waterfront is frequently trafficked by multiple vessels. Increases in vessel use from ferry operations associated with the Pier 3 Alternative, including associated pollution, would be negligible when considered in the context of the Pier 3 area and existing uses of the Bay. Ferry operations would occur in adherence with plans and policies designed to address potential water quality impacts from fueling, sewage, trash generation, and operations in general, including through implementation of a site-specific SWPPP, SPCC, or equivalent plan(s). Therefore, the Pier 3 Alternative would have no impact on recreational rowing and swimming opportunities associated with water quality as compared to the No Action Alternative.

Cumulative Impact Analysis

The Pier 3 Alternative would result in short-term, minor, adverse impacts on recreation during construction. Operations at Pier 3 would have a long-term, minor, adverse impacts on recreation due to change in existing use of the Pier 3 shed, but would also result in in long-term, major recreational benefits. Therefore, the Pier 3 Alternative's incremental contribution to any cumulative impacts on recreation would not be major.

Mitigation

Transportation-MM-5. Implementation of a transit connection between Fisherman's Wharf and Lower Fort Mason would reduce the number of vehicles attempting to park in the Fort Mason area by providing an incentive to use transit, as well as taking advantage of large parking structures near Fisherman's Wharf. The transit connection could either be in the form of an extension of the F-Line, or an independent shuttle. Both of these options

are analyzed in the "Transportation and Circulation" section of this chapter. Implementation of either of these transit connection options would reduce the Project's contribution to parking demand, and parking demand would return to acceptable levels during the weekend midday period between 12:00 and 3:00 p.m. Parking supply during the 3:00 to 6:00 p.m. period would remain above acceptable levels, although it would be lower than conditions without this mitigation measure.

Additional mitigation measures, such as constructing new parking facilities, would be inconsistent with the City's Transit-First policy, as well as potentially inconsistent with the Park Service's goals regarding encouraging multimodal access to park sites, and would not be considered feasible.

Conclusion

The Pier 3 Alternative would result in short-term, minor, adverse impacts on recreational resources due to construction. During operation, the Pier 3 Alternative would result in long-term, minor, adverse impacts on recreation from increased visitor travel time to the site from primary parking locations at Fisherman's Wharf; long-term, minor, adverse impacts on recreation from the change in use of the Pier 3 shed; long-term, major, beneficial impacts from accommodating increased visitors and providing connections to other GGNRA parklands; and no impact on recreational swimming and rowing opportunities compared to the No Action Alternative.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between piers 1 and 2 that comprises the physical elements of this development is inherently accounted for in the alternative's impact analysis.

Impact Analysis. Alcatraz Island ferry embarkation operations would continue at Pier 31½ during construction of the gangway and floats; therefore, temporary site closure in the Pier 1 and Pier 2 area would have no adverse effects on Alcatraz Island visitors during construction. Construction would be localized to the overwater and seawall areas between piers 1 and 2, and access to other recreational opportunities in Lower Fort Mason would not be affected. As such, Fort Mason special ferry service would result in no recreational impacts during construction compared to the No Action Alternative.

There are no recreational uses currently associated with the area between piers 1 and 2 in Lower Fort Mason; as such, special ferry service in this location would not displace any existing recreational opportunities. In fact, providing special ferry service between Fort Mason and other potential locations would support the Park Service's goals to improve connectivity between and visitor knowledge of the GGNRA parklands outside of Alcatraz Island. Under the Pier 31½ and Pier 41 alternatives, Fort Mason would become an additional visitor destination for non-Alcatraz visitors, resulting in a beneficial effect. As such, Fort Mason special ferry service would result in long-term, major, beneficial impacts from operations compared to the No Action Alternative.

Cumulative Impact Analysis. Fort Mason special ferry service would result in no impacts on recreational resources during construction, and the Project element's incremental contribution to any cumulative impacts on recreational resources would not be major. Operational impacts of Fort Mason special ferry service would be beneficial.

Mitigation. No mitigation is proposed.

Conclusion. Fort Mason special ferry service would not result in impacts on recreation due to construction, and long-term, major,

beneficial impacts on recreation from operations compared to the No Action Alternative.

Fort Baker Special Ferry Service

This Project element includes retrofit of the pier substructure and the construction of a pedestrian path, as well as the establishment of special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. Construction activities at Fort Baker would have no impact on existing Alcatraz Island visitors or embarkation site operations. Recreational opportunities for fishing and personal boat launching would be restricted or closed during construction. As such, Fort Baker special ferry service would result in short-term, minor, adverse impacts during construction compared to the No Action Alternative.

In the future, recreational uses currently associated with the Fort Baker pier, such as fishing and private boat launching, would be restricted to areas not affected by ferry and embarkation operations. Due to the intermittent and infrequent number of ferry trips to Fort Baker that would be expected, this would result in long-term, minor, adverse impacts from operations compared to the No Action Alternative.

Providing special ferry service between Fort Baker, the primary embarkation site, and other potential locations would support the Park Service's goals to improve connectivity between and visitor knowledge of the GGNRA parklands outside of Alcatraz Island, and would meet the purpose and need of the Project. Under all alternatives, Fort Baker would become an additional visitor destination for non-Alcatraz visitors, resulting in a beneficial effect. As such, Fort Baker special ferry service would result in long-term, major, beneficial impacts from operations compared to the No Action Alternative.

Cumulative Impact Analysis. While Fort Baker special ferry service would result in short-term, minor, adverse impacts on recreational resources during construction and operations, it would also result in a long-term, major, beneficial impact. Due to the intermittent and infrequent number of ferry trips to Fort Baker expected, this Project element's incremental contribution to any cumulative impacts on recreational resources would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Fort Baker special ferry service would result in short-term, minor, adverse impacts on recreational resources during construction; long-term, minor, adverse impacts on recreational resources from intermittent use restrictions on the fishing pier; and long-term, major, beneficial impacts on recreational resources from improving the connectivity between and visitor knowledge of GGNRA parklands.

SOCIOECONOMICS

METHODOLOGY AND THRESHOLDS

Socioeconomic conditions refer to the duration, degree, and type of impacts of the alternatives that would affect local and regional socioeconomic conditions. The potential for the alternatives to affect spending within the study area was evaluated. The potential for the alternatives to add short- and long-term jobs, as well as the impact that any influx of new jobs would have on the local population, was also evaluated.

The proposed measurement indices used to evaluate socioeconomic impacts include employment levels, spending, and the quality of life in surrounding communities. An alternative would be considered to have a major impact if it had a substantial, highly noticeable influence on the social and economic conditions in the study area, and could be expected to permanently alter these environments.

The analysis considered the potential for an alternative to do the following:

- Result in economic impacts of businesses in the study area
- Affect population and housing in the study area

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

No construction would occur under the No Action Alternative; therefore, no construction jobs would be created. As such, there would be no change in socioeconomic conditions as a result of construction of the No Action Alternative.

Under the No Action Alternative, the economic contribution of the Alcatraz Island ferry embarkation site would likely be similar to, or slightly improved from, existing conditions as a result of the overall growth of tourism to the island and the area. The location of the No Action Alternative in the future remains uncertain; therefore, specifying socioeconomic impacts resulting from the alternative would be speculative, as they could vary depending on the location of the future concessioner's lease with the Port.

It is anticipated that a small number of jobs may be added to accommodate increases in ferry service under the No Action Alternative. As estimated by the Park Service, the average visitor party to GGNRA spends $43 per day. Thus, additional visitors at the site and in the study area would result in an incremental, beneficial economic impact on the local economy. It is anticipated that the small number of new jobs associated with increased ferry operations and indirectly with spending by additional visitors would be able to be filled from the existing labor pool in the vicinity of the study area, and changes in population are not anticipated to occur. As such, the No Action Alternative would likely result in long-term, negligible, beneficial impacts on socioeconomics in the study area.

Cumulative Impact Analysis

Because the No Action Alternative would result in negligible, beneficial impacts on this resource, its incremental contribution to cumulative impacts on socioeconomics would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The No Action Alternative would result in no short-term changes to socioeconomics, and long-term, negligible, beneficial impacts on socioeconomics.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

During construction, portions of Pier 31½ would be closed to visitors, although ferry service to Alcatraz Island would continue. Closure of portions of the site during construction may result in short-term crowding and possible minor disruptions in service, especially when ferries are loading and unloading, which has the potential to discourage people from visiting the attraction. These impacts on visitation would be short-term, minor, and adverse, lasting only as long as construction (approximately 5 months).

There would be a short-term increase in jobs (approximately 15 to 25 positions) associated with construction of the Pier 31½ Alternative, resulting in a minor, beneficial effect to the local economy. It is anticipated that the construction jobs would be filled from the local labor force and would not attract additional population to the vicinity of the study area. Construction activities would be localized at Pier 31½, and access to surrounding businesses would be maintained, resulting in negligible to no impact on these businesses compared to the No Action Alternative.

The Pier 31½ Alternative would improve wharf facilities and buildings and would provide additional and improved orientation and exhibit opportunities, enhancing the Alcatraz Island ferry embarkation experience. It is anticipated that these improvements would create a long-term, positive socioeconomic impact to the local economy by providing an increased sustained source of tourism. A permanent location with improved services and the ability to accommodate additional visitors and connect them to other GGNRA parklands could attract additional street vendors and local artists to the study area and could result in additional foot traffic to local businesses. Accordingly, these effects would result in increased numbers of direct and indirect jobs, and would be a beneficial impact. The number of jobs generated by the incrementally increased operations of the alternative compared to the No Action Alternative would be minor, and would not be expected to induce population growth in the area.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in minor to negligible impacts during construction, as well as long-term, minor, beneficial impacts on socioeconomics, its incremental contribution to any cumulative impacts on socioeconomic conditions would not be major.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 31½ Alternative would result in short-term, minor, beneficial and adverse impacts on socioeconomic conditions during construction. This alternative would result in long-term, minor, beneficial impacts on socioeconomics due to operation of the new site.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative includes expanding the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41 as detailed in the "Alternatives" chapter.

Impact Analysis

Alcatraz Island ferry embarkation service and operations would continue from Pier 31½ during construction of the Pier 41 Alternative, which would last approximately 12 months. Construction activities would be localized, and access to existing businesses near the Pier 41 site should not be affected during construction, other than the potential for minor detours or avoidance of construction barriers.

During construction, a small number of jobs (approximately 15 to 25 positions) would be created. It is expected that all jobs required would be able to be filled from the local labor pool, and changes in population would not be expected. A short-term, minor, beneficial socioeconomic impact would occur, compared to the No Action Alternative, from the addition of jobs and construction spending.

As the former Alcatraz Island ferry embarkation site between the early 1980s and 2006, Pier 41 is centrally located within Fisherman's Wharf, just west of popular tourist attraction Pier 39. Relocating the Alcatraz Island ferry embarkation site to Pier 41 would result in incrementally increased foot traffic in the vicinity of the site, creating long-term, minor, beneficial socioeconomic impacts on nearby Fisherman's Wharf merchants compared to the No Action Alternative. Many of these local merchants currently receive socioeconomic benefits from visitors to Alcatraz Island because the majority of the parking in the study area is provided at Fisherman's Wharf. Because few tourism-catering businesses are located along The Embarcadero in the vicinity of Pier 31½ (outside of Fisherman's Wharf), the reduced foot traffic would not be expected to result in notable effects. As such, the Pier 41 Alternative would result in long-term, negligible impacts on existing businesses in the vicinity of Pier 31½ that may experience reduced foot traffic compared to the No Action Alternative.

Development of the Pier 41 Alternative would displace the existing Blue & Gold Fleet, and potentially the WETA ferry service, which operates from Pier 41. It is possible that the combined operations of the Alcatraz ferry embarkation site and WETA service, which currently operates from Pier 41, could exceed the operational capacity of the facility, thereby creating the potential need for WETA service to be relocated. This would potentially impact employees and commuters, and could potentially cause the agency to need to invest significant resources in developing alternative facilities and routes. The displacement of the Blue & Gold Fleet, requiring that service to find and invest in a new location, as well as the potential need to relocate WETA service, would result in a long-term, major, adverse socioeconomic impact compared to the No Action Alternative.

Cumulative Impact Analysis

Because construction of the Pier 41 Alternative would result in short-term benefits on socioeconomics, the alternative's incremental contribution to any cumulative impacts on socioeconomics due to construction would not be major.

However, the need to permanently relocate the Blue & Gold Fleet, as well as the potential need to permanently relocate the WETA ferry service, could result in long-term, major, adverse socioeconomic impacts. Therefore, the incremental impacts of this action, in combination with the past, present, and reasonably foreseeable projects identified in Table 61, would potentially be major, given the potential "ripple effect" on existing ferry

services, specifically the potential socioeconomic effects of moving and displacing existing services.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 41 Alternative would result in short-term, minor, beneficial socioeconomic impacts during construction. This alternative would potentially result in long-term, minor, beneficial socioeconomic impacts on nearby Fisherman's Wharf merchants and long-term, major, adverse socioeconomic impacts, as well as potentially major cumulative impacts, due to the need to relocate existing ferry services out of Pier 41.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Similar to the Pier 31½ and Pier 41 Alternatives, the Alcatraz Island ferry embarkation service and operations would continue from Pier 31½ during construction of the Pier 3 Alternative, which would last approximately 21 months. During construction, a small number of jobs (approximately 15 to 25 positions) would be created. It is expected that all jobs required would be able to be filled from the local labor pool, and changes in population would not be expected. Construction would also displace existing users of Pier 3, which is discussed below as a long-term operational effect. A short-term, minor, beneficial socioeconomic impact would occur due to construction activities, compared to the No Action Alternative, from the addition of jobs and construction spending.

The Alcatraz Island ferry embarkation site has historically been a part of the local economy of Fisherman's Wharf and The Embarcadero since its establishment in the 1970s. According to public comments received from Fisherman's Wharf business representatives during the scoping period for this EIS, business owners are concerned about the adverse effects of relocating the Alcatraz Island ferry embarkation site to Fort Mason on tourism-catering merchants, including but not limited to restaurants, retail stores, and parking garages (NPS 2012e). Fisherman's Wharf is a major tourist attraction with a multitude of lodging, shopping, dining, tours, recreation, and other opportunities, including parking opportunities, that far exceed the Fort Mason area. The majority of visitors to Fisherman's Wharf are not attracted to the area solely for the Alcatraz Island tour. The majority of Alcatraz Island visitors would likely continue to visit Fisherman's Wharf.

Residents within the vicinity of Fort Mason, as well as current tenants of Fort Mason, expressed concern pertaining to the potential impacts of increased tourism on the adjacent residential community and on Lower Fort Mason itself. Specifically, they were concerned that existing businesses that cater to the local community may become displaced by retail stores catering to tourists, which would alter the character of the neighborhood and Lower Fort Mason. It is possible that small-scale retail uses may develop in Fort Mason to support Alcatraz Island visitors, provided these uses are approved by the Park Service and Fort Mason Center. It is unlikely that incompatible businesses would relocate to Lower Fort Mason because the events and residents at the site are controlled by the Park Service and the Fort Mason Center, which is focused on preserving and fostering arts and cultural opportunities. That said, it is likely that some small-scale businesses intended to complement the tours being offered from Fort Mason would develop, such as food and sundries. Therefore, it is unlikely that

conversion from an arts and cultural-focused center to tourism-catering businesses would occur on a large scale. However, as discussed in the "Transportation and Circulation" section of this chapter, current parking supply at Fort Mason would not meet the combined capacity needs of Fort Mason users and Alcatraz demands during certain operational scenarios. Therefore, long-term impacts on the availability of parking for other events at Fort Mason would be potentially adverse and would constitute a moderate impact if an event were occurring at the same time as ferry service. This impact is not considered major because parking is already very limited.

Approximately half of the Pier 3 shed would be used for Alcatraz Island ferry embarkation operations, allowing for a future compatible use—including the potential for special events—to occupy the remaining space. Due to the reduced size of the available space in Pier 3, commenters during public scoping stated that this space may not be sufficient to accommodate certain special events of the size that currently occur in Pier 3. Relatively large-sized (though comparably slightly smaller) special events could continue to be accommodated at Pier 2. The permanent loss of this larger space for larger special events under the Pier 3 Alternative would constitute a long-term, moderate, adverse socioeconomic impact both to users of the space and the Fort Mason Center compared to the No Action Alternative. However, it is anticipated that lost revenue to Fort Mason Center would be offset by the remaining use of the compatible use space, activities within Pier 2, and revenue from the Alcatraz ferry service itself; therefore, impacts would not be considered major.

Implementation of mitigation measure Transportation-MM-5, which involves operating transit connections between Fort Mason and Fisherman's Wharf (described further below), would incrementally reduce any potential parking- and access-related impacts. Through this mitigation measure, visitors would be encouraged to either use a shuttle or the extended F-Line to access Pier 3; however, the overall parking demand would remain above 95% of supply for at least part of the weekend peak period. Therefore, while it is anticipated that the majority of Alcatraz Island visitors would continue to begin and end their experience at Fisherman's Wharf due to the availability of parking and access to other vendors and attraction, the potential impact to parking supply for area businesses would remain a potentially long-term, moderate, adverse impact compared to the No Action Alternative.

Cumulative Impact Analysis

Because construction of the Pier 3 Alternative would result in short-term, minor, beneficial impacts on socioeconomics, the alternative's incremental contribution to any cumulative impacts on socioeconomics due to construction would not be major.

The alternative's potential impacts on parking supply could result in long-term, moderate, adverse socioeconomic impacts. Furthermore, displacement of existing uses of the Pier 3 shed, as well as shifts in business at Lower Fort Mason, could also represent a lasting moderate impact.

Therefore, the incremental impacts of this action, in combination with the past, present, and reasonably foreseeable projects identified in Table 61, would be expected to contribute to long-term, moderate, adverse cumulative impacts on socioeconomics due to the current constraints on parking availability in the Fort Mason area and changes in business use of Lower Fort Mason.

Mitigation

Transportation-MM-5. Implementation of a transit connection between Fisherman's Wharf and Lower Fort Mason would reduce the number of vehicles attempting to park in the Fort Mason area by providing an incentive to use transit, as well as taking advantage of large parking structures near Fisherman's Wharf. The transit connection could either be in the form of an extension of the F-Line, or

an independent shuttle. Both of these options are analyzed in the "Transportation and Circulation" section of this chapter. Implementation of either of these transit connection options would reduce the Project's contribution to parking demand, and parking demand would return to acceptable levels during the weekend midday period between 12:00 and 3:00 p.m. Parking supply during the 3:00 to 6:00 p.m. period would remain above acceptable levels, although it would be lower than conditions without this mitigation measure.

Additional mitigation measures, such as constructing new parking facilities, would be inconsistent with the City's Transit-First policy, as well as potentially inconsistent with the Park Service's goals regarding encouraging multimodal access to park sites, and are not considered feasible.

Conclusion

The Pier 3 Alternative would result in short-term, minor, beneficial impacts on socioeconomic conditions during construction. This alternative would potentially result in long-term, moderate, adverse socioeconomic impacts, as well as potentially moderate, cumulative impacts, due to changes in the use of the Pier 3 shed and shifts in businesses at Lower Fort Mason.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between Piers 1 and 2 that comprises the physical element of this development is inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Alcatraz Island ferry embarkation service and operations would continue from Pier 31½ during construction between piers 1 and 2 associated with Fort Mason special ferry service. During construction, a small number of jobs would be created. It is expected that all jobs required would be able to be filled from the local labor pool, and changes in population would not be expected. A short-term, minor, beneficial socioeconomic impact would occur compared to the No Action Alternative from the addition of jobs and construction spending.

It is unlikely that tourism-oriented businesses would relocate within Fort Mason Center as a result of this Project element because service would be sporadic and would serve various user groups. There would be no change in use to the Pier 3 shed as a result of this special ferry service, which would only occupy the space between piers 1 and 2, and would not affect the Pier 3 shed independently. Additionally, as discussed in the "Transportation and Circulation" section of this chapter, due to the intermittent nature of the special ferry service, impacts of parking availability for other events at Fort Mason would be expected to be minor to negligible compared to the No Action Alternative. As such, the incremental impacts of this Project element with respect to socioeconomics would be long-term, minor to negligible, and adverse.

Cumulative Impact Analysis. Because Fort Mason special ferry service would result in minor to negligible impacts, its incremental contribution to any cumulative impacts on socioeconomic conditions would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Fort Mason special ferry service would result in short-term, minor, beneficial impacts and long-term, minor to negligible, adverse impacts on socioeconomics.

Fort Baker Special Ferry Service

This Project element would include retrofit of the pier substructure and construction of a

pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. The Alcatraz Island ferry embarkation service and operations would continue from Pier 31½ during construction associated with Fort Baker special ferry service. During construction, a small number of jobs (approximately 15 to 25 positions) would be created. It is expected that all jobs required would be able to be filled from the local labor pool, and changes in population would not be expected. A short-term, minor, beneficial socioeconomic impact would occur compared to the No Action Alternative from the addition of jobs and construction spending.

Commercial activity within the vicinity of Fort Baker is limited to the Cavallo Point Lodge, the Presidio Yacht Club harbor, and the Bay Area Discovery Museum. The City of Sausalito represents the closest commercial business location, located 1.4 miles north of Fort Baker. It is anticipated that, due to the infrequency of trips to Fort Baker and a lack of commercial business, socioeconomic impacts would be long-term, negligible, and beneficial compared to the No Action Alternative.

Cumulative Impact Analysis. Because Fort Baker special ferry service would result in negligible, beneficial impacts, its incremental contribution to any cumulative impacts on socioeconomic conditions would not be major.

Mitigation. No mitigation is proposed.

Conclusion. Fort Baker special ferry service would result in short- and long-term minor to negligible, beneficial impacts on socioeconomics.

PUBLIC SERVICES AND UTILITIES

METHODOLOGY AND THRESHOLDS

Impacts on, or associated with, public services and utilities were qualitatively evaluated based on the potential for the alternatives to temporarily or permanently alter public services and utilities within the study area.

The measurement index for evaluating impacts associated with public services and utilities is any change in the ability of public service providers and utilities to adequately serve individuals. An alternative would be considered to have a major impact if it would result in substantial changes in public services and utilities throughout the study area.

The analysis considered the potential for an alternative to do the following:

- Result in long-term operational conditions that exceed the overall capacity of existing public services and utilities, and/or require expansion of existing facilities
- Result in temporary public services or utility interruptions during construction

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

While visitor levels to the embarkation site could increase incrementally compared to existing conditions, existing public services or utilities would continue to meet such needs under the No Action Alternative. Fire protection and police services would continue to be provided as they currently are, and utilities would continue to meet demand generated by visitors and employees within the study area. Therefore, there would be no impacts on public services and utilities as a result of the No Action Alternative.

Cumulative Impact Analysis

Because the No Action Alternative would be unchanged from present conditions with respect to the need for new public services and utilities, there would be no major cumulative impacts related to these services as a result of this alternative.

Mitigation

No mitigation is proposed.

Conclusion

Under the No Action Alternative, no impacts on public services and utilities would occur.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and the establishment of long-term ferry service and embarkation site operations at Pier 31½, as detailed in the “Alternatives” chapter.

Impact Analysis

Design of the Pier 31½ Alternative would proceed in adherence with all applicable regional, state, and local regulations related to utility systems, public services, and waste management.

Construction of improvements at Pier 31½ would occur for a period of approximately 5 months. During this period, the presence of construction workers at the construction site would result in a marginal and temporary increase in demand for emergency medical services, which would be met by existing paramedic and ambulance services from SFFD. BMPs would be followed during construction to minimize possible risks to the public during construction, including but not limited to construction fencing and signage. Access to the site by public safety providers would not be significantly constrained during or following construction, and emergency response times would not be affected. Therefore, the impacts on public services from construction of the Pier 31½ Alternative would be short-term, negligible, and adverse compared to the No Action Alternative.

Construction of proposed improvements at Pier 31½ may require removal, relocation, upgrade, or installation of utility lines, such as water, wastewater, gas, and electricity. These activities may result in the temporary disruption of service to residents and businesses in the vicinity of the site. While construction is anticipated to occur for a period of 5 months, site utility work would occur over a much shorter period of time. This would be considered a short-term, minor, adverse impact compared to the No Action Alternative. Implementation of mitigation measure Utilities-MM-1 would reduce the impact to negligible compared to the No Action Alternative.

Following construction, this site would be served by existing utility systems, including the SFPUC water delivery system, the SFPUC combined sewer system, a separate municipal storm sewer system, and PG&E-provided electricity and gas. Operation of ferry service from this site would not increase overall demand for these utilities beyond capacity, and long-term utility impacts would not occur. Pier 31½ would continue to be served by the SFFD, SFPD, Port Police, and USCG. While there would be a slight increase in the number of visitors accessing the site compared to the No Action Alternative, ferry service operations under this alternative would not notably increase overall demand for utility services compared to the No Action Alternative. Therefore, the operational impacts on emergency, fire, or police service from the Pier 31½ Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

This alternative would not create new sources of solid waste or significantly increase solid waste generation compared to the No Action Alternative. Therefore, the impacts on solid waste disposal from the Pier 31½ Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in negligible impacts on public services and utilities, its incremental contribution to cumulative impacts on public services and utilities would not be major, and would be considered unchanged from the No Action Alternative.

Mitigation

Utilities-MM-1. A detailed study identifying locations of utilities within the study area would be conducted during the design phase of the Project. For areas with the potential for adverse impacts on utility services, the Park Service or its contractors would implement the following mitigation measures:

- Utility excavation or encroachment permits would be obtained from the appropriate agencies. The permits would include measures to minimize utility disruption, which would be included in construction contract specifications.
- Utility locations would be verified through field surveys.
- Detailed specifications would be prepared as part of the design plans to include procedures for excavation, support, and fill of areas around utility

cables and pipelines. Affected utility services would be notified of construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services.
- Residents and businesses in the vicinity of the site would be notified of planned utility service disruption in advance, in conformance with City/County and state standards.
- Disconnected cables and lines would be reconnected promptly.

Conclusion

After implementation of mitigation measure Utilities-MM-1, the Pier 31½ Alternative would result in short-term, negligible impacts from temporary disruption of utility service during construction. This alternative would also result in short-term, negligible impacts on public services during construction, and long-term, negligible impacts on public services and utilities from operations.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expansion of the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Design of the Pier 41 Alternative would proceed in adherence with all applicable regional, state, and local regulations related to utility systems, public services, and waste management.

Construction of these improvements at Pier 41 would occur for a period of approximately 12 months. During this period, the presence of construction workers at the site would result in a marginal and temporary increase in demand for emergency medical services, which would be met by existing paramedic and ambulance services from SFFD. BMPs would be followed during construction to minimize possible risks to the public, including but not limited to construction fencing and signage. Access to the site by public safety providers would not be significantly constrained during or following construction, and emergency response times would not be affected. Therefore, the impacts on public services from construction of the Pier 41 Alternative would be short-term, negligible, and adverse compared to the No Action Alternative.

Construction of proposed improvements at Pier 41 may require removal, relocation, or installation of utility lines, such as water, wastewater, gas, and electricity. These activities may result in the temporary disruption of service to residents and businesses in the vicinity of the site. While construction is anticipated to occur for a period of 21 months, site utility work would occur over a much shorter period of time. This would be considered a short-term, minor, adverse impact compared to the No Action Alternative. Implementation of mitigation measure Utilities-MM-1 would reduce the impact to negligible compared to the No Action Alternative.

Pier 41 would be served by existing utility systems, including the SFPUC water delivery system, the SFPUC combined sewer system, a separate municipal storm sewer system, and PG&E-provided electricity and gas. While there would be a slight increase in the number of visitors accessing the site compared to the No Action Alternative, operation of ferry service from the Pier 41 Alternative site would not increase overall demand for these utilities beyond capacity, and long-term utility impacts would not occur. This site would continue to be served by the SFFD, SFPD, Port Police, and USCG. While there would be a slight increase in the number of visitors accessing the site, the Pier 41 Alternative would not notably increase long-term demand for these services compared to the No Action Alternative.

Service would be provided from existing fire and police stations in the area, as described in the "Public Services and Utilities" section of the "Affected Environment" chapter. Therefore, the operational impacts on emergency, fire, or police service from the Pier 41 Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

This alternative would not create new sources of solid waste or significantly increase solid waste generation compared to the No Action Alternative. Therefore, the impacts on solid waste disposal from the Pier 41 Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

Minor redirection of water-based services from the USCG and SFPD Marine Unit would occur as a result of ferry route changes associated with the Pier 41 Alternative. Demand for these services would not increase compared to the No Action Alternative, and expansion of service or construction of new facilities would not be required. This would represent a long-term, negligible impact compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in negligible impacts on public services and utilities, its incremental contribution to cumulative impacts on public services and utilities would not be major, and would be considered unchanged from the No Action Alternative.

Mitigation

Utilities-MM-1. A detailed study identifying locations of utilities within the study area would be conducted during the design phase of the Project. For areas with the potential for adverse impacts on utility services, the Park Service or its contractors would implement the following mitigation measures:

- Utility excavation or encroachment permits would be obtained from the appropriate agencies. The permits would include measures to minimize utility disruption, which would be included in construction contract specifications.
- Utility locations would be verified through a field surveys.
- Detailed specifications would be prepared as part of the design plans to include procedures for excavation, support, and fill of areas around utility cables and pipelines. All affected utility services would be notified of construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services.
- Residents and businesses in the vicinity of the site would be notified of planned utility service disruption in advance, in conformance with City and state standards.
- Disconnected cables and lines would be reconnected promptly.

Conclusion

After implementation of mitigation measure Utilities-MM-1, the Pier 41 Alternative would result in short-term, negligible impacts from temporary disruption of utility service during construction. This alternative would also result in short-term, negligible impacts on public services during construction, and long-term, negligible impacts on public services and utilities from operations.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Design of the Pier 3 Alternative would proceed in adherence with all applicable regional, state, and local regulations related to utility systems, public services, and waste management.

Construction would occur for a period of approximately 21 months. During this period, the presence of construction workers at the site would result in a marginal increase in demand for emergency medical services, which would be met by existing paramedic and ambulance services from SFFD. BMPs would be followed during construction to minimize possible risks to the public, including but not limited to construction fencing and signage. Access to the site by public safety providers would not be significantly constrained during or following construction, and emergency response times would not be affected. Therefore, the impacts on public services from construction of the Pier 3 Alternative would be short-term, negligible, and adverse compared to the No Action Alternative.

Construction of proposed improvements may require removal, relocation, or installation of utility lines, such as water, wastewater, gas, and electricity. These activities may result in the temporary disruption of service to residents and businesses in the vicinity of the site. While construction is anticipated to occur for a period of 5 months, site utility work would occur over a much shorter period of time. This would be considered a short-term, minor, adverse impact compared to the No Action Alternative. Implementation of mitigation measure Utilities-MM-1 would reduce the impact to negligible compared to the No Action Alternative.

Under this alternative, the embarkation site at Pier 3 would be served by existing utility systems, including the SFPUC water delivery system, SFPUC combined sewer system, and PG&E-provided electricity and gas. The site would continue to be served by the SFFD, SFPD, and USCG. Implementation of the Pier 3 Alternative would not result in long-term operational conditions that exceed the overall capacity of these services. Service would be provided from existing fire and police stations in the area, as described in the "Public Services and Utilities" section of the "Affected Environment" chapter. In addition, USPP officers would be available to assist with law enforcement at Pier 3 as needed. Therefore, the operational impacts on emergency, fire, or police service from the Pier 3 Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

This alternative would not create new sources of solid waste or significantly increase solid waste generation compared to the No Action Alternative. Therefore, the impacts on solid waste disposal from the Pier 3 Alternative would be long-term, negligible, and adverse compared to the No Action Alternative.

Minor redirection of water-based services from the USCG and SFPD Marine Unit would occur as a result of ferry route changes associated with the Pier 3 Alternative. Demand for these services would not increase compared to the No Action Alternative, and expansion of service or construction of new facilities would not be required. This would represent a long-term, negligible, and adverse change compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 3 Alternative would result in negligible impacts on public services and utilities, its incremental contribution to cumulative impacts on public services and utilities would not be major, and would be considered unchanged from the No Action Alternative.

Mitigation

Utilities-MM-1. A detailed study identifying locations of utilities within the study area would be conducted during the design phase of the Project. For areas with the potential for

adverse impacts on utility services, the Park Service or its contractors would implement the following mitigation measures:

- Utility excavation or encroachment permits would be obtained from the appropriate agencies. The permits would include measures to minimize utility disruption, which would be included in construction contract specifications.
- Utility locations would be verified through field surveys.
- Detailed specifications would be prepared as part of the design plans to include procedures for excavation, support, and fill of areas around utility cables and pipelines. All affected utility services would be notified of construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services.
- Residents and businesses in the vicinity of the site would be notified of planned utility service disruption in advance, in conformance with City/County and state standards.
- Disconnected cables and lines would be reconnected promptly.

Conclusion. After implementation of mitigation measure Utilities-MM-1, the Pier 3 Alternative would result in short-term, negligible impacts from temporary disruption of utility service during construction. This alternative would also result in short-term, negligible impacts on public services during construction, and long-term, negligible impacts on public services and utilities from operations.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between piers 1 and 2 that comprises the physical element of this development is inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to public services and utilities that would occur as a result of the Pier 31½ and Pier 41 alternatives would be consistent with those of the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element includes retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. Design of the Fort Baker pier improvements would proceed in adherence with all applicable regional, state, and local regulations related to utility systems, public services, and waste management.

Construction of these improvements would occur for a period of 12.5 months. During this period, the presence of construction workers at the site would result in a marginal and temporary increase in the demand for emergency medical services, which would be met by existing paramedic and ambulance services in the area, including the SMFPD. BMPs would be followed during construction to minimize possible risks to the public during construction, including but not limited to construction fencing and signage. Access to the site by public safety providers would not be constrained during or following construction, and emergency response times would not be affected. Therefore, the impacts on public services from construction

associated with Fort Baker special ferry service would be short-term, negligible, and adverse compared to the No Action Alternative.

Construction of proposed improvements may require removal, relocation, or installation of utility lines, such as water, wastewater, gas, and electricity, which could result in short-term, minor, adverse disruptions to local residents or businesses. Implementation of mitigation measure Utilities-MM-1 would reduce associated impacts to negligible compared to the No Action Alternative.

Fort Baker would continue to be served by existing utility systems, including the Marin Municipal Water District water delivery system, the trunkline stormwater conveyance and outfall system, the gravity sewer system and SMCSD facilities, and PG&E-provided electricity and gas. Providing special ferry service to Fort Baker would result in a negligible increase in electricity use and demands on the water and sewer systems. These systems have been designed to accommodate existing uses at Fort Baker. Any increase in user demand associated with NPS ferry service to Fort Baker is expected to be served by these existing systems. Therefore, the impacts on utilities from operations associated with Fort Baker special ferry service would be long-term, negligible, and adverse compared to the No Action Alternative.

Improvements and operations would result in negligible increases in solid waste generation not exceeding the existing capacity of current collection and disposal services. Therefore, the impacts on solid waste disposal from Fort Baker special ferry service would be long-term, negligible, and adverse compared to the No Action Alternative.

Fort Baker would continue to be served by the SMFPD, USPP, NPS Rangers, MCSD, and USCG. Providing special ferry service to Fort Baker is expected to result in a negligible increase in demand for these services. As with utilities, any increased demand for public services associated with this Project component is expected to be minimal and served by existing services. Therefore, the impacts on public services from operations associated with Fort Baker special ferry service would be long-term, negligible, and adverse compared to the No Action Alternative.

Cumulative Impact Analysis. Because Fort Baker special ferry service would result in negligible impacts on public services and utilities, its incremental contribution to cumulative impacts on public services and utilities would not be major, and would be considered unchanged from the No Action Alternative.

Mitigation.

Utilities-MM-1—A detailed study identifying locations of utilities within the study area would be conducted during the design phase of the Project. For areas with the potential for adverse impacts on utility services, the Park Service or its contractors would implement the following mitigation measures:

- Utility excavation or encroachment permits would be obtained from the appropriate agencies. The permits would include measures to minimize utility disruption, which would be included in construction contract specifications.
- Utility locations would be verified through field surveys.
- Detailed specifications would be prepared as part of the design plans to include procedures for excavation, support, and fill of areas around utility cables and pipelines. All affected utility services would be notified of construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services.
- Residents and businesses in the vicinity of the site would be notified of planned utility service disruption in advance, in conformance with City and state standards.

- Disconnected cables and lines would be reconnected promptly.

Conclusion. After implementation of mitigation measure Utilities-MM-1, Fort Baker special ferry service would result in short-term, negligible impacts from temporary disruption of utility service during construction. This Project element would also result in short-term, negligible impacts on public services during construction, and long-term, negligible impacts on public services and utilities from operations.

HAZARDOUS MATERIALS

METHODOLOGY AND THRESHOLDS

Impacts on or associated with public health and safety were qualitatively evaluated based on the potential for the alternatives to temporarily or permanently result in health or safety effects related to hazardous materials. Because construction of the alternatives under evaluation may require demolition or alteration of existing structures, as well as grading and possible soil excavation, these analyses address the potential to encounter hazardous materials in building materials and within soils. In addition, the potential hazards to the public and the environment were assessed based on long-term operations of the alternatives.

The proposed measurement index used to evaluate impacts is the potential for hazardous materials to affect public health and safety. An alternative would be considered to have a major impact if it would result in substantial changes in risks to public health and safety throughout the study area.

The analysis considered the potential for an alternative to do the following:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Be located on or near a hazardous materials site as listed by federal or state regulatory agencies

Potential seismic hazards to public safety are addressed in the "Geology, Soils, and Seismicity" section of this chapter. Potential hazards to waterbodies from runoff during construction and operation are discussed in the "Water Quality and Hydrology" section of this chapter. Potential water quality hazards to the safety of swimmers are addressed in the "Water Quality and Hydrology" section of this chapter.

IMPACTS OF NO ACTION ALTERNATIVE

The No Action Alternative assumes that ferry service to Alcatraz Island would continue to be provided from Pier 31½. No construction or modifications to the existing Pier 31½ site would occur under the No Action Alternative.

Impact Analysis

Because no construction is proposed, the No Action Alternative would not result in impacts related to disturbance or exposure to hazardous materials on site during construction.

While there could be minor increases in ferry operations compared to existing conditions, ongoing embarkation site and ferry operations under the No Action Alternative would occur in adherence with several plans and policies designed to address potential impacts associated with hazardous material storage, transport, and use. This includes implementation of an SWPPP (Alcatraz Cruises 2012), an SPCC (Incident and Risk Management Services 2012), a Hazardous and Universal Waste Management Program (Alcatraz Cruises 2011a), and a Hazards Communications Plan (Alcatraz Cruises 2011b). These plans are discussed in detail in the "Water Quality and Hydrology" section of this chapter. The public and persons are unlikely to come in direct contact with waters at Pier 31½. As a result of adherence to these established plans and procedures, the No Action Alternative would have no hazardous materials or public health and safety impacts.

Mitigation

No mitigation is proposed.

Cumulative Impact Analysis

Because the No Action Alternative would be consistent with present conditions with respect to public health and safety hazards, there would be no cumulative impacts related to these issues as a result of this alternative.

Conclusion

The No Action Alternative would result no impact with respect to disturbance or exposure to hazardous materials within soils and structures on site during construction; no impacts with respect to operational use of hazardous materials; and no impacts with respect to siting on or near a hazardous materials site.

IMPACTS OF PIER 31½ ALTERNATIVE

The Pier 31½ Alternative would include retrofit of existing structures and establishing long-term ferry service and embarkation site operations at Pier 31½, as detailed in the "Alternatives" chapter.

Impact Analysis

Construction activities under the Pier 31½ Alternative would entail improvements to structures, which, due to their age, may contain hazardous materials, including asbestos, lead-based paint, and PCBs. The Pier 31½ Alternative would not likely entail significant grading or soil disturbance. However, artificial fill underlying Pier 31½ may contain PAHs, heavy metals, oil and grease, and VOCs. Wood underneath the pier may be treated with hazardous compounds. Industrial compounds and fuels may be used during construction.

Due to the age of the pier and the construction requirements, it is expected that some removal and management of hazardous materials may be required. Construction would proceed in adherence with all applicable federal, state, and local regulations addressing these potential hazards, and appropriate tests and studies would be conducted to identify hazardous materials during construction. Therefore, any exposure and handling would be temporary and minor, and would result in short-term, negligible impacts compared to the No Action Alternative. Moreover, improvements to existing facilities may potentially remove or otherwise address hazardous materials contained in building materials on-site, offering a long-term benefit to public health and safety.

Ongoing ferry operations would occur in adherence with site-specific SWPPP, SPCC, or other hazardous material management plans developed for the site, as applicable. Therefore, there would be no impact to public health and safety due to ongoing operations.

Pier 31½ is not listed in the Geotracker or Envirostor database of hazardous material sites. The Pier 31½ Alternative would not affect ongoing investigations and cleanups of any listed hazardous materials sites, and would therefore have no impact associated with siting on or near a hazardous materials site compared to the No Action Alternative.

Mitigation

No mitigation is proposed.

Cumulative Impact Analysis

Because the Pier 31½ Alternative would result in negligible to no impacts on public health and safety, the alternative's incremental contribution to any cumulative impacts on public health and safety would not be major, and would be considered unchanged from the No Action Alternative.

Conclusion

The Pier 31½ Alternative would result in short-term, negligible impacts with respect to operational use of hazardous materials, and no impacts due to exposure to hazardous materials during construction compared to the No Action Alternative. Implementation of this alternative may create a long-term benefit to public health and safety from removing any hazardous materials encountered during construction.

IMPACTS OF PIER 41 ALTERNATIVE

The Pier 41 Alternative would include expanding the existing building structure and updating the entire building to be compliant with seismic safety codes, as well as the establishment of long-term ferry service and embarkation site operations at Pier 41, as detailed in the "Alternatives" chapter.

Impact Analysis

Construction activities under the Pier 41 Alternative would entail improvements to structures which, due to their age, may contain hazardous materials such as lead-based paint and PCBs. The Pier 41 building was constructed during the 1980s, and is therefore unlikely to contain asbestos. The Pier 41 Alternative would not entail significant grading or soil disturbance. However, similar to the other alternative sites along the San Francisco waterfront, artificial fill underlying the Pier 41 site may contain PAHs, heavy metals, oil and grease, and VOCs. Wood underneath the pier may be treated with hazardous compounds. Industrial compounds and fuels may be used during construction.

Similar to the Pier 31½ Alternative, it is expected that some removal and management of hazardous materials may be required during construction of site improvements. Construction would proceed in adherence with all applicable federal, state, and local regulations addressing these potential hazards, and appropriate tests and studies would be conducted to identify hazardous materials during construction. Therefore, any exposure and handling would be temporary and minor, and would result in short-term, negligible impacts compared to the No Action Alternative. Moreover, improvements to existing facilities may potentially remove or otherwise address hazardous materials contained in building materials on site, offering a long-term benefit to public health and safety.

Ongoing ferry operations would occur in adherence with site-specific SWPPP, SPCC, or other hazardous material management plans as applicable. The public and persons are unlikely to come in direct contact with waters at Pier 41. Therefore, there would be no impact to public health and safety due to ongoing operations.

Pier 41 is not listed in the Geotracker or Envirostor database of hazardous material sites. The Pier 41 Alternative would not affect ongoing investigations and cleanups of any listed hazardous materials sites. The Pier 41 Alternative would therefore have no impact associated with siting on or near a hazardous materials site compared to the No Action Alternative.

Mitigation

No mitigation is proposed.

Cumulative Impact Analysis

Because the Pier 41 Alternative would result in negligible to no impacts on public health and safety, the alternative's incremental contribution to any cumulative impacts on public health and safety would not be major, and would be considered unchanged from the No Action Alternative.

Conclusion

The Pier 41 Alternative would result in short-term, negligible impacts with respect to

operational use of hazardous materials, and no impacts due to exposure to hazardous materials during construction compared to the No Action Alternative. Implementation of this alternative may create a long-term benefit to public health and safety from removing any hazardous materials encountered during construction.

IMPACTS OF PIER 3 ALTERNATIVE

The Pier 3 Alternative would include improvements to the pier, shed building, and associated structures, as well as the establishment of long-term ferry service and embarkation site operations at Pier 3, as detailed in the "Alternatives" chapter.

Impact Analysis

Construction activities under the Pier 3 Alternative would entail improvements to structures which, due to their age, may contain hazardous materials, including asbestos, lead-based paint, and PCBs. The Pier 3 Alternative would not entail significant grading or soil disturbance. However, similar to the other alternative sites along the San Francisco waterfront, artificial fill underlying Pier 3 may contain PAHs, heavy metals, oil and grease, and VOCs. Wood underneath the pier may be treated with hazardous compounds. Industrial compounds and fuels may be used during construction.

Similar to the other alternatives, it is expected that some removal and management of hazardous materials may be required. Construction would proceed in adherence with all applicable federal, state, and local regulations addressing these potential hazards, and appropriate tests and studies would be conducted to identify hazardous materials during construction. Therefore, any exposure and handling would be temporary and minor, and would result in short-term, negligible impacts compared to the No Action Alternative. Moreover, improvements to existing facilities may potentially remove or otherwise address hazardous materials contained in building materials on-site, offering a long-term benefit to public health and safety.

Ongoing ferry operations would occur in adherence with site-specific SWPPP, SPCC, or other hazardous material management plans developed for the site, as applicable. Fort Mason is listed on the San Francisco RWQCB-maintained Geotracker and Envirostor databases as a Military Cleanup Site and active state response site (DTSC 2007, 2013). The site is part of the Defense Environmental Restoration Program, and a Site Investigation Work Plan has been prepared to identify hazardous materials on site and guide remediation activities, as necessary. The Pier 3 Alternative would not affect ongoing investigations and cleanups at Fort Mason, and construction activities would not entail significant soil disturbance. The Pier 3 Alternative would therefore have no impact associated with siting on or near a hazardous materials site compared to the No Action Alternative.

Cumulative Impact Analysis

Because the Pier 3 Alternative would result in negligible to no impacts on public health and safety, the alternative's incremental contribution to any cumulative impacts on public health and safety would not be major, and would be considered unchanged from the No Action Alternative.

Mitigation

No mitigation is proposed.

Conclusion

The Pier 3 Alternative would result in short-term, negligible impacts with respect to operational use of hazardous materials; and no impacts due to exposure to hazardous materials during construction; compared to the No Action Alternative. Implementation of this alternative may create a long-term benefit

to public health and safety from removing any hazardous materials encountered during construction.

IMPACTS OF ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

Fort Mason Special Ferry Service

Under all alternatives, special ferry service to Fort Mason would be implemented as described in the "Alternatives" chapter. Specific to the Pier 3 Alternative, the gangway and float between piers 1 and 2 that comprises the physical element of this development is inherently accounted for in the alternative's impact analysis.

Impact Analysis. The Fort Mason special ferry service would be located in the same area as portions of the Pier 3 Alternative. The incremental impacts of this Project element with respect to hazardous materials, public health, and safety that would occur as a result of the Pier 31½ and Pier 41 alternatives would be consistent with those of the Pier 3 Alternative. As such, the impact analysis and cumulative impact analysis determinations, as well as the conclusions, would be the same as those of the Pier 3 Alternative.

Fort Baker Special Ferry Service

This Project element would include retrofit of the pier substructure and construction of a pedestrian path, as well as the establishment of a special ferry service at Fort Baker, as detailed in the "Alternatives" chapter.

Impact Analysis. The existing concrete pier was constructed in the late 1930s and likely contains creosote-treated wood. Other hazardous materials including asbestos, lead-based paint, or PCBs may be present in structures or other improvements on-site, including treated woods. Fort Baker is also listed in the FUDS database as both a Hazardous, Toxic, and Radioactive Waste site and a Military Munitions Response Program site (USACE 2011b), although the immediate Project area is not among the eight Fort Baker sites with identified elevated soil concentrations of PAHs, pesticides, metals, and petroleum hydrocarbons.

Similar to the other alternatives, it is expected that some removal and management of hazardous materials may be required. Construction would proceed in adherence with all applicable federal, state, and local regulations addressing these potential hazards, and appropriate tests and studies would be conducted to identify hazardous materials during construction. Therefore, any exposure and handling would be temporary and minor, and would result in short-term, negligible impacts compared to the No Action Alternative. Moreover, improvements to existing facilities may potentially remove or otherwise address hazardous materials contained in building materials on site, offering a long-term benefit to public health and safety.

Implementing ferry service to Fort Baker would expand existing operations and would require use of potentially hazardous materials associated with ferry operation and maintenance. Operations would occur in adherence with site-specific SWPPP, SPCC, or other hazardous material management plans as applicable. Given these preventative measures, and the limited expansion of service associated with special event ferry service to Fort Baker, there would be no operational public health and safety impacts.

Mitigation. No mitigation is proposed.

Cumulative Impact Analysis. Because Fort Baker special ferry service w would result in negligible to no impacts on public health and safety, the alternative's incremental contribution to any cumulative impacts on public health and safety would not be major, and would be considered unchanged from the No Action Alternative.

Conclusion. Fort Baker special ferry service would result in short-term, negligible impacts with respect to operational use of hazardous materials, and no impacts due to exposure to

hazardous materials during construction compared to the No Action Alternative. Implementation of this alternative may create a long-term benefit to public health and safety from removing any hazardous materials encountered during construction.

SUMMARY OF MITIGATION MEASURES

Table 73 presents a summary of all the proposed mitigation measures described in this chapter.

TABLE 73. SUMMARY OF MITIGATION MEASURES

Mitigation Measure	Description
Transportation-MM-1	The SFMTA routinely monitors and adjusts its transit service to respond to changing demands and travel patterns over time. While it may be likely that SFMTA would adjust transit service in response to this alternative such that impacts to transit capacity utilization would be reduced, the Park Service cannot guarantee that this would occur. Thus, the Park Service should consider operating a supplemental shuttle service connecting key park destinations with major hotel and regional transit connections. However, the details of such a system, including its effectiveness and costs, would require further coordination, planning, and outreach, and therefore, it cannot be guaranteed at this time.
Transportation-MM-2	The Park Service should work with the City to identify and fund pedestrian capacity and safety improvements for the intersections of Taylor and Jefferson streets and Powell and Jefferson streets to improve pedestrian conditions in the area. Because these improvements would need to be constructed in cooperation with the City, DPW, and SFMTA, their implementation cannot be guaranteed.
Transportation-MM-3	The final design for the Pier 41 Alternative would include dedicated queuing areas for arriving visitors and clear wayfinding signage so that visitors do not linger in the middle of the promenade, blocking access and circulation for other pedestrians. While these measures would decrease the conflicts with other pedestrians, it is uncertain whether they would be fully effective in improving LOS to acceptable levels.
Transportation-MM-4	Improvements to the bicycle and pedestrian facilities at the intersection of Laguna and Beach streets should be incorporated as part of the final design for the Pier 3 Alternative to increase space for cyclists and pedestrians at this congested location. However, these improvements would likely need to be constructed in cooperation with the City, DPW, and SFMTA, and thus, their implementation cannot be guaranteed.
Transportation-MM-5	Implementation of a transit connection between Fisherman's Wharf and Lower Fort Mason would reduce the number of vehicles attempting to park in the Fort Mason area by providing an incentive to use transit, as well as taking advantage of large parking structures near Fisherman's Wharf.

Mitigation Measure	Description
Transportation-MM-6	The Park Service should work with the City to analyze the potential for a new traffic signal at the intersection of Divisadero Street and Marina Boulevard and, if appropriate, fund the creation of the signal. Installation of a traffic signal at this intersection would improve the intersection LOS to LOS B during the weekend midday peak hour. However, this recommendation is based on a general correlation between the amount of new traffic generated by the Project and the need for new traffic signals. The ultimate decision as to whether a new traffic signal is an appropriate treatment at this location would be made by the City Traffic Engineer, based on a full examination of traffic signal warrants and other factors that they may deem appropriate.
Air-MM-1	The idling time of diesel powered construction equipment would be minimized to 2 minutes.
Air-MM-2	The Project shall develop a plan demonstrating that the offroad equipment (greater than 50 hp) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a projectwide fleet-average 20% NOx reduction and 45% PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and other options as they become available.
Air-MM-3	The Project shall use tugboats with Tier 3 propulsion engines in 2016, Tier 4 propulsion engines in 2017, and Tier 3 auxiliary engines in 2016 and 2017.
Noise-MM-1	The Park Service would ensure that the contractor does the following: • Avoids simultaneous use of equipment that exceeds 90 dBA, particularly impact and vibratory pile drivers • Avoids simultaneous use of nonimpact equipment that exceeds 70 dBA, particularly pavers and trucks • Installs noise mufflers to stationary equipment and impact tools that are no less effective than those provided by the manufacturer • Installs barriers around particularly loud activities at the construction site to eliminate the line of sight between the source of noise and nearby sensitive receptors • Uses construction equipment with low noise emission ratings • Locates equipment, materials, and staging areas as far as practicable from sensitive receptors • Prohibits unnecessary idling of vehicles or equipment • Requires applicable construction-related vehicles or equipment to use designated truck routes to access the Project site • Restricts construction activities between 7:00 a.m. to 8:00 p.m. Monday through Saturday
Vibration-MM-1	The Park Service would conduct vibration monitoring when construction activities occur within 50 feet of the historic Pier 33 bulkhead.
Aquatic-MM-1	The Park Service would obtain and comply with all required resource agency permit conditions, including any required work windows.

Mitigation Measure	Description
Aquatic-MM-2	The Park Service would ensure that the contractor does the following: • Maintains a 500-meter safety zone around sound sources in the event that the sound level is unknown or cannot be adequately predicted. • Halts work activities when a marine mammal enters the 500-meter safety zone. • Brings loud mechanical equipment online slowly.
Visual-MM-1	All new and upgraded lighting on the Pier 31½ site would employ shields over lamps or be located under building/structure overhangs to minimize light pollution of the dark sky.
Visual-MM-2	New and upgraded float lighting within the site would employ motion activation sensors after operation hours, to minimize the amount of time lamps would be illuminated.
Visual-MM-3	Upgraded public access to water viewpoints on-site would be provided through the design.
Visual-MM-4	Trees removed for the Pier 41 expansion would be replaced within the alternative boundary. The replacement location would not result in a loss of views to the Bay.
Cultural-MM-1	Any modifications to the national register-eligible structures would be required to meet the Secretary of Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995).
Cultural-MM-2	A Postreview Discovery Plan would be developed and maintained on-site during construction, in case archeological materials are discovered during construction.
Cultural-MM-3	Any modifications to Fort Mason would be required to meet the preservation brief *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes* (Birnbaum 1994) and the applicable NPS cultural landscapes report.
Cultural-MM-4	Features of CA-MRN-648 would be located, marked, and avoided during construction.
Utilities-MM-1	A detailed study identifying locations of utilities within the study area would be conducted during the design phase of the Project. For areas with the potential for adverse impacts on utility services, the Park Service or its contractors would implement the following mitigation measures: • Utility excavation or encroachment permits would be obtained from the appropriate agencies. The permits would include measures to minimize utility disruption, which would be included in construction contract specifications. • Utility locations would be verified through field surveys. • Detailed specifications would be prepared as part of the design plans to include procedures for excavation, support, and fill of areas around utility cables and pipelines. All affected utility services would be notified of construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services. • Residents and businesses in the vicinity of the site would be notified of planned utility service disruption in advance, in conformance with City/County and state standards. • Disconnected cables and lines would be reconnected promptly.

Sustainable and Long-term Management

SUSTAINABLE AND LONG-TERM MANAGEMENT

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Construction of the Pier 31½, Pier 41, or Pier 3 alternatives, and implementing special ferry service at Fort Baker and Fort Mason would result in short-term uses of the environment that are needed to achieve Project objectives and accomplish long-term objectives. Construction activities would be of short duration, potentially resulting in temporary effects such as disruption of transportation and circulation, fugitive dusts and increased emissions; increased noise, disturbance of cultural resources, loss of recreational opportunities, disruption of utilities or public services, and worker exposure to hazardous materials. Long-term benefits of the Project include improving the quality of the Alcatraz Island visitor experience and providing visitors the opportunity to visit other GGNRA parklands and other sites within the Bay. These long-term benefits would outweigh the short-term impacts resulting from construction.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable commitments of resources are commitments where the resource would be permanently lost or consumed. Irreversible commitments would result from Project construction that would consume fossil fuels, labor, and construction materials such as concrete, steel, wood, and other materials. Some historic resources may be affected; impacts to these resources would be mitigated through various cultural resource mitigation measures, but the impact would be irreversible. Loss of terrestrial and aquatic biological resources which may occur which would be irreversible, although these communities are expected to fully recover. The use of waterfront areas for dock, piers, bulkheads, and other structures would constitute an irretrievable commitment of resources during the period the site is used for embarkation site infrastructure. However, these resources could be converted to another use at a future date.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

The Project could result in unavoidable adverse impacts to air quality, transportation and circulation, seismic safety hazards, and socioeconomic resources that could not be mitigated through alteration of an alternative's design. The Park Service avoids impacts that it determines to be unacceptable (NPS 2006). Based on the analysis in this EIS, the Project would not result in any "unacceptable impacts."

GROWTH-INDUCING IMPACTS

While the Project would accommodate growth in visitor levels to Alcatraz Island, the Project itself is not growth-inducing. Future capacity is based on the forecasted 20% growth in visitors to the site through 2036 (ORCA 2011a). This projected growth is based on general increases in City tourism levels and population growth, as well as on-island improvements such as the Park Service either opening additional locations on Alcatraz Island for visitor use or implementing visitor management strategies that would allow for increased visitation. The growth is not induced by this Project; it is however intended for the Project to accommodate the projected growth. The Project would provide for a long-term home for the embarkation site, allowing the Park Service and its concessionaire location certainty in implementing the various targeted components of the design program.

There could be incremental increases in visitor numbers at the embarkation site (in additional to the above-mentioned projected

growth in visitor numbers to Alcatraz Island) associated with providing special ferry service to Fort Baker or other locations in the Bay from the primary embarkation site's additional (third) berth. This incremental increase is considered growth induced by the Project; however, the design program was developed in accordance with the highest possible visitor levels assumed, which includes this growth.

Consultation and Coordination

INTRODUCTION

This chapter provides an overview of public involvement and consultation processes undertaken for the Project. It also includes information on other requirements for the Project, as well as a list of preparers.

HISTORY OF PUBLIC INVOLVEMENT

Early agency and stakeholder scoping for the Project was conducted in spring 2012, followed by public scoping meetings and additional meetings with key stakeholders. These public involvement activities are shown in Table 74 and described in further detail in the following paragraphs.

TABLE 74. PUBLIC INVOLVEMENT ACTIVITIES

Activity	Date
Pre-scoping letters sent to agencies and organizations	December 28, 2011
Pre-scoping letters sent to stakeholders	April 18, 2012
NOI/section 106 letters sent to SHPO and ACHP	April 26, 2012
Pre-scoping letter sent to the Office of Federal Agency Programs	May 24, 2012
NOI published in the national register; scoping period begins	June 1, 2012
Scoping letters sent to NMFS and USFWS	June 1, 2012
Scoping notice emailed to mailing list recipients	June 1, 2012
Scoping newsletter mailed to mailing list recipients	June 13, 2012
Public meeting at Fort Mason	June 26, 2012
Public meeting at Sausalito	June 28, 2012
Scoping period ends	July 31, 2012

Notes:
ACHP = Advisory Council on Historic Preservation

The NOI for the Project was published in the FR on June 1, 2012. The NOI provided information about the Project and invited public and agency input on the scope of the EIS during the 60-day scoping period. The Park Service sent an electronic public scoping newsletter to 1,626 email addresses followed by printed copies to 569 individuals, agencies, and organizations.

During the public scoping period, two public scoping meetings were held. The first was held on June 26 at Fort Mason in San Francisco, California, and the second was held on June 28 at City Hall in Sausalito, California. Both meetings presented information about the purpose, need, and objectives of the Project and concepts for possible alternatives, in an open-house format.

Additional meetings with key stakeholders, including current ferry operators, the Port, the San Francisco BCDC, and the City/County, were held after public scoping.

Information on the key concerns documented during the Project's public and agency scoping process is presented in the "Purpose and Need" chapter. Additional details on the comments received during the scoping process are provided in the Public Scoping Report (NPS 2012c).

CURRENT AND FUTURE PUBLIC INVOLVEMENT

The formal public comment period for this Draft EIS began upon publication of a NOA in the FR. Agencies and the general public have the opportunity to review and comment on this Draft EIS during the 90-day comment period. Copies of the Draft EIS are available at the offices and libraries noted in the "Distribution Information" section of this chapter. For specific public comment period start and end dates, please visit the Project's website: http://parkplanning.nps.gov/alcatrazferry.

The Park Service will record, categorize, and respond to all substantive public comments

received on this Draft EIS. The Final EIS will incorporate text revisions as appropriate, will identify revisions corresponding to comments received, and will identify the Park Service's reasons for selecting the preferred alternative. The release of the Final EIS will be announced through publishing an NOA in the FR and posting updates on the Project website. The ROD will be issued a minimum of 30 days after publication of the NOA for the Final EIS.

FUTURE COMPLIANCE REQUIREMENTS

The Project will require compliance with a number of other policies and regulations. The anticipated requirements of the Project are listed in Table 75.

Consultations with NMFS and USFWS

The Park Service sent scoping letters to the NMFS and USFWS on December 28, 2011, and did not receive an initial response. The letters described the Project and sought comments from each agency on a range of possible alternatives.

The Park Service has initiated consultations with NMFS and USFWS under section 7 of the ESA of 1973, and with NMFS under the M-SFCMA. The Park Service has determined, as described in the "Aquatic Biological Resources" and "Terrestrial Biological Resources" sections of the "Environmental Consequences" chapter, that the Project may affect, but is not likely to adversely affect several marine species, and that the Project would have only temporary and minimal effects on EFH.

TABLE 75. POTENTIAL FUTURE COMPLIANCE REQUIREMENTS

Regulation	Agency	Requirement
CWA Section 404	USACE	Standard Individual or Nationwide Permit
Rivers and Harbors Act	USACE	Standard Individual or Nationwide Permit
ESA	USFWS, NMFS	Biological Opinion
Section 106	ACHP, SHPO, tribes	Consultation on Project effects to historic properties; Memorandum of Agreement if any adverse effects
CWA Section 401/Porter-Cologne Water Quality Control Act	San Francisco Bay RWQCB	Water Quality Certification/Waste Discharge Requirements
San Francisco Bay Plan	BCDC	Major Permit
CZMA	BCDC	Federal Consistency Determination
CWA Section 402	San Francisco Bay RWQCB	General Construction Permit; VGP; SWPPP
City Codes	City/County	Construction permits, as appropriate

Section 106 of the NHPA

Section 106 of the NHPA requires that agencies consult with the ACHP, the SHPO, interested and affected federally recognized Indian tribes, other interested parties, and the public. Section 106 regulations at 36 CFR 800.8(c) allow agencies to use, "the process and documentation," required under the NEPA to fulfill all or part of section 106 requirements.

On April 20, 2013, NPS notified the ACHP, SHPO, and representatives of the Ohlone and Costanoan tribes of the Project. The notification included the NOI to prepare an EIS, and a statement that the NEPA process would be used to fulfill some section 106 requirements related to consulting the public and other interested parties. The Park Service is conducting a separate section 106 consultation process with the ACHP, SHPO, and tribes.

LIST OF PREPARERS AND CONSULTING PARTIES

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Uday Prasad, Interim Chief Harbor Engineer

DISTRIBUTION INFORMATION

The following agencies were provided printed copies of this Draft EIS.

Federal Agencies

Advisory Council on Historic Preservation
National Marine Fisheries Service
U.S. Army Corps of Engineers, San Francisco District
U.S. Coast Guard
U.S. Environmental Protection Agency, Headquarters
U.S. Environmental Protection Agency, Region IX
U.S. Fish and Wildlife Service

Tribes

Ohlone/Costanoan Tribe

California State Agencies

California Office of Historic Preservation
California Coastal Commission
California Coastal Conservancy
California Department of Boating and Waterways
California Department of Fish and Wildlife
California Department of Parks and Recreation
California Department of Transportation, District 4
San Francisco Bay Conservation and Development Commission
San Francisco Regional Water Quality Control Board

Regional and Local Agencies

Association of Bay Area Governments
Bay Area Air Quality Management District
City and County of San Francisco
San Francisco Office of the Mayor
San Francisco Planning Department
San Francisco Department of the Environment
San Francisco Public Works Deparment
San Francisco Recreation and Parks Department
Metropolitan Transportation Commission

Organizations

National Parks Conservation Association, Office of Preservation
San Francisco Bay Trail Association

Elected Officials and Committees

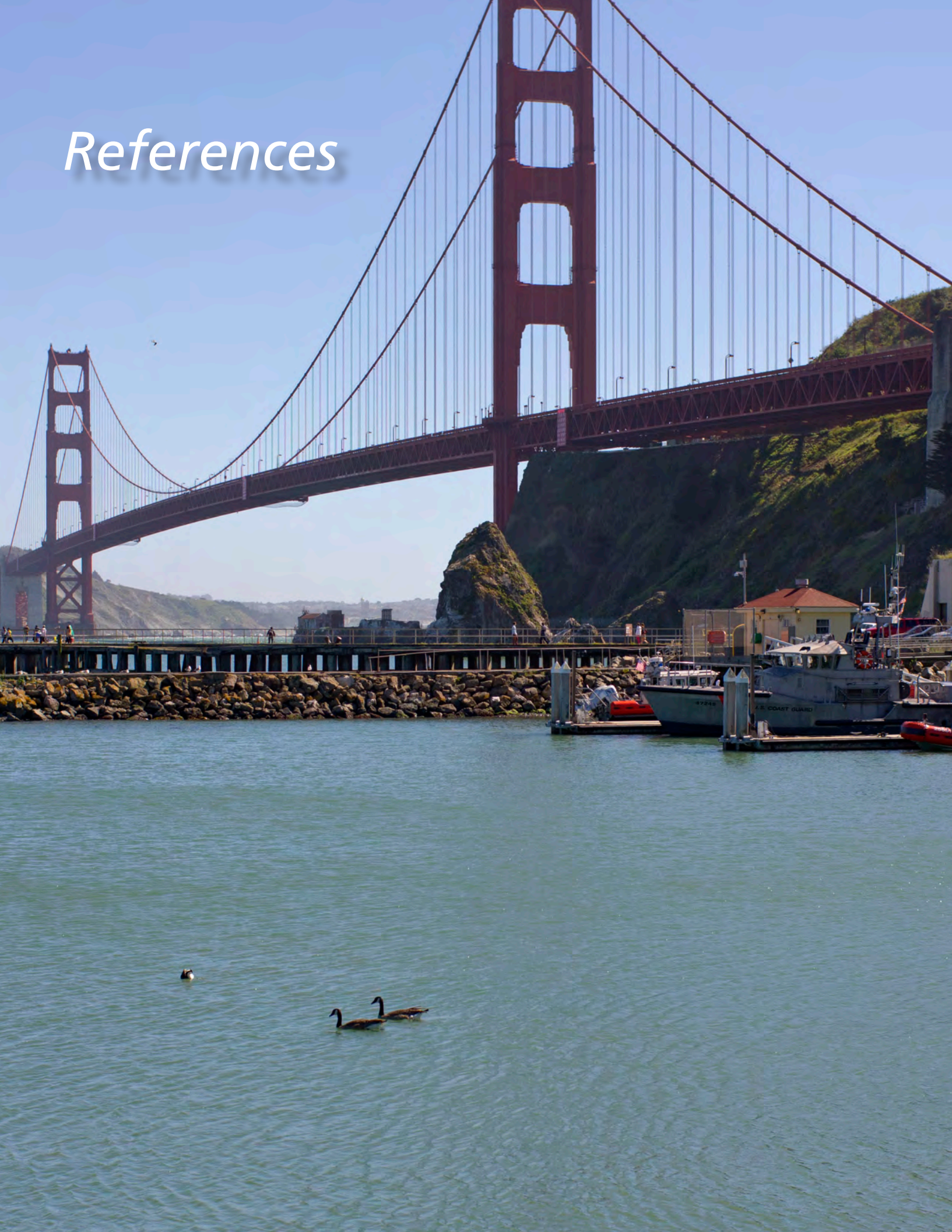
Office of Senator Barbara Boxer
Office of Senator Dianne Feinstein
Office of Representative Nancy Pelosi
Office of Representative Jackie Speier
United States House of Representatives Committee on Resources
Office of Mayor Gavin Newsom

Locations Where Draft EIS is Available for Public Review

The Draft EIS is available for review on the Project's website: http://parkplanning.nps.gov/alcatrazferry. Paper copies of the Draft EIS are also available for public review at the following locations:

- GGNRA Headquarters –
  Upper Fort Mason, Building 201
  San Francisco, California 94123
- San Francisco's Main Library –
  101 Larkin Street
  San Francisco, California 94102

References



ABAG (Association of Bay Area Governments)
2003 Interactive Future Earthquake Shaking Scenarios Map. Cited March 18, 2013. Available from: http://gis3.abag.ca.gov/Website/Shaking-Maps/viewer.htm accessed 3/15/2013.

2013a Alquist-Priolo Earthquake Fault Zone Maps. Last Modified February 26, 2013. Cited March 18, 2013. Available from http://quake.abag.ca.gov/faults/.

2013b Liquefaction Susceptibility Maps. Website last modified January 3, 2013. Cited March 18, 2013. Available from: http:// http://quake.abag.ca.gov/liquefaction/.

2013c Landslide Maps and Information. Website last modified January 3, 2013. Cited March 18, 2013. Available from: http:// http://quake.abag.ca.gov/landslides/.

Alcatraz Cruises
2008 *Vessel Fueling Plan*. December 20, 2008.

2009 *Alcatraz Island Fueling Checklist*. Revised March 18, 2009.

2011a *Hazardous and Universal Waste Management Program*. Revised March 24, 2011.

2011b *Hazardous Communications Plan*. Revised March 24, 2011.

2012 *Storm Water Pollution Prevention Plan Alcatraz Cruises and Hornblower Cruises and Events*. Revised September 26, 2012.

Ambler, J.W., J.E. Cloern, and A. Hutchinson
1985 Seasonal cycles of zooplankton from San Francisco Bay, California, USA. *Hydrobiologia* 129:177-198.

ARG (Architectural Resources Group)
1991 *San Francisco Port of Embarkation Historic Structures Report*. Cited September 9, 2013. Available from http://www.nps.gov/history/history/online_books/goga/embarkation_hsr.pdf.

2002 *Maritime Museum Building, Limited Scope Historic Structure Report*. Report on file at Golden Gate National Recreation Area, San Francisco, California.

BAAQMD (Bay Area Air Quality Management District)
2011 *BAAQMD CEQA Air Quality Guidelines*. May 2011.

2013 *Particulate Matter Planning*. Available online: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/PM-Planning.aspx. Last accessed December 2013.

Baker, Suzanne, Laurie Horvath, and Anne Carlson
1978 *Archeological Site Survey Record, Primary Record P-38-000031, Site CA-SFR-31*. Record on file at the California Office of Historic Preservation, Sacramento, CA.

Bakker, E.
1972 *An Island Called California*. University of California Press, Berkeley.

Bay Area Census
2013 Counties. http://www.bayareacensus.ca.gov/counties/counties.htm. Accessed September 16.

Bay Area Council Economic Institute
2013a Leisure and Hospitality Employment Statistics, April 2013 Update. May 28.

2013b San Francisco Metropolitan District Employment Statistics, April 2013 Update. May 28.

BCDC (San Francisco Bay Conservation and Development Commission)
1998 *LTMS Management Plan EIS/EIR*. Cited June 21, 2013. Available from: http://www.bcdc.ca.gov/dredging/ltms/ltms_mgemnt_eis-eir.shtml.

2005 *Public Access Design Guidelines for the San Francisco Bay*. Available from: http://www.bcdc.ca.gov/pdf/planning/PADG.pdf.

2010 *San Francisco Waterfront Special Area Plan*. April 1975 as amended through February 2010. Available from: http://www.bcdc.ca.gov/pdf/sfwsap/SFWSAP_Final.pdf.

2012 *San Francisco Bay Plan*. Adopted in 1968 and reprinted in 2012. Available from: http://www.bcdc.ca.gov/pdf/bayplan/bayplan.pdf.

Biodiversity Council of California
2012 *Bioregions of California*. Cited April 3, 2013. Available at: http://biodiversity.ca.gov/bioregions.html.

Birnbaum, Charles
1994 *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes*. National Preservation Briefs 36. National Park Service, Washington, DC.

Bowles, Ann, and S. Wisdom
2005 The 60-dB rule for birds: An example of the application of a weighting function in environmental impact mitigation. *The Journal of the Acoustical Society of America*. 118, 2018 (2005).

Cable Car Museum
2013 *Today's Cable Car System-Andrew Hallidie's Legacy*. Cited September 19, 2013. Available from: http://www.cablecarmuseum.org/archive/Today/.

Cal-Adapt
2013 *Cal-Adapt Climate Tools*. Available online at: http://cal-adapt.org. Last accessed December 2013.

California Emergency Management Agency
2009a *CA Geological Survey University of Southern California, 2009, Tsunami Inundation Map for Emergency Planning, San Francisco*. Cited March 18, 2013. Available from: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/SanFrancisco/Documents/Tsunami_Inundation_SF_Overview_SanFrancisco.pdf.

2009b CA Geological Survey University of Southern California, 2009. Tsunami Inundation Map for Emergency Planning, SF North Quadrangle. Cited March 18, 2013. Available from: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Marin/Documents/Tsunami_Inundation_SanFranciscoNorth_Quad_Marin.pdf.

California Employment Development Department Labor Market Information Division

2013a *Historical Civilian Labor Force*. http://www.calmis.ca.gov/LF-UI-Data.htm. Accessed September 16.

2013b 2010-2020 *Industry Employment Projections*. http://www.labormarketinfo.edd.ca.gov/LMID/Projections_of_Employment_by_Industry_and_Occupation.html. Accessed September 16.

California Geological Center

2007 *California Geological Survey, Earthquake Mapping Center, Significant California Earthquakes*. Cited March 18, 2013. Available from: http://www.conservation.ca.gov/CGS/r ghm/quakes/Pages/eq_chron.aspx.

CALTRANS (California Department of Transportation)

2007 *The Effects of Highway Noise on Birds*. September 30, 2007. Cited October 21, 2013. Available from: http://www.dot.ca.gov/hq/env/bio/files/caltrans_birds_10-7-2007b.pdf.

2012 California Streets and Highways Code. Available from: http://www.leginfo.ca.gov/.html/shc_table_of_contents.html

CAPCOA (California Air Pollution Control Officers Association)

2013 *California Emissions Estimator Model (CalEEMod)*. Version 2013.2.2. Available online at: http://www.caleemod.com/. Last accessed December 2013.

CARB (California Air Resources Board)

2004 *Fact Sheet: Climate Change Emission Control Regulations*. December 10, 2004. Available online at: http://www.arb.ca.gov/cc/factsheets/cc_newfs.pdf.

2010 Harbor Craft Emissions Inventory Databases. Available online at: http://www.arb.ca.gov/msei/categories.htm#chc_category. Last accessed December 2013.

2011 *Amendments to the Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline, 2011*. http://www.arb.ca.gov/regact/2010/chc10/frochc931185.pdf.

2013 iADAM Air Quality Data Statistics Database. Available online at http://www.arb.ca.gov/adam. Last accessed December 2013.

CDFG (California Department of Fish and Game)

1987 *Delta Outflow Effects on the Abundance and Distribution of San Francisco Bay Fishes and Invertebrates, 1980-1985*. Exhibit 60. CDFG for the State Water Resources Control Board 1987 Water Quality/Water Rights Proceedings on the San Francisco Bay/Sacramento-San Joaquin Delta. Interagency Ecological Study Program for the Sacrament-San Joaquin Estuary, Sacramento, CA. Cited October

1, 2013. Available from: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/1995wqcp/admin_records/part05/304.pdf.

2012a CDFG Natural Diversity Database search of the San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, and San Francisco South USGS Quadrangles. Updated December 30, 2012.

2012b *California Least Tern Breeding Survey 2011 Season*. Cited October 17, 2013. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=83182.

CDFW (California Department of Fish and Wildlife)

2003 *CDFW Resource Management Entry for Chinook Salmon*. Available at: http://www.dfg.ca.gov/fish/Resources/Chinook/. Accessed 11/25/2013.

2008 *California Wildlife Habitat Relationship System*. Personal computer program, Version 8.2. California Interagency Wildlife Task Group. Sacramento, CA.

2013 California Natural Diversity Database (CNDDB) and USFWS database search of Project and surrounding quadrangles; San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, San Francisco South.

CDMG (California Department of Mines and Geology)

2001 GIS files of official Alquist-Priolo Earthquake Fault Zones, Central Coastal Region. Developed by William A. Bryant, Ross Martin, Perrty Wong, Dinah Maldonado, Jerry Wampole, and David Dixon, DMG CD 2001-04, 2001.

CEQ (Council on Environmental Quality)

2010 NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions. February, 2010.

Chambers Group

1998 *Preliminary Draft Dredge Material Management Plan Programmatic Environmental Impact Statement/Report for Harbors/Marinas in the Los Angeles Region*. Prepared for the USACE, Los Angeles District. September, 1998.

Chappell, Gordon

1976 *Pumping Station No. 2, San Francisco Fire Department Auxiliary Water Supply System National Register Nomination*. Cited September 19, 2013. http://pdfhost.focus.nps.gov/docs/NRHP/Text/76000177.pdf.

Chartkoff, Joseph L. and Kerry Kona Chartkoff

1984 *The Archeology of California*. Stanford University Press, Stanford, CA.

CHS Associates, Inc.; JD Franz Research, Inc.; Mark Bradley Research & Consulting; Parsons Brinckerhoff Quade & Douglas, Inc.; and URS Corporation

2007 *Golden Gate National Recreation Area Water Shuttle Access Study and Conceptual Plan Summary Final Report*. Prepared for the National Park Service, U.S. Department of the Interior. April 2007.

City/County (City and County of San Francisco)

2003 *Northeastern Waterfront Area Plan*. Available from http://www.sf-planning.org/ftp/general_plan/NE_Waterfront.htm.

2008 *San Francisco Noise Ordinance*. Available from: http://www.noisefree.org/cityord/san-francisco.pdf.

2010 *Northeast Embarcadero Study*. June 2010. Available from: http://www.sf-planning.org/ftp/files/Citywide/NES/Northeast_Embarcadero_Study_Report_June2010.pdf.

2011 *Emergency Response Plan Tsunami Response Annex*. March 2011. Cited March 18, 2013. Available from: http://www.sfdem.org/modules/ShowDocument.aspx?documentid=1115.

2012 *San Francisco General Plan*. Available from: http://www.sf-planning.org/ftp/general_plan/index.htm.

2013a *San Francisco Municipal Code*. Current through Ordinance 70-12, File No. 130085, approved April 23, 2013, and effective May 23, 2013. Available from: http://www.amlegal.com/library/ca/sfrancisco.shtml.

2013b *Recreation and Open Space Element*. http://www.sf-planning.org/ftp/general_plan/13_Rec_and_Open_Space.htm. Accessed September 11.

2013c *San Francisco General Plan Commerce and Industry Element*. http://www.sf-planning.org/ftp/general_plan/I2_Commerce_and_Industry.htm.

2013d San Francisco Fire Department Website, Fire Station Locations. Cited June 3, 2013. Available from: http://www.sf-fire.org/index.aspx?page=176.

2013e San Francisco Police Department Website, Police District Maps. Cited June 3, 2013. Available from: http://sf-police.org/index.aspx?page=868.

2013f San Francisco Police Department Website, Water Supply Systems. Cited June 3, 2013. Available from: http://www.sf-fire.org/index.aspx?page=1003.

2013g City and County of San Francisco Website, Recycling Program: Mayor Announces City Leads America in Recycling. Cited June 3, 2013. Available from: http://www5.sfgov.org/sf_news/2012/10/recycling-program-mayor-announces-city-leads-america-in-recycling.html.

Corbett, Michael R., Marjorie Dobkin and William Kostura

2002 *Port of San Francisco Embarcadero Historic District National Register Nomination Form*. Cited September 9, 2013. Available from: http://pdfhost.focus.nps.gov/docs/NRHP/Text/06000372.pdf.

Davis, J.

1954 *Archeological Site Survey Record, Primary Record P-38-000023, Site CA-SFR-23*. Record on file at the California Office of Historic Preservation, Sacramento, CA.

Delgado, James P. and Laura Soulliere Harrison
1986 *Aquatic Park Historic District National Register Nomination*. Cited September 13, 2013 Available from: http://pdfhost.focus.nps.gov/docs/NHLS/Text/84001183.pdf.

Dillon, James
1978 *San Francisco Cable Cars National Register Nomination*. Cited September 19, 2013. Available from: http://pdfhost.focus.nps.gov/docs/NHLS/Text/66000233.pdf.

DOF (California Department of Finance)
2013 *Demographic Research Unit. Report P-1 (County) - Total Population Projections for California and Counties: July 1, 2015 to 2060 in 5-year Increments*. January 31, 2013.

DPH (San Francisco Department of Public Health)
2013 *Hazardous Waste - Analyzing Soil for Hazardous Waste*. Available from: http://www.sfdph.org/dph/EH/HazWaste/hazWasteAnalyzeSoil.asp.

DTSC (California Department of Toxic Substances Control)
2007 EnviroStor Database, San Francisco Waterfront Search. Cited: September 5, 2013. Available from: http://www.envirostor.dtsc.ca.gov/public/.

2013 Geotracker Database, San Francisco Waterfront. Cited: September 5, 2013. Available from: http://geotracker.waterboards.ca.gov/.

EIP Associates and Wilbur Smith Associates
2003 *Fort Mason Center Long-Term Lease Environmental Assessment*. Prepared for the National Park Service, U.S. Department of the Interior. August 2003. Cited May 14, 2012. Available from: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CFIQFjAA&url=http%3A%2F%2Fparkplanning.nps.gov%2FshowFile.cfm%3FprojectID%3D20253%26docType%3Dpublic%26MIMEType%3Dapplication%25252Fpdf%26filename%3DFOMA%2520Long%2520Term%2520Lease.pdf%26clientFilename%3DFOMA%2520Long%2520Term%2520Lease.pdf&ei=NkexT-K8CIfciQLdrqWqBA&usg=AFQjCNEA71xMv10LyaiBZjetAmmcCvqyAQ.

Farneth, Stephen J., Hisashi B. Sugaya, David P. Wessel, Gordon O. White
1991 *San Francisco Port of Embarkation Historic Structure Report*. Golden Gate National Recreation Area. National Park Service, San Francisco, CA.

FEMA (Federal Emergency Management Agency)
2007 *Flood Insurance Rate Map City and County of San Francisco, California*. Panel Number 120 of 260. Cited June 24, 2013. Available from: http://sfgsa.org/Modules/ShowImage.aspx?imageid=2672.

2009 *Flood Insurance Rate Map Marin County Unincorporated and Incorporated Areas, California*. Panel Number 528 of 531. Cited October 24, 2013. Available from: https://msc.fema.gov/webapp/wcs/stores/servlet/MapSearchResult?storeId=10001&catalogId=10001&langId=-1&panelIDs=06041C0528D$&Type=pbp&nonprinted=&unmapped=.

Fisherman's Wharf (Fisherman's Wharf Community Benefit District)
2013 Fisherman's Wharf San Francisco Website. http://www.visitfishermanswharf.com/. Accessed September 11.

FTA (Federal Transit Administration)
2006 *Transit Noise and Vibration Impact Assessment*. May 2006. Available from: http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

GGNPC (Golden Gate National Parks Conservancy)
2013 Native Plant Information Website. Available at http://ssl1.mediatrope.com/our_work/native_plants/restoration.asp. Accessed September 2013.

n.d. a National Parks Conservancy Park Sites Fort Mason Website. Cited: May 14, 2012. Available from: http://www.parksconservancy.org/visit/park-sites/marin-headlands.html.

n.d. b National Parks Conservancy Park Sites Marin Headlands Website. Cited: May 14, 2012. Available from: http://www.parksconservancy.org/visit/park-sites/marin-headlands.html.

Guardians of the City
2013 Guardians of the City Museum and Safety Learning Center Website Fireboats Entry. Cited October 23, 2013. Available from: http://guardiansofthecity.org/sffd/fireboats/index.html.

Harrison, A., E. Small, and H. Mooney
1971 Drought Relationships and Distribution of Two Mediterranean Climate California Plan Communities. *Ecology* 52: 869-875.

Heady, H. F., T. C. Foin, M.M. Hektner, D. W. Taylor, M. G. Barbour, and W. J. Barry
1977 Coastal Prairie and Northern Coastal Scrub. Pages 733-760 in M.G. Barbour and J. Major, eds. *Terrestrial Vegetation of California*. John Wiley and Sons, NY.

Higgins-Evenson, Rudy
2002 *Fort Mason: The Undiscovered Crossroads*. Special History Study. National Park Service, Washington DC.

Hoke, Amy and Eliot Foulds
2004 *Cultural Landscape Report for Fort Mason, Golden Gate National Recreation Area: Volume One, Site History, Existing Conditions, and Analysis*. Olmstead Center for Landscape Preservation, Brookline, MA.

Hornblower
2013 E-mail communications with Hornblower. January 2012 through January 2014.

IEP (Interagency Ecological Program for the San Francisco Bay Estuary)
2005-2009 San Francisco Bay Study, 2005-2009, unpublished raw midwater trawl data and unpublished raw bottom trawl data, 2005-2009.

Incident and Risk Management Services
2012 *Spill Prevention, Control, and Countermeasure Plan*. March 2, 2012.

IPCC (Intergovernmental Panel on Climate Change)
2007 Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Jassby, A. D., J. E. Cloern and B. E. Cole
2002 Annual primary production: Patterns and mechanisms of change in a nutrient-rich tidal ecosystem. *Limnology and Oceanography* 47(3): 698-712. Cited: October 23, 2013. Available from: http://aslo.org/lo/toc/vol_47/issue_3/0698.pdf.

Keddy, Paul
2012 Forward: Some thoughts on San Francisco Bay and its wetlands. In *Ecology, Conservation and Restoration of Tidal Marshes: The San Francisco Estuary*, edited by A. Palaima, pp. xv-xiix. University of California Press, Berkeley, CA.

Kopec, D. and J. Harvey
1995 *Toxic Pollutants, Health Indices, and Pollution Dynamics of Harbor Seals in San Francisco Bay, 1989-91: Final Report*. Moss Landing Marine Labs. Moss Landing, CA.

Mann, K.L.
2000 *The Ecology of Coastal Waters*. Blackwell Science, Malden, MA.

Marin County
2005 *Marin County Noise Ordinance*. August 16, 2005. Available from: http://www.co.marin.ca.us/depts/BS/Main/BOSagmn/ordinances/ord-3431.pdf.

2007a *Marin County Countywide Plan*. Most recently amended November 13, 2012. Available from: http://www.co.marin.ca.us/depts/cd/main/fm/TOC.cfm.

2007b Marin County Sheriff Webpage, Patrol Division Entry. Cited October 4, 2013. Available from: http://www.marinsheriff.org/about.aspx?gi_id=91.

2007c Marin County Sheriff Webpage, Marine Services Entry. Cited October 4, 2013. Available from: http://www.marinsheriff.org/about.aspx?gi_id=89.

Marin County Community Development Agency
2005 *Marin Countywide Plan Geology, Mineral Resources and Hazardous Materials Technical Background Report*. Updated November 2005. Cited March 18, 2013. Available from: http://www.co.marin.ca.us/depts/cd/main/pdf/eir/CWP/Appendix1_K.pdf.

2008 *Redwood Landfill Final Environmental Impact Report*, March 2008.

Marin County Sheriff Office of Emergency Services
2007 *Tsunami Annex Marin Operational Area Emergency Operations Plan*. January 2007. Cited March 18, 2013. Available from: http://www.marinsheriff.org/uploads/documents/Marin%20Tsunami%20Annex%20Jan%202007.pdf.

MTC & ABAG (Metropolitan Transportation Commission and Association of Bay Area Governments)

2013a *Plan Bay Area. July 2013*. Available online at: http://onebayarea.org/plan-bay-area/final-plan-bay-area.html. Last accessed January 2013.

2013b *Plan Bay Area Draft Environmental Impact Report*. April 2013. Available online at: http://onebayarea.org/pdf/Draft_Plan_Bay_Area/Draft_EIR.pdf. Last accessed January 2014.

Muni (San Francisco Municipal Railway)

2005 *Short Range Transit Plan: FY 2006 – 2025*. Adopted December 2005.

NAVFACSW & Unified Port of San Diego (Naval Facilities Engineering Command and Unified Port of San Diego)

2011 *San Diego Bay Integrated Natural Resources Management Plan, Draft*. San Diego, California. Prepared by Tierra Data Inc., Escondido, California. November.

Newland, M., S. Massey, B. Mischke, and M. Stoyka

2001 *Primary Record, P-21-00682, East Fort Baker*. Archeological site form on file at the California Office of Historic Preservation, Sacramento, CA.

NMFS (National Marine Fisheries Service)

2001 *Fisheries 2001. Fisheries Management Plan Species Distributions in San Francisco, San Pablo and Suisun Bays*. Cited September 1, 2013. Available from: http://swr.nmfs.noaa.gov/hcd/loclist.htm.

2007 *Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay*. Prepared by NOAA National Marine Fisheries Service. Santa Rosa, CA, June 2007. Cited September 30, 2013. Available from: http://swr.nmfs.noaa.gov/hcd/HCD_webContent/nocal/SF_Bay_Habitat_Report_Final_07-30-07.pdf.

NOAA (National Oceanic and Atmospheric Association)

2011 NOAA/West Coast and Alaska Tsunami Warning Center, Observations and Forecasts for the U.S. West Coast, British Columbia, and Alaska, March 11, 2011 entry, Japan Tsunami. Cited May 14, 2013. Available from: http://oldwcatwc.arh.noaa.gov/previous.events/03-11-11_Honshu/index.php.

NPS (National Park Service)

1916 Organic Act of 1916. Available from: http://www.nps.gov/grba/parkmgmt/organic-act-of-1916.htm.

1980 *Golden Gate National Recreation Area and Point Reyes National Seashore General Management Plan/Environmental Analysis*. September 1980. Available from: http://www.nps.gov/history/history/online_books/goga/goga_gmp.pdf.

1999 *Fort Baker Plan Final Environmental Impact Statement*. October 1999. Available from: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=20244&documentID=20847.

2000 *Director's Order #47: Soundscape Preservation and Noise Management*. December 1, 2000. Available from: http://www.nps.gov/policy/DOrders/DOrder47.html.

2004a *Fort Mason Center Long-term Lease Environmental Assessment/Finding of No Significant Impact*. Completed August 2003 and approved March 2004. Available from: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=20253&documentID=20867.

2004b Cultural Landscape Report for Fort Mason, Golden Gate National Recreation Area. Site History, Existing Conditions and Analysis. Olmstead Center. September 2004.

2005 *Cultural Landscape Report for Fort Baker, Golden Gate National Recreation Area*. Cited September 25, 2013. Available from http://www.nps.gov/history/history/online_books/foba/clr.pdf.

2006 *Management Policies 2006. The Guide to Managing the National Park System*. Cited: May 19, 2012. Available from: http://www.nps.gov/policy/mp/policies.html.

2007a *San Francisco Maritime National Historic Park General Management Plan*. October 2007. Cited: May 14, 2012. Available from: http://www.nps.gov/safr/parkmgmt/upload/Safrgmp.pdf.

2007b *World War II and the American Homefront: A National Historic Landmarks Theme Study*. National Park Service, Washington, DC.

2008a Fort Baker Brochure. Updated: June 2008. Cited: May 14, 2012. Available from: http://www.nps.gov/goga/planyourvisit/upload/2008-0910-sb-foba-web.pdf.

2008b *Golden Gate National Recreation Area Climate Change Action Plan*. December 2008. Available from: http://www.nps.gov/climatefriendlyparks/downloads/Action%20Plans%20and%20Inventories/CFP%20_%20GOGA%20Action%20Plan%20(12%205%2008).pdf.

2009a *Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan Final Environmental Impact Statement*. March 2009. Cited: May 14, 2012. Available from: http://www.projectheadlands.gov/MH_FB%20TIMP%20Final%20EIS_Main%20Document.pdf.

2009b *Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan Record of Decision*. August 11, 2009. Cited: January 22, 2013. Available from: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=12152&documentID=29117.

2010 *Cultural Landscape Report, Aquatic Park, San Francisco Maritime, National Historic Park*. Cited September 13, 2013, Available from: http://www.nps.gov/safr/parkmgmt/upload/cultural_ldscape_rpt_opimized.pdf.

2011a *Director's Order No. 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*. Effective Date: October 5, 2011. Cited: May 5, 2012. Available from: http://www.nps.gov/policy/DOrders/DO-12.pdf.

2011b *Draft Final Alcatraz Ferry Embarkation and Education Site Feasibility Study*. May 2011.

2011c *Technical Guidance on Assessing Impacts to Air Quality in NEPA and Planning Documents*. January 2011. Natural Resource Report NPS/NRPC/ARD/NRR—2011/ 289.

2012a Alluring History of Alcatraz Website. Last updated: April 22, 2012. Cited: May 14, 2012. Available from: http://www.nps.gov/stli/parknews/alluring-history-of-alcatraz.htm.

2012b Golden Gate National Recreation Area Park Statistics Website. Last updated: May 4, 2012. Cited: May 14, 2012. Available from: http://www.nps.gov/goga/parkmgmt/statistics.htm.

2012c *Public Scoping Comment Analysis Report. Alcatraz Ferry Embarkation EIS*. Golden Gate National Recreation Area. October 2012.

2012d *Draft Feasibility Analysis of Sausalito and Fort Baker Embarkation Sites. Alcatraz Ferry Embarkation EIS*. October 2012. Review only – not for public distribution.

2012e *Final Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center*. NPS Document No. 641/106203a. February 2012.

2014a *Golden Gate National Recreation Area Muir Woods National Monument General Management Plan/Environmental Impact Statement*. Cited: April 2014. Available from: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=15075&documentID=58777.

2014b *Transportation and Circulation Study, Alcatraz Ferry Embarkation EIS*. Golden Gate National Recreation Area, California. Fehr & Peers. May 2014.

n.d. a Museum Collections at the Rock: Alcatraz Island: Golden Gate Recreational Area Website. Cited: May 14, 2012. Available from: http://www.nps.gov/museum/exhibits/alca/overview.html.

n.d. b *National Park Service, Fort Mason History Walk: An Army Post at the Edge of San Francisco*. Self-Guided Tour Brochure, undated.

NPS & USCG (National Park Service and U.S. Coast Guard)

2012 *Environmental Assessment Summary 34th America's Cup Races*. June 7.

NRCS (Natural Resources Conservation Service)

2012 Web Soil Survey Search of Project Area. Site last modified February 17, 2012. Cited March 18, 2013. Available from: websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

OEHHA (California Office of Environmental Health Hazard Assessment)
2002 *Office of Environmental Health Hazard Assessment, Particulate Matter Health Effects and Standard Recommendations*. May 9, 2002.

Olson, J.A. and M.L. Zoback
1998 Source Character of Microseismicity in the San Francisco Bay Block, California, and Implications for Seismic Hazard. *Bulletin of the Seismological Society of America* 88:543-555.

ORCA (ORCA Consulting, LLC)
2011a *America's Cup 34 Spectator Site on NPS Properties Visitation Estimates and Capacity Assessment Preliminary Report*. December 2011.

2011b *Alcatraz Island Embarkation Facility Space Planning Model-Results*. May 23.

Port (Port of San Francisco)
2003 *Storm Water Management Plan 2003-2004*. Cited October 23, 2013. Available from: http://www.sfport.com/ftp/uploadedfiles/about_us/divisions/engineering/storm_water/SWMP2003-04.pdf.

2004 *Waterfront Land Use Plan*. Adopted in 1997 and republished in 2004. Available from: http://www.sf-port.org/index.aspx?page=294.

2011a *The 34th America's Cup and James R. Herman Cruise Terminal and Northeast Wharf Plaza Final Environmental Impact Statement*. December 1, 2011. Available from: http://www.sf-planning.org/index.aspx?page=1828.

2011b *Embarcadero Promenade Design Criteria*. January 13, 2011. Cited: May 14, 2012. Available from: http://38.106.4.220/Modules/ShowDocument.aspx?documentid=354.

2012 Land Use and Environment Projects Pier 43 Promenade Website. Cited: May 14, 2012. Available from: http://38.106.4.220/index.aspx?page=1986.

2013 *Contract No. 2746 Maintenance Dredging 2011-2015*. Cited: October 15, 2013. Available from: http://www.sf-port.org/index.aspx?page=1727.

Psota, Sunshine
2010 *Archeological Assessment of Proposed F-Line Historic Streetcar Project's South Loop Alternative Effects on CA-SFR-29 and Review of CA-SFR-23 Fort Mason*. Golden Gate National Recreation Area San Francisco, California.

Reid, F. & Helgen, K.
2008. *Taxidea taxus*. In: *IUCN 2013. IUCN Red List of Threatened Species*. Version 2013.1. Cited October 17, 2013. Available from: http://www.iucnredlist.org/details/41663/0.

Rosenthal, Jeffrey S., and Jack Meyer
2004 Geoarcheological Study; Landscape Evolution and the Archeological Record of Central California. In *Cultural Resources Inventory of California Department of Transportation District 10 Rural Conventional Highways*. Far Western

Anthropological Research Group, Inc., Davis, California. Report on file at the California Department of Transportation, District 10, Stockton.

Sanborn (Sanborn Fire Insurance Company)
1899 Fire Insurance Map, City and County of San Francisco, Volume 1.

San Francisco County Transportation Authority
2013 *Van Ness Avenue Bus Rapid Transit Fact Sheet*. July 2013. Cited: October 15, 2013. Available from: http://www.sfcta.org/sites/default/files/content/Planning/VanNessAvenueBusRapidTransit/_VN_webpage_photos/VN_fact_sheet_v23_en_080413.pdf.

San Francisco Planning Department
2009 *San Francisco General Plan*. 2009. Cited March 18, 2013. Available from: http://www.sf-planning.org/ftp/general_plan/index.htm.

2011 *The 34th America's Cup, James R. Herman Cruise Terminal and Northeast Wharf Plaza Final Environmental Impact Report*. December 15, 2011.

2013 *Jefferson Street Improvements/Fisherman's Wharf Fact Sheet*. http://www.newjeffersonstreet.com/calendar/event/1/2lo1qbgg9aa9r8bb4tm45j354k. Accessed on September 13.

Schlocker, Julius
1974 *Geology of the San Francisco North Quadrangle, California*, Geological Survey Professional Paper 782, 109 pp., 1974. Cited March 18, 2013. Available from: http://ngmdb.usgs.gov/Prodesc/proddesc_19768.htm.

SFEI (San Francisco Estuary Institute)
2013 *2011 Annual Monitoring Results*. Cited June 24, 2013. Available from: http://www.sfei.org/sites/default/files/AMR%202011%20Report%20Final.pdf.

SFEP (San Francisco Estuary Project)
1999 *State of the Estuary: A Report on Conditions and Problems in the San Francisco Bay/Sacramento-San Joaquin Delta*. Prepared by M.W. Monroe and J. Kelley.

SFGate
2013 "Fire Department Gets Another Chance at Money for a Fireboat." September 4, 2013. Cited October 23, 2013. Available from: http://blog.sfgate.com/cityinsider/2013/09/04/fire-department-gets-another-chance-at-money-for-fireboat/.

SFM (San Francisco Museum)
2013 From the 1820s to the Gold Rush. *Virtual Museum of the City of San Francisco*. Cited September 18, 2013. Available from http://www.sfmuseum.org/hist1/early.html.

SFMTA (San Francisco Municipal Transportation Agency)
2013a Central T Website. Cited: September 3, 2013. Available from: http://centralsubwaysf.com/.

2013b Transit Effectiveness Project Website. Cited: September 3, 2013. Available from: http://www.sfmta.com/projects-planning/projects/tep-transit-effectiveness-project.

SFPD (San Francisco Police Department)
2011 *San Francisco Police Department 2011 Annual Report*. Cited October 4. 2013. Available from: https://dl.dropboxusercontent.com/u/76892345/Annual%20Reports/2011%20Annual%20Report.pdf.

SFPUC (San Francisco Public Utilities Commission)
2004 *Stormwater Management Plan 2003-2004*. January 2004. Cited June 3, 2013. Available from: http://www.waterboards.ca.gov/water_issues/programs/stormwater/swmp/sfpuc_swmp.pdf.

2011a San Francisco Water Power Sewer System Information Webpage. Cited March 18, 2013. Available from: http://www.sfwater.org/index/aspx?page=396.

2011b *2010 Urban Watershed Management Plan for the City and County of San Francisco*. Cited June 3, 2013. Available from: http://www.sfwater.org/Modules/ShowDocument.aspx?documentID=1055.

2011c SFPUC Webpage, Making Dirty Water Clean Again. Cited June 3, 2013. Available from: http://www.sfwater.org/index.aspx?page=400.

2011d SFPUC Webpage, Capturing and Storing Stormwater. Cited June 3, 2013. Available from: http://www.sfwater.org/index.aspx?page=399.

2012 *Auxiliary Water Supply System 2010 Earthquake Safety and Emergency Response Bond*. November 19, 2012. Cited October 22, 2013. Available from: http://sfwater.org/Modules/ShowDocument.aspx?documentid=2945.

SF Travel
2013 San Francisco Visitor Industry Specifics Website http://www.sanfrancisco.travel/research/#visitors. Accessed October 2013.

SMCSD (Sausalito Marin-City Sanitary District)
2007 *Petition for Review of State Water Resource Control Board of Order No. R2-2007-0054 and Order No. R2-2007-0055*. Cited October 4, 2013. Available from: http://www.swrcb.ca.gov/public_notices/petitions/water_quality/docs/petitions/a1879petition.pdf.

SMFPD (Southern Marin Fire Protection District)
2013 Southern Marin Fire Protection District Website, Fire Stations. Cited June 3, 2013. Available from: http://www.southernmarinfire.org/operations/fire-stations.

SWRCB and RWQCB (State and Regional Water Resources Control Boards)
2010 *2010 Integrated Report on Water Quality with Web-Based Interactive Map*. April 2010. Cited June 21, 2013. Available from: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Stinson, M.C., M.W. Manson, and J.J. Plappert
1987a *Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area. Part II, Classification of Aggregate Resource Areas South San Francisco Bay Production-Consumption Region.*

1987b *Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area. Part III, Classification of Aggregate Resource Areas North San Francisco Bay Production-Consumption Region.*

TetraTech, Inc.
2009 *Draft: Historical Resource Evaluation for Auxiliary Water Supply System, City and County of San Francisco*. Report on file at the City and County of San Francisco, CA.

Thompson, Erwin N.
1979a *Historic Resource Study: Forts Baker, Barry, Cronkhite*. Cited September 19, 2013. Available from: http://www.nps.gov/goga/historyculture/publications.htm.

1979b *Fort Mason Historic District National Register Boundary Increase*. Cited September 13, 2013. Available from: http://pdfhost.focus.nps.gov/docs/NRHP/Text/79000530.pdf.

TJPA (Transbay Joint Powers Authority)
2013 Transbay Transit Center Webpage; Program Overview and Construction Updates entries. Cited: September 3, 2013. Available from: http://transbaycenter.org/.

TRB (Transportation Research Board)
2000 *Highway Capacity Manual.*

Urban Wildlands Group (Authors MacDonald, B., T. Longcore, and S. Weiss)
2012 *Status and Variability of Mission Blue Butterfly Populations at Milagra Ridge, Marin Headlands, and Oakwood Valley*. Report to Golden Gate National Parks Conservancy. The Urban Wildlands Group Creekside Center for Earth Observation. May 20, 2012. Cited October 17, 2013. Available from: http://www.urbanwildlands.org/Resources/MBBFinalLowRes.pdf.

URS (URS Corporation)
2003 *Final Program Environmental Impact Report Expansion of Ferry Transit Service in the San Francisco Bay Area*. Prepared for Water Transit Authority. June 2003.

USACE (U.S. Army Corps of Engineers)
2002 *Bolinas Lagoon Ecosystem Restoration Feasibility Study*. June 2002. Available from: http://www.marincounty.org/depts/pk/our-work/os-main-projects/~/media/Files/Departments/PK/Projects/Open%20Space/Bolinas%20Lagoon/Draft%20Bolinas%20Lagoon%20Ecosystem%20Restoration%20Feasibility%20Study%20and%20Draft%20EIR-EIS.pdf.

2011a *Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program*. June 9, 2011. Cited October 28, 2013. Available from: http://swr.nmfs.noaa.gov/hcd/HCD_webContent/nocal/Santa%20Rosa%20Dredge%20KMLs/LTMS_EFH_full_signed_agreement_FINAL_060911.pdf.

2011b *Formerly Used Defense Sites Projects Per State, California Entry*. September 30, 2011. Cited: September 5, 2013. Available from: http://www.usace.army.mil/Missions/Environmental/FormerlyUsedDefenseSites/FUDSInventory.aspx.

U.S. Census Bureau
1992 1990 Census of Population and Housing Age by Race and Hispanic Origin.

2001 Table DP-1: Profile of General Demographic Characteristics: 2000.

2013 *2010 Census Quickfacts*. Accessed September 17.

USCG (United States Coast Guard)
2013a US Coast Guard Website, Station San Francisco Entry. Cited October 4, 2013. Available from: http://www.uscg.mil/d11/staSanFrancisco/.

2013b US Coast Guard Website, Station Golden Gate Entry. Cited October 4, 2013. http://www.uscg.mil/d11/stagoldengate/.

USEPA (U.S. Environmental Protection Agency)
2004 *Air Quality Criteria for Particulate Matter*. October 2004.

2010 *Final Rulemaking: Model Year 2012-2016 Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards*. 40 CFR Parts 85, 86, and 600; 49 CFR Parts 531, 533, 536, et al. May 7, 2010. Available from: http://www.gpo.gov/fdsys/pkg/FR-2010-05-07/pdf/2010-8159.pdf.

2011 *United States Environmental Protection Agency. General Conformity Regulation*. 40 CFR Part 93 §193.

2013 *The Green Book Nonattainment Areas for Criteria Pollutants*. Available online at: http://www.epa.gov/air/oaqps/greenbk/index.html. Last accessed December 2013.

USFWS (U.S. Fish and Wildlife Service)
1992 *Status and Trends Report on Wildlife of the San Francisco Estuary*. Prepared under USEPA cooperative agreement CE-009519-0. Sacramento, CA. January.

2012 USFWS Species List Search of Project and Surrounding Quadrangles. Last updated October 11, 2012. Cited April 3, 2013. Available at http://www.fws.gov/sacramento/es_species/Lists/es_species_lists-form.cfm. Accessed 3/20/2013.

USFWS & NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service)
1998 *Endangered Species Consultation Handbook*. March 1998. Cited October 28, 2013. Available from: http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf.

USGS (United States Geological Survey)
1999 *Working Group on California Earthquake Probabilities. Probabilities in the San Francisco Bay Region: 2000 to 2030 - A Summary of Findings. U.S. Geological Survey*

Open-File Report 99-517. 38 p. Cited March 18, 2013. Available from: http:// http://geopubs.wr.usgs.gov/open-file/of99-517/of99-517.pdf.

2012 San Francisco Bay Area Regional Database Topographic and Elevation Data, 7.5 Min DEMS Index San Francisco Quadrangle Entry. Cited May 14, 2013. Available from: http://bard.wr.usgs.gov/getDEMSMap.html.

2013 Potential Inundation due to Rising Sea Levels in the San Francisco Bay Region. Cited September 9, 2014. Available from: http://cascade.wr.usgs.gov/data/Task2b-SFBay/.

Weeks, Kay D. and Anne E. Grimmer

1995 *The Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. National Park Service, Washington DC.

WETA (Water Emergency Transportation Authority)

2006 *South San Francisco Ferry Terminal Project*. November 27, 2006. Available from: https://watertransit.org/files/pubs/SouthSanFrancisco/EIR-Draft/09%20Sec%203.4%20Noise%20and%20Vibration.pdf.

2013a WETA Website San Francisco Ferry Terminal Expansion Project Entry. Cited: October 15, 2013. Available from: http://watertransit.org/CurrentProjects/DFTX/DFTX.aspx.

2013b WETA Website Central Bay Operations and Maintenance Facility Project Entry. Cited: October 15, 2013. Available from: http://watertransit.org/CurrentProjects/CBOM/CBOM.aspx.

Wong, I.G., Ely, R.W., and Kollman, A.C.

1988 Contemporary seismicity and tectonics of the Northern and Central Coast Ranges-Sierran Block Boundary Zone, *California. Journal of Geophysical Research*.

Woolsey, Kristina

2013 *Build: The Making of a Museum*. February 1, 2013.

Yuba County Planning Department

2013 Yuba County Planning Department Notice Preparation of Draft Environmental Impact Report/Environmental Assessment and Notice of Scoping Meeting. March 29, 2013. Cited June 3, 2013. Available from: http://sfmea.sfplanning.org/2013.0175E_NOP1.pdf.

Zeiner, D.C., Laudenslayer, W.F., Mayer, K.E., and M. White

1990 *California's Wildlife. Volume II: Birds and Volume III: Mammals*. California Statewide Wildlife Habitat Relationships System. California Department of Fish and Game. Sacramento, CA. Cited October 28, 2013. Available from: http://www.co.monterey.ca.us/planning/gpu/2007_GPU_DEIR_Sept_2008/Text/References/Zeiner1990a.pdf.

Zimmerman, R. C., J. L. Reguzzoni, S. Wyllie-E cheverria, M. Josselyn & R. S. Alberte
1991 Assessment of Environmental Suitability for Growth of Zostera-Marina (Eelgrass) in San-Francisco Bay. *Aquatic Botany*, 39: 353-366. Cited October 23, 2013. Available from: www.sciencedirect.com/science/article/pii/030437709190009T.

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Appendixes

APPENDIX A
SPECIAL STATUS SPECIES TABLES

TABLE A-1. FEDERALLY LISTED SPECIES WITH THE POTENTIAL TO OCCUR IN THE STUDY AREA

(FISH AND MARINE MAMMALS LISTED IN TABLE 28)

Species	Federal	State	Habitat Association	Potential to Occur
Invertebrates				
San Bruno elfin butterfly (*Callophrys mossii bayensis*)	E	-	Rocky outcrops and cliffs in coastal scrub on the San Francisco peninsula that support its host plant, stonecrop (*Sedum spathulifolium).*	No potential to occur. Habitat not present.
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	T	-	Shallow, serpentine-derived or similar soils in the San Francisco Bay Area. Primary host plant is the native plantain (*Plantago erecta).* Populations are known only from San Mateo and Santa Clara counties.	Very low potential to occur. Coastal scrub habitat may be marginally suitable for host species. No recorded observations in the study area.
Black abalone *(Haliotes cracherodii*)	E	-	Rocky intertidal and subtidal habitats.	No potential to occur. Habitat not present.
White abalone (*Haliotes sorenseni*)	E	-	Open low and high relief rock or boulder habitat that is interspersed with sand channels	No potential to occur. Habitat not present.
Mission blue butterfly (*Icaricia icarioides missionensis*)	E	-	Coastal chapparal and grasslands that support its host plants, perennial lupines (*Lupinus albifrons, L. Variicolor*, and *L. Formosus*).	Low potential to occur. Coastal scrub habitat may be marginally suitable for host species. Recorded observations in grasslands of Marin Headlands.
Callippe silverspot butterfly (*Speyeria callippe callippe*)	E	-	Grasslands that support its host plant, Johnny jump-up (*Viola pedunculata*). Populations are known only from San Bruno Mountain on the San Francisco peninsula.	No potential to occur. Habitat not present.
Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*)	E	-	Dunes, scrub, and grasslands immediately adjacent to the coast. Populations are known only from Marin County.	No potential to occur. Habitat not present.
Amphibians				
California red-legged frog (Rana draytonii)	T	-	Streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons and adjacent uplands.	No potential to occur. Habitat not present.
Reptiles				
Loggerhead turtle (*Caretta caretta*)	T	-	Open ocean, seldom along the California coast.	No potential to occur. Habitat not present.

Species	Federal	State	Habitat Association	Potential to Occur
Green turtle (*Chelonia mydas*)	T	-	Warm-water bays and lagoons.	No potential to occur. Habitat not present.
Leatherback turtle (*Dermochelys coriacea*)	E	-	Open ocean, California coast, bays, and estuaries.	No potential to occur. Habitat not present.
Olive Ridley sea turtle (*Lepidochelys olivacea*)	T	-	Bay and lagoons, seldom in California.	No potential to occur. Habitat not present.
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	T	T	Chaparral and scrub habitats, adjacent grassland, oak savanna, and woodland habitats. Mostly south-facing slopes and ravines with rock outcrops, deep crevices, or abundant rodent burrows.	No potential to occur. Habitat not present.
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	E	E	Wetlands or grasslands near ponds, marshes, and sloughs.	No potential to occur. Habitat not present.
Birds				
Marbled murrelet (*Brachyramphus marmoratus*)	T	E	Coastal waters; nests inland in old-growth redwood forests and in Marin County in Douglas fir forests.	No potential to occur. Habitat not present.
Western snowy plover (*Charadrius alexandrinus nivosus*)	T	SSC	Flat, open coastal beaches, dunes, and near stream mouths.	No potential to occur. Habitat not present.
California clapper rail (*Rallus longirostris obsoletus*)	E	E; FP	Saltmarshes along San Francisco Bay.	No potential to occur. Habitat not present.
California least tern (*Sternula antillarum brown*ii)	E	E; FP	Shallow estuaries and lagoons.	Low potential to occur. Known to occur in Horseshoe Bay.
Northern spotted owl (*Strix occidentalis caurina*)	T	-	Old-growth forests or mixed stands of old-growth and mature trees. Occasionally in younger forests w/patches of big trees. High, multistory canopy dominated by big trees, many trees w/cavities or broken tops, woody debris, and space under canopy.	No potential to occur. Habitat not present.

Species	Federal	State	Habitat Association	Potential to Occur
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	-	SC	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as odonata are abundant, nesting timed with maximum emergence of aquatic insects.	No potential to occur. Habitat not present.
Mammals				
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	E	E, FP	Saline emergent wetlands only; requires pickleweed.	No potential to occur. Habitat not present.
Plants				
Presidio manzanita (*Arctostaphylos montana ssp. ravenii*)	E	E; 1B.1	Serpentinite soils in chaparral, coastal prairie and coastal scrub. Known from only one extant native occurrence at the Presidio in San Francisco	No potential to occur. Habitat not present.
Pallid manzanita (*Arcostaphylos pallida*)	T	E; 1B.1	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub. Grows on uplifted marine terraces on siliceous shale or thin chert. May require fire.	No potential to occur. Habitat not present.
Marsh sandwort (*Arenaria paludicola*)	E	E; 1B.1	Sandy, openings, freshwater or brackish marshes and swamps. Populations are known only from Santa Cruz County.	No potential to occur. Habitat not present.
Tiburon mariposa lily (*Calochortus tiburonensis*)	T	T; 1B.1	Valley and foothill grassland. On open, rocky, slopes in serpentine grassland.	No potential to occur. Habitat not present.
Tiburon paintbrush (*Castilleja affinis ssp. neglecta*)	E	T; 1B.2	Valley and foothill grassland. Rocky serpentine sites.	No potential to occur. Habitat not present.
Robust spineflower (*Chorizanthe robusta* var. *robusta*)	E	1B.1	Sandy or gravelly soils in maritime chaparral, openings in cismontane woodland, coastal dunes and coastal scrub. Most populations extirpated, and now known from only six extended occurrences in Santa Cruz and Monterey Counties	No potential to occur. Habitat not present.
Presidio clarkia (*Clarkia franciscana*)	E	E; 1B.1	Coastal scrub and serpentinite soils in valley and foothill grassland	No potential to occur. Habitat not present.

Species	Federal	State	Habitat Association	Potential to Occur
Marin dwarf-flax (*Hesperolinon congestum*)	T	T; 1B.1	Serpentinite soils in chaparral and valley and foothill grassland	No potential to occur. Habitat not present.
Santa Cruz tarplant (*Holocarpha macradenia*)	T	E; 1B.1	Coastal prairie, valley and foothill grassland. Light, sandy soil or sandy clay; often with non-natives.	No potential to occur. Habitat not present.
Beach layia (*Layia camosa*)	E	E; 1B.1	Coastal dunes and sandy soils in coastal scrub.	No potential to occur. Habitat not present.
San Francisco lessingia (*Lessingia germanorum*)	E	E; 1B.1	Remnant dunes in coastal scrub. Populations known from only four occurrences in the Presidio.	No potential to occur. Habitat not present.
White-rayed pentachaeta (*Pentachaeta bellidiflora*)	E	E; 1B.1	Cismontane woodland and serpentine soils in valley and foothill grassland	No potential to occur. Habitat not present.
Tiburon jewelflower (*Streptanthus glandulosus ssp. niger)*	E	E; 1B.1	Valley and foothill grassland. Shallow, rocky serpentine slopes.	No potential to occur. Habitat not present.
California sea blite *(Suaeda californica*)	E	1B.1	Coastal salt marshes and swamps. Populations known only from Morrow Bay and near Cayucos Point; considered extirpated in the San Francisco Bay area	No potential to occur. Habitat not present.
Showy rancheria clover (*Trifolium amoenum*)	E	1B.1	Coastal bluff scrub and valley and foothill grasslands (occasionally serpentinite soils)	No potential to occur. Habitat not present.

Notes:
(Source: CNDDB and USFWS database search of project and surrounding quadrangles; San Francisco North, San Rafael, San Quentin, Richmond, Point Bonita, Oakland West, Hunters Point, San Francisco South)
E – endangered
T – threatened
SSC – state species of special concern
Rare Plant Rank 1B.1 – rare, threatened, or endangered in California and elsewhere; seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

TABLE A-2. STATE LISTED THREATENED AND ENDANGERED PLANTS AND ADDITIONAL SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR IN THE STUDY AREA

(FISH AND MARINE MAMMALS LISTED IN TABLE 28)

Species	Federal	State	Habitat Association	Potential to Occur
Amphibians				
Foothill yellow-legged frog (*Rana boylii*)	-	SC	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying.	No potential to occur. Habitat not present.
Reptiles				
Western pond turtle (*Emys marmorata*)	-	SSC	freshwater ponds, marshes and year-round streams	No potential to occur. Habitat not present.
Birds				
Short-eared owl (*Asio flammeus*)	-	SSC	Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	No potential to occur. Habitat not present.
Burrowing owl (*Athene cunicularia*)	-	SSC	Open, dry annual or perennial grasslands, deserts & scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	No potential to occur. Habitat not present.
Northern harrier (*Circus cyaneus*)	-	SSC	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	No potential to occur. Habitat not present.
Salt marsh common yellowthroat (*Geothylpis trichas sinuosa*)	-	SSC	Tidal salt marshes with adjacent riparian vegetation	No potential to occur. Habitat not present.
California black rail (*Lateralus jamaicensis coturniculus*)	-	T; FP	Tidal salt marshes	No potential to occur. Habitat not present.

Species	Federal	State	Habitat Association	Potential to Occur
Alameda song sparrow (*Melospiza melodia pusillula*)	-	SSC	Tidal salt marshes	No potential to occur. Habitat not present.
San Pablo song sparrow (*Melospiza melodia samuelis*)	-	SSC	Tidal salt marshes	No potential to occur. Habitat not present.
California brown pelican (*Pelecanus occidentalis californicus*)	D	FP	Coastal waters along the Pacific Coast	Potential to occur.
Bank swallow (*Riparia riparia*)	-	T	Vertical banks or bluffs of friable soils suitable for burrowing	No potential to occur. Habitat not present.
Mammals				
Pallid bat *Antrozous pallidus*	-	SSC	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low to moderate potential to occur. May roost in abandoned or minimally occupied structures within the study area.
Townsend's big-eared bat (*Corynorhinus (Plecotus) townsendii*)	-	SSC	Caves, mines, tunnels, buildings, or other human-made structures for roosting	Low to moderate potential to occur. May roost in abandoned or minimally occupied structures within the study area.
Western red bat (*Lasiurus blossevillii*)	-	SSC	Woodland borders, rivers, agricultural areas, and urban areas with mature trees	Low to moderate potential to occur. May roost in trees within the project area.
San Pablo vole (*Microtus californicus sanpabloensis*)	-	SSC	Saltmarshes of San Pablo Creek, on the south shore of San Pablo Bay. Constructs burrow in soft soil. Feeds on grasses, sedges and herbs. Forms a network of runways leading from the burrow	No potential to occur. Habitat not present.
Big free-tailed bat (*Nyctinomops macrotis*)	-	SC	Low-lying arid areas in southern California. Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	Low to moderate potential to occur. May roost or forage in the project area.

Species	Federal	State	Habitat Association	Potential to Occur
Salt-marsh wandering shrew (*Sorex vagrans halicoetes*)	-	SSC	Salt marshes of the south arm of San Francisco Bay. Medium high marsh 6-8 ft above sea level where abundant driftwood is scattered among salicornia.	No potential to occur. Habitat not present.
American badger (*Taxidea taxus*)	-	SSC	Open, arid habitats, commonly in grasslands, savannas, mountain meadows, and open areas of desert scrub	Low potential to occur. Known to occur in grasslands of Marin Headlands. May frequent coastal scrub at Fort Baker.
Point Reyes jumping mouse (*Zapus trinotatus orarius*)	-	SSC	Coastal forests; restricted to Point Reyes Peninsula	No potential to occur. Habitat not present.
Plants				
San Bruno Mountain manzanita (*Arctostaphylos imbricata*)	-	E; 1B.1	Rocky areas in chaparral and coastal scrub. Population known from fewer than five occurrences on San Bruno Mountain	No potential to occur. Habitat not present.
San Francisco popcorn-flower (*Plagiobothrys diffuses*)	-	E; 1B.1	Coastal prairie and valley and foothill grassland. Populations in San Francisco are considered extirpated.	No potential to occur. Habitat not present.
North Coast semaphore grass (*Pleuropogon hooverianus*)	-	T; 1B.1	Broadleafed upland forest, meadows and seeps, north coast coniferous forest. Wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments.	No potential to occur. Habitat not present.

Notes:
T – threatened
D- Delisted
FP – fully protected
SSC – state species of special concern
Rare Plant Rank 1B.1 – rare, threatened, or endangered in California and elsewhere; seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

Additional Special-Status Plants. Plant species with a California Rare Plant Rank (CRPR) 1B (Plants Rare, Threatened or Endangered in California and Elsewhere), 2 (Plants Rare, Threatened or Endangered in California but More Common Elsewhere) or 3 (Plants About Which We Need More Information) are listed in Table B-3 below. Based on the current habitat conditions and the known range of these species, none of these have potential to occur within the study area:

TABLE A-3. ADDITIONAL CNPS LIST PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE STUDY AREA

Common Name	Scientific Name	California Rare Plant Rank
Napa false indigo	*Amorpha californica var. napensis*	1B.2
Bent-flowered fiddleneck	*Amsinckia lunaris*	1B.2
Franciscan manzanita	*Arctostaphylos franciscana*	1B.1
Montara manzanita	*Arctostaphylos montaraensis*	1B.2
Pacific manzanita	*Arctostaphylos pacifica*	1B.2
Marin manzanita	*Arctostaphylos virgata*	1B.2
Alkali milk-vetch	*Astragalus tener* var. *tener*	1B.2
Round-leaved filaree	*California macrophylla*	1B.1
Coastal bluff morning-glory	*Calystegia purpurata ssp. saxicola*	1B.2
Bristly sedge	*Carex comosa*	2B.1
Point Reyes bird's-beak	*Chloropyron maritimum* ssp. *palustre*	1B.2
San Francisco Bay spineflower	*Chorizanthe 8uspidate* var. *cuspidata*	1B.2
Franciscan thistle	*Cirsium andrewsii*	1B.2
Mt. Tamalpais thistle	*Cirsium hydrophilum var. vaseyi*	1B.2
Compact cobwebby thistle	*Cirsium occidentale* var. *compactum*	1B.2
Round-headed Chinese-houses	*Collinsia corymbosa*	1B.2
San Francisco collinsia	*Collinsia multicolor*	1B.2
Western leatherwood	*Dirca occidentalis*	1B.2
Tiburon buckwheat	*Eriogonum luteolum var. caninum*	1B.2
Minute pocket moss	*Fissidens pauperculus*	1B.2
Marin checker lily	*Fritillaria lanceolata var. tristulis*	1B.1
Fragrant fritillary	*Fritillaria liliacea*	1B.2
Blue coast gilia	*Gilia capitata ssp. chamissonis*	1B.1
Dark-eyed gilia	*Gilia millefoliata*	1B.2
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	3.2
Diablo helianthella	*Helianthella castanea*	1B.2
White seaside tarplant	*Hemizonia congesta* ssp. *congesta*	1B.2
Short-leaved evax	*Hesperevax sparsiflora* var. *brevifolia*	1B.2
Loma Prieta hoita	*Hoita strobilina*	1B.1
Kellogg's horkelia	*Horkelia cuneata* ssp. *sericea*	1B.1
Thin-lobed horkelia	*Horkelia tenuiloba*	1B.2
Rose leptosiphon	*Leptosiphon rosaceus*	1B.1

Common Name	Scientific Name	California Rare Plant Rank
Tamalpais lessingia	*Lessingia micradenia var. micradenia*	1B.2
Arcuate bush-mallow	*Malacothamnus arcuatus*	1B.1
Marsh microseris	*Microseris paludosa*	1B.2
Marin County navarretia	*Navarretia rosulata*	1B.2
Choris' popcorn-flower	*Plagiobothrys chorisianus* var. *chorisianus*	1B.2
Hairless popcorn-flower	*Plagiobothrys glaber*	1A
Oregon polemonium	*Polemonium carneum*	2B.2
Marin knotweed	*Polygonum marinense*	3.1
Adobe sanicle	*Sanicula maritime*	1B.1
Point Reyes checkerbloom	*Sidalcea calycosa ssp. rhizomata*	1B.2
San Francisco campion	*Silene verecunda* ssp. *verecunda*	1B.2
Santa Cruz microseris	*Stebbinsoseris decipiens*	1B.2
Mount Tamalpais bristly jewel-flower	*Streptanthus glandulosus ssp. pulchellus*	1B.2
Suisun Marsh aster	*Symphyotrichum lentum*	1B.2
Saline clover	*Trifolium hydrophilum*	1B.2
San Francisco owl's-clover	*Triphysaria floribunda*	1B.2
Coastal triquetrella	*Triquetrella californica*	1B.2

Notes:
Rare Plant Rank 1B.1 – rare, threatened, or endangered in California and elsewhere; seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
Rare Plant Rank 1B.2 – rare, threatened, or endangered in California and elsewhere; fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
Rare Plant Rank 2.1 – rare, threatened, or endangered in California but more common elsewhere; seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
Rare Plant Rank 2.2 – rare, threatened, or endangered in California but more common elsewhere; fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
Rare Plant Rank 3 – a review list of plants about which more information is needed
Rare Plant Rank 3.1 – a review list of plants about which more information is needed; seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat

APPENDIX B
AIR QUALITY ANALYSIS

DRAFT

Air Quality Analysis

In Support of:

National Park Service Alcatraz Ferry Embarkation Environmental Impact Statement

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January 2014

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Appendix A: Supporting Documentation

ACRONYMS

AB32	Assembly Bill 32 California Global Warming Solutions Act of 2006
ABAG	Association of Bay Area Governments
AQI	Air Quality Impact
AQS	Air Quality Study
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BMP	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
CAFE	Corporate Average Fuel Economy Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2-e	Carbon Dioxide Equivalent
DOC	Diesel Oxidation Catalyst
DPM	Diesel Particulate Matter
EIS	Environmental Impact Statement
GHG	Greenhouse Gas
GVWR	Gross Vehicle Weight Rating
GWP	Global Warming Potential
hp	Horsepower
LCFS	Low Carbon Fuel Standard
LDVR	Light Duty Vehicle Rule
mph	Miles per Hour
MTC	Metropolitan Transportation Commission
mty	Metric Tons per Year
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act

NHTSA	National Highway Traffic Safety Administration
NMHC	Non-Methane Hydrocarbon
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NPS	National Parks Service
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
PERP	Portable Equipment Registration Program
PFCs	Perfluorocarbons
PM_{10}	Particulate Matter, diameter <10 microns
$PM_{2.5}$	Particulate Matter, diameter <2.5 microns
ppm	Parts Per Million
RFS	Renewable Fuel Standard
SCR	Selective Catalytic Reduction
SF_6	Sulfur Hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 Introduction

This Air Quality Study (AQS) was prepared in support of the Alcatraz Ferry Embarkation Draft Environmental Impact Statement (EIS) for the National Parks Service (NPS or Park Service). The Park Service seeks to establish a permanent embarkation and education site for the principal ferry service between the northern San Francisco waterfront and Alcatraz. The Park Service is the lead agency in preparation of the EIS under the National Environmental Policy Act (NEPA). A detailed discussion of Project purpose, objectives, as well as benefits and constraints of the No Action Alternative and proposed actions under the three action alternatives are discussed in detail in the Project Description section of the EIS and are presented here in summary.

The No Action Alternative

The No Action Alternative represents no change from the Park Service's current management direction and provides a baseline for evaluating impacts under the proposed action alternatives. Although it assumes a continuation of existing conditions, where a permanent Alcatraz ferry embarkation site would not be established, for the purpose of analyzing potential impacts this AQS assumes that the site of the current ferry embarkation would remain at Pier 31.5. There would be no construction activities under the No Action Alternative. Operational emission sources would include marine ferries, visitor vehicles, and delivery vehicles in support of continuing ferry service.

Pier 3 Alternative

The Pier 3 Alternative would locate the ferry embarkation site in Fort Mason's historic Pier 3 shed. This alternative proposes to retrofit existing Pier 3 substructure, upgrade/improve the existing building shed to accommodate proposed elements, and create a third berth to increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This Alternative would also include a special ferry service to Fort Baker. In contrast to the No Action Alternative, a shuttle service from Fisherman's Wharf to Fort Mason would be required to manage parking constraints.

Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles. Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service.

Pier 31.5 Alternative

The Pier 31.5 Alternative would retain the current Alcatraz ferry embarkation site at Pier 31.5 and improve the existing facility to better accommodate visitors and retrofit aged infrastructure. This alternative would construct a third berth at Pier 31.5, which would increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This Alternative would also include a special ferry service to Fort Baker and a special ferry or water taxi service to Fort Mason at Pier 3.

Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles. Sources of operational emissions would include marine ferries to Alcatraz and Fort Baker, visitor vehicles, and delivery vehicles in support of the ferry service.

Pier 41 Alternative

The Pier 41 Alternative would return the embarkation site to Pier 41, which served as the Alcatraz ferry embarkation site between the early 1980s and 2006. This alternative would expand and retrofit the

existing building structure to accommodate the proposed elements, would demolish and rebuild the older pier, built in the 1910s, and would retrofit the newer pier, built in the 1980s. This alternative, similar to the Pier 31.5 Alternative, would create a third berth to increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This Alternative would also include a special ferry service to Fort Baker and a special ferry or water taxi service to Fort Mason at Pier 3.

Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles. Sources of operational emissions would include marine ferries to Alcatraz and Fort Baker, visitor vehicles, and delivery vehicles in support of the ferry service.

The Park Service intends that the selected site be capable of providing special ferry service to Fort Baker and to other destinations in San Francisco Bay in the future. The following elements are seen as common to all action alternatives:

- A special ferry service (i.e., a service with no regular schedule and primarily used for special events) to Fort Baker.

  The *Fort Baker Plan Final EIS* (NPS 1999) provided a comprehensive plan for future uses and improvements of Fort Baker. However, the Fort Baker Plan was not explicit about ferry use at the existing pier. This AQS analyzes construction and operational activities at Fort Baker necessary to accommodate a special ferry service to the primary embarkation site, selected from one of the action alternatives.

  The construction necessary to establish ferry service at Fort Baker would include upgrades to the existing 1930s concrete pier. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles. Sources of operational emissions would include marine ferries from Fort Baker to one of the selected embarkation sites (Pier 3, Pier 31.5 or Pier 41). Since the special service to Fort Baker would only occur if one of the action alternatives is selected, visitor vehicles, and delivery vehicles are analyzed as part of the action alternatives. The existing shuttle service at Fort Baker was previously analyzed in the Fort Baker Plan EIS and is not analyzed in this AQS.

- Ferry service from the primary Alcatraz embarkation site to other locations on the San Francisco Bay.

  The Park Service believes that the ability of the selected embarkation site to provide service to other destinations in San Francisco Bay, in the future, would enhance the connectivity and accommodation of visitor demands. Such connections could be developed through additional ferry and/or shuttle service. However, these additional ferry and shuttle service activities are not yet defined and would require site-specific analyses and market forecasts. Therefore, a quantitative analysis of services to destinations other than Alcatraz Island is not included in this AQS. A programmatic assessment of providing ferry service from the primary Alcatraz embarkation site to other locations in the San Francisco Bay is provided in the EIS.

- A special ferry or water tax service to/from Fort Mason at Pier 3 is included as part of the Pier 31.5 and 41 action alternatives.

This AQS analyzes air emissions and impacts related to air quality due to construction and operation of the No Action Alternative and the proposed action alternatives. The AQS compares the impacts from the three action alternatives to the No Action Alternative, also referred to as the NEPA baseline, identified and described in detail in the EIS.

2.0 Environmental Setting

This section evaluates the existing regional and local air quality conditions from both stationary and mobile sources of air emissions. Development of this section was based on a review of existing documentation of air quality conditions in the region, air quality regulations from the United States Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), the Bay Area Air Quality Management District (BAAQMD), and information related to the proposed Project.

The proposed Project activities would be limited to the proposed embarkation sites, the San Francisco Bay, and surrounding roadways, within the peninsula region of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma, and the southwestern portion of Solano County. Potential air quality impacts associated with the proposed Project would be within the jurisdiction of the BAAQMD.

2.1 Regional Climate and Meteorology

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

The project area is located in the SFBAAB's San Francisco peninsula climatological subregion. The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits resulting in a western coast gap, Golden Gate, and an eastern coast gap, Carquinez Strait, which allow air to flow in and out of the SFBAAB and the Central Valley.

The climate in the SFBAAB is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface due to the northwesterly flow produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts southward resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms.

The peninsula climatological subregion of the SFBAAB extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end and decreasing to 500 feet in South San Francisco, and below 200 feet in North San Francisco. Because most of topography, in the project area, is below 200 feet, marine air is able to flow easily, making the climate cool and windy.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. The coastal portions of the peninsula experience a high incidence of cool, foggy weather in the summer. In the project area, the mean maximum summer temperatures are in the mid-60's, whereas the mean minimum temperature during the winter months are in the low 40's. The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. Annual average wind speeds range from 5 to 10 miles per hour (mph) throughout the peninsula, with higher wind speeds along the coast.

2.2 Criteria Air Pollutants Ambient Air Quality

The USEPA establishes the national ambient air quality standards (NAAQS). For a region to be considered NAAQS attainment, maximum concentrations for most pollutants, must neither exceed an NAAQS more than once per year nor exceed the annual standards. The CARB establishes the California Ambient Air Quality Standards (CAAQS), which are generally more stringent and include more pollutants than the NAAQS. For a region to be considered CAAQS attainment, maximum pollutant concentrations must not equal or exceed the CAAQS. These standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and as such include a reasonable margin of safety to protect the more sensitive individuals in the population.

Pollutants that have corresponding NAAQS and CAAQS are known as criteria pollutants. The criteria pollutants of primary concern in this air quality assessment are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with particle diameter less than 10 microns (PM_{10}), and particulate matter with particle diameter less than 2.5 microns ($PM_{2.5}$). Criteria pollutants contribute directly to regional health issues. The known adverse effects associated with these criteria pollutants are shown in Table 2-1.

Of the criteria pollutants of concern, ozone is unique because it is not directly emitted from project-related sources. Rather, ozone is a secondary pollutant, formed from the precursor pollutants volatile organic compounds (VOC) and nitrogen oxides (NOx). VOC and NOx react to form ozone in the presence of sunlight through a complex series of photochemical reactions. As a result, unlike inert pollutants, ozone levels usually peak several hours after the precursors are emitted and many miles downwind of the source. Because of the complexity and uncertainty in predicting photochemical pollutant concentrations, ozone impacts are indirectly addressed in this study by comparing project-generated emissions of VOC and NOx to daily emission thresholds set by the BAAQMD and by comparing pollutant concentrations to NAAQS and CAAQS.

Air quality at a given location can be characterized by the concentration of various pollutants in the air. Units of concentration are generally expressed as parts per million on a volume basis (ppmv) or micrograms per cubic meter (µg/m3) of air. The significance of a pollutant concentration is determined by comparing the concentration to an appropriate NAAQS or CAAQS.

Table 2-1 Adverse Effects Associated with Criteria Pollutants

Pollutant	Sources	Adverse Effects
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals and (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage.
Carbon	Incomplete combustion of fuels and other	(a) Aggravation of some coronary heart disease;

Pollutant	Sources	Adverse Effects
Monoxide (CO)	carbon-containing substances, such as motor vehicle exhaust; natural events, such as decomposition of organic matter.	(b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible birth defects.
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust; high temperature stationary combustion; atmospheric reactions.	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration.
Sulfur Dioxide (SO_2)	Combination of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ore; industrial processes.	(a) Broncho-constriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM_{10} and $PM_{2.5}$)	Combustion of fuels; construction activities; industrial processes; atmospheric chemical reactions.	(a) Excess deaths from short-term and long-term exposures; (b) excess seasonal declines in pulmonary function, especially in children; (c) asthma exacerbation and possibly induction; (d) adverse birth outcomes including low birth weight; (e) increased infant mortality; (f) increased respiratory symptoms in children such as cough and bronchitis; and (g) increased hospitalization for both cardiovascular and respiratory disease (including asthma)[a]
Lead[b]	Metal processing.	Behavioral and hearing disabilities in children; nervous system impairment.

Source: BAAQMD 2011, CARB 2009a
Notes:
[a] More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: OEHHA, *Particulate Matter Health Effects and Standard Recommendations* (www.oehha.ca.gov/air/toxic_contaminants/PM_{10}notice.html#may), May 9, 2002 (OEHHA 2002); and USEPA, *Air Quality Criteria for Particulate Matter*, October 2004.

[b] California Ambient Air Quality Standards have also been established for lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. They are not shown in this table because they are not pollutants of concern for the proposed Project.

USEPA designates all areas of the United States according to whether they meet the NAAQS. A nonattainment designation means that a primary NAAQS has been exceeded more than once per year in a given area. States with nonattainment areas prepare a State Implementation Plan (SIP) that demonstrates how those areas will come into attainment.

USEPA currently designates the San Francisco portion of the SFBAAB as marginal nonattainment for 8-hr O_3 and attainment/unclassified for PM_{10}, CO, NO_2, and SO_2 (USEPA 2013). Furthermore, in January 2013 the USEPA issued a final rule stating that the SFBAAB has attained the 24-hour PM2.5 NAAQS.

The CARB also designates areas of the state according to whether they meet the CAAQS. A nonattainment designation means that a CAAQS has been exceeded more than once in 3 years. The CARB currently designates the San Francisco portion of the SFBAAB as serious nonattainment for O_3, nonattainment for $PM_{2.5}$ and $PM_{10,}$ and attainment/unclassified for CO, NO_2, SO_2, sulfates, hydrogen sulfide, lead, and visibility reducing particles.

Local Air Monitoring Levels

Air quality conditions in the SFBAAB have improved significantly since the BAAQMD was created in 1955. Since that time ambient concentrations and the number of days on which the region exceeds standards have declined dramatically (BAAQMD 2013).

The CARB and BAAQMD operate a network of monitoring stations that regularly measure the concentrations of the major criteria air pollutants. Air pollutant monitoring data is available through the CARB's iADAM Air Quality Data Statistics Database (CARB 2013). The most representative and closest station for the project vicinity is the San Francisco-Arkansas Street monitoring station, which monitors O_3, PM_{10}, $PM_{2.5}$, NO_2 and CO, but does not monitor SO_2. Ambient air measurements for SO_2 were obtained from the Berkeley–6th Street monitoring station, also located close to the project vicinity. Table 2-2 shows the highest pollutant concentrations recorded at the station for 2010 to 2012, the most recent complete 3-year period of data available from the CARB. Table 2-2 shows exceedances of the NAAQS and/or CAAQS in bold.

Table 2-2 Maximum Pollutant Concentrations Measured at the San Francisco - Arkansas Street Monitoring Station

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration		
				2010	**2011**	**2012**
O_3 (ppm)	1-hour	--	0.09	0.079	0.070	0.069
	8-hour [a]	0.075	0.07	0.051	0.054	0.048
CO (ppm)	1-hour	35	20	na	Na	na
	8-hour	9	9	1.37	1.20	1.19
NO_2 (ppm)	1-hour National [b]	0.100	--	0.0766	0.0796	0.0659
	1-hour State	--	0.18	0.080	0.090	0.090
	Annual	0.053	0.030	0.013	0.014	0.012
SO_2 (ppm) [e]	1-hour National [c]	0.075	--	na	na	na
	1-hour State	--	0.25	na	na	na
	24-hour	--	0.04	0.003	nd	nd
PM_{10} ($\mu g/m^3$)	24-hour National	150	--	38.6	43.7	48.2
	24-hour State	--	50	39.7	45.6	**50.6**

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration		
				2010	2011	2012
	Annual	--	20	nd	19.5	17.5
$PM_{2.5}$ ($\mu g/m^3$)	24-hour [d]	35	--	24.4	26.4	21.5
	Annual	15	12	10.5	9.5	8.2

Source: iADAM ARB database - historical air quality data, 2010-2012 (CARB 2013).

Notes: Exceedances of the standards are highlighted in bold.
$\mu g/m^3$- micrograms per cubic meter
ppm - parts per million
na – not available
nd - insufficient data
[a] The monitored concentrations reported for the national 8-hour O_3 standard represent the 3-year average (including the reported year and the prior 2 years) of the 4th-highest 8-hour concentration each year.
[b] The monitored concentrations reported for the national 1-hour NO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th %ile of the annual distribution of daily maximum 1-hour average concentrations.
[c] The monitored concentrations reported for the national 1-hour SO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 99th %ile of the annual distribution of daily maximum 1-hour average concentrations.
[d] The monitored concentrations reported for the national 24-hour $PM_{2.5}$ standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th %ile of the annual distribution of daily average concentrations.
[e] Arkansas Street monitoring station does not monitor SO_2; Berkeley–6th Street monitoring station was used.

2.3 Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). TACs include air pollutants that can produce adverse human health effects, including carcinogenic effects, after short-term (acute) or long-term (chronic) exposure.

In 1998, the CARB identified diesel particulate matter (DPM), the exhaust from diesel engines, as a TAC. CARB determined that the estimated cancer risk from exposure to DPM was higher than the risk from all other TACs combined. In the 2009 California Almanac of Emissions, the CARB estimated that 79% of total statewide cancer risk was attributable to DPM (CARB 2009b). In the SFBAAB, cancer risk from DPM, as determined by the CARB, declined from 750 in one million in 1990, to 570 in one million in 1995, and further to 480 in one million in 2000. With the advent of CARB's Diesel Risk Reduction Plan, approved in 2000, statewide cancer risk is expected to decrease to below 100 in one million by 2020, a decrease of 80% from 2000 levels (CARB 2009b).

2.4 Sensitive Receptors

Air quality does not affect individuals in a given population in the same way; some groups may be more sensitive than others to adverse health effects. The impact of air emissions on sensitive members of the population is a special concern. Sensitive receptor groups include children, the elderly, and the acutely and chronically ill. Land uses and facilities such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their

residences, with associated greater exposure to ambient air quality conditions. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. However, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools. Table 2-3 shows the closest sensitive receptors to each project alternative site; project alternatives are discussed in detail in the Project Description of the EIS and in summary in Section 1.0, Introduction, of this AQS.

Table 2-3 Sensitive Receptors

Project Site	Receptor Type and Location	Distance from Project Area
Pier 3	Residential, corner of Marina Boulevard and Buchanan Street	330 meters southwest
Pier 31.5	Residential, corner of Sansome Street and Chestnut Street	220 meters south
Pier 41	Residential, North Point Street and Powell Street	225 meters south
Fort Baker	Residential, corner of Bunker Road and McReynolds Road	450 meters north-northwest
Source: GoogleEarth		

2.5 Greenhouse Gas Emissions

Gases that trap heat in the atmosphere are called greenhouse gases (GHGs). GHGs are emitted by natural processes and human activities. Examples of GHGs that are produced both by natural processes and industry include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons HFCs and perfluorocarbons PFCs) and sulfur hexafluoride.

The accumulation of GHGs in the atmosphere regulates the earth's temperature and without these natural GHGs, the earth's surface would be about 61°F cooler (AEP 2007). However, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels.

Scientific evidence indicates a trend of increasing global temperatures near the earth's surface over the past century due to increased human induced levels of GHGs. According to the Intergovernmental Panel on Climate Change (IPCC 2007), the atmospheric concentration of CO_2 in 2005 was 379 ppm compared to the pre-industrial levels of 280 ppm. In addition, the Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO_2 emissions increased by 20% from 1990 to 2004, while CH_4 and N_2O emissions decreased by 10% and 2%, respectively. Studies suggest a close relationship between the increased concentration of GHGs in the atmosphere and global temperatures.

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase in global temperatures, which in turn has numerous indirect effects on the environment and humans. For example, some observed changes include shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees. Other, longer-term environmental impacts of global warming may include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack. Data suggest that in the next 25 years, California could

experience longer, more frequent and more extreme heat waves, longer dry periods, an increase in wildfires, and sea level rise.

The 2009 California Climate Adaptation Strategy is a multi-sector strategy with the objective to guide California's efforts in adapting to climate change impacts. The Adaptation Strategy summarizes the science on climate change impacts in seven specific sectors and provides recommendations on how to manage against those threats. As part of the Adaptation Strategy mandate, the California Natural Resources Agency and the California Energy Commission developed Cal-Adapt, a web-based climate change adaptation tool. The Cal-Adapt tool enables users to identify potential climate change risks in specific areas throughout California. It is important to note that climate change models are intentionally conservative and may overestimate atmospheric heat retention and climate change impacts. Cal-Adapt projects the following in the areas surrounding the proposed Project vicinity (Cal-Adapt 2013):

- Temperature rise of approximately 3.2-5.5 ºF by the end of the century.
- Decrease of approximately 1-5 inches in annual precipitation by the end of the century.
- Increase of 26% in areas in threat of inundation during an extreme flood event (100 year flood).
- Cal-Adapt has not assigned wildfire risk or snow pack change to the area.

3.0 Regulatory Setting

The Federal Clean Air Act of 1969 (CAA) and its subsequent amendments established air quality regulations and the NAAQS, and delegated enforcement of these standards to the states. In California, the CARB is responsible for enforcing air pollution regulations. The CARB has, in turn, delegated the responsibility of regulating stationary emission sources to the local air agencies. In the SFBAAB, the local air agency is the BAAQMD. The following is a summary of the key federal, state, and local air quality rules, policies, and agreements that potentially apply to the project and its related activities.

3.1 Federal Regulations

3.1.1 Federal Regulations Affecting Criteria and Toxic Pollutants

State Implementation Plan

The San Francisco region is designated a nonattainment area for the federal 8-hour ozone air quality standard and as such is required, per the California Clean Air Act (CCAA) to undertake planning efforts to reach the health-based standard for ozone. In response to this requirement, the BAAQMD has been preparing ozone plans since 1982. The most recent ozone plan is the Bay Area 2010 Clean Air Plan. This plan is a multi-pollutant plan that provides an integrated control strategy to reduce ozone, particulate matter, TACs, and GHGs.

Furthermore, in January 2013, the USEPA determined that the SFBAAB had attained the 24-hour $PM_{2.5}$ NAAQS. This action suspends federal SIP planning requirements for SFBAAB (BAAQMD 2013).

Emission Standards for Non-road Diesel Engines

To reduce emissions from off-road diesel equipment, USEPA established a series of increasingly strict emission standards for new off-road diesel engines. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards were phased in from 2006 to 2008. Tier 4 standards, which require add-on emission control equipment to attain them, are being phased in between 2008 to 2015. These standards apply to project-related off-road construction equipment, based on year of manufacture.

Emission Standards for Marine Diesel Engines

To reduce emissions from Category 1 (greater than 50 horsepower [hp], less than 5 liters per cylinder displacement) and Category 2 (between 5 and 30 liters per cylinder displacement) marine diesel engines, USEPA established emission standards for new engines, referred to as Tier 2, 3 and 4 marine engine standards. Tier 2 standards were phased in between 2004 and 2007, depending on the engine size. Tier 3 standards are being phased in between 2009 and 2014. The after-treatment-based Tier 4 standards will be phased in from 2014 to 2017. These standards apply to project-related ferries, depending on year of engine manufacture.

Emission Standards for On-Road Trucks

Heavy-duty trucks are subdivided into three categories by the vehicle's gross vehicle weight rating (GVWR): light heavy-duty engines (8,500 to 19,500 GVWR), medium heavy-duty engines (19,500 to 33,000 GVWR), and heavy heavy-duty engines (greater than 33,000 GVWR).

To reduce emissions from on-road, heavy-duty diesel trucks, USEPA established a series of increasingly strict emission standards for new truck engines. The 1988-2003 emission standards applied to trucks

manufactured between 1988 and 2003. In 1997, USEPA adopted new emission standards for model year 2004 and later heavy-duty trucks. The goal of the 1997 regulation was to reduce NOx engine emissions to approximately 2.0 grams per brake horsepower (g/bhp). In 2000, USEPA adopted standards PM, NOx and nonmethane hydrocarbon (NMHC) for model year 2007 and later heavy-duty highway engines and a 15 ppm limit on the sulfur content of diesel fuel. The NOx and NMHC standards were phased in between 2007 and 2010; the PM standard applied to 2008 and newer engines. These standards apply to some supply delivery trucks used during project operation.

Non-road Diesel Fuel Rule

With this rule, USEPA set sulfur limitations for non-road diesel fuel, including marine vessels. For the proposed Project, this rule affects construction equipment and harbor craft, as well as ferries used during proposed Project operation, although the California Diesel Fuel Regulations (described under state regulations) generally pre-empt this rule. Under this rule, the diesel fuel used by off-road equipment and harbor craft was limited to 500 ppm sulfur content prior to June 1, 2007; and further limited to 15 ppm sulfur content (ultra low sulfur diesel) starting January 1, 2010 for non-road fuel, and June 2012 for and marine fuels.

Highway Diesel Fuel Rule

With this rule, USEPA set sulfur limitations for on-road diesel fuel to 15 ppm starting June 1, 2006.

General Conformity Rule

Section 176(c) of the CAA states that a federal agency cannot support an activity unless the agency determines that the activity will conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval must not: (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone.

In an area with a SIP (an area in non-attainment of a NAAQS), conformity can be demonstrated in one of four ways:

- By showing that the emission increases caused by an action are included in the SIP;
- By demonstrating that the State agrees to include the emission increases in the SIP;
- Through offsets; and
- Through mitigation.

USEPA created de minimis emission levels, which are based on the attainment status of the area under the NAAQS, in order to limit the need to conduct conformity determinations for actions with minimial emission increases. A project/action is not subject to a conformity determination when the total direct and indirect emissions from the project/actions are below the de minimis levels. The defined de minimis levels in the SFBAAB are listed in Table 3-1 (USEPA 2011). Federal actions with emissions below these levels are not obligated to perform a conformity determination.

Table 3-1 Conformity De Minimis Levels

	San Francisco Bay Area	
	Attainment Status	**Conformity De Minimis Level (tpy)**
8-hr O3	marginal nonattainment	100 (NOx), 50 (VOC)
CO	attainment	na
NO2	attainment	na
SO2	attainment	na
PM10	attainment	na
PM2.5	attainment	na
Source: 40 Code of Federal Regulations (CFR) Part 93 §193.		

These de minimis levels apply to construction and/or operation activities, depending on extent of the Federal authority over the activity. If the proposed action exceeds one or more of the de minimis levels, a more rigorous conformity determination would be the next step in the conformity evaluation process.

3.1.2 Federal Regulations Affecting GHGs

Mandatory Reporting of GHG Gases Rule

In response to the 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), USEPA issued the Mandatory Reporting of GHG Rule. Signed on September 22, 2009, the rule required that suppliers of fossil fuels and industrial GHGs, manufacturers of vehicles and engines outside of the light duty sector, and facilities that emit 25,000 metric tons or more of GHGs per year (mty) to submit annual reports to USEPA. The rule was intended to collect emissions data to guide future policy decisions on climate change. This rule, although not directly relevant to proposed activities, serves to highlight the developing GHG regulatory framework.

USEPA Tailoring Rule for GHG Emissions

On May 13, 2010, the USEPA issued the "tailoring" rule for GHG emissions, which targets the largest GHG emitters. Starting January 2, 2011, the largest GHG emitters have been subject to the CAA construction and operating permit requirements. Facilities already subject New Source Review permits for other pollutants will be required to include GHGs in their permits if they increase their emissions by 75,000 tons of carbon dioxide equivalent (CO2e) per year[1]. On July 1, 2011, the USEPA extended the requirements to new construction projects that emit at least 100,000 tons of GHGs and existing facilities that increase their emissions by 75,000 tons per year, even if they do not exceed thresholds for pollutants. GHG emissions will be accounted for in Title V operating permits if the source emits 100,000 tons of CO2e per year or more.

The USEPA GHG guidance for this rule explains that new and modified facilities will be required to implement Best Available Control Technology (BACT) to control GHGs. There is considerable uncertainty as to what controls must be installed. A BACT is a case-by-case analysis that considers technological feasibility, environmental effectiveness, and cost effectiveness of the control technology

[1] The effect each of individual GHG has on global warming is a combination of the volume of their emissions and their 100-year global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. GWP is a unitless quantity. CH_4 and N_2O are substantially more potent than CO_2, with GWPs (100-year horizon) of 21 and 310, respectively. GHG emissions are typically reported in terms of metric tonnes of carbon dioxide equivalents (CO_2e), which are calculated as the product of the mass emitted of a given GHG and its specific GWP. In this document, the unit metric tonnes per year (mty) is used to report GHG emissions.

at the particular facility. This rule, although not directly relevant to proposed activities, serves to highlight the developing GHG regulatory framework.

GHG Endangerment and Cause or Contribute Findings for GHGs under the Clean Air Act

On December 7, 2009, two findings were signed by USEPA regarding GHGs under section 202(a) of the CAA:

- Endangerment Finding: The USEPA found that the current and projected concentrations of the six key GHGs in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The USEPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG gas pollution which threatens public health and welfare.

Although these findings do not themselves impose any requirements on industry or other entities, this action is a prerequisite to finalizing the USEPA's proposed GHG emission standards for light-duty vehicles, which USEPA proposed in a joint proposal including the Department of Transportation's proposed Corporate Average Fuel Economy (CAFE) standards on September 15, 2009. The final rule became effective in January, 2010.

USEPA and NHTSA Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards

In May 2010 the USEPA in conjunction with the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) finalized the Light-Duty Vehicle Rule (LDVR) that establishes a national program consisting of GHG emissions standards and CAFE standards for light-duty vehicles (USEPA, 2010). LDVR standards first apply to new cars and trucks starting with model year 2012. Although the rule is designed to address GHG emissions, primarily, the fuel economy standards portion of the rule would serve to also reduce criteria pollutant emissions. On August 28, 2012, USEPA and NHTSA extended the National Program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles. The 2010 and 2012 rules affect passenger vehicles (i.e. employees and visitors) and other light-duty vehicles.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 was signed into law on December 19, 2007 and includes provisions covering:

- Renewable Fuel Standard (Section 202);
- Appliance and Lighting Efficiency Standards (Section 301–325);
- Building Energy Efficiency (Sections 411–441).

Additional provisions of the Energy Independence and Security Act address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

The Renewable Fuel Standard (RFS) is of some relevance to the proposed Project as the regulations require annual increases in biofuels sold – both biodiesel and bioethanol – from the years 2010-2022. By year 2022, the RFS will require at least 74 billion gallons of biofuel to be sold in the US, as compared

to the 2010 level of approximately 14.5 billion gallons. This act, although not directly relevant to proposed Project activities, serves to highlight the developing GHG regulatory framework.

Council on Environmental Quality (CEQ) NEPA Guidance on Consideration of Effects of Climate Change and GHG Emissions

In February 2010, CEQ released a guidance memorandum on the ways in which Federal agencies can improve their consideration of the effects of GHG emissions and climate change in their evaluation of proposals for Federal actions under NEPA. The guidance was intended to help explain how agencies of the Federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500-1508. The guidance affirmed the requirements of the statute and regulations and their applicability to GHGs and climate change impacts. CEQ advised Federal agencies that they should consider opportunities to reduce GHG emissions caused by proposed Federal actions and adapt their actions to climate change impacts throughout the NEPA process and to address these issues in their agency NEPA procedures.

The guidance advised Federal agencies to consider whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. The guidance identified a "reference point" of 25,000 metric tons of direct CO_2e GHG emissions as an indicator that the proposed federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. For indirect GHG emissions (i.e., GHG emissions that have a causal nexus to, but are not directly emitted by, or the direct result of, the project), the guidance did not propose a reference point indicating when such indirect emissions are significant and cautioned that any consideration of indirect GHG emissions needed to recognize the limits of feasibility in evaluating upstream and downstream effects of proposed federal actions.

The guidance did not propose this reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather as a minimum standard for reporting emissions under the CAA.

3.2 State Regulations

3.2.1 State Regulations Affecting Criteria and Toxic Pollutants

California Clean Air Act

The CCAA of 1988, as amended in 1992, outlines a program to attain the CAAQS by the earliest practical date. Because the CAAQS are more stringent than the NAAQS, attainment of the CAAQS requires more emissions reductions than what would be required to show attainment of the NAAQS. Consequently, the main focus of attainment planning in California has shifted from federal to state requirements. Similar to the federal system, the state requirements and compliance dates are based upon the severity of the ambient air quality standard violation within a region.

California Diesel Fuel Regulations

With this rule, the CARB set sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles. Harbor craft were originally excluded from the rule, but were later included by a 2004 rule amendment. Under this rule, diesel fuel used in motor vehicles except harbor craft has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm on September 1, 2006.

CARB Statewide Portable Equipment Registration Program (PERP)

The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. The PERP applies to off-road construction equipment that would be used during project construction.

CARB In-Use Off-Road Diesel Vehicle Regulation

In 2007 the CARB adopted a rule that requires owners of off-road mobile equipment powered by diesel engines 25 hp or larger to meet the fleet average or BACT requirements for NOx and PM emissions by March 1 of each year (CCR Title 13, Section 2449). The rule is structured by fleet size: large, medium and small fleets. The regulation was adopted in April 2008 and subsequently amended to delay the turnover of Tier 1 equipment for meeting the NOx performance requirements of the regulation, and then to delay overall implementation of the equipment turnover compliance schedule in response to the economic downturn in 2008 and 2009.

In September 2013, the CARB received authorization from the USEPA to enforce the In-Use Off-Road Diesel Vehicle Regulation, including the regulation's performance requirements, such as turnover requirements and restrictions on adding older, dirtier Tier 0 and 1 vehicles. Enforcement of the restrictions on adding Tier 0 and 1 vehicles will begin January 1, 2014. Enforcement of the first fleet average requirements for large fleets (greater than 5,000 total fleet horsepower) will begin on July 1, 2014. For the purposes of this analysis, the regulation was applied to construction activities.

CARB On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation – Truck and Bus Regulation

In December 2011, CARB amended the 2008 Statewide Truck and Bus Regulation, to modernize in-use heavy-duty vehicles operating throughout the state. The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses with a GVWR greater than 14,000 pounds. Heavier trucks must be retrofitted with PM filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. This regulation applies to construction trucks and to tour buses.

CARB Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft

In November 2007, the CARB adopted a regulation to reduce DPM and NOx emissions from new and in-use commercial harbor craft. Under the CARB's definition, commercial harbor craft include tug boats, tow boats, ferries, excursion vessels, work boats, crew boats, and fishing vessels. The regulation implemented stringent emission limits on harbor craft auxiliary and propulsion engines. In 2010 the CARB amended the regulation to add specific in-use requirements for barges, dredges, and crew/supply vessels.

The regulation requires that all in-use, newly purchased, or replacement engines meet USEPA's most stringent emission standards per a compliance schedule set forth by the CARB. The compliance schedule as listed in the 2007 regulation for in-use engine replacement was supposed to begin in 2009,

but was not enforced until August 2012, after USEPA approved the CARB's regulation (CARB 2011). This regulation was assumed to apply to harbor craft used during project construction and ferries used during operation.

3.2.2 Regional GHG Agreements

Western Regional Climate Action Initiative

The Western Regional Climate Action Initiative is a partnership among seven states, including California, and four Canadian provinces that are implementing a regional, economy-wide cap-and-trade system to reduce global warming pollution. The Western Regional Climate Action Initiative intends to cap the region's electricity, industrial, and transportation sectors with the goal of reducing the heat-trapping emissions that cause global warming to 15% below 2005 levels by 2020. California is working with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. CARB has developed a cap-and-trade program for California that will eventually link California and other member states and provinces

3.2.3 State Regulations Affecting GHGs

Currently, control of GHGs is generally regulated at the state level and approached by setting emission reduction targets for existing sources of GHGs, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans. California has enacted a variety of laws that relate to climate change, much of which set aggressive goals for GHG reductions within the state. The discussion below provides a brief overview of the CARB and Office of Planning and Research documents and of the primary legislation that relates to climate change and may affect the GHG emissions associated with the proposed Project.

AB 1493 – Vehicular Emissions of Greenhouse Gases

Assembly Bill (AB) 1493 (Pavley), enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by the CARB apply to 2009 and later model year vehicles. The CARB estimated that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by 18% in 2020 and 27% in 2030 (CARB 2004).

Executive Order S-3-05

Executive Order S-3-05 set forth state-wide GHG emission reduction targets as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80% below 1990 levels.

AB 32 - California Global Warming Solutions Act of 2006

The purpose of AB 32 is to reduce statewide GHG emissions to 1990 levels by 2020. This enactment instructs the CARB to adopt regulations that reduce emissions from significant sources of GHGs and establish a mandatory GHG reporting and verification program by January 1, 2008. AB 32 required the CARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which became effective on January 1, 2012. The CARB also established a market-based cap and trade system. AB32 does not identify a significance level of GHG for NEPA purposes.

California Climate Change Scoping Plan

The Climate Change Scoping Plan is the state's roadmap to reach the GHG reduction goals required in the Global Warming Solutions Act of 2006, or AB 32. This plan calls for reductions in California's carbon footprint to 1990 levels. The Scoping Plan calls to cut approximately 30% from business-as-usual emissions levels projected for 2020, or about 15% from today's levels. The Scoping Plan includes strategies such as the cap-and-trade program, improved appliance efficiency standards and other energy efficiency measures, capture of high global warming potential gases, more efficient agricultural equipment and uses, reduction of 30% in vehicle GHG emissions by 2016 (known as the 'Pavley standards') followed by further reductions from 2017, better land-use planning, regulations on largest emission sources, forestry measures, waste facility emission reduction measures, and improved recycling measures. The Scoping Plan requires the CARB and other state agencies to adopt regulations and other initiatives in 2010 and 2011.

Executive Order S-01-07

Executive Order S-01-07 was enacted by the Governor on January 18, 2007. The order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020; and 2) that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California.

Energy Conservation Building Standards

Energy Conservation Standards for new residential and commercial buildings were originally adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (24 CCR 6). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2006 Appliance Efficiency Regulations (20 CCR 1601–1608), dated December 2006, were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often seen as "business as usual," they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (proposed 24 CCR 11) was adopted as part of the California Building Standards Code (24 CCR). Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. Some of these standards have become mandatory in the 2010 edition of 24 CCR 11.

The California Energy Commission has opened a public process and rulemaking proceeding to adopt changes to the 2013 Building Energy Efficiency Standards contained in 24 CCR 6 (also known as the California Energy Code), and associated administrative regulations in Part 1 (collectively referred to here as the Standards). The proposed amended standards will be adopted in 2014. The 2013 Building Energy Efficiency Standards are 25% more efficient than previous standards for residential construction and 30% better for nonresidential construction. The Standards, which take effect on January 1, 2014, will offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

S-13-08 California Climate Adaptation Strategy

On November 14, 2008, Governor Arnold Schwarzenegger signed EO S-13-08, which called on state agencies to develop a strategy for identification and preparation for expected climate change impacts in California. The resulting 2009 California Climate Adaptation Strategy report was developed by the California Natural Resources Agency in coordination with the Climate Action Team (CAT). The report presents best available science relevant to climate impacts in California and proposes a set of recommendations for California decision makers to assess vulnerability and promote resiliency in order to reduce California's vulnerability to climate change. In addition to requiring the CAT to create a Climate Adaptation Strategy, EO-S13-08 ordered the creation of a comprehensive Sea Level Rise Assessment Report, which was completed by the National Academy of Science in 2012. Guidance regarding adaptation strategies is general in nature and emphasizes incorporation of strategies into existing planning policies and processes.

EO-S-13-08 called for the California Ocean Protection Council to work with the other CAT state agencies to develop interim guidance for assessing the potential impacts of sea-level rise (SLR) due to climate change in California. In coordination with National Academy of Science efforts, the council drafted interim guidance recommending that state agencies consider a range of SLR scenarios for the years 2050 and 2100 in order to assess project vulnerability, reduce expected risks, and increase resiliency to SLR. The draft resolution and interim guidance document is consistent with the Ocean Protection Act (Division 26.5 PRC Section 35615(a)(1)), which specifically directs the California Ocean Protection Council to coordinate activities of state agencies to improve the effectiveness of state efforts to protect ocean resources.

3.3 Local Regulations and Agreements

Through the attainment planning process, local air districts develop rules and regulations to regulate sources of air pollution within their jurisdictions. The proposed Project would occur in the SFBAAB, within the jurisdiction of the BAAQMD.

3.3.1 BAAQMD Applicable Rules

BAAQMD Rule 401 - Ringelmann Chart/Opacity

This rule limits the discharge of air contaminants into the atmosphere through visible emissions and opacity. The rule stipulates that a person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is:

- As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or
- Of such opacity as to obscure a human observer's view, or a certified calibrated in-stack opacity monitoring system to a degree equal to or greater than does smoke described in Subsection 301.1 of the rule.

BAAQMD Rule 402 - Nuisance

The purpose of the rule is to protect the public's health and welfare from the emission of air contaminants which constitute a nuisance. The rule requires that a person not discharge from any source such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.

BAAQMD Rule 403 - Fugitive Dust

The purpose of the rule is to regulate operations which periodically may cause fugitive dust emissions into the atmosphere. The rule requires that a person take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation. Reasonable precautions include, but are not limited to:

- Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways or the clearing of land.
- Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts.

San Francisco Construction Dust Control Ordinance

San Francisco Health Code Article 22B and San Francisco Building Code Section 106.A.3.2.6, which collectively comprise the Construction Dust Control Ordinance, require that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from the Department of Building Inspection.

Dust suppression activities may include watering of all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 mph. Reclaimed water must be used if required by Article 21, Section 1100 et seq. of the San Francisco Public Works Code. If not required, reclaimed water should be used whenever possible. Contractors shall provide as much water as necessary to control dust (without creating runoff in any area of land clearing and/or earth movement).

During excavation and earth-moving activities, contractors must wet sweep or vacuum the streets, sidewalks, paths, and intersections where work is in progress at the end of the work day. Inactive stockpiles (where no disturbance occurs for more than seven days) greater than 10 cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base and soil must be covered with a 10-millimeter polyethylene plastic (or equivalent) tarp, braced down, or other equivalent soil stabilization techniques must be used. For project sites greater than one-half acre in size, the ordinance requires that the project sponsor submit a Dust Control Plan for approval by the San Francisco Health Department.

4.0 Environmental Consequences

This section presents the significance criteria, assumptions and methodology used to quantify emissions and impacts, and a discussion of the potential air quality impacts associated with construction and operation of the No Action Alternative and proposed action alternatives. Mitigation measures are provided where feasible, for impacts found to be above applicable thresholds.

4.1 Significance Criteria

The Park Service assesses impacts in terms of type, context, duration, intensity, and whether the impact is direct or indirect as detailed in Chapter 4 of the EIS and summarized in Table 4-1.

Table 4-1. Park Service Impact Classification

Classification	Description
Type	Impacts can be either beneficial or adverse. A beneficial impact would be a positive change in air quality or a change that would move air quality toward a desired condition. An adverse impact would be a change that would move air quality away from a desired condition or would detract from its condition.
Duration	Duration describes the length of time over which an impact would occur. Short-term impacts are those caused by construction activities or temporary changes in operations; air quality would return to conditions prevalent prior to the commencement of these activities, once these activities have ceased. Long-term impacts would last well beyond the construction period or the temporary operational change, and air quality may not return to previous conditions.
Intensity	Intensity describes the degree, level, or strength of an impact. Intensity levels used in this AQS are based on USEPA's Air Quality Index (AQI) that correlates criteria pollutant concentrations to associated health concern categories. The Park Service 2011 Air Quality Guidance (NPS 2011) recommends the use of the AQI methodology and NAAQS thresholds for characterizing impact levels for assessing human health. Because BAAQMD is the air quality district of authority in the project area, the thresholds for project alternatives are based, for the most part, on the AQI methodology and the BAAQMD thresholds.[2] Intensity levels are categorized as follows: • Negligible: The impact would occur at or below the lowest levels of detection and for the purposes of this AQS, is defined as no change from existing conditions. • Minor: The impact would be slight, but detectable. For the purposes of this AQS, an alternative would result in minor impacts if emissions exceed the negligible impact intensity, but are less than 50% of the corresponding air quality threshold in Table 4-2. • Moderate: The impact would be readily apparent. For the purposes of this AQS, an alternative would result in moderate impacts if emissions are between 51% and 99% of the corresponding air quality threshold in Table 4-2. • Major: The impact would be substantial. For the purposes of this AQS, a major impact would equal or exceed the air quality thresholds in Table 4-2.
Source: EIS, Chapter 4.	

[2] BAAQMD thresholds for criteria pollutants were used to identify impacts associated with criteria pollutant emissions from the project alternatives. Per lead agency guidance, thresholds for health impacts, used in this AQS, were based on the safe siting distances determined by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) in the 2013 Plan Bay Area (MTC 2013a, MTC 2013b).

The BAAQMD developed guidelines to assist lead agencies in complying with requirements of the California Environmental Quality Act (CEQA) (BAAQMD 2011). These guidelines provide reference thresholds for considering whether a project would have a significant air quality impact and also provide recommended procedures for evaluating potential air quality impacts during the environmental review process.[3] Although the BAAQMD guidelines were developed to assist with the CEQA process, they are often used for NEPA projects in the SFBAAB.

The BAAQMD guidelines state that no single project is sufficient in size, by itself, to result in nonattainment of health protective ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant. The BAAQMD's thresholds for construction and operational emissions represent the levels below which a project's individual emissions of criteria air pollutants or precursors would not result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions.

The Plan Bay Area was adopted in July 2013 by a coalition of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) to set a course for accommodating economic growth in the area while preserving health targets (MTC 2013a). In proposing a land use distribution approach and transportation investment strategy, the Plan Bay Area set performance targets designed to reduce health impacts from air pollution. The Plan Bay Area EIR, prepared to inform the public and decision makers of potential environmental impacts associated with the Plan Bay Area, also identified safe distances at which sensitive receptors should be protected from stationary and mobile emission sources (MTC 2013b). These safe distances represent distances beyond which the cumulative cancer risk would drop below BAAQMD thresholds for sensitive receptors. To help identify the appropriate safe siting distances, the Plan Bay Area EIR relied on the CARB 2005 Air Quality and Land Use Handbook: A Community Health Perspective (CARB 2005). For sources of TACs and PM2.5 not included in CARB's Land Use Handbook, such as ferry terminals, or for sources where BAAQMD's data was more site specific than CARB's data, MTC worked with BAAQMD to develop distance recommendations for siting new sensitive land uses. Table 4-2 presents the BAAQMD thresholds and the Plan Bay Area safe siting distances used as thresholds for impacts assessment in this AQS.

[3] On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds in the BAAQMD CEQA Guidelines. The court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was itself a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD had complied with CEQA. The BAAQMD has appealed the Alameda County Superior Court's decision. The appeal is currently pending in the Court of Appeal of the State of California, First Appellate District. Since the technical merits of the Guidelines were not questioned in the Court judgment, this AQS uses the Guidelines methodology and thresholds.

Table 4-2. Thresholds

	Construction	Operation	
BAAQMD Mass Daily Regional Thresholds (net increase)			
Pollutant	Average Daily Emissions (lb/day)	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
VOC	54	54	10
NOx	54	54	10
PM10 (exhaust)	82	82	15
PM2.5 (exhaust)	54	54	10
PM10 and PM2.5 (fugitive dust)	Implementation of BAAQMD-mandated Best Management Practices (BMP)	None	
BAAQMD Localized Thresholds			
CO	None	9.0 ppm (8-hour average) 20.0 ppm (1-hour average) Or the following screening criteria: Consistency with local congestion management program and traffic volumes at affected intersections below 44,000 vehicles/hour or 24,000 vehicles/year in tunnel-like conditions	
BAAQMD Odor Threshold			
Odor	None	5 confirmed complaints per year averaged over three years	
BAAQMD Cumulative Thresholds [1]			
ROG, NOx, PM10, PM2.5	If individual emissions from a project would result in an increase that exceeds the project-level significance criteria, then the project would also be considered to contribute considerably to a significant cumulative effect.		
Plan Bay Area Safe Siting Distance			
Ferry Terminals	500 feet (152 meters)		
GHG CEQ Reference Point [2]			
GHG	25,000 mty		

Notes:

[1] Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. BAAQMD holds that by its nature, air pollution is largely a cumulative impact and that no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively adverse air quality impacts. If a project exceeds the identified thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary (BAAQMD 2011).

[2] In 2010, the CEQ provided guidance for Federal agencies to assess the effects of federal actions on GHG and climate change under NEPA. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 mty or more of CO_2e GHG emissions, agencies should consider this an indicator that a detailed consideration under NEPA is warranted. CEQ did not propose a reference point for indirect GHG emissions. It should be noted that CEQ's guidance did not propose the 25,000 mty reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather as a minimum standard for reporting emissions under the CAA (CEQ 2010).

4.2 Methodology and Assumptions

The following summarizes the methodology used to assess impacts under NEPA.

- Air emissions of VOC, NOx, PM10, PM2.5, and GHG were estimated for construction and operation of the No Action Alternative and action alternatives.
- In assessing impacts of PM10 and PM2.5 emissions from construction activities, BAAQMD requires that only exhaust PM10 and PM2.5 emissions be quantified and compared to quantitative thresholds. BAAQMD recommends that construction fugitive dust PM10 and PM2.5 impacts be addressed by implementing BAAQMD's Basic Construction Mitigation Measures, presented in Table 4-3, in order to meet the BAAQMD's BMP threshold for fugitive dust in Table 4-2. BAAQMD recommends that the Basic Construction Mitigation Measures be applied to all projects, regardless of whether construction emissions exceed significance (BAAQMD 2011). Since the BAAQMD recommends implementation of the Basic Construction Mitigation Measures for all proposed projects, this analysis considers the Basic Construction Mitigation Measures as part of the project and not as mitigation measures. This analysis also does not take quantitative credit for implementation of the Basic Construction Mitigation Measures.
- Impacts of operational VOC, NOx, PM10, and PM2.5 emissions were assessed on an incremental basis by subtracting emissions associated with the NEPA baseline[4] from emissions for each action alternative and comparing the incremental emissions to thresholds in Table 4-2 and applying the Park Service Classifications per Table 4-1.
- BAAQMD's screening methodology for operational CO was used to provide a conservative indication of whether the implementation of the action alternatives would result in CO emissions that exceed BAAQMD's localized CO threshold, presented in Table 4-2. The BAAQMD screening criteria are appropriate for projects with predominantly mobile sources, such as on-road vehicles. The Transportation and Circulation study conducted by Fehr & Peers (Fehr & Peers 2013) was used to assess traffic volumes at affected intersections for comparison with the CO screening criteria presented in Table 4-2.
- GHG emissions were quantified for construction and operational activities. Impacts were assessed by subtracting emissions associated with the NEPA baseline from emissions for each action alternative and comparing the incremental emissions to the CEQ reference point of 25,000 mty.
- The California Emissions Estimator Model (CalEEMod) was used for typical construction and operational equipment, per BAAQMD guidelines, to quantify combustion exhaust emissions from off-road equipment and on-road vehicles, entrained road dust, construction dust, and fugitive emissions associated with architectural coatings (CAPCOA 2013). Emissions from non-typical sources, such as tugboats and ferries, were quantified outside of CalEEMod because CalEEMod is not well suited to these types of sources. These sources were quantified using the CARB's Off-Road database for harbor craft and regulatory requirements (CARB 2010) and combined with emissions quantified in CalEEMod for impacts assessment.
- Health impacts for sensitive individuals were assessed by comparing the distance from the ferry terminal to the Plan Bay Area safe siting distance in Table 4-2. In this AQS, distances to

[4] NEPA baseline is the same as the No Action Alternative.

sensitive receptors from each of the action alternatives were estimated from GoogleEarth Map and presented in Table 2-3. These distances were compared to the 500 feet (152 meters) maximum distance identified in the Plan Bay Area EIR as the distance beyond which cancer risk to sensitive receptors would drop below the level of cumulative significance.

- The potential for odors at sensitive receptors in the vicinity of the proposed action alternatives was assessed qualitatively.
- Impacts were considered to be cumulatively considerable if criteria pollutant emissions exceeded the applicable thresholds in Table 4-2.

Table 4-3 Basic Construction Mitigation Measures [1]

Basic Construction Mitigation Measures
1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.
Source: BAAMD CEQA Guidelines (BAAQMD 2011) **Notes:** [1] These Basic Construction Mitigation Measures are recommended by BAAQMD, as a way to meet the BMP threshold for fugitive dust in Table 4-2, regardless of whether or not construction-related emissions exceed applicable thresholds.

The following summarizes the methodology used to determine federal conformity:

- The SFBAAB is in non-attainment with NAAQS for ozone. The de minimis levels for ozone precursors NOx and VOC are presented in Table 3-1. An action is not subject to a conformity determination when the total direct and indirect emissions from the action are below the conformity de minimis levels.
- The net change in emissions relative to the NEPA baseline was compared to the de minimis levels for each action alternative.
- The Park Service would have authority over all construction activities and ferry activities during operation. The Park Service would not have authority over visitor vehicles, tour busses or shuttles.

Sources of construction emissions would include tugboats, workboats, off-road construction equipment, and on-road vehicles. The following assumptions were made in quantifying construction emissions:

- Construction equipment size, activity, schedule and utilization were provided by KPFF, construction engineer to the Park Service and are presented in Appendix A.
- Construction would take between seven and twenty months, depending on the action alternative. Pier 31.5 action alternative would take approximately seven months in 2016, whereas Pier 41.5 and Pier 3 action alternatives would take up to twenty months and occur in years 2016 and 2017. Construction at Fort Baker, common to all action alternatives, would take approximately eleven months and would occur in 2016.
- Default CalEEMod off-road construction equipment age and on-road fleet mix were used. Tugboat and workboat emission factors and characteristics were derived from the CARB Harbor Craft Model default fleet mix in the Bay Area (CARB 2010).
- In estimating construction emissions, emissions were first calculated for the individual equipment, summed for each construction activity and then summed for all overlapping activities.

Sources of operational emissions would include marine ferries and on-road vehicles such as visitor/employee vehicles, shuttles, tour buses, and delivery vehicles in support of the ferry service. The following assumptions were made in quantifying operational emissions:

- Emissions were calculated for operational years 2018 and 2035. Year 2018 was chosen as the first year following completion of construction and year 2035 was chosen as the long-term future year. These years are consistent with the Transportation and Circulation study conducted by Fehr & Peers (Fehr & Peers 2013).
- On-Road Vehicle Assumptions
  - CalEEMod was used to calculate emissions from on-road vehicles, such as employee vehicles, visitor vehicles, shuttles, tour buses, and delivery vehicles.
  - Vehicle trip rates were developed by Fehr & Peers (Fehr & Peers 2013). These trip rates were used as input parameters into the CalEEMod software to quantify emissions. Table 4-4 summarizes vehicle trip rates.
- Ferry Assumptions
  - Table 4-5 presents anticipated ferry activity and shows that ferry service to Alcatraz would not change in future years and would be the same for the No Action and all action alternatives. The table also shows that ferry service to non-Alcatraz destinations, such as Fort Baker, would only occur under the action alternatives. Finally, the table shows that special ferry service to Fort Mason would only occur under the Pier 31.5 and Pier 41 action alternatives; special ferry service to Fort Mason would not be necessary under the Pier 3 action alternative because Pier 3 is located at Fort Mason.
  - Ferry engine characteristics were based on the existing Alcatraz ferry fleet, provided by Hornblower (Hornblower 2013) and consist primarily of diesel-fueled ferries with Tier 2, 700 horsepower (hp) propulsion engines, equipped with selective catalytic reduction

(SCR) and diesel oxidation catalyst (DOC) control technologies. Ferry characteristics are included in Appendix A tables.

- Ferry engine characteristics reflect Tier 2 propulsion engines in analysis year 2018 and Tier 4 propulsion engines in year 2035. Based on ferry engine age and in accordance with CARB regulatory requirements for harbor craft, it was assumed that ferry engines older than 2007 would be replaced with new Tier 4 ferries in 2022 and ferry engines newer than 2008 would remain Tier 2 until 2035, at which time they too would be replaced with Tier 4 engines. The small, 50 hp, auxiliary ferry engines were assumed to be Tier 2 in 2018 and Tier 3 in 2035.
- The analysis assumes that if in the future Hornblower is replaced as the Alcatraz ferry concessionaire, ferry characteristics would not change significantly because ferry size is driven by the projected number of visitors and engine compliance is mandated by CARB regulatory requirements.
- In addition to diesel-fueled ferries, Hornblower operates a hybrid ferry. However, since 95% of the Alcatraz ferry trips in 2013 were made by the diesel-fueled ferry fleet and future projections for hybrid ferry utilization were unavailable, any emission reductions due to the use of the hybrid ferry were conservatively excluded from the analysis. The AQS analysis conservatively assumed all diesel-fueled ferries.
- The distance traveled by ferries to Alcatraz would decrease slightly for the Pier 3 alternative. In addition, all action alternatives would include additional service to non-Alcatraz destinations, increasing overall transit distance. Assumed transit distances and speed are included in Appendix A tables.
- Ferry operators currently turn off ferry engines or plug ferries into shore power when it is available at the ferry terminal. The analysis conservatively accounts for incidental idling and assumes that ferries idle at the ferry terminal for 5 minutes at the start and end of each trip.
- The analysis uses USEPA emission factors for harbor craft engines and CARB engine load factors, which are included in Appendix A tables.

Table 4-4. Vehicle Trip Rates

	2018				2035			
	No Action	Pier 31.5	Pier 41	Pier 3	No Action	Pier 31.5	Pier 41	Pier 3
Vehicle Trip Rates (trips per day)								
Weekday	464	539	614	919	553	628	718	1,069
Weekend	498	576	743	1,040	595	672	870	1,212
Average Vehicle Fleet Mix								
Visitor / Employee Vehicles	95.6%	87.5%	89.2%	88.1%	95.8%	88.9%	90.3%	89.6%
Delivery Trucks	1.6%	1.4%	1.2%	0.9%	1.3%	1.2%	1.0%	0.8%
Shuttles	0%	8.6%	7.1%	12.0%	0.0%	7.4%	6.1%	10.4%
Tour Buses	2.8%	2.5%	2.5%	1.6%	2.9%	2.5%	2.6%	1.6%

Source:
(Fehr & Peers 2013)

Table 4-5. Ferry Activity

	2018				2035			
	No Action	Pier 31.5	Pier 41	Pier 3	No Action	Pier 31.5	Pier 41	Pier 3
Service to Alcatraz (trips/yr)	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670
Service to non-Alcatraz Destinations (trips/yr)	--	680	680	680	--	680	680	680
Special Service to Ft. Mason (trips/yr)	--	312	312	--	--	312	312	--
Average Annual Activity (hr/yr)	**4,857**	**5,733**	**5,733**	**4,697**	**4,857**	**5,733**	**5,733**	**4,697**
Service to Alcatraz (trips/day)	44	44	44	44	44	44	44	44
Service to non-Alcatraz Destinations (trips/day)		28	28	28		28	28	28
Special Service to Ft. Mason (trips/day)		2	2			2	2	
Peak Daily Activity (hr/day)	**17**	**43**	**43**	**39**	**17**	**43**	**43**	**39**

Notes: Trips represent one-way trips.
Source: Hornblower 2013.

4.3 No Action Alternative (NEPA Baseline)

The No Action Alternative (NEPA baseline) represents actions that would take place absent the federal action. Without federal action, construction activities would not occur and ferry service to Alcatraz would continue to be provided from Pier 31.5. Service to non-Alcatraz destinations and special ferry service to Fort Mason would not occur under this alternative.

Construction Impact Analysis

Construction activities would not occur.

Mitigation

Mitigation is not required.

Residual Impacts

No impacts.

Operational Impact Analysis

Operational emissions associated with the No Action Alternative are presented in Table 4-6 and reflect actions that would continue without federal action. Air quality impacts are assessed on an incremental basis by subtracting emissions associated with the NEPA baseline from emissions for the alternative. Since the No Action Alternative is the same as the NEPA baseline, there would be no incremental impacts for the No Action Alternative.

Mitigation

Mitigation is not required.

Residual Impacts

No impacts.

Conformity Determination

Construction activities and construction emissions would not occur without the federal action. A conformity determination is therefore not applicable to the No Action Alternative.

Cumulative Impacts

Emissions from this alternative would not result in an increase that exceeds the project-level thresholds for criteria pollutants in Table 4-2. This alternative would therefore not contribute considerably to a significant cumulative effect.

Table 4-6. Operational Emissions, No Action Alternative (NEPA Baseline)

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Maximum Annual		(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(mty)
	On-road Vehicles	0.3	0.9	0.5	0.1	486
	Off-road Equipment	0.0	0.0	0.0	0.0	7
	Ferries	0.1	1.5	0.3	0.3	619
	Total	0.4	2.4	0.8	0.4	1,112
	NEPA Baseline	0.4	2.4	0.8	0.4	1,112
	NEPA Increment	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Threshold/Reference Point [1]	10	10	15	10	25,000
	Above Threshold?	No	No	No	No	No
Average Daily 2018		(lb/day)	(lb/day)	(lb/day)	(lb/day)	
	On-road Vehicles	1.5	4.9	2.8	0.8	
	Off-road Equipment	0.0	0.2	0.0	0.0	
	Ferries	0.7	8.1	1.7	1.5	

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
	2018 Total	2.3	13.1	4.5	2.4	
	NEPA Baseline	2.3	13.1	4.5	2.4	
	NEPA Increment	**0.0**	**0.0**	**0.0**	**0.0**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
2035						
	On-road Vehicles	0.8	2.9	3.3	1.0	
	Off-road Equipment	0.0	0.0	0.0	0.0	
	Ferries	0.1	8.1	0.3	0.3	
	2035 Total	1.0	11.0	3.6	1.3	
	NEPA Baseline	1.0	11.0	3.6	1.3	
	NEPA Increment	**0.0**	**0.0**	**0.0**	**0.0**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
		Vehicle Trips (peak hour)				
2018						
	On-road Vehicles	169				
	Screening Threshold	44,000				
	Above Threshold?	No				
2035						
	On-road Vehicles	203				
	Screening Threshold	44,000				
	Above Threshold?	No				

Notes:
Numbers may not add precisely due to rounding.

4.4 Pier 3 Alternative

The Pier 3 Alternative would locate the ferry embarkation site at Fort Mason, Pier 3. Construction would include the retrofit of existing Pier 3 substructure, upgrade/improvement of the existing Pier 3 building shed to accommodate proposed elements, and the creation of a third berth to increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This alternative would also include a special ferry service to Fort Baker. In contrast to the No Action Alternative, a shuttle service from Fisherman's Wharf to Fort Mason would be required to manage parking constraints.

Construction Impact Analysis

Construction at Pier 3 would occur in 2016 and 2017, take approximately 20 months, and overlap with construction at Fort Baker, which would occur over 11 months in 2016. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles.

Table 4-7 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016. Table 4-7 shows that construction impacts would not exceed the significance threshold for NOx in 2017, but would be greater than 50% of the applicable threshold. Table 4-7 also shows that construction impacts for ROG, PM10 exhaust, PM2.5 exhaust, and fugitive dust would be less than 50% of applicable thresholds in 2016 and 2017. Construction impacts for this alternative would therefore be classified as follows:

- 2016 NOx – Construction impacts would be adverse, short-term, and major.
- 2017 NOx – Construction impacts would be adverse, short-term and moderate.
- 2016 and 2017 ROG, PM10, and PM2.5 – Construction impacts would be adverse, short-term, and minor.

Mitigation

BAAQMD guidelines recommend specific mitigation measures for projects that exceed construction thresholds (BAAQMD 2011). The following mitigation measures will be applied to reduce NOx emissions associated with construction. Some mitigation measures have the co-benefit of reducing emissions of other criteria pollutants in addition to reducing NOx emissions.

MM-1 Construction Equipment Idling: The idling time of diesel powered construction equipment will be minimized to two minutes.

MM-2 Construction Equipment Fleet Emissions Reduction: The project shall develop a plan demonstrating that the off-road equipment (greater than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20% NOx reduction and 45% PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

MM-3 Tugboat Engine Modernization: The project shall use tugboats with Tier 3 propulsion engines in 2016, Tier 4 propulsion engines in 2017, and Tier 3 auxiliary engines in 2016 and 2017.

Residual Impacts

Table 4-8 shows that following the implementation of mitigation measures MM-1 and MM-2, NOx impacts would be reduced, but would remain above the applicable threshold in 2016. In 2017, NOx impacts would be reduced to less that 50% of the applicable threshold. Construction impacts, following mitigation, for this alternative would therefore be classified as follows:

- 2016 NOx – Construction impacts following mitigation would remain adverse, short-term, and major.
- 2017 NOx – Construction impacts would be reduced to adverse, short-term and minor.
- 2016 and 2017 ROG, PM10, and PM2.5 – Construction impacts would remain adverse, short-term, and minor.

Table 4-7. Construction Emissions, Pier 3 and Fort Baker, Unmitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	4.5	44.6	1.8	1.7
	Marine Sources	4.2	41.0	1.5	1.4
	2016 Total	**8.6**	**85.7**	**3.4**	**3.1**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
2017					
	Construction Equipment and On-road Vehicles	6.5	15.6	0.6	0.6
	Marine Sources	2.6	24.1	0.8	0.7
	2017 Total	**9.0**	**39.7**	**1.4**	**1.3**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
Notes: Numbers may not add precisely due to rounding.					

Table 4-8. Construction Emissions, Pier 3 and Fort Baker, Mitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	4.5	35.7	1.0	0.9
	Marine Sources	4.0	41.0	1.5	1.4
	2016 Total	**8.5**	**76.7**	**2.5**	**2.3**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
2017					
	Construction Equipment and On-road Vehicles	6.5	12.5	0.3	0.3
	Marine Sources	1.2	10.9	0.3	0.2
	2017 Total	**7.6**	**23.5**	**0.6**	**0.6**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
Notes: Numbers may not add precisely due to rounding.					

Operational Impact Analysis

Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Table 4-9 presents operational emissions associated with the Pier 3 Alternative and shows that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035. GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year.

Table 4-9 also shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour and the alternative would therefore result in a localized CO

concentration below the CO threshold in Table 4-2, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 3 and Fort Baker would be 330 meters to the southwest and 450 meters to the north-northwest, respectively, as presented in Table 2-3, which is further than the 152 meters safe siting distance identified as a threshold in Table 4-2.

Operation of the alternative would cause combustion of diesel and gasoline fuel and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 3 and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels.

Operational impacts for this alternative are therefore classified as follows in 2018 and 2035:

- 2018 – Operational impacts would be adverse, long-term, and minor.
- 2035 – Operational impacts would be adverse, long-term, and minor.

Mitigation

Mitigation is not required.

Residual Impacts

Operational impacts would be adverse, long-term, and minor.

Conformity Determination

Table 4-10 shows that construction and operational emissions for this alternative would be below conformity de minimis levels for SFBAAB. The Federal action, as designed, is therefore not subject to a general conformity determination and will conform to the purpose of the approved SIP.

Cumulative Impacts

Construction emissions from this alternative would result in an increase that exceeds the NOx threshold in Table 4-2. Construction emissions from this alternative would therefore contribute considerably to an adverse cumulative impact for NOx.

Operational emissions from this alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 4-2. Operational emissions from this alternative would therefore not contribute considerably to an adverse cumulative impact.

Table 4-9. Operational Emissions, Pier 3 & Fort Baker Build Alternative

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Maximum Annual		(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(mty)
	On-road Vehicles	0.8	3.8	1.2	0.4	1494
	Off-road Equipment	0.0	0.0	0.0	0.0	7
	Ferries	0.1	1.4	0.3	0.3	599
	Total	1.0	5.3	1.5	0.6	2,100
	NEPA Baseline	0.4	2.4	0.8	0.4	1,112
	NEPA Increment	**0.5**	**2.9**	**0.7**	**0.2**	**988**
	Threshold/Reference Point [1]	10	10	15	10	25,000

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
	Above Threshold?	No	No	No	No	No
Average Daily						
		(lb/day)	(lb/day)	(lb/day)	(lb/day)	
2018						
	On-road Vehicles	4.4	21.1	5.9	1.8	
	Off-road Equipment	0.1	0.2	0.0	0.0	
	Ferries	0.7	7.8	1.6	1.5	
	2018 Total	5.2	29.1	7.5	3.3	
	NEPA Baseline	2.3	13.1	4.5	2.4	
	NEPA Increment	**3.0**	**15.9**	**3.1**	**1.0**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
2035						
	On-road Vehicles	2.5	10.2	6.7	2.0	
	Off-road Equipment	0.0	0.0	0.0	0.0	
	Ferries	0.1	7.8	0.3	0.3	
	2035 Total	2.6	18.0	7.0	2.3	
	NEPA Baseline	1.0	11.0	3.6	1.3	
	NEPA Increment	**1.7**	**7.0**	**3.4**	**1.0**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
	CO Assessment	**Vehicle Trips** (peak hour)				
2018						
	On-road Vehicles		327			
	CO Screening Threshold		44,000			
	Above Threshold?		No			
2035						
	On-road Vehicles		389			
	CO Screening Threshold		44,000			
	Above Threshold?		No			

Notes:
[1] There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).
Numbers may not add precisely due to rounding.

Table 4-10. Conformity Analysis, Pier 3 and Fort Baker Alternative, Unmitigated

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016			
	Construction Equipment and On-road Vehicles	8	1
	Marine Sources	7	1
	Total	**16**	**2**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2017			
	Construction Equipment and On-road Vehicles	3	1
	Marine Sources	4	0

Year	Source Category	NOx (mty)	VOC (mty)
	Total	**7**	**2**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018			
	Off-road Equipment	0	0
	Ferries	1	0
	Total	**1**	**0**
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035			
	Off-road Equipment	0	0
	Ferries	1	0
	Total	**1**	**0**
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No

Notes:
De minimis thresholds are for SFBAAB.
Numbers may not add precisely due to rounding.

4.5 Pier 31.5 Alternative

The Pier 31.5 Alternative would retain the current Alcatraz ferry embarkation site at Pier 31.5 and improve the existing facility to better accommodate visitors and retrofit aged infrastructure. This alternative would construct a third berth at Pier 31.5, which would increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay; this alternative would accommodate a special ferry service to Fort Baker and a special ferry or water taxi service to Fort Mason at Pier 3.

Construction Impact Analysis

Construction at Pier 31.5 would occur in 2016, take approximately 5 months, and overlap with construction at Fort Baker, which would occur over 11 months in 2016. Construction activities are not anticipated in 2017 under this alternative. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles.

Table 4-11 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016. Table 4-11 also shows that construction impacts for ROG, PM10 exhaust, PM2.5 exhaust, and fugitive dust would be less than 50% of applicable thresholds in 2017. Construction impacts for this alternative would therefore be classified as follows:

- 2016 NOx – Construction impacts would be adverse, short-term, and major.
- 2016 ROG, PM10, and PM2.5 – Construction impacts would be adverse, short-term, and minor.

Mitigation

Mitigation Measures MM-1, MM-2, and MM-3 as described in the Pier 3 Alternative, would be applied to reduce impacts under this alternative.

Residual Impacts

Table 4-12 shows that following the implementation of mitigation measures MM-1 and MM-2, NOx impacts would be reduced, but would remain above the applicable threshold in 2016. Construction impacts, following mitigation, for this alternative would therefore be classified as follows:

- 2016 NOx – Construction impacts following mitigation would remain adverse, short-term, and major.
- 2016 and 2017 ROG, PM10, and PM2.5 – Construction impacts would remain adverse, short-term, and minor.

Table 4-11. Construction Emissions, Pier 31.5 and Fort Baker, Unmitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	7.9	60.3	2.3	2.2
	Marine Sources	3.0	29.9	1.1	1.0
	2016 Total	**10.9**	**90.2**	**3.5**	**3.2**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
Notes: Numbers may not add precisely due to rounding.					

Table 4-12. Construction Emissions, Pier 31.5 and Fort Baker, Mitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	7.9	48.2	1.3	1.2
	Marine Sources	2.9	29.9	1.1	1.0
	2016 Total	**10.8**	**78.2**	**2.4**	**2.2**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
Notes: Numbers may not add precisely due to rounding.					

Operational Impact Analysis

Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Table 4-13 presents operational emissions associated with the Pier 31.5 Alternative and shows that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035. GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year.

Table 4-13 also shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour and the alternative would therefore result in a localized CO concentration below the CO threshold in Table 4-2, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 31.5 and Fort Baker would be 220 meters to the south and 450 meters to the north-

northwest as presented in Table 2-3, which is further than the 152 meters safe siting distance identified as a threshold in Table 4-2.

Operation of the alternative would cause combustion of diesel and gasoline fuel and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 31.5 and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels.

Operational impacts for this alternative are therefore classified as follows in 2018 and 2035:

- 2018 – Operational impacts would be adverse, long-term, and minor.
- 2035 – Operational impacts would be adverse, long-term, and minor.

Mitigation

Mitigation is not required.

Residual Impacts

Operational impacts would be adverse, long-term, and minor.

Conformity Determination

Table 4-14 shows that construction and operational emissions for this alternative would be below conformity de minimis levels for SFBAAB. The Federal action, as designed, is therefore not subject to a general conformity determination and will conform to the purpose of the approved SIP.

Cumulative Impacts

Construction emissions from this alternative would result in an increase that exceeds the NOx threshold in Table 4-2. Construction emissions from this alternative would therefore contribute considerably to an adverse cumulative impact for NOx.

Operational emissions from this alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 4-2. Operational emissions from this alternative would therefore not contribute considerably to an adverse cumulative impact.

Table 4-13. Operational Emissions, Pier 31.5 & Fort Baker Build Alternative

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Maximum Annual		(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(mty)
	On-road Vehicles	0.4	1.4	0.7	0.2	654
	Off-road Equipment	0.0	0.0	0.0	0.0	7
	Ferries	0.2	1.7	0.4	0.3	731
	Total	0.5	3.2	1.1	0.5	1392
	NEPA Baseline	0.4	2.4	0.8	0.4	1112
	NEPA Increment	**0.1**	**0.8**	**0.2**	**0.1**	**280**
	Threshold/Reference Point [1]	10	10	15	10	25,000
	Above Threshold?	No	No	No	No	No

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Average Daily		(lb/day)	(lb/day)	(lb/day)	(lb/day)	
2018						
	On-road Vehicles	1.9	7.9	3.3	1.0	
	Off-road Equipment	0.1	0.2	0.0	0.0	
	Ferries	0.9	9.5	2.0	1.8	
	2018 Total	2.9	17.6	5.3	2.8	
	NEPA Baseline	2.3	13.1	4.5	2.4	
	NEPA Increment	**0.7**	**4.5**	**0.8**	**0.5**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
2035						
	On-road Vehicles	1.0	4.1	3.8	1.1	
	Off-road Equipment	0.1	0.0	0.0	0.0	
	Ferries	0.2	9.5	0.4	0.4	
	2035 Total	1.3	13.6	4.2	1.5	
	NEPA Baseline	1.0	11.0	3.6	1.3	
	NEPA Increment	**0.4**	**2.6**	**0.5**	**0.2**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
		Vehicle Trips (peak hour)				
2018						
	On-road Vehicles	179				
	Screening Threshold	44,000				
	Above Threshold?	No				
2035						
	On-road Vehicles	213				
	Screening Threshold	44,000				
	Above Threshold?	No				

Notes:
[1] There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).
Numbers may not add precisely due to rounding.

Table 4-14. Conformity Analysis, Pier 31.5 and Fort Baker Alternative, Unmitigated

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016			
	Construction Equipment and On-road Vehicles	11	1
	Marine Sources	5	1
	Total	**16**	**2**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018			
	Off-road Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**

Year	Source Category	NOx (mty)	VOC (mty)
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035			
	Off-road Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No

Notes:
De minimis thresholds are for SFBAAB.
Numbers may not add precisely due to rounding.

4.6 Pier 41 Alternative

The Pier 41 Alternative would move the embarkation site to Pier 41. This alternative would expand and retrofit the existing building structure at Pier 41 to accommodate the proposed elements, would demolish and rebuild the older pier and would retrofit the newer pier at the Pier 41 site. This alternative, similar to the Pier 31.5 Alternative, would create a third berth, which would increase operational capacity and provide visitors the opportunity to visit other park sites within the Bay. This Alternative would also include a special ferry service to Fort Baker and a special ferry or water taxi service to Fort Mason at Pier 3.

Construction Impact Analysis

Construction at Pier 41 would occur in 2016 and 2017, take approximately 19 months, and overlap with construction at Fort Baker, which would occur over 11 months in 2016. Sources of construction emissions would include tugboats, off-road construction equipment, and on-road vehicles.

Table 4-15 presents construction emissions and shows that construction impacts would exceed the significance threshold for NOx in 2016 and 2017. Table 4-15 also shows that construction impacts for ROG, PM10 exhaust, PM2.5 exhaust, and fugitive dust would be less than 50% of applicable thresholds in 2016 and 2017. Construction impacts for this alternative would therefore classified as follows:

- 2016 NOx – Construction impacts would be adverse, short-term, and major.
- 2017 NOx – Construction impacts would be adverse, short-term and major.
- 2016 and 2017 ROG, PM10, and PM2.5 – Construction impacts would be adverse, short-term, and minor.

Mitigation

Mitigation Measures MM-1, MM-2, and MM-3 as described in the Pier 3 Alternative, would be applied to reduce impacts under this alternative.

Residual Impacts

Table 4-16 shows that following the implementation of mitigation measures MM-1 and MM-2, NOx impacts would be reduced, but would remain above the applicable threshold in 2016. In 2017, NOx impacts would be reduced to more than 50% of the applicable threshold, but less than the threshold itself. Construction impacts, following mitigation, for this alternative would therefore be classified as follows:

- 2016 NOx – Construction impacts following mitigation would remain adverse, short-term, and major.
- 2017 NOx – Construction impacts would be reduced to adverse, short-term and moderate.
- 2016 and 2017 ROG, PM10, and PM2.5 – Construction impacts would remain adverse, short-term, and minor.

Table 4-15. Construction Emissions, Pier 41 and Fort Baker, Unmitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	6.3	65.6	2.6	2.4
	Marine Sources	1.9	18.9	0.7	0.6
	2016 Total	**8.2**	**84.5**	**3.3**	**3.0**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
2017					
	Construction Equipment and On-road Vehicles	5.1	40.9	1.8	1.7
	Marine Sources	2.4	22.6	0.8	0.7
	2017 Total	**7.5**	**63.5**	**2.6**	**2.4**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
Notes:					
PM10 and PM2.5 emissions and thresholds are for exhaust; fugitive dust emissions are addressed with BMPs.					

Table 4-16. Construction Emissions, Pier 41 and Fort Baker, Mitigated (average lb/day)

Year	Source Category	ROG	NOx	PM10	PM2.5
2016					
	Construction Equipment and On-road Vehicles	6.3	52.5	1.4	1.3
	Marine Sources	1.9	18.9	0.7	0.6
	2016 Total	**8.1**	**71.4**	**2.1**	**1.9**
	Threshold	54	54	82	54
	Above Threshold?	No	**Yes**	No	No
2017					
	Construction Equipment and On-road Vehicles	5.1	32.7	1.0	0.9
	Marine Sources	1.1	10.4	0.3	0.2
	2017 Total	**6.2**	**43.1**	**1.3**	**1.2**
	Threshold	54	54	82	54
	Above Threshold?	No	No	No	No
Notes:					
PM10 and PM2.5 emissions and thresholds are for exhaust; fugitive dust emissions are addressed with BMPs.					

Year	Source Category	ROG	NOx	PM10	PM2.5
BAAQMD BMP measures applied as mitigation to construction equipment exhaust: 20% reduction for Nox, 45% reduction for PM. 3xday watering affects fugitive dust emissions. Tier 3 tugboat auxiliary engines in 2016. Tier 4 tugboat main engines in 2017. No mitigation for workboats.					

Operational Impact Analysis

Sources of operational emissions would include marine ferries, visitor vehicles, and delivery vehicles in support of the ferry service. Table 4-17 presents operational emissions associated with the Pier 41 Alternative and shows that impacts would be less than 50% of the applicable threshold levels for criteria pollutants in 2018 and 2035. GHG emissions would be below the CEQ reference point of 25,000 mty in the maximum analysis year.

Table 4-17 also shows that vehicle trips associated with the alternative would be below the screening level of 44,000 vehicles per hour and the alternative would therefore result in a localized CO concentration below the CO threshold in Table 4-2, in 2018 and 2035. In addition, the closest sensitive receptors to Pier 41 and Fort Baker would be 225 meters to the south and 450 meters to the north-northwest, respectively, as presented in Table 2-3, which is further than the 152 meters safe siting distance identified as a threshold in Table 4-2.

Operation of the alternative would cause combustion of diesel and gasoline fuel and some individuals might find these emissions to be objectionable in nature. Odors are generally regarded as an annoyance rather than a health hazard and quantifying the odorous impacts of combustion emissions to the public is difficult. The mobile nature of ferries and vehicles would serve to disperse combustion emissions from these sources. Additionally, the distance between Pier 41 and the nearest sensitive receptor, as well as between Fort Baker and the nearest sensitive receptor, would be sufficiently far to allow for adequate dispersion of these emissions to below objectionable odor levels.

Operational impacts for this alternative are therefore classified as follows in 2018 and 2035:

- 2018 – Operational impacts would be adverse, long-term, and minor.
- 2035 – Operational impacts would be adverse, long-term, and minor.

Mitigation

Mitigation is not required.

Residual Impacts

Operational impacts would be adverse, long-term, and minor.

Conformity Determination

Table 4-18 shows that construction and operational emissions for this alternative would be below conformity de minimis levels for SFBAAB. The Federal action, as designed, is therefore not subject to a general conformity determination and will conform to the purpose of the approved SIP.

Cumulative Impacts

Construction emissions from this alternative would result in an increase that exceeds the NOx threshold in Table 4-2. Construction emissions from this alternative would therefore contribute considerably to an adverse cumulative impact for NOx.

Operational emissions from this alternative would not result in an increase that exceeds the criteria pollutant thresholds in Table 4-2. Operational emissions from this alternative would therefore not contribute considerably to an adverse cumulative impact.

Table 4-17. Operational Emissions, Pier 41 & Fort Baker Build Alternative

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Maximum Annual		(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(mty)
	On-road Vehicles	0.4	1.6	0.8	0.2	748
	Off-road Equipment	0.0	0.0	0.0	0.0	7
	Ferries	0.2	1.7	0.4	0.3	731
	Total	0.6	3.4	1.2	0.6	1,485
	NEPA Baseline	0.4	2.4	0.8	0.4	1,112
	NEPA Increment	**0.2**	**1.0**	**0.4**	**0.1**	**373**
	Threshold/Reference Point [1]	10	10	15	10	25,000
	Above Threshold?	No	No	No	No	No
Average Daily		(lb/day)	(lb/day)	(lb/day)	(lb/day)	
2018						
	On-road Vehicles	2.2	8.7	3.9	1.2	
	Off-road Equipment	0.0	0.2	0.0	0.0	
	Ferries	0.9	9.5	2.0	1.8	
	2018 Total	3.2	18.4	5.9	3.0	
	NEPA Baseline	2.3	13.1	4.5	2.4	
	NEPA Increment	**0.9**	**5.2**	**1.4**	**0.6**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
2035						
	On-road Vehicles	1.2	4.6	4.5	1.3	
	Off-road Equipment	0.0	0.0	0.0	0.0	
	Ferries	0.2	9.5	0.4	0.4	
	2035 Total	1.4	14.2	4.9	1.7	
	NEPA Baseline	1.0	11.0	3.6	1.3	
	NEPA Increment	**0.5**	**3.2**	**1.3**	**0.4**	
	Threshold	54	54	82	54	
	Above Threshold?	No	No	No	No	
		Vehicle Trips (peak hour)				
2018						
	On-road Vehicles	238				
	Screening Threshold	44,000				
	Above Threshold?	No				
2035						
	On-road Vehicles	283				
	Screening Threshold	44,000				
	Above Threshold?	No				

Year / Period	Source Category	ROG	NOx	PM10	PM2.5	CO2e
Notes:						
[1] There is no threshold for GHGs. 25,000 is the CEQ reference point (CEQ 2010).						
Numbers may not add precisely due to rounding.						

Table 4-18. Conformity Analysis, Pier 41 and Fort Baker Alternative, Unmitigated

Year	Source Category	NOx (mty)	VOC (mty)
Construction			
2016			
	Construction Equipment and On-road Vehicles	12	1
	Marine Sources	3	0
	Total	**15**	**1**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2017			
	Construction Equipment and On-road Vehicles	7	1
	Marine Sources	4	0
	Total	**12**	**1**
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Operation			
2018			
	Off-road Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
2035			
	Off-road Equipment	0	0
	Ferries	2	0
	Total	**2**	**0**
	NEPA Baseline	2	0
	NEPA Increment	0	0
	De Minimis Threshold	100	50
	Above Threshold?	No	No
Notes:			
De minimis thresholds are for SFBAAB.			
Numbers may not add precisely due to rounding.			

Table 4-19 presents a summary and comparison of all alternatives following mitigation.

Table 4-19. Impacts Summary After Mitigation

Construction	2016					2017				
	ROG	**NOx**	**PM10 exhaust**	**PM2.5 exhaust**	**Fugitive dust**	**ROG**	**NOx**	**PM10 exhaust**	**PM2.5 exhaust**	**Fugitive dust**
No Action Alternative	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Pier 3 Alternative and Fort Baker	Adverse, Short-Term, Minor	Adverse, Short-Term, Major	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor
Pier 31.5 Alternative and Fort Baker	Adverse, Short-Term, Minor	Adverse, Short-Term, Major	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	No Impact	No Impact	No Impact	No Impact	No Impact
Pier 41 Alternative and Fort Baker	Adverse, Short-Term, Minor	Adverse, Short-Term, Major	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Moderate	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor	Adverse, Short-Term, Minor

Operation	2018							2035						
	ROG	**NOx**	**PM10**	**PM2.5**	**CO**	**Safe Distance**	**Odors**	**ROG**	**NOx**	**PM10**	**PM2.5**	**CO**	**Safe Distance**	**Odors**
No Action Alternative	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Pier 3	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,	Adverse,

Alternative and Fort Baker	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor	Long-Term, Minor
Pier 31.5 Alternative and Fort Baker	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor
Pier 41 Alternative and Fort Baker	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor	Adverse, Long-Term, Minor

5.0 List of References

AEP 2007. Association of Environmental Professionals, *Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents*, 2007.

BAAQMD 2011. Bay Area Air Quality Management District. BAAQMD CEQA Air Quality Guidelines. May 2011.

BAAQMD 2013. Bay Area Air Quality Management District. *Particulate Matter Planning.* Available online: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/PM-Planning.aspx. Last accessed December 2013.

CARB 2005. California Air Resources Board. *2005 Air Quality and Land Use Handbook: A Community Health Perspective*. Available online at: http://www.arb.ca.gov/ch/landuse.htm. Last accessed December 2013.

CARB 2009a. California Air Resources Board. ARB Fact Sheet: Air Pollution and Health. Available online at: http://www.arb.ca.gov/research/health/fs/fs1/fs1.htm. Last accessed January 2014.

CARB 2009b. California Air Resources Board. The California Almanac of Emissions and Air Quality - 2009 Edition, Chapter 5 Toxic Air Contaminant Emissions, Air Quality, and Health Risk. Available online at: http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Last accessed December 2013.

CARB 2010. California Air Resources Board. Harbor Craft Emissions Inventory Databases. Available online at: http://www.arb.ca.gov/msei/categories.htm#chc_category. Last accessed December 2013.

CARB 2011. California Air Resources Board. *Amendments to the Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline,* 2011. http://www.arb.ca.gov/regact/2010/chc10/frochc931185.pdf

CARB 2013. California Air Resources Board. *iADAM Air Quality Data Statistics Database.* Available online at http://www.arb.ca.gov/adam. Last accessed December 2013.

Cal-Adapt 2013. Cal-Adapt Climate Tools. Available online at: http://cal-adapt.org. Last accessed December 2013.

CAPCOA 2013. California Air Pollution Control Officers Association. California Emissions Estimator Model (CalEEMod). Version 2013.2.2. Available online at: http://www.caleemod.com/. Last accessed December 2013.

CEQ 2010. Council on Environmental Quality. *NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*. February, 2010.

Fehr & Peers 2013. The Transportation and Circulation Study for Alcatraz Ferry Embarkation EIS. December 2013.

Hornblower 2013. E-mail communications with Hornblower. January 2012 through January 2014.

IPCC 2007. Intergovernmental Panel on Climate Change. *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

MTC 2013a. Metropolitan Transportation Commission and Association of Bay Area Governments. *Plan Bay Area*. July 2013. Available online at: http://onebayarea.org/plan-bay-area/final-plan-bay-area.html. Last accessed January 2013.

MTC 2013b. Metropolitan Transportation Commission and Association of Bay Area Governments. *Plan Bay Area Draft Environmental Impact Report*. April 2013. Available online at: http://onebayarea.org/pdf/Draft_Plan_Bay_Area/Draft_EIR.pdf. Last accessed January 2014.

NPS 1999. National Parks Service. Fort Baker Plan Final Environmental Impact Statement. October 1999. Available online at: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=20244&documentID=20847. Last accessed January 2014.

NPS 2011. National Parks Service. *Technical Guidance on Assessing Impacts to Air Quality in NEPA and Planning Documents.* January 2011. Natural Resource Report NPS/NRPC/ARD/NRR—2011/ 289.

OEHHA 2002. Office of Environmental Health Hazard Assessment*, Particulate Matter Health Effects and Standard Recommendations.* May 9, 2002.

USEPA 2011. United States Environmental Protection Agency. *General Conformity Regulation, 40 CFR Part 93 §193*.

USEPA 2013. *The Green Book Nonattainment Areas for Criteria Pollutants.* Available online at: http://www.epa.gov/air/oaqps/greenbk/index.html. Last accessed December 2013.

Appendix A

Supporting Documentation

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Table A-7 Ferry Characteristics - Detailed
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Table A-9 Ferry Travel Distances
Table A-10 Building Dimensions Used for Architectural Coating Emission Calculations
Table A-11 Vehicle Trip Rates - Weekdays
Table A-12 Vehicle Trip Rates - Weekends

CalEEMod input/output files can be provided upon request.

APPENDIX C
CALCULATIONS FOR NOISE AND VIBRATION

Noise Analysis Calculations

Equation Used to Calculate Combined Noise Level of Construction Equipment

$N_e = 10 \log_{10} (10^{[NL_1/10]} + 10^{[NL_2/10]})$, where:

N_e = combined noise level of construction equipment at 50 feet = 102 dBA

N_1 = noise level of vibratory pile driver at 50 feet = 96 dBA

N_2 = noise level of impact pile driver at 50 feet = 101 dBA

Equation Used to Calculate Attenuated Noise Level of Construction Equipment

$N_a = N_e - 6(Di/Do)$, where:

N_a = attenuated noise level of construction equipment

Di = distance of noise source to receptor

Do = reference distance = 50 feet

Equation Used to Calculate Combined Noise Level of Construction Equipment and Existing Ambient Noise at Sensitive Receptors

$N_s = 10 \log_{10} (10^{[Na/10]} + 10^{[N_3/10]})$, where:

N_3 = noise level of existing ambient noise at the receptor

Equation Used to Calculate Moderate Impact Criteria (dBA) for Operational Noise

$L_P =$ Category 1 and 2 = $11.450 + 0.953L_E$ $L_E < 42$

$71.662 - 1.164L_E + 0.018L_E^2 - 4.088 \times 10^{-5}L_E^3$ $42 \le L_E \le 71$

65 $L_E > 71$

Category 3 = $16.450 + 0.953L_E$ $L_E < 42$

$76.662 - 1.164L_E + 0.018L_E^2 - 4.088 \times 10^{-5}L_E^3$ $42 \le L_E \le 71$

70 $L_E > 71$

Equation Used to Calculate Severe Impact Criteria (dBA) for Operational Noise

$L_P =$ Category 1 and 2 = $17.322 + 0.940L_E$ $L_E < 44$

$96.725 - 1.992L_E + 3.02 \times 10^{-2}L_E^2 - 1.043 \times 10^{-4}L_E^3$ $44 \le L_E \le 77$

75 $L_E > 77$

Category 3 = $22.322 + 0.940L_E$ $L_E < 44$

$101.725 - 1.992L_E + 3.02 \times 10^{-2}L_E^2 - 1.043 \times 10^{-4}L_E^3$ $44 \le L_E \le 77$

80 $L_E > 77$, where:

L_E = existing noise exposure

L_P = project noise exposure which determines impact

Table 1. Calculated Maximum Attenuated Noise Level from Construction at Sensitive Receptors

Site	Receptor	N_1	N_2	Di	Do	N_a	N_3	N_s
Pier 31	Historic Pier 33 Bulkhead Building	96	101	0	50	108	68	108
	Businesses Directly Across the Street			120		94	68	94
	Historic Pier 29 Building			340		67	68	71
	Nearest Residential Zone			530		44	63	63
Pier 41	Radisson Hotel			180		86	65	86
	Pier 39 Concourse			300		72	68	73
	Pier 41 Building			0		108	68	108
	Historic Pier 43 Building			220		82	68	82
	USS Pampanito			900		0	68	68
	Musee Mecanique			870		0	68	68
Pier 3	Firehouse and Landmark Buildings A through E			25		105	46	105
	Great Meadow			100		96	46	96
	Marina Green			760		17	46	46
	Residences at Beach and Buchanan Streets			930		0	55	55
	Residences at North Point and Buchanan Streets			1,300		0	56	56
	Residences at North Point and Laguna Streets			1,030		0	58	58
	Upper Fort Mason			280		74	46	74
Fort Baker	Recreational Use Area			0		108	55	108
	USCG Station			600		36	55	55
	Bay Area Discovery Museum			1,150		0	55	55

Table 2. Calculated Impact from Operation Noise at Sensitive Receptors

Site	Receptor	Land Use Category	N_3	Noise Source No. 1		Noise Source No. 2		Total Noise Exposure	Criteria	
				Number of Daytime Landings	Distance to Receiver	Number of Buses per Hour	Distance to Receiver		Moderate Impact	Severe Impact
Pier 31	Historic Pier 33 Bulkhead Building	3	68	1.07	180			68	68	73
	Businesses Directly Across the Street	3	68		360			68	68	73
	Historic Pier 29 Building	3	68		440			68	68	73
	Nearest Residential Zone	2	63		730			68	63	68
Pier 41	Radisson Hotel	2	65	2.4	250			65	61	66
	Pier 39 Concourse	3	68		530			68	68	73
	Pier 41 Building	3	68		60			69	68	73
	Historic Pier 43 Building	3	68		210			68	68	73
	USS Pampanito	3	68		1,010			68	68	73
	Musee Mecanique	3	68		900			68	68	73
Pier 3	Firehouse and Landmark Buildings A through E	3	46	2.4	140	15	50	55	57	64
	Great Meadow	3	46		650		320	46	57	64
	Marina Green	3	46		850		1240	46	57	64
	Residences at Beach and Buchanan Streets	2	55		1,130		1340	55	55	61
	Residences at North Point and Buchanan Streets	2	56		1,400		1630	56	56	62
	Residences at North Point and Laguna Streets	2	58		1,220		1300	55	55	61
	Upper Fort Mason	2	46		580		280	46	52	59
Fort Baker	Recreational Use Area	3	55	2.4	160			55	60	66
	USCG Station	3	55		800			55	60	66
	Bay Area Discovery Museum	3	55		1,290			55	60	66

Vibration Analysis Calculations

Equation Used to Calculate PPV Levels

$PPV_{vs} = PPV_{ref} \times (25/D)^{1.5}$, where:

PPV_{vs} = attenuated PPV level (in/sec)

PPV_{ref} = PPV level of vibration source at 25 feet =

0.644 for the impact pile driver during construction

0.012 for the shuttle during operation

D = distance of vibration source to receptor

Equation Used to Convert PPV to VdB

$L_v = 20 \times \log10(V/V_{ref})$

L_v = attenuated velocity level in decibels (VdB)

V = RMS velocity amplitude = PPV_{vs}/crest factor of 4

$V_{ref} = 1 \times 10^{-6}$ inches per second

Table 1. Calculated Construction PPV and VdB Levels at Sensitive Receptors

Site	Receptor	PPV_{ref}	Di	PPV_{vs}	VdB
Pier 31	Historic Pier 33 Bulkhead Building	0.644	0	80500.000	206
	Businesses Directly Across the Street		120	0.061	84
	Historic Pier 29 Building		340	0.013	70
	Nearest Residential Zone		530	0.007	64
Pier 41	Radisson Hotel		180	0.033	78
	Pier 39 Concourse		300	0.015	72
	Pier 41 Building		0	80500.000	206
	Historic Pier 43 Building		220	0.025	76
	USS Pampanito		900	0.003	57
	Musee Mecanique		870	0.003	58
Pier 3	Firehouse and Landmark Buildings A through E		25	0.644	104
	Great Meadow		100	0.081	86
	Marina Green		760	0.004	60
	Residences at Beach and Buchanan Streets		930	0.003	57
	Residences at North Point and Buchanan Streets		1,300	0.002	53
	Residences at North Point and Laguna Streets		1,030	0.002	56
	Upper Fort Mason		280	0.017	73

Site	Receptor	PPV_{ref}	Di	PPV_{vs}	VdB
Fort Baker	Recreational Use Area		0	80500.000	206
	Coast Guard Station		600	0.005	63
	Bay Area Discovery Museum		1,150	0.002	54

Table 2. Calculated Operational PPV and VdB Levels at Sensitive Receptors

	Receptor	PPV_{ref}	Di	PPV_{equip}	VdB
Pier 3	Firehouse and Landmark Buildings A through E	0.012	25	0.012	70
	Great Meadow		100	0.002	51
	Marina Green		760	0.000	25
	Residences at Beach and Buchanan Streets		96	0.002	52
	Residences at North Point and Buchanan Streets		30	0.009	67
	Residences at North Point and Laguna Streets		1,300	0.000	18
	Upper Fort Mason		1,030	0.000	21

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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