

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the environmental consequences of the project alternatives. This section introduces methodology used to assess the probable environmental consequences, or impacts, of implementing each of the alternatives, and the methods used to assess cumulative impacts. The environmental resources discussed in this chapter are the same and presented in the same order as in Chapter 3. Affected Environment. Each resource section in Chapter 4 presents the applicable analysis thresholds and methodology for evaluation of impacts, and identifies the impacts of each alternative for the specific resource area.

4.1.1 General Methodology for Analyzing Impacts

Potential impacts or effects are described in terms of type, context, duration and intensity, which are generally defined below, while more specific impact thresholds are given for each resource at the beginning of each resource section.

Type of Impact. Impacts can be either beneficial or adverse. A beneficial impact would be a positive change in the condition or appearance 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 appearance or condition.

Context. Context describes the area or location (site-specific, local, parkwide, or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action, local impacts would occur area, parkwide impacts would affect a greater portion of the park, and regional impacts would extend beyond park boundaries.

Duration. Duration describes the length of time an effect would occur, either short term or long-term. Short-term impacts are those caused by construction activities (from start to end of the construction period), and long-term impacts are those caused by activities associated with the operation and use of the extended F-Line (from start of streetcar operation and beyond).

Intensity. Intensity describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic.

Direct and Indirect Impacts. National Park Service policy requires that direct and indirect impacts be considered, but not specifically identified. A direct effect would occur at the same time and place as the action. An indirect effect 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.

4.1.2 Cumulative Impact Scenario

The Council on Environmental Quality (CEQ) regulations that implement the provisions of the National Environmental Policy Act requires that cumulative impacts be assessed in the decisionmaking process for federal projects. Cumulative effects 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 non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The cumulative impact analysis includes projects both inside and outside the park. Cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions within the park and outside the park, as described below.

Past Actions. Past actions are assumed to create the existing affected environment. The text will not specifically call out each action—with the exception of threshold or milestone projects identified by the resource specialist or land manager. Identified actions include:

- Fort Mason Center Long-Term Lease – The proposed long-term lease included shifting responsibility for parking management and full building maintenance (excluding substructures of piers and Building E) from the National Park Service (NPS) to the Fort Mason Foundation.
- Fort Mason Center Parking – In June 2006, Fort Mason Center implemented paid parking for the lower Fort Mason parking lot.
- Extension of the Historic F-Line to Jones Street – Construction of the extension of the F-line along Embarcadero to Jones Street in Fisherman’s Wharf was completed in 2000.
- Aquatic Park Bathhouse Windows, Doors and Roofs rehabilitation project – Started in May 2006, project addressed damage to the building caused by 67 years of wind, rain, and fog, which resulted in rusted windows and doors, and a leaking roof.
- Improvements to the extensive Bay Trail (including the intersection of the Fort Mason Bay Trail at Laguna Street and Marina Boulevard – known as “the squeeze”) were completed in 2009.

Present Actions. Present identified actions include:

- **Restoration of the Aquatic Park Bathhouse/Amphitheater in the San Francisco Maritime National Historical Park** – Beginning in September 2008, the San Francisco Maritime NHP began restoration of the park’s failing bleachers and associated underground structures. Project is close to completion.
- **San Francisco Marina Renovation Project** – The project would be constructed in two phases; Phase I at the West Harbor with construction anticipated October 2008 to March 2010 and Phase II at the East Harbor with construction anticipated July 2010 to June 2012.
- **Presidio Transit Program** – comprehensive transportation program, which will improve mobility within the park, increase the use and availability of public transit and pedestrian and bicycle options, improve connections to regional transit, and make it easier for people to get around without a car.
- **Third Street Light Rail Project Phase II and the Central Subway Project** – Construction began in 2010 and operation is expected to start in 2018.

- On-going Muni operations of existing transit lines
- On-going use of the Alcatraz Ferry at Pier 331/2-11 – 5,000-6,000 passengers per day during the peak season, which lasts 9 months of the year.
- **721 Beach Street Development** – demolition of an existing 558-square foot one-story commercial building constructed in 1912 and construction of a 40-foot, 12,857 square-foot mixed-use building composed of four residential units and 6,558 square feet of retail space.
- **Aquatic Park Bathhouse Exhibit Plan & Installation** – The Bathhouse exhibits will be planned/installed from FY2011-2014.
- Aquatic Park Cultural Landscape Report and Implementation
- **Doyle Drive Replacement/Presidio Parkway Project** – Project construction began in early 2010 to improve seismic, structural, and traffic safety along Doyle Drive. Project will provide direct access to the Presidio and indirect access to Marina Boulevard.
- **Fort Mason - Franklin Street Houses** – Five houses are being rehabilitated for short term occupancy by Hostelling International and others. Seismic foundation work, strengthening, painting, accessibility upgrades and lead soils removal are ongoing repair and rehabilitation of the historic landscape around these houses will be a future project, informed by an overall treatment strategy based upon Fort Mason as an "evolved cultural landscape." Now to 2011.
- **Fort Mason Sidewalk replacement** – East of buildings #33, 34 and 35 a sidewalk in poor condition has recently been replaced with a wheelchair-accessible sidewalk. Seven Red Flowering Gum eucalyptus trees were removed and replaced with the same species as part of this project. Project began in winter 2010 and was completed in autumn 2011, following publication of the DEIS.
- **Upper Fort Mason Entry at Bay and Franklin Streets** – Intersection upgrade: new sidewalks, striped cross-walks and curb ramps for wheel chairs were recently installed to create an accessible route along Bay Street and into upper Fort Mason. Traffic changes in upper Fort Mason were engineered in order to create a standard and safer intersection; the curved drives in and out of upper Fort Mason were removed and a curb now closes the access from the south end of Franklin Street into the Officers Row housing and parking lot areas. Construction began in April 2011 and was completed following publication of the DEIS.

Reasonably Foreseeable Future Actions. In general, each resource section will evaluate projects identified in the following plans:

- San Francisco Municipal Transportation Agency (SFMTA) FY 2008-09 Short Range Transit Plan (SRTP)
- San Francisco Municipal Transportation Agency (SFMTA) Transit Effectiveness Project (TEP)
- Metropolitan Transportation Commission (MTC) Draft Transportation 2035 Plan
- San Francisco Maritime NHP GMP – 2011 with emphasis on Lower Van Ness, Municipal Pier and Western Aquatic Park

Specific Projects include:

- **Fisherman's Wharf Public Realm Plan** – The Fisherman's Wharf Public Realm Plan is an inter-agency partnership, led by the San Francisco Planning Department. Design concepts under consideration for the Fisherman's Wharf Public Realm Plan would designate Jefferson Street a Pedestrian Priority Street, and would reduce vehicle traffic volumes on Jefferson Street.

- **Municipal Pier Rehabilitation Project** – to repair Municipal Pier (removal and replacement of timber piles, replacement of severed pier piles and wave baffle batter piles, etc.).
- **Rehabilitate NHL Building E Lower Fort Mason to Address Seismic and Code Deficiencies** – The project will provide seismic and system upgrades to Building E to meet safety code deficiencies.
- **Maritime Heritage Learning Center rehabilitation and program development** – Establishment of an Education Center, at the current Sea Scout base [on east side of Van Ness, just south of Municipal Pier], to provide a focal point for maritime history and education.
- **Alcatraz Transportation Study** – GGNRA, National Park Service and the San Francisco Port Authority are conducting a study for development and operation of ferry service connecting the Marin Headlands, Alcatraz, and San Francisco. The objective would be to establish a passenger ferry embarkation site on the northern San Francisco waterfront that would serve primarily as a long-term embarkation and educational site for Alcatraz and Fort Baker bound ferries. The project could result in development of an embarkation area located in the Project study area or the Project's regional area.
- **Van Ness Bus Rapid Transit (BRT)** – The BRT area would run two miles along Van Ness Avenue between Mission and Lombard. The BRT service would end five blocks before the proposed Historic Streetcar alignment. It is currently under environmental review with construction scheduled for 2013.
- **Fort Mason Center Pier 2 shed restoration** – Project work is expected to commence in the spring of 2011. The work is confined to the shed and involves exterior repairs and the installation of solar panels.
- **The E-Embarcadero Historic Streetcar Line** – Pending operating funds, SFMTA plans to initiate a basic 20-hour-a-day historic streetcar service from the Caltrain Terminal to Fisherman's Wharf.
- **Piers 27 - 31 Cruise Terminal Project** – The Port of San Francisco is evaluating development of a new primary cruise terminal located at Pier 27 near the foot of Telegraph Hill.
- **Fort Mason Cultural Landscape** – The project goal is to develop an overall treatment strategy for improving and restoring the historic landscape at Fort Mason, based upon the concept of "evolved cultural landscape. NPS's *Olmstead Center* will create a Cultural Landscape Report directing treatment, replacement and management strategies for upper Fort Mason landscapes. Treatment will start in 2011 and be ongoing yearly for at least 8 years.
- **Fort Mason Hazard Tree Replacement** – A three year implementation plan for hazard tree removal and replacement – upper Fort Mason- A recent arborist's report reviewed 427 trees – 54 different species for health and safety. The report determined that 248 trees are high risk for falling or dropping limbs and injuring people or property. These are Priority 1 for being removed, pruned or to have cables added. The trees will be replaced per the recommendations of the upcoming Olmsted Center Cultural Landscape Report. Priority 1 actions will take place starting in winter 2010 in 3 phases: remove 45 trees -replace per upcoming Cultural Landscape Study; prune 165 trees; cable 46 trees.
- **Removal of Accessibility Barriers in upper Fort Mason** – The Architectural Barriers Act Accessibility Standards (ABAAS) guides NPS access requirements, similar to the Americans with Disabilities Act (ADA) for state and commercial access. Upper Fort Mason will undergo a series of changes to conform to ABAAS standards; the Great Meadow pathways will be the first phase of this project. 2011: pathways graded and replaced, standardized curb cuts added, accessible routes defined and mapped, entry kiosks added, accessible site furnishings installed; waysides will be upgraded.

- **America's Cup** – In 2012 and 2013, San Francisco will be the host city for the America's Cup sailing competition. In advance of this event, construction activities are expected to occur at the following piers: 23, 27, 29, 26, 28, 30-32, and 14-22 ½. Exact dates and construction details are unknown at this time.
- **Marina Green Zone H Bay Trail** – This project would complete a trail gap along the edge of the San Francisco Marina East Harbor parking lot connecting Fort Mason and existing shoreline trail at the Marina Green.

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4.2 LAND USE

4.2.1 Methodology and Assumptions

Guiding regulations and policies evaluated for consistency include: NPS Management Policies (2006); GGNRA General Management Plan (1980); SF Maritime National Historical Park General Management Plan (1997); as well as state and local plans described in Section 3.2.

| Impact Intensity | Impact Description |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The Project would not involve any activities that would be inconsistent with land use. |
| Minor: | The Project would not fully support land use policies and could be inconsistent with land use policies. |
| Moderate: | The Project would be inconsistent with land use policies; such inconsistencies would be localized. |
| Major: | The Project would be inconsistent with land use policies, and would interfere with wide-scale implementation of these policies. |

Table 4.2-1 summarizes the consistency of the alternatives with relevant land use policies. Consistency determination has been made using the following categories:

- **Consistent:** The Project would be consistent with the existing policies.
- **Non consistent:** The Project would conflict with the existing policies. Project modifications may be suggested to mitigate the impacts to return to a state of consistency.

Specific inconsistencies associated with other alternatives are further discussed in the impact analysis discussion below.

4.2.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Alternative 1 establishes the baseline for comparing the action alternative since it represents no change from the existing management direction or level of management intensity. Alternative 1 would neither facilitate transit connectivity or accessibility nor increase access to National Park Service facilities beyond those measures identified in the management plans.

Turnaround Segment. No changes are proposed in the Turnaround Segment under Alternative 1; therefore the existing land use of Upper Fort Mason and Lower Fort Mason in the GGNRA would remain the same.

Transition Segment. No changes are proposed in the Transition Segment under Alternative 1; therefore the existing land use of the San Francisco Maritime NHP would remain the same.

In-Street Segment. No changes are proposed in the In-Street Segment under Alternative 1; therefore land use of the San Francisco Maritime NHP would remain the same.

TABLE 4.2-1: LAND USE POLICY CONSISTENCY ANALYSIS

| Plan Policy | Discussion | Conclusion, Including Recommendations to Eliminate Inconsistencies |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| The 1980 General Management Plan, Golden Gate National Recreation Area and Point Reyes | | |
| 2.1.2 Scientific, Technical and scholarly analysis | Throughout the process of developing the EIS, the Project is conducting scientific, technical and scholarly analysis | consistent |
| 2.1.3 Public Participation | Four public meetings have been held throughout the Project's development | consistent |
| 2.3.1 General Management Planning | The Project is consistent with the GGNRA General Management Plan (1980), which identifies a transit extension to make the GGNRA more available to a variety of users | consistent |
| 2.3.1.2 Management Zoning | The Project area is within the Urban Landscape Subzone of the Natural Resources Zone; the Enhancement Zone and the Adaptive Use Zone of the Historic Resources Zone | consistent |
| National Park Service (NPS) Management Policies | | |
| 9.1 Construction | The Project would incorporate sustainable principles and practices into design, siting, construction, building materials, etc... and implement best management practices where feasible. Construction would comply with permit requirements. | consistent |
| 9.2 Transportation Systems and Alternative Transportation | The Project is designed to enhance the quality of visitor experience and meets park management needs | consistent |
| The San Francisco Maritime National Historical Park (SF Maritime NHP) General Management Plan | | |
| <i>Local Context</i> | | |
| Understand, assess, and consider the effects of park decisions outside the park boundaries as well as inside | The SF Maritime NHP is an active cooperating agency of the Project and participates in public involvement as part of the Project planning efforts. | consistent |
| Work cooperatively with appropriate local groups and government agencies to emphasize the public's use of alternative modes of transportation to the park and surrounding areas | The SF Maritime NHP is an active cooperating agency of the Project and participates in public involvement as part of the Project planning efforts. | consistent |
| Work cooperatively with appropriate local groups and government agencies to encourage compatible, aesthetic, and planned development and recreational opportunities adjacent to park boundaries, and to provide information, orientation, and services to visitors | The SF Maritime NHP is an active cooperating agency of the Project. | consistent |

TABLE 4.2-1: LAND USE POLICY CONSISTENCY ANALYSIS (CONTINUED)

| Plan Policy | Discussion | Conclusion, Including Recommendations to Eliminate Inconsistencies |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| The McAteer-Petris Act and San Francisco Bay Plan (San Francisco Waterfront Special Area Plan) | | |
| All work, including grading, on land within 100 feet of the Bay shoreline needs permit approval | The Project would comply with all required permits. | Consistent |
| Northeastern Waterfront Plan | | |
| Calls for enhancement of the economic vitality of the Port and the City, preserving the unique maritime character, and provide for the maximum feasible visual and physical access to and along the Bay | The Project improves access to portions of the Bay while maintaining historic characteristics. | Consistent |
| Van Ness Avenue Plan | | |
| Provides guidance and direction on physical arrangement of development along the Van Ness corridor | The Project retains the physical arrangement and the current alignment along the Van Ness corridor | Consistent |
| City of San Francisco General Plan (1996) – Urban Design Element | | |
| 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. | The South Loop turnaround option would occur in what is now open space, whereas the North Loop turnaround option would occur in a developed area. | inconsistent/consistent |

Cumulative Impacts. Alternative 1 would have no direct or indirect impacts on land use. As a result, there would be no cumulative impacts under this alternative.

Conclusions. Alternative 1 would not result in any direct, indirect impacts to land use.

4.2.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. Alternative 2 - Action Alternative was evaluated for its compatibility with existing land use plans and policies as depicted in Table 4.2-1. Land use changes that would result from the implementation of Alternative 2 include construction of streetcar tracks, platforms, and overhead wires and lights in the In-Street Segment, Transition Segment and Turnaround Segment. The In-Street Segment of the Project would be consistent with existing land use in that area, which is currently a vehicular street. Adding tracks and streetcars (and infrastructure) to this area would be consistent with surrounding land uses and the continuity of the F-line at Fisherman’s Wharf. The In-Street segment is not within the National Park Service boundaries. The Transition Segment is located in the SF Maritime NHP between the Maritime Museum and the east portal of the Fort Mason Tunnel. The existing land use in this area consists of recreational park land at the tunnel portal, four sidewalks, and the bocce courts.

Construction practices would comply with National Park Service Management Policies. Construction sites would be limited to the smallest feasible area. Ground disturbance and site management would be carefully controlled to prevent undue damage to vegetation, soils, and archeological resources and to minimize air, water, soil and noise pollution. The implementation of the Alternative 2 – Action Alternative would result in a moderate short-term adverse impact to land use practices due to the temporary disturbance in land use practices due to construction.

The operation of the historic streetcar would be compatible with land use plans and policies. Table 4.2-1 illustrates the compatibility of the Project with applicable land use regulations. The implementation of Alternative 2 – Action Alternative would result in a minor long-term adverse impact to land use practices due to change in land use of the existing site, however the Project would remain consistent with applicable land use plans and policies.

Alternative 2A: North Loop Option. The North Loop Turnaround Option would be consistent with guiding regulations and policies evaluated in Table 4.2-1. The existing land use in the area designated for the North Loop Option is currently a paved parking lot in lower Fort Mason. For further information on the impact of the North Loop option to the cultural and historical resources in this area, refer to Section 4.7, Cultural Resources. The North Loop Turnaround Option would result in a negligible impact to land use.

Alternative 2B: South Loop Option. The South Loop Turnaround Option would be inconsistent with the City of San Francisco General Plan – Urban Design Element 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. The land use for the South Loop Option is currently an open space recreation area called the Great Meadow, which is used for passive and active recreational purposes. The configuration of the South Loop Turnaround Option would convert less than one acre of open space into rail track for the historic streetcar. The multi-use pedestrian and bicycle path (Bay Trail) would be realigned around the track configuration. The inner loop of the track configuration would be landscaped with plantings that are compatible with the setting. The South Loop Turnaround Option would result in a long-term moderate adverse impact.

Cumulative Impacts. Cumulative effects to land use are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect land use within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on land use include the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fort Mason Cultural Landscape, Fort Mason Sidewalk Replacement, Fort Mason Hazard Tree Replacement, upper Fort Mason Entry at Bay and Franklin Streets, Removal of Accessibility Barriers in upper Fort Mason. The beneficial impacts would result from improving safety and accessibility of features within the project study area. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to land use within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman’s Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier

Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive are for the most part improvements to existing facilities in the long-term but could result in short-term adverse impacts to land use during construction. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-generated activity in areas that may have a high density of recreational use, including pedestrians, bicycles, or residential and commercial areas; however they would not significantly change the land use in the respective areas of these projects. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to land use.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a local, short-term and long-term, minor, adverse cumulative impact on land use in the project area. The local, short-term, minor effect on land use would result from construction activities. The local, long-term, minor, adverse effect on land use would result from the change in land use in areas where the historic streetcar track would be permanently constructed.

Conclusions. Overall, Alternative 2-Action Alternative is compatible with the land use plans and policies depicted in Table 4.2-1. The North Loop Turnaround Option would result in a negligible impact to land use and the South Loop Turnaround Option would result in a long-term moderate adverse impact.

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4.3 SOCIOECONOMICS

4.3.1 Methodology and Assumptions

Methods. This section describes the applicable methodology for evaluation of the socioeconomic effects associated with the Project.

Socioeconomic conditions that may be affected by the actions in the alternatives include economic impacts on local and regional employment and social impacts, such as traffic congestion in the study area, quality of life impacts for surrounding communities, and impacts on transit-dependent visitors.

The analysis of economic and social impacts is mostly qualitative and is based on readily available existing socioeconomic data and reports. The impacts on the local economy are evaluated based on employment information provided by the National Park Service and City of San Francisco staff. The NPS's Money Generation Model 2 (MGM2) has been used to estimate the direct and indirect economic impacts that the Project might have as a result of proposed construction and future operational spending.

Other specific impacts considered include visitor-related effects from changes in park access; potential economic impacts resulting from changes in employment; and quality of life impacts resulting from changes in traffic or access to the Fort Mason area.

Assumptions. Project related spending for construction and future operations would be the predominant socioeconomic impacts associated with the Project. While the Project would add a new public transit option to Fort Mason, this analysis conservatively does not project substantial visitation growth from the Project,¹ however, the *Fort Mason Center Long-Term Lease Environmental Assessment* projects an increase in visitor levels to the Fort Mason Center by 14.5 percent if Pier One, which is currently not used as an event space, is renovated. If Pier One was restored, the 2003 EA projected that the 1.6 million annual visitors would be increased to 1.9 million for the entire Fort Mason Center. Therefore, this estimate of increased visitor use could increase transit demand in the future.

As discussed in the Section 4.4 Transportation and Circulation, the degree of the shift in travel modes is projected to result in a 14.4 percent increase in transit use between the No Project levels and the levels predicted with the implementation of the F-line extension. Therefore, it may reasonably be expected that improved public transit options would favor increased use by tourists (who are less likely to have a private vehicle). This potential beneficial effect would be particularly true given that: (a) the F-Line would provide direct transit linkages to downtown areas where most of the City's major hotels are located; and (b) the transit line is more tourist-orientated given the route and the use of historic rail cars. It might also be reasonably expected that the additional public transit options may increase future demand and use of the Fort Mason conference facilities since it would be easier for its attendees to reach events held there.

¹ Future trip levels by travel mode projections by URS indicated that a minimal net increase (1%) in future daily person trip between the No Project and Project Alternatives (URS 2009f). Nonetheless, approximately 7.8 percent future increase in Fort Mason visitation for both the No Project and Project Alternative is expected from regional population growth between 2005 and 2030.

The average San Francisco visitor is estimated to typically spend over a \$170 per day (SFCVB 2009). Consequently, any net future visitation growth or length of stay increase that can be attributed to the Project would be likely to result in positive economic benefits to the City of San Francisco’s economy.² However, unfortunately there is very little available data on current visitor use and spending within the City and particularly to Fort Mason. Therefore, given the lack of information to predict the likelihood and extent of any future net visitation growth no such economic benefits are attributed to the Project.

The addition of new public transit options for local residents in the Fort Mason area would also be expected to have a beneficial socioeconomic impact. The improved public transit would not only benefit those residents or local workers that would be inclined to use the F-Line themselves, but their travel mode shifts would likely also result in reduced traffic congestions for other residents. These factors would generally represent quality of life improvement for local residents. There should be similar though likely lesser and more occasional quality of life benefits for other City residents that are inclined to visit the Fort Mason area. However, by their very nature, such quality of life benefits can not generally be quantified or readily attributed to the Project. Therefore, no such economic benefits are attributed to the Project.

Given the various uncertainties associated with future Project use, the socioeconomic impact analysis limits its analysis to evaluating the economic impacts associated with project-related construction and operations spending.

| Impact Intensity | Impact Description |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Impacts to socioeconomic conditions would not be detectable. |
| Minor: | Either beneficial or adverse impacts would be slightly detectable but would not be expected to have an overall effect on the long-term character of the social and economic environment. |
| Moderate: | Either beneficial or adverse impacts would be detectable and would likely be long-term. Effects would result in changes on the social and economic environment on a local scale. |
| Major: | Either beneficial or adverse impacts would be considered to have a substantial, highly noticeable influence on the social and economic conditions in the region, and could be expected to alter those environments permanently. |

4.3.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Under Alternative 1 no project-related construction would occur and as a result the local economy would not receive any benefits of temporary construction employment or spending. Consequently, there would be no direct or indirect economic impact to the San Francisco economy.

Under Alternative 1 no new transportation facilities would be built and as a result the local economy would not receive any benefits of future operations employment or spending. A relatively minor increase in future Fort Mason visitation is expected as a result of future population growth. A

² However it is important to recognize that the economic benefit to the City only occur if net visitation growth occurs. Merely redistributing visitor use (e.g., only attracting tourists away from one of the City’s other tourist destinations) would have little if any benefit to the City economy.

comparable increase in both future private vehicle and public transit trips to Fort Mason is also expected (URS 2009f) to serve the future increase visitation to the area. As a result, the current conditions of local traffic congestion and inconvenience for out of town visitors to Fort Mason would persist but future visitation growth would occur. Consequently, there would be no direct or indirect economic impact to the San Francisco economy from not implementing the Project.

Cumulative Impacts. Since the alternative would have no direct or indirect economic impacts, no cumulative economic impacts would result under this alternative.

Conclusions. Alternative 1 would have no economic impacts to the San Francisco economy.

4.3.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Construction Spending Impact. The primary economic impact of the Project would be related to the future construction spending. URS updated previous construction cost estimates by Wilbur Smith Associates in their *Muni E-Line Extension Feasibility Study* published in 2004. As part of its updated methodology, URS determined the alignment alternatives and identified the project components. URS then determined component quantities and unit costs to develop construction cost estimates. The estimated construction costs for the Alternative 2 are shown in **Table 4.3-1**. (These cost estimates use the North Loop costs – differences between North and South Loop costs are discussed below).

TABLE 4.3-1: ESTIMATED DEVELOPMENT COST – ALTERNATIVE 2A (NORTH LOOP)

| Component | Estimated Cost ^{a,b} |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Site Preparation | \$4,797,400 |
| Structures | \$97,200 |
| Tunnel | \$10,123,600 |
| Utilities | \$3,789,100 |
| Trackwork | \$6,065,600 |
| Stations | \$733,800 |
| Traction power | \$1,977,500 |
| Signal System and Communications | \$1,326,200 |
| Total Construction Cost | \$28,907,200 |
| ^a Costs adjusted into 2010 Dollar terms. Total may not add up exactly due to rounding. ^b Does not include professional services or construction and professional services contingency costs. SOURCE: URS, 2009c. | |

Construction of the Project would have a total direct construction spending benefit to the San Francisco economy of approximately \$28.9 million dollars. This would be a temporary and positive impact to the local economy. However, it may be expected that only a portion of the actual construction spending would be captured by San Francisco businesses and residents. Some of the

construction work may be performed by other Bay Area businesses and residents. In which case, a portion of the direct economic benefits would instead be obtained by the other Cities in which the businesses and employees reside.

The MGM2 operate economic model was used to estimate the direct and indirect construction spending impacts to the City and County of San Francisco (MSU 2010). The MGM2Operate economic model has been developed by Michigan State University in cooperation with the National Park Service. The model projects that a large metro area such as San Francisco would capture 80 percent of the spending benefits to their economy. Consequently, the model estimates approximately a \$23.1 million direct income benefit to the City's economy and that up to 214 jobs could be created temporarily from the construction activities.

In addition to these direct effects, indirect spending would be generated from spending by project employees and support businesses. The value of the indirect spending and employment is projected to add potentially up to \$11.8 million in sales and 167 additional jobs during the 12 to 24 month construction period.

However, these direct and indirect economic benefits would be negligible in magnitude compared with the City's total estimated employment of 568,730. Furthermore the construction related benefits would be temporary since they would last solely for the duration of the construction activities, therefore this would result in a short-term, negligible, beneficial impact.

Construction Impacts on Local Businesses. The project construction activities along Beach Street and the extension along Jefferson and Leavenworth Streets would result in short-term disruption of traffic and parking along the route. Disturbances for specific street segments are expected to be relative short (approximately a month) and construction activities would be temporary and less extensive than the utility improvement work that occurs periodically. Businesses within nearby buildings would be to continue to operate although customers' access to the businesses may be inconvenienced. For example, visitors to the San Francisco Senior Center and the Maritime Museum could be inconvenienced during the short period that roadway construction along Beach Street would interfere with access to those facilities. However, both the Senior Center and the Maritime Museum would be expected to be able to continue to operate throughout the construction period.

Sidewalk vendors would be temporarily displaced to other locations during the construction. However, since specific locations are assigned by a daily lottery system, consequently the displacement of vendors would be distributed widely amongst all the licensed street artists. While the effects of the temporary reduction in selling spaces and pedestrian traffic may be noticeable to individual businesses and street vendors, from the perspective of the local economy the effects would not be detectable. As a result the construction impacts to street vendors would represent temporary and negligible adverse impacts to the local economy.

Operating Spending Impacts. The additional cost for operating the proposed extension was estimated to be between \$2.03 million for the E-Line (adjusted into 2010 dollars) and up to \$3.65 million for the F-Line option (URS 2009c). The difference in the operating costs for the two scenarios is based on the different headways along the extension. The F-Line scenario would provide more frequent service (shorter headways) and therefore would be more costly to operate.

As a conservative assumption the less expensive annual operating spending estimate of \$2.03 million is used to evaluate the future operations spending benefits to the City and County of San Francisco. Of this, it is assumed that approximately \$0.7 million would be used for maintenance spending (based on a typical 2 to 3 percent operations and maintenance cost for the approximately \$29 million of new construction) as opposed to labor for operating the light rail.

The MGM2Operate economic model was used to estimate the direct and indirect operations spending impacts to the City and County of San Francisco (MSU 2010). The MGM2Operate model projects that a large metro area such as San Francisco would capture 100 percent of the spending benefits to their economy for operating and maintenance expenditures. Consequently, the model estimates approximately a \$2.03 million direct income benefit to the City's economy and it is estimated that up to 22 jobs could be directly created annually from the future operations of the extension.³

In addition to these direct effects, indirect spending would be generated from spending by project employees and support businesses. The value of the indirect spending and employment is projected to add potentially up to nearly \$0.7 million in sales and 13 additional jobs annually.

These direct and indirect economic benefits would be negligible in magnitude compared with the City's total estimated employment of 568,730, resulting in a long-term, negligible, beneficial impact.

Operational Impacts to Local Businesses. As discussed in the assumptions discussion to this analysis, it is conservatively assumed that no net growth in visitation to Fort Mason or the local area is projected to result from the project. Consequently, no increase in local visitor spending is attributed to the project. Instead, the primary effect of the project would be to result in mode shift for visitors as the enhanced transit opportunities are expected to encourage visitors to use public transportation instead of private vehicles. The enhanced transit options would potentially both increase Fort Mason's capacity to serve high visitation events and improve the ability for tourists and other visitors who may not have private vehicles. However, given the difficulty of projecting future use levels and given the a minor decrease in parking and a minor reduction in parking at Fort Mason and within Fisherman's Wharf it is conservatively assumed that no significant net increase in future visitation to the project area would occur as a result of the project.⁴

Proposed construction of a west-bound transit platform on Beach Street, between Leavenworth and Polk Streets, ranging in length from 110 to 155 feet, could result in the displacement of up to approximately 7 parking spaces. This figure represents a "worst case" scenario, based upon the highest end of the range of potential platform lengths (URS 2009e). Final platform location and design – including length – would be determined in the design phase of the proposed project, which would consist of a separate local public planning process that takes into account operational and design considerations, as well as public comment. Depending on the outcome of the local public planning process, final platform location may or may not have an impact on existing street artist spaces. If, for example, that process resulted in the selection of a west-bound Beach Street platform location east of

³ The model only projects the direct construction related jobs and the total (i.e., direct and indirect) operations employment. It is conservatively assumed that a similar number of operations jobs would be directly related to the future operations.

⁴ Up to 35 parking spaces may be removed at Fort Mason for the transit turnaround.

Hyde Street or west of Larkin Street, it is generally expected that existing street artist spaces would remain relatively undisturbed. Similarly, if the design process resulted in the selection of a west-bound Beach Street platform location between Hyde Street and Larkin Street, and includes a bulb-out design that utilizes the area of existing on-street parking⁵, street artist vendor operations might be able to continue with only short-term and minor disruption.⁶ However, conservatively assuming that a west-bound Beach Street platform location between Hyde Street and Larkin Street were to be selected, and certain street artist spaces located directly adjacent to the platform could not be accommodated without encroaching on Victorian Park, then up to 17 vendor spaces could be permanently impacted. Under this latter worst case scenario, the street artist spaces and the street artist vendors could be displaced to other locations. The sites that could be affected are the most popular in the Fisherman’s Wharf area (San Francisco Arts Commission 2010).

Although the potential loss of these spaces would result in a net reduction in vendor spaces, there would nonetheless remain approximately 28 neighboring vendor spaces on the Beach Street block with another existing 11 spaces west of Larkin Street. Currently, the more westerly spaces are less popular and generally only fully occupied on peak weekends. However, removal of the sites nearest to the Larkin Street corner could result in a shift of the business further west down Beach Street. Although not as immediately close to current Cable Car turnaround, the sites are still in relatively close proximity and could continue to attract visitors to their stands – thereby reducing the adverse impact to street artist vendor sales within Fisherman’s Wharf. Since there are existing nearby vendor spaces that currently are only used during peak weekends, this suggests that an actual reduction of operating vendor spaces would only occur during peak weekends and holidays. At other times, any vendors displaced by the project could be accommodated at other existing nearby sites which currently are typically unused.

Furthermore, since specific locations are assigned by a daily lottery system, consequently the displacement of vendors would be distributed widely amongst all the licensed street artists. While the effects of a possible permanent reduction in selling spaces may be noticeable to individual street vendors, from the perspective of the local economy the effects would not be detectable. As a result the project related impacts to street vendors would represent permanent and negligible adverse impacts to the local economy.

Alternative 2B: South Loop Option. The construction costs for the Alternative 2B (South Loop) are shown in Table 4.3-2. The construction cost for the Alternative 2B (South Loop) is approximately \$30.8 million and \$1,884,700 higher than that for the Alternative 2A: North Loop.

⁵ Currently, many vendors occupy the adjoining hourly parking spots and “feed the meter” during throughout the day. Although convenient for vendors, this practice is contravenes San Francisco parking regulations which requires vehicles to vacate hourly spaces after the end of the hour parking period. As a result, the potential loss of this informal practice does not represent a legitimate impact to the street artist vendors especially since vendors will continue to have adequate load-in / load out parking irrespective of the potential parking reduction for a new transit platform.

⁶ San Francisco Police Code section 2405 specifies that, among other restrictions, street artist spaces shall not be located within 4½ feet from the curb line of any sidewalk, or on any sidewalk adjacent to a curb that has been designated pursuant to local ordinance or regulation as a bus zone. The ordinance does not address street artist proximity to rail platforms. The ordinance’s application in the present case would also be clarified during the design phase of the proposed project.

TABLE 4.3-2: ESTIMATED DEVELOPMENT COST – ALTERNATIVE 2B (SOUTH LOOP)

| Component | Estimated Cost ^a |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Site Preparation | \$5,281,300 |
| Structures | \$417,600 |
| Tunnel | \$10,123,600 |
| Utilities | \$3,789,800 |
| Trackwork | \$6,967,600 |
| Stations | \$679,100 |
| Traction power | \$2,156,000 |
| Signal System and Communications | \$1,376,800 |
| Total Construction Cost | \$30,791,900 |
| ^a Costs adjusted into 2010 Dollar terms. Total may not be exact due to rounding. SOURCE: URS, 2009c. | |

Using the same approach as applied for the Alternative 2A (North Loop) the MGM2Operate economic model estimates approximately a \$24.6 million direct income benefit to the City's economy and that up to 228 jobs could be created temporarily from the construction activities.

In addition to these direct effects, indirect spending would be generated from spending by project employees and support businesses. The value of the indirect spending and employment is projected to add potentially up to \$12.6 million in sales and 178 additional jobs during the 12 to 24 month construction period.

Consequently, it is expected that the Alternative 2A (North Loop) would result in negligible positive short-term economic impacts to the City and County of San Francisco economy.

No differences were estimated in the annual operating costs for the South Loop and North Loop configurations (URS 2009e). Given the similarity in their physical configurations and construction costs, it may be expected that there would be no significant difference in their future annual operating costs. Therefore, the economic impacts for operating of the Alternative 2B (South Loop) would be the same as those identified for the Alternative 2A (North Loop).

Consequently, it is expected that the Alternative 2B (South Loop) would result in negligible positive long-term economic impacts to the City and County of San Francisco economy.

Cumulative Impacts. Cumulative effects to socioeconomics are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect visitation and visitor spending at local businesses within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial socioeconomic effect include the Presidio Transit Program, the Fort Mason Bay Trail at Laguna Street

and Marina Boulevard, Fisherman's Wharf Public Realm Plan, Van Ness Bus Rapid Transit, E-Embarcadero Historic Streetcar Line, and SFMTA's Transit Effectiveness Project. The beneficial impacts would result from increased use of transit (with a corresponding decrease use of private automobiles). The degree of travel mode shift away from private automobiles is not certain. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial socioeconomic impact to visitation and/or visitor spending at local businesses within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive could result in short-term adverse impacts on visitation and spending to local businesses. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-related inconveniences to visitors to the project area. Construction activities would increase traffic on local roadways; both from equipment and material haul trips and commute trips by construction workers. The intensity of the adverse effects from the construction-related traffic and other activities would range from minor to moderate, depending on which, if any, of the construction projects occurred simultaneously. Activities related to the construction of the reasonably foreseeable projects could result in a short-term, minor to moderate, adverse impact to visitation and visitor spending at local businesses in the project area.

Collectively, the cumulative projects discussed above would have a long-term, minor to moderate, beneficial impact to visitation and visitor spending at local businesses within the project area.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would result in a long-term, minor to moderate, beneficial cumulative impact on economic conditions in the project area.

Conclusions. Alternative 2 would have short-term negligible beneficial construction related economic impacts and long-term negligible beneficial operations related economic impacts on the San Francisco economy. Alternative 2 would also have no cumulative impact on other reasonably foreseeable future projects.

4.4 TRANSPORTATION AND CIRCULATION

4.4.1 Methodology and Assumptions

The focus of this impact assessment was on the effect of changes in the project area to transit service, parking facilities and conditions, transit operations, travel lanes, traffic circulation and associated traffic flow and safety conditions. It was assumed that the Project would result in quantifiable construction activity, the effects of which were assessed. It also was assumed that the context of project effects would be local (i.e., those that would occur within the project study area), as opposed to regional (i.e., those that would occur outside the project study area).

Although quantitative analysis of potential effects was conducted for the impact assessment of the effects of changes in travel lanes on traffic flow, and of changes in parking facilities on parking conditions, the nature of analysis of effects on traffic safety (i.e., the uncertainty of consequences of an increase in potential vehicle conflicts) does not lend itself to quantification, and professional transportation engineering judgment was applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts. When possible, mitigation measure(s) were incorporated into the Project to reduce the intensity of adverse effects.

Transit Operations. This section assessed changes to transit services associated with extension of the F-line streetcar that could result from each of the action alternatives (and configuration options). Changes to transit services were then judged as to whether they would substantially change the mix of transportation modes (autos and transit) serving the project area.

Traffic Flow Conditions. This section assessed changes in travel lanes associated with accommodation of the F-line in roadway right-of-way that could result from each of the action alternatives (and configuration options). Changes in travel lanes were then judged as to whether they would substantially change the levels of congestion (average vehicle delay) on the roadway system serving the project area.

Parking Conditions. This section assessed potential changes in lane configuration associated with accommodation of the F-line in roadway right-of-way that could result from each of the action alternatives (and configuration options). Changes in lane configuration were then judged as to whether they would substantially change the availability of on-street parking spaces serving the project area. Parking conditions at the Fort Mason Center were also addressed. In addition, this section addresses concerns expressed by project area residents about North Bay-based motorists driving across the Golden Gate Bridge to park in the area and use the F-Line to continue on to downtown destinations.

Traffic Safety/Conflicts. This section assessed potential changes in lane configuration associated with accommodation of the F-line in roadway right-of-way that would result from each of the action alternatives (and configuration options). Changes in travel lanes and availability of parking spaces were then judged as to whether increased levels of congestion (average vehicle delay) and decreased availability of on-street parking spaces would substantially affect the potential for traffic conflicts.

| Impact Intensity | Impact Description |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Effects considered not detectable which and would have no discernible effect on transit service, traffic flow, parking, and/or traffic safety conditions. |
| Minor: | Effects on transit service, traffic flow, parking, and/or traffic safety conditions that would be slightly detectable, but not expected to have an overall effect on those conditions. |
| Moderate: | Effects that would be clearly detectable, and could have an appreciable effect on transit service, traffic flow, parking, and/or traffic safety conditions. |
| Major: | Effects that would have a substantial, highly noticeable, influence on transit service, traffic flow, parking, and/or traffic safety conditions and could permanently alter those conditions. |

4.4.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Under Alternative 1, the availability of parking spaces and the mix of transportation modes (autos and transit) serving the project area would remain similar to current conditions for all portions of the project study area. A San Francisco County Transportation Authority Travel Demand Model Run (August 2007) conducted for daily person trips to Fort Mason Center identified a mode split between automobiles and transit. The model predicted daily person trips to Fort Mason Center under the No Project for the year 2030 would be 71 percent via automobiles and 10 percent via transit (with the rest via walking or bicycle travel mode), the same as the 2005 mode split (URS 2009f).

Alternative 1 would not affect transit operation conditions.

Alternative 1 would not affect parking conditions.

Under Alternative 1, although not quantified, it is reasonable to expect that traffic volumes would increase on the streets serving the project area. The current traffic control (signals and stop signs) would remain the same, and as a result, the level of congestion (average vehicle delay), particularly at unsignalized intersections, would be expected to increase. It is also reasonable to expect that the potential for conflicts between different traffic streams would increase due to the increased traffic congestion and the unchanged traffic control at area intersections.

The operation-related effects on traffic flow conditions would be long-term, minor and adverse.

The operation-related effects on traffic safety conditions would be long-term, minor, and adverse.

Cumulative Impacts. Cumulative effects to transportation are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect transit operations, traffic flow, traffic safety and/or parking conditions within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on transportation include the Presidio Transit Program, the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fisherman’s Wharf Public Realm Plan, Van Ness Bus Rapid Transit, E-Embarcadero Historic Streetcar Line, and SFMTA’s Transit Effectiveness Project. The beneficial

impacts would result from increased use of public transit (with a corresponding decrease use of private automobiles). The degree of travel mode shift away from private automobiles is not certain. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to transit operations, traffic flow, traffic safety and/or parking conditions within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive could result in short-term adverse impacts on transportation. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-generated traffic on roadways serving the project sites. Construction activities would increase traffic on local roadways, both from equipment and material haul trips and commute trips by construction workers. The intensity of the adverse effects from the construction-related traffic would range from minor to moderate, depending on which, if any, of the construction projects occurred simultaneously. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to traffic flow.

The Alcatraz Ferry Embarkation and Education Feasibility Study examines nine potential locations for the establishment of a new passenger ferry embarkation site along the San Francisco waterfront. Four of the sites evaluated are located within Fort Mason. The other five sites include Port of San Francisco sites between Piers 45 and 19-1/2 along the northern waterfront. No final site has been selected. The planning phase of that project has only just begun and will undergo its own separate environmental review process. However, conservatively assuming that one of the Fort Mason sites is selected; the embarkation project – in combination with the F-Line extension – could reasonably be expected to have both adverse and beneficial impacts to transportation within the project area. Establishment of such a facility at Fort Mason would be expected to generate additional vehicle trips and associated traffic and parking congestion within the project area. The extent of such an impact has yet to be evaluated and is beyond the scope of this EIS. However, because extension of the F-Line would increase transit connectivity along the San Francisco waterfront, and result in an associated modal shift towards transit, it is reasonable to expect that extension of the F-Line would have a mitigating effect on transportation impacts associated with the establishment of a new embarkation facility at Fort Mason.

Collectively, the cumulative projects discussed above would have a long-term, minor to moderate, beneficial impact to transit operations, traffic flow, traffic safety and/or parking conditions within the project area.

The impacts of Alternative 1, when combined with the impacts of the cumulative projects described above, would result in a long-term, minor, beneficial cumulative impact on transportation conditions in the project area.

Conclusions. Alternative 1 would have long-term, minor, adverse impacts to traffic flow and traffic safety conditions, and would cause no impacts to transit operations and parking conditions.

4.4.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. As stated above, the focus of this impact assessment was on the effect of changes in the project area to transit service, parking facilities and conditions, transit operations, travel lanes, traffic circulation and associated traffic flow and safety conditions. Alternative 2 would construct an extension of the F-Line on an alignment consisting of four segments (i.e., Fort Mason Turnaround Segment, Tunnel Segment, Transition Segment, and In-Street Segment). Effects of Alternative 2 on transit operations (defined as changes to the area served by transit and changes to the mix of transportation modes [autos and transit] serving the project area) were assessed on the basis of the full proposed action (i.e., the above-cited four segments as a whole). The effects of Alternative 2 on traffic flow conditions were assessed for the In-Street segment only. The effects of Alternative 2 on traffic safety and parking conditions were assessed for the Fort Mason Turnaround, Transition, and In-Street segments. The Alternative 2 transportation impacts are presented in the order of impact topic after a description of the construction impacts of the overall Alternative 2.

Construction Impacts. The construction effort for Alternative 2 would have short-term, adverse transportation impacts during the 18- to 24-month construction period. The intensity and nature of the construction activity would vary over the construction period, and the range of adverse impacts to traffic flow, traffic safety, and parking conditions would similarly vary. Adverse construction-related transportation impacts would primarily relate to temporary increases in traffic volumes (including heavy trucks) on area roadways, and displaced on-street parking spaces to accommodate staging areas and/or parking demand by construction workers.

Construction activities would generate varying numbers of vehicle trips (depending on the type of work) to accommodate construction workers, trucks, and equipment. Construction-related truck trips would be dispersed throughout the day, and although they would cause a temporary and intermittent lessening of the capacities of area roadways because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles, those trips would fall within the daily fluctuations of traffic volumes on affected roadways, causing short-term, minor, adverse impacts on traffic flow conditions in the project area. Construction activities for the in-street segment would be phased to retain some access to each street block at all times. Traffic might be re-routed temporarily, which would be an inconvenience to motorists, but the street grid system would minimize the impact. Loading/unloading of delivery trucks may be temporarily relocated.

Construction-related truck traffic would cause a temporary and slightly detectable increase in potential conflicts between different traffic streams because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles.

Construction on the in-street segment would occur on one side of the road at a time. In addition, staging areas would be required to store materials and equipment for the Project, and parking spaces would be required to accommodate construction worker vehicles. The size and location of staging areas is expected to vary throughout the Project duration. To the degree that staging areas and parking spaces displace existing on-street parking spaces, the Project would have short-term, minor, adverse impacts on parking conditions. If the North Loop Turnaround option were selected, construction activities at the Fort Mason terminal would be performed in phases to minimize the loss of parking spaces at Fort Mason Center.

Construction of the crossing of the cable car line at Hyde Street would require phased closures of portions of the roadway and the intersection of Hyde and Beach Streets. Work would require the closure of the Powell/Hyde cable car line for up to one month, and additional cable cars would run on the Powell/Mason line as replacement service for tourists. For people who use the Powell/Hyde cable cars for commute purposes, a bus substitution would operate on the Powell/Hyde route (between Market Street and Hyde Street). It is anticipated that closure of the Powell/Hyde cable car line would occur during non-holiday, non-peak-tourist seasons.

Best Management Practices would be employed to reduce transportation effects and would be made conditions of agreements with contractors. Generally, these practices include implementation of a traffic control plan, which would involve measures (e.g., advance warning signs, and flaggers to direct traffic) to maintain safe and efficient traffic flow during the construction period. The mitigation measures would lessen the magnitude of the adverse construction-related impacts to traffic safety to a negligible level.

Effects on Transit Operation Conditions

Overall Alternative 2 (all segments). Alternative 2 would extend public transit service to Fort Mason Center (with interim stops in the Fisherman's Wharf area beyond the existing terminal for the F-Line). The extension of service would accommodate people who otherwise would travel to Fort Mason Center via private automobile or other non-transit modes of travel. The 28-19th Avenue Muni bus currently serves Fort Mason Center, but that bus line serves only the west side of San Francisco. The F-Line extension would connect Fort Mason Center to the downtown area of San Francisco, and the multiple connection possibilities with other Muni lines and regional transit service (e.g., BART, AC Transit, and SamTrans) in the downtown area.

Changes to the mix of transportation modes [autos and transit] serving the project area resulting from Alternative 2 were predicted using the Travel Demand Model Run (URS 2009f). These results identified a 14.4 percent increase in transit use for daily person trips to Fort Mason Center between the No Project and implementation of the Project with the F-line extension. The result would be a long-term, moderate, beneficial impact.

Effects on Traffic Flow Conditions

In-Street Segment. The in-street segment would extend from the transition area at Beach and Polk Streets easterly to Jones Street, where it would connect with the existing F-Line. East of Leavenworth Street, the eastbound alignment would continue on Beach Street to the aforementioned connection, while the westbound alignment would extend from the existing F-Line on Jefferson Street, turn left onto Leavenworth Street and turn right onto Beach Street.

Alternative 2 would alter the manner in which automobiles and trucks would be accommodated on streets within the in-street segment. One option would consist primarily of shared auto/streetcar operation (the exception being along one-way [westbound] Jefferson Street, where semi-exclusive streetcar operation would be used), and a second option would consist of semi-exclusive streetcar operation for eastbound service and shared auto / streetcar operation for westbound service (again except along Jefferson Street, where semi-exclusive operation would be used). While it is possible to create a hybrid of the two options, having some semi-exclusive and some shared operation for eastbound service, for purposes of this analysis, the two options have been evaluated separately.

For the Semi-Exclusive Option, potential changes to the lane configurations at area intersections are described below (there would be no change to the existing lane configuration at Intersections 6 [Beach Street and Larkin Street] and 7 [Beach Street and Polk Street]). Intersections described below are depicted on Figure 3.4-3.

1. Jefferson Street and Jones Street – the westbound approach would change from one through lane and one left-turn/through lane to one through lane and one left-turn lane.
2. Beach Street and Jones Street – the eastbound approach would change from two through lanes (one left-turn/through lane and one through/right-turn lane) to one through lane (combined left-turn/through/right-turn).
3. Beach Street and Hyde Street – the eastbound approach would change from two through lanes (one through lane and one through/right-turn lane) to one through lane (combined through/right-turn).
4. Jefferson Street and Leavenworth Street – the westbound approach would change from two through lanes (one left-turn/through lane and one through/right-turn lane) to one through lane (combined left-turn/through/right-turn).
5. Beach Street and Leavenworth Street – the eastbound approach would change from two through lanes (one left-turn/through lane and one through/right-turn lane) to one through lane (combined left-turn/through/right-turn).
8. Beach Street and Columbus Avenue – the eastbound approach would change from one through lane and one through/right-turn lane to one through lane and one right-turn lane.

For the Shared Lane Option, potential changes to the lane configurations at area intersections are described below (there would be no change to the existing lane configuration at Intersections 1 [Jefferson Street and Jones Street] and 7 [Beach Street and Polk Street]). Intersections described below are depicted on Figure 3.4-3.

2. Beach Street and Jones Street – the eastbound approach would change from two through lanes (one left-turn/through lane and one through/right-turn lane) to one through lane (combined left-turn/through) and a separate right-turn lane.
3. Beach Street and Hyde Street – the eastbound approach would change from two through lanes (one through lane and one through/right-turn lane) to one through lane (right turns would be prohibited).
4. Jefferson Street and Leavenworth Street – same change as described above for Semi-Exclusive Option.
5. Beach Street and Leavenworth Street – the eastbound approach would change from two through lanes (one left-turn/through lane and one through/right-turn lane) to one through lane (through/right-turn) and a separate left-turn lane. In addition, the westbound approach would retain the one through lane, but would be a through/right-turn lane, with the addition of a separate left-turn lane.
6. Beach Street and Larkin Street – the left-turn/through lane on the westbound approach would be split into one through lane and a separate left-turn lane.

8. Beach Street and Columbus Avenue – same change as described above for Semi-Exclusive Option.

Streetcar movements would be governed by line-of-sight operations, except at intersections, where movements would be controlled by traffic signals. The following three unsignalized intersections would be signalized as part of Alternative 2 (under both Semi-Exclusive and Shared Lane options).¹ Intersections described below are depicted on Figure 3.4-3.

4. Jefferson Street and Leavenworth Street
5. Beach Street and Leavenworth Street (a protected left-turn phase for east-west traffic under the Shared Lane Option only)
7. Beach Street and Polk Street

Each of the new signals would have a dedicated transit-only phase (which is skipped if no transit actuation is detected).² At the intersection of Jefferson Street and Jones Street, where on occasion there is a backup of streetcars from the existing Jones Street terminal (when there are three or four streetcars at the terminal at the same time), the configuration of the F-Line extension would include a turnout that allows a streetcar continuing straight on Jefferson Street to pass a streetcar turning onto Jones Street.³

An LOS analysis was performed for the eight study intersections under Alternative 2 conditions. No attempt was made to quantify the reduction in automobile traffic volumes that would occur if the F-Line were extended to Fort Mason Center, though as described above, it is reasonable to expect that under Alternative 2, people would shift from using their private automobile to using other modes of travel including the F-Line to travel to and from Fort Mason Center. In addition, the analysis of LOS conditions under Alternative 2 does not attempt to quantify the degree to which the Fisherman's Wharf Public Realm Plan would divert traffic off Jefferson Street onto other streets in the area.⁴ The effects of Alternative 2 on traffic flow conditions were judged on the basis of the above-described changes to the lane configurations and to the traffic control at the intersections, which provides a conservative analysis of the effects on Alternative 2 on traffic flow conditions. As shown in Tables 4.4-1 and 4.4-2, all except one of the study intersections would continue to operate at acceptable LOS during both the weekday p.m. and weekend midday peak hours under both the Semi-Exclusive and Shared Lane options. During the weekend midday peak hour, the Jefferson/Leavenworth Streets intersection would operate at an unacceptable LOS F (high delay experienced by the average motorists) under both the Semi-Exclusive and Shared Lane options (weekday p.m. peak-hour conditions would be acceptable).

Design concepts under consideration for the Fisherman's Wharf Public Realm Plan would designate Jefferson Street a Pedestrian Priority Street, and would reduce vehicle traffic volumes on Jefferson Street through wayfinding signage, and sidewalk and pavement design features. As stated above, no

¹ The new traffic signals, and modifications to existing signals, would be funded as part of the project.

² The LOS analysis prepared for this analysis assumed that the transit-only phase would occur during every signal cycle, ensuring a conservative assessment of LOS conditions for Alternative 2.

³ See Draft Conceptual Engineering Report, January 22, 2009.

⁴ The Fisherman's Wharf Public Realm Plan is an inter-agency partnership, led by the San Francisco Planning Department; the Draft Plan was released in June 2010.

TABLE 4.4-1: EXISTING AND EXISTING PLUS ALTERNATIVE 2 WEEKDAY PM PEAK-HOUR LEVEL OF SERVICE (LOS) AND AVERAGE DELAY

| Intersection | Traffic Control ^a | Existing | | Existing + Alt. 2 | |
|-----------------------------------------------------------------------------------------------|-------------------------------|----------|--------------------|-------------------|--------------------|
| | | LOS | Delay ^b | LOS | Delay ^b |
| 1. Jefferson Street and Jones Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | C | 20.2 | C C | 21.3 20.6 |
| 2. Beach Street and Jones Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | B | 13.1 | B B | 12.2 12.3 |
| 3. Beach Street and Hyde Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | B | 12.1 | B B | 12.3 12.3 |
| 4. Jefferson Street and Leavenworth Street (Semi-Exclusive Option) (Shared Lane Option) | AWSC/ Signal | A | 8.4 | D D | 35.1 36.6 |
| 5. Beach Street and Leavenworth Street (Semi-Exclusive Option) (Shared Lane Option) | AWSC/ Signal | A | 8.8 | B C | 17.1 24.1 |
| 6. Beach Street and Larkin Street (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c | A | 8.7 | A A | 8.7 8.2 |
| 7. Beach Street and Polk Street (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c / Signal | A | 8.3 | C C | 23.2 23.2 |
| 8. Beach Street and Columbus Avenue (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c | A | 8.1 | A A | 8.2 8.2 |

^a AWSC is an unsignalized intersection with All-Way Stop-Control, and SSSC is an unsignalized intersection with Side-Street Stop-Control. If two traffic control types (e.g., AWSC/Signal) are shown, then the top type is the current traffic control, and the bottom type would be the traffic control under Alternative 2.

^b The LOS and delay represent conditions for the overall intersection.

^c This intersection was analyzed as AWSC because, from field observations, it was noted that most of the vehicles on the major (uncontrolled) street come to a full stop due to high pedestrian crossing volumes.

SOURCES: Wilbur Smith Associates and ESA

attempt was made to quantify the lower traffic volume on Jefferson Street resulting from the Public Realm Plan. However, the weekend midday peak-hour LOS F condition at the Jefferson/Leavenworth Streets intersection would improve to an acceptable LOS D or better if reduced by 33 percent or more. Strategies currently under consideration to reduce the number of vehicles on Jefferson Street during peak periods of activity at the Wharf focus on two options: (1) to limit the volume to 100 vehicles per hour, or (2) to effectively eliminate vehicles on Jefferson Street. In either case, the percent reduction during the weekend midday peak hour would be greater than 33 percent, and the level of service would be LOS D or better. The result with implementation of the Public Realm Plan would be a long-term, minor, adverse impact, and without implementation of the Public Realm Plan would be a long-term, major, adverse impact.

TABLE 4.4-2: EXISTING AND EXISTING PLUS ALTERNATIVE 2 WEEKEND MIDDAY PEAK-HOUR LEVEL OF SERVICE (LOS) AND AVERAGE DELAY

| Intersection | Traffic Control ^a | Existing | | Existing + Alt. 2 | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------|--------------------|----------------------|------------------------------|
| | | LOS | Delay ^b | LOS | Delay ^b |
| 1. Jefferson Street and Jones Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | C | 23.0 | C C | 26.2 23.4 |
| 2. Beach Street and Jones Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | C | 25.1 | C C | 23.1 25.3 |
| 3. Beach Street and Hyde Street (Semi-Exclusive Option) (Shared Lane Option) | Signal | C | 20.1 | C C | 23.8 21.8 |
| 4. Jefferson Street and Leavenworth Street (Semi-Exclusive Option) (Shared Lane Option) | AWSC/ Signal | B | 10.3 | F F | 148.0 146.8 |
| 5. Beach Street and Leavenworth Street (Semi-Exclusive Option) (Shared Lane Option) | AWSC/ Signal | C | 19.3 | C D | 23.7 35.6 |
| 6. Beach Street and Larkin Street (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c | C | 16.4 | C B | 16.4 12.3 |
| 7. Beach Street and Polk Street (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c / Signal | B | 12.0 | C C | 28.7 28.7 |
| 8. Beach Street and Columbus Avenue (Semi-Exclusive Option) (Shared Lane Option) | SSSC ^c | B | 12.1 | C C | 15.3 15.2 |
| <p>^a AWSC is an unsignalized intersection with All-Way Stop-Control, and SSSC is an unsignalized intersection with Side-Street Stop-Control. If two traffic control types (e.g., AWSC/Signal) are shown, then the top type is the current traffic control, and the bottom type would be the traffic control under Alternative 2.</p> <p>^b The LOS and delay represent conditions for the overall intersection.</p> <p>^c This intersection was analyzed as AWSC because, from field observations, it was noted that most of the vehicles on the major (uncontrolled) street come to a full stop due to high pedestrian crossing volumes.</p> <p>SOURCES: Wilbur Smith Associates and ESA</p> | | | | | |

Effects on Traffic Safety Conditions

In-Street Segment. As described above, Alternative 2 would degrade the weekend midday peak-hour traffic level of service (LOS) to an unacceptable condition (LOS F, with high delay experienced by the average motorists) at one intersection (Jefferson Street at Leavenworth Street) under both track configuration options (i.e., Semi-Exclusive and Shared Lane). All other study intersections would operate at acceptable service levels during the weekend midday peak hour, and weekday p.m. peak-hour LOS would be acceptable at all study intersections. However, the poor LOS at Jefferson/ Leavenworth during the weekend midday peak hour would not substantially affect the potential for traffic conflicts because the traffic signal phasing would effectively remove conflicts among the different traffic streams (i.e., the signal

phases for automobile/truck/pedestrian/bicycle traffic and for streetcars). This would result in a long-term, negligible, adverse impact.

Transition Segment. Alternative 2 would introduce locations along the track alignment as it leaves the Aquatic Park area and crosses Van Ness Avenue to the east portal of the Fort Mason Tunnel where automobiles, bicyclists and pedestrians would have to cross (on Bicycle Route 2 and sidewalks). Van Ness Avenue traffic (vehicular and bicycle) crossing the track would be controlled by stop signs, and positive wayfinding devices (e.g., signs and pavement markings) would alert pedestrians of the presence of possible streetcar movements. Given the planned frequency of streetcar service (as frequent as every six minutes), the above-cited traffic control devices, and the clear view that bicyclists and pedestrians would have of the streetcars as they approach the crossings, Alternative 2 would not substantially affect the potential for traffic conflicts. This would result in a long-term, minor, adverse impact.

North Loop Option. Although subject to final design, it is expected that Alternative 2 would introduce points along the track loop in the Fort Mason Center where automobiles would have to cross as people drive to parking spaces, and to leave Fort Mason Center from those parking spaces (see Figure 2-3). Those locations would be controlled by stop signs on the automobile approaches to the crossings. Similarly, there would be potential conflicts between bicyclists and streetcars. However, given the planned frequency of streetcar service (as frequent as every six minutes) and the clear view that motorists and bicyclists would have of the streetcars as they approach the crossings, Alternative 2 would not substantially affect the potential for traffic conflicts. Also, pedestrians (including people who travel on the streetcars or in automobiles to/from Fort Mason Center) would potentially walk across the tracks, especially people (e.g., tourists) who could be unfamiliar with their surroundings. Provision of positive wayfinding devices (e.g., signs and pavement markings) would reduce the potential adverse effects. This option would result in a long-term, minor, adverse impact.

South Loop Option. Although subject to final design, and not depicted on Figure 2-4, Alternative 2 would realign a portion of the San Francisco Bay Trail to accommodate the F-Line platform. The affected segment of the Bay Trail currently connects to the sidewalk at the intersection of Laguna Street and Marina Boulevard near the Fort Mason Center gatehouse, a constrained area where pedestrians and bicyclists (some of the latter traveling at excessive speeds down the slope of the Bay Trail) converge. Alternative 2 would realign the Bay Trail to follow an area of the Great Meadow above the track loop and connect to the sidewalk along Laguna Street south of Marina Boulevard. The proposed realignment of the Bay Trail would have a beneficial effect on the potential for traffic conflicts.

Also, people who travel on the streetcars to/from Fort Mason Center would potentially walk through the existing Fort Mason Center parking lot between the platform and their origin / destination, especially people (e.g., tourists) who could be unfamiliar with their surroundings. Provision of positive wayfinding devices (e.g., signs and pavement markings) would reduce the potential adverse effects. This option would result in a long-term, minor, beneficial impact.

Effects on Parking Conditions. The City and County of San Francisco does not consider parking supply as part of the permanent physical environment and therefore, does not consider changes in parking conditions to be environmental impacts. It is acknowledged, however, that parking conditions may be of interest to the public and the decision makers.

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel. Parking deficits are considered to be social effects, rather than impacts on the physical environment. The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environment impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. However, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Resulting shifts to transit service in particular would be in keeping with the City's "Transit First" policy. The City's Transit First Policy, established in the City's Charter Article 8A, Section 8A.115, provides that "parking policies for areas well-served by public transit shall be designed to encourage travel by public transportation and alternative transportation." As described above, it is reasonably expected that Alternative 2 would result in people shifting from use of their private automobile to use of other modes of travel including the F-Line, and that the degree of that shift in travel mode would be clearly detectable.

In-Street Segment. Under Alternative 2, on-street parking spaces would be removed along the following locations in order to accommodate (a) the streetcar tracks and platforms, and (b) turn lanes for automobile/truck traffic:

Semi-Exclusive Option (a total of 129 spaces would be removed):

- Beach Street west of Polk Street - all spaces (24 general parking) along the north side
- Beach Street between Polk and Larkin Streets – all spaces (12 metered, 1 truck loading, and 4 passenger loading) along the south side
- Beach Street between Larkin and Hyde Streets – all spaces (16 metered, and 2 truck loading) along the south side, and about half of the spaces (7 metered) along the north side
- Beach Street between Hyde and Leavenworth Streets – all spaces (7 metered, 3 passenger loading, and 1 disabled) along the north side
- Beach Street between Leavenworth and Jones Streets – all spaces (14 truck loading) along the south side
- Leavenworth Street between Jefferson and Beach Streets – all spaces (3 metered, and 8 truck loading) along the west side, and half of the spaces (3 truck loading, and 2 passenger loading) on the east side
- Jefferson Street between Leavenworth and Jones Streets – all spaces (9 metered, and 2 passenger loading) along the north side
- Jefferson Street between Jones and Taylor Streets – all of the spaces (9 metered, and 2 passenger loading) along the north side

This option would result in a long-term, minor, adverse impact.

Shared Lane Option (a total of 97 spaces would be removed):

- Beach Street west of Polk Street - all spaces (24 general parking) along the north side

- Beach Street between Polk and Larkin Streets – no spaces
- Beach Street between Larkin and Hyde Streets - half of the spaces (7 metered, and 2 truck loading) along the south side, and about half of the spaces (7 metered) along the north side
- Beach Street between Hyde and Leavenworth Streets - half of the spaces (5 metered) along the north side
- Beach Street between Leavenworth and Jones Streets – all spaces (14 truck loading) along the south side
- Leavenworth Street between Jefferson and Beach Streets – all spaces (3 metered, and 8 truck loading) along the west side, and half of the spaces (3 truck loading, and 2 passenger loading) on the east side
- Jefferson Street between Leavenworth and Jones Streets – all spaces (9 metered, and 2 passenger loading) along the north side
- Jefferson Street between Jones and Taylor Streets – all of the spaces (9 metered, and 2 passenger loading) along the north side

This option would result in a long-term, minor, adverse impact.

As described above for individual street segments, depending on the configuration option, a total of 27 or 28 truck loading spaces, and 6 or 13 passenger loading spaces, would be removed. Under either option, it is anticipated that SFMTA would reconfigure the remaining on-street parking spaces (e.g., change general metered spaces to metered truck loading spaces or passenger loading spaces) to minimize the incidence of double parking caused by removal of truck loading and passenger loading spaces under either option. Fisherman’s Wharf Public Realm Plan contains parking management policies to provide more efficient use of the existing parking garages. Dynamic signage with real-time parking information will be used to direct drivers to those garages with the greatest number of available parking spaces.

Transition Segment. The Alternative 2 track alignment would cross Van Ness Avenue as it transitions from the Aquatic Park area to the east portal of the Fort Mason Tunnel. There are parking spaces on Van Ness Avenue near, but not across, the track alignment in this area. These parking spaces would not be affected by the Project. Alternative 2 would not affect parking conditions in the Transition Segment.

North Loop Option. Alternative 2 would reduce the parking supply at Fort Mason Center because of the area displaced by the streetcar tracks, platforms and associated facilities by up to 35 spaces. However, the actual number of parking spaces that would be displaced is expected to be less; the Fort Mason Center parking lot would be reconfigured so as to make more efficient use of available area for parking, thereby reducing the overall number of parking spaces that might otherwise be displaced. Nonetheless, with the reduction in available parking spaces, some Fort Mason Center visitors would likely seek alternative parking nearby and walk the remaining distance. Given that, as described above, it is reasonably expected that Alternative 2 would result in a clearly detectable shift from use of private automobile to use of other modes of travel including the F-Line, the effect of Alternative 2 could be slightly detectable, but would not be expected to have an overall effect on parking conditions. The result would be a long-term, minor, adverse impact.

South Loop Option. Alternative 2 would not affect parking conditions at Fort Mason Center, and would not displace any parking spaces resulting in no impact.

Overall Alternative 2 (all segments). Alternative 2 would extend public transit service, connecting Fort Mason Center and downtown. Concerns have been raised about the possibility that North Bay-based motorists would drive across the Golden Gate Bridge to park in the area and use the F-Line to continue on to downtown destinations. Parking on Marina Boulevard and on the street network south of the marina area is restricted to two hours between 8:00 a.m. and 6:00 p.m. (Monday through Friday) for nonresidents. Residents (with residential zone “M” parking permits) have no time limit. Because of its proximity to the Fort Mason Center, people could seek parking spaces at the marina and then walk to reach the F-Line. The effect could be adverse if large numbers of people search parking at the marina, creating traffic congestion at local intersections, but it is speculative to quantify. However, based upon best professional judgment, and for the reasons described below, the overall effect is expected to be minor.

First, the proposed extension is not expected to be an attractive transportation supplement for inbound commuters or those traveling beyond Fisherman’s Wharf. For purposes of comparison, travel time for an automobile commuter from the Golden Gate Bridge to Downtown San Francisco (2nd Street and Market Street) is approximately 16 minutes. Using the F-Line to supplement a commute to the same destination would require an approximately 9 minute drive from the Golden Gate Bridge to Fort Mason, plus an additional 21 minute trip on the historic streetcar (URS 2009f). Thus, utilization of the F-Line would add approximately 15 minutes (per direction) to overall commute time. North Bay travelers presently have a number of other more time- and cost-competitive options for accessing San Francisco’s Downtown and Fisherman’s Wharf areas. These include Golden Gate Transit, Golden Gate Ferry, and the Blue and Gold Fleet, each of which has available capacity.

Next, transportation demand model 2030 projections (URS 2009f) indicate that extension of the F-Line would result in an overall decrease in daily vehicle trips to Fort Mason by 42 (15,330 annually) and the Maritime Museum by 160 (58,400 annually). This reduction is expected to offset any potential vehicle trip generation that would occur as a result of the project.

Lastly, in the unexpected event that the proposed extension did result in the generation of new vehicle trips to the Marina Neighborhood beyond the projected offsets, a number of measures are available to mitigate those impacts. For example, as discussed in section 4.4.3, and included as mitigation measure TRANS-4, imposing time restrictions on parking spaces in the Marina Neighborhood would deter long-term (i.e., commuter) parking around the proposed Fort Mason turnaround. Other alternatives available to the Marina Neighborhood residents include the establishment of metered parking and the expansion of permit parking.

For these reasons, and based upon best professional judgment, extension of the F-line is not expected to cause a considerable increase in trip generation to the Marina Neighborhood, or associated vehicle congestion and transit service delays.

For these reasons, and based upon best professional judgment, extension of the F-line is not expected to cause a considerable increase in trip generation to the Marina Neighborhood, or associated vehicle congestion and transit service delays. The overall impact would be long-term, minor and adverse.

Cumulative Impacts. The impacts of the other actions (past, present, and reasonably foreseeable future actions) for transportation under Alternative 2 would be the same as described under Alternative 1. See the discussion of cumulative effects under Alternative 1.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a local, long-term, moderate, beneficial cumulative impact on transportation conditions in the project area. The local, short-term, minor to moderate, adverse impact on transportation conditions from Project construction activities would be offset by the beneficial impacts of the cumulative projects. The local, long-term, moderate, beneficial effect on transit operations would be enhanced by the beneficial impacts of the cumulative projects. The long-term, negligible to minor, adverse effects on traffic flow and safety, and the long-term, minor, adverse effects on parking conditions, would be offset by the beneficial impacts of the cumulative projects.

Mitigation Measures

TRANS-1: Optimize Traffic Signal Timing. SFMTA would optimize the traffic signal timing for weekend conditions at the intersection of Jefferson Street and Leavenworth Street to reduce overall vehicle delays, while accommodating the F-Line streetcars and pedestrian circulation. As described above, no attempt was made to quantify the reduction in automobile traffic volumes that would occur if the F-Line were extended to Fort Mason Center, or from the Public Realm Plan, which provides a conservative analysis of the effects on Alternative 2 on traffic flow conditions. As also described above, strategies are currently under consideration to reduce the number of vehicles on Jefferson Street during peak periods of activity at the Wharf to no more than 100 vehicles per hour. Such a reduction in automobile traffic would improve the level of service at Jefferson/Leavenworth Streets to an acceptable LOS D or better during the weekend midday peak hour. The result with implementation of the Public Realm Plan (i.e., LOS D or better) would be a long-term, minor, adverse impact, but without implementation of the Public Realm Plan, the expectation is that the intersection LOS would remain at an unacceptable level (i.e., worse than LOS D), and the long-term, major, adverse impact would remain.

TRANS-2: Install Wayfinding Devices. Provision of positive wayfinding devices (e.g., signs and pavement markings) would reduce the potential adverse effects of potential traffic conflicts.

TRANS-3: Reconfigure On-Street Parking Spaces. SFMTA would reconfigure on-street parking spaces in the in-street segment (e.g., change general metered spaces to metered truck loading spaces) to minimize the incidence of double parking caused by removal of truck loading spaces under either the Semi-Exclusive and Shared Lane options. In addition, as described above, the Public Realm Plan contains parking management policies to use dynamic signage with real-time parking information to direct drivers to available parking spaces in area garages.

TRANS-4: Implement Parking Time Restrictions. SFMTA and NPS would recommend the implementation of time limitations on the parking spaces in the Marina lot near the Fort Mason Center; which, if implemented, would reduce the potential adverse effects of North Bay-based motorists driving across the Golden Gate Bridge to park in the area to use the F-Line to continue on to downtown destinations.

Conclusions. Alternative 2 would have a short-term, minor, adverse impact, and long-term, negligible, adverse impacts on transportation conditions in the project area.

4.5 AIR QUALITY

4.5.1 Methodology and Assumptions

Project-related air quality impacts fall into two categories: impacts due to construction, and impacts due to Project operation. First, during Project construction, the Project would increase regional pollutants of reactive organic gases (ROG) and oxides of nitrogen (NO_x) as well as local particulate concentrations primarily due to fugitive dust sources. Over the long-term, the Project would result in a decrease in emissions primarily due to decreased motor vehicle trips resulting from greater public transit access provided by the Project. This Project would not include any onsite stationary or area sources (such as natural gas boilers for water and space heating, and emissions from landscaping and use of consumer products).

Air quality assessment methodologies in this section generally conform to those identified by the Bay Area Air Quality Management District (BAAQMD) in its newly updated 2010 California Environmental Quality Act (CEQA) Air Quality Thresholds and Guidelines.

Construction-related Impacts. For construction phase-related impacts, BAAQMD's 2010 CEQA Air Quality Thresholds and Guidelines establish exhaust-related significance thresholds of 54 pounds per day of ROG, NO_x, and fine particulate matter (PM_{2.5}) and 82 pounds per day for PM₁₀. Based on this guidance, construction emissions are calculated using RoadMod because of the linear nature of the Project improvements and compared to the proposed significance thresholds in this EIS (see Appendix E).

| Impact Intensity | Impact Description |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The area of construction activity would not change from the area disturbed under the No-Action Alternative. |
| Minor: | The Alternative would involve less than 10,000 cubic yards of soil export or import by truck. |
| Moderate: | The Alternative would involve more than 10,000 cubic yards of soil export or import by truck. |
| Major: | Alternative construction would result in average construction exhaust emissions exceeding 54 pounds per day of ROG, NO _x , or PM _{2.5} or 82 pounds per day of PM ₁₀ . |

| Type | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Beneficial | Beneficial impacts would reduce vehicle trip generation and its associated pollutant emissions and by reducing levels of congestion (average vehicle delay), and occurrences of vehicle idling. |
| Adverse | Adverse impacts would increase pollutant emissions by introducing new emission sources or increasing vehicle miles travelled in the region. |

Operational-related Impacts. The Project would result in a decrease in vehicle miles travelled in the region resulting from an increase in access to public transit. This decrease in vehicle travel would reduce criteria air pollutant emissions in the region.

| Impact Intensity | Impact Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The Alternative would not increase vehicle miles travelled in the region or increase electrical demand. |
| Minor: | The Alternative would increase daily emissions of ROG, NOx or PM2.5 by less than 10 pounds per day, emissions of PM10 by less than 15 pounds per day or emissions of greenhouse gases by less than 200 metric tons per year. |
| Moderate: | The Alternative would increase daily emissions of ROG, NOx or PM2.5 by less than 27 pounds per day, emissions of PM10 by less than 41 pounds per day or emissions of greenhouse gases by less than 550 metric tons per year. |
| Major: | The Alternative would increase daily emissions of ROG, NOx or PM2.5 by more than 54 pounds per day, emissions of PM10 by more than 82 pounds per day or emissions of greenhouse gases by more than 1,100 metric tons per year. |

4.5.2 Impacts of Alternative 1—No-Action Alternative

Construction. Alternative 1 would not require the construction of any new roadway, transit or utility improvements. No new local or regional short-term, construction related impacts to air quality or greenhouse gas emissions would occur under Alternative 1.

Operation. New transit service would not be introduced under this alternative. Consequently, Alternative 1 would not have any beneficial air quality or greenhouse gas emission impacts related to vehicle trip reduction.

Because the roadway network, parking supply and transit service would not be altered under Alternative 1, there would be no traffic volume changes or other changes to the distribution of mobile source emissions within Fort Mason and the surrounding area under this Alternative. Therefore there would be no traffic-related air quality or greenhouse gas impacts.

Cumulative Impacts. There would be no incremental air quality or greenhouse gas emission impacts under Alternative 1. Therefore this Alternative would not contribute to any potential cumulative air quality or greenhouse gas impacts that may result from other development in the project area and surrounding area.

Conclusions. Alternative 1 would not propose the construction of any new roadway, transit or utility improvements and would therefore not result in any short- or long-term air quality or greenhouse gas emission impacts, either beneficial or adverse.

4.5.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Alternative 2A: North Loop Option. Alternative 2A would result in construction activities of approximately 8 weeks per block for advance utility work, followed by 6 weeks per block for track and rail installation. Construction work for the at-grade crossing of the Powell/Hyde Street cable car line would occur over a 6 month period as would the installation of new switches at Jones Street. Construction activities within the Fort Mason tunnel are anticipated to occur over a period of up to 12 months.

Construction emissions would be short-term (temporary) and would have the potential to result in adverse impacts to air quality. Air pollutant emissions would result from construction equipment and truck exhaust as well as from construction worker vehicle trips. Additionally, fugitive emissions of particulate matter would be generated by excavation and back-filling of trenches for utility installations and rails.

The Bay Area Air Quality Management District (BAAQMD) has recently adopted quantitative significance criteria for construction-related emissions. These quantitative thresholds are 54 pounds per day of either ROG, NO_x, or fine particulate matter (PM_{2.5}) and 82 pounds per day for PM₁₀. These criteria are to be compared to exhaust emissions only. For emissions of particulate matter from fugitive dust, BAAQMD identifies the implementation of Best Management Practices as necessary to avoid an adverse air quality impact.

Construction emissions were calculated using RoadMod (see Appendix E) because of the linear nature of the Project improvements, as recommended by BAAQMD guidance. Construction-related emissions for Alternative 2 as calculated by RoadMod are presented in Table 4.5-1. As can be seen from Table 4.5-1, emissions of NO_x associated with construction activities would exceed BAAQMD significance criterion of 54 pounds per day. All other pollutants would be less than their associated significance thresholds. Therefore, construction-related NO_x emissions represent a major adverse air quality impact. Exhaust emissions of all other pollutants would be considered minor adverse impacts.

TABLE 4.5-1: MAXIMUM DAILY CONSTRUCTION EMISSIONS OF CRITERIA AIR POLLUTANTS

| Year | Estimated Daily Emissions (pounds per day) | | | |
|--------------------|--------------------------------------------|-----------------|------------------|-------------------|
| | ROG | NO _x | PM ₁₀ | PM _{2.5} |
| 2011 | 7.4 | 55.5 | 2.6 | 2.4 |
| BAAQMD Threshold | 54 | 54 | 82 | 54 |
| Significant? | No | Yes | No | No |
| SOURCE: ESA, 2010. | | | | |

Additionally, mitigation measures in the form of Best Management Practices are required to avoid a major adverse air quality impact resulting from emissions of fugitive dust.

Construction-related GHG emissions were also calculated using RoadMod (see Appendix E) to estimate CO₂ emissions and diesel emission factors for N₂O and CH₄ to estimate the additional contributions of these fractions. N₂O and CH₄ emissions were then multiplied by their global warming potential to determine construction-related GHG emissions in terms of CO₂ equivalents (eCO₂). Construction related GHG emissions are estimated at 431 metric tons of eCO₂ per year and assume that all construction would occur in a single year. Construction-related GHG emissions would be short-term. The BAAQMD has not established a significance threshold for temporary construction-related GHG emissions. Therefore construction-related GHG emissions are considered a minor adverse impact with respect to global climate change.

The proposed extension of streetcar service that would occur under Alternative 2A is presumed to result in a net decrease in motor vehicle operations within the area which would result in a beneficial impact to air quality. Given that the streetcar extension would be powered by electricity, there would be no on-site emissions generation associated with the proposed action. Therefore, Alternative 2A would have a net negligible to minor beneficial operational air quality impact.

It is assumed that the Project would reduce vehicle trips into the Fort Mason area as a result of increased public access to public transit. This reduction in vehicle trips would result in a reduction in GHG emissions from motor vehicles. While the proposed extension of streetcar service into Fort Mason would require an increase in electrical demand by the SFMTA, the indirect GHG emissions from this increased demand would likely be more than offset by the reduction in vehicle trips.

This likelihood is supported by the following assertions:

1. GHG emission factors for the electrical service provider (SFPUC) is one of the lowest in the state (40 pounds eCO₂ per MWh¹ vs. a statewide average of 727 pounds eCO₂ per MWh²); and
2. A single car trip of 10 miles per day generates over 3372 pounds eCO₂ per year³. Consequently GHG emissions from an increase in electrical demand of 84 MWh, would be offset by a reduction of a single automobile trip per day.

Therefore, the Action Alternative is considered to result in a minor net beneficial impact to GHG emissions.

Alternative 2B: South Loop Option. From an air quality perspective, the south Loop Option would have the same magnitude of air quality emissions as the North Loop Option. The primary difference would be the location of activities for loop construction. The daily construction-related emissions for the South Loop Option would be the same as those presented in table 4.5-1. Emissions of NO_x associated with construction activities would exceed BAAQMD significance criterion of 54 pounds per day. All other pollutants would be less than their associated significance thresholds. Therefore, construction-related NO_x emissions represent a major adverse air quality impact. Exhaust emissions of all other pollutants would be considered minor adverse impacts. Similar to the North Loop Option, mitigation measures in the form of Best Management Practices would be required to avoid a major adverse air quality impact resulting from emissions of fugitive dust.

The South Loop option would have exactly the same net minor adverse construction-related GHG emission impact with as would occur with the North Loop Option.

The extension of streetcar service that would occur under Alternative 2B South Loop Option is presumed to result in a net decrease in motor vehicle operations within the area which would result in a beneficial impact to air quality. Given that the service extension would be powered by electricity, there would be no on-site emissions generation associated with the Alternative 2. Therefore, the Alternative 2B South Loop Option would have a net minor beneficial operational air quality impact.

¹ Ostrander, Calla, Climate Action coordinator, City of San Francisco Department of the Environment, e-mail communication, June 23, 2010.

² California Climate Action Registry General Reporting Protocol, Version 3.1, January 2009, Page 95.

³ As calculated by the URBEMIS2007 model in conjunction with the BAAQMD BGM model.

The South Loop option would have exactly the same net minor beneficial impact with regard to GHG emissions as would occur with the North Loop Option.

Cumulative Impacts. Cumulative effects to air quality should consider the past present and reasonable foreseeable actions in the study area in addition to potential affects of Alternative 2. The projects identified include only those projects that could affect transit operations and thus air quality and greenhouse gas emissions within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on air quality and greenhouse gas emissions include the Presidio Transit Program, the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fisherman’s Wharf Public Realm Plan, Van Ness Bus Rapid Transit, E-Embarcadero Historic Streetcar Line, and SFMTA’s Transit Effectiveness Project. The beneficial impacts would result from increased use of transit (with a corresponding decrease use of private automobiles). The degree of travel mode shift away from private automobiles is not certain. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to air quality conditions within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman’s Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive could result in short-term adverse impacts on air quality. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-generated traffic on roadways serving the project sites. The intensity of the adverse effects from the construction-related traffic would range from minor to moderate, depending on which, if any, of the construction projects occurred simultaneously. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to air quality and greenhouse gas emissions. Project construction emissions, with mitigation, would be less than BAAQMD significance thresholds. BAAQMD developed these thresholds to represent the levels at which a project’s individual emissions of criteria air pollutants or precursors would result in a “cumulatively considerable contribution” to existing air quality (BAAQMD 2010). Therefore project construction-related emissions would not be considered to result in a significant cumulative impact.

Mitigation Measures

AIR-1: Implement BAAQMD Basic Construction Mitigation Measures. In order to avoid a major adverse impact to air quality as a result of localized emissions of fugitive dust during construction activity, the BAAQMD recommends that all projects implement Best Management Practices. BAAQMD identifies the following “Basic Construction Mitigation Measures” as recommended for all projects:

1. All exposed surfaces shall be watered two times daily.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet-power vacuum street sweepers at least once per day.

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. 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 manufacturers specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
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.

In order to reduce daily emissions of NO_x to below the 54 pounds per day threshold the contractor may employ any one of the following alternatives:

- Limit daily excavation and import volumes to 170 cubic yards, respectively; or
- Retrieve fill material from a local source within a 10-mile radius; or
- Dispose of excavated materials at a local depository within a 10 mile radius.

Conclusions. Short-term adverse air quality impacts would result from daily maximum construction activities. With implementation of BAAQMD best management practices for the control of construction-generated emissions as well as implementation of one of the three excavation/fill material mitigation measures, short-term air quality impacts would be minor to moderate and adverse.

Long-term air quality impacts under Alternative 2 would be associated with potential minor decreases in vehicle trip generation into the Fort Mason area and associated decreases in intersection traffic volumes. Therefore, Alternative 2 would result in negligible to minor beneficial operational impacts to both regional and local air quality as well as greenhouse gas emissions.

4.6 NOISE AND VIBRATION

4.6.1 Methodology and Assumptions

To assess potential short-term construction noise impacts, sensitive receptors and their relative exposure (considering topographic barriers and distance) were identified. Combined intermittent noise levels from the simultaneous operation of onsite equipment expected to be used in project construction were determined based on a study of measured construction equipment noise in the Roadway Construction Noise Model of the Federal Highway Administration, as indicated in **Table 4.6-1**. The sources in this list were identified as likely equipment to be used in the project.¹ An additional piece of equipment proposed to be used for which operational noise specifications are not available is a roadheader which is a device that would be used to cut concrete out of the tunnel. Because it would be used within the tunnel, its noise generation is assumed to be no greater than that of the concrete saw in Table 4.6-1.

Based on these noise levels and a typical noise attenuation rate of 6 dBA per doubling of distance, resultant noise levels at noise sensitive noise receptors were calculated. Consistent with the guidance for determination of construction noise impacts of the Federal Transit Administration (FTA)², impacts were assessed assuming simultaneous operation of the two noisiest pieces of construction equipment.

Long-term noise impacts would be associated with the introduction of street car operations in an area where none currently exist. Operational street car noise results from wheel and rail interactions as well as from warning bells. Braking operations are typically not noise generating. Prediction of noise and vibration impacts is assessed using noise and vibration measurement data³ from adjacent areas where the streetcars currently run and adding this new noise to noise data for the existing environment where the new streetcar tracks are proposed to run.

There is also potential for beneficial noise reduction impacts that would result from the reduction in motor vehicle trips. Because the trip reduction for local roadways is not quantified, the associated reduction in vehicle road noise is also not quantified and assumed to be negligible.

Construction noise impact criteria is suggested in the Federal Transit Administration (FTA) Guidance which identifies a 1-hour Leq of 90 dBA for daytime and 80 dB for nighttime construction noise exposure at residential uses. Commercial and industrial land use exposure to construction noise of 100 dBA is suggested as assessment criteria. Additionally, the City of San Francisco noise ordinance prohibits the operation of any powered construction equipment emitting noise at a level in excess of 80 dBA at 100 feet, or an equivalent sound level at some other distance. This limit does not apply to impact tools and equipment, such as pile drivers, pavement breakers, and jackhammers, provided such equipment is fitted with approved noise control features.

¹ Foster, Rick, National Park Service, e-mail communication to Darcey Rosenblatt of Environmental Science Associates, April 15, 2010.

² U.S. Department of Transportation, Federal Transit Administration, Traffic Noise and Vibration Impact Assessment, May 2006.

³ Wilson Ihrig & Associates, Noise and Vibration Setting Report Historic Streetcar Service to Fort Mason, April 2009.

TABLE 4.6-1: MEASURED NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

| Construction Equipment | Noise Level (dBA, Lmax at 50 feet) |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Auger Drill Rig | 84 |
| Backhoe | 78 |
| Compactor | 83 |
| Air Compressor | 78 |
| Concrete Batch Plant | 83 |
| Concrete Mixer | 79 |
| Concrete Saw | 90 |
| Crane | 81 |
| Drill Rig Truck | 79 |
| Drum Mixer | 80 |
| Dump Truck | 76 |
| Excavator | 81 |
| Flat Bed Truck | 74 |
| Front End Loader | 79 |
| Generator | 81 |
| Grade All | 83 |
| Grapple (on Backhoe) | 87 |
| Jackhammer | 89 |
| Man Lift | 75 |
| Mounted Impact Hammer | 90 |
| Pickup Truck | 75 |
| Pneumatic Tools | 85 |
| Pumps | 81 |
| Rock Drill | 81 |
| Slurry Plan | 78 |
| Tractor | 84 |
| Ventilation Fan | 79 |
| Vibratory Concrete Mixer | 80 |
| Welder | 74 |
| SOURCE: Federal Highway Administration, <i>Roadway Construction Noise Model Handbook</i> , Chapter 9, August 2006. | |

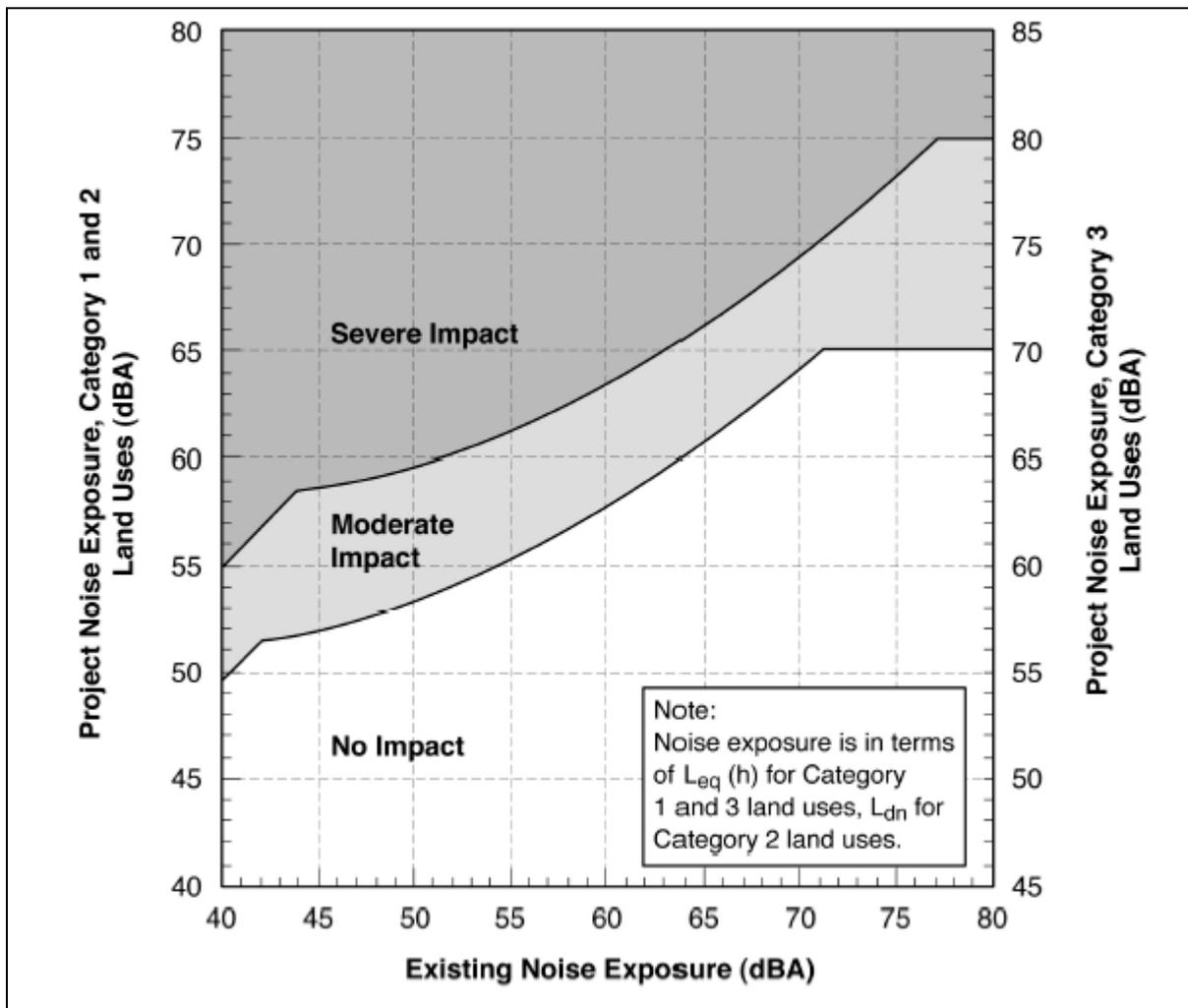
Operational noise impact severity is based on Federal Transit Administration (FTA) Guidance which takes into account not only the type of sensitive receptor to be considered but also the existing noise levels prior to the addition of a project's contribution. The main basis of the noise impact criteria is a comparison between the existing ambient noise levels and the future noise levels from the proposed project. If the project noise contribution is well below the existing noise levels at sensitive receptors, the project is considered to have no impact.

Figure 4.6-1 presents the FTA’s noise operational impact criteria. In this figure three types of sensitive receptors are considered:

- Category 1: Where quiet is essential (including national historic landmarks with significant outdoor use, recording studios, concert halls);
- Category 2: Residences and buildings where people normally sleep (including hotels); and
- Category 3: Institutional land uses with primarily daytime and evening use (includes schools, libraries, theaters and museums).

The City of San Francisco addresses noise within its municipal code but only in relation to stationary source noise. Generally, cities defer to the state’s effort to address vehicle noise through vehicle code sections 23130 and 23130.5 which provide on-road vehicle noise limits enforced by police departments, sheriffs and the California Highway Patrol. Transit noise is not regulated locally.

FIGURE 4.6-1 NOISE IMPACT CRITERIA FOR TRANSIT PROJECT



SOURCE: Federal Transit Administration, May 2006.

Analysis Thresholds – Construction Noise

| Impact Intensity | Impact Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Construction Noise would be below ambient noise levels. |
| Minor: | Construction Noise would exceed ambient noise levels but would not exceed 90 dBA during daytime hours or 80 dbA during nighttime hours at residential uses, or 100 dBA at commercial or industrial land uses at any time |
| Moderate: | Construction noise would approach 90 dBA during daytime hours or 80 dbA during nighttime hours at residential uses, or 100 dBA at commercial or industrial land uses at any time. |
| Major: | Construction noise would exceed 90 dBA during daytime hours or 80 dbA during nighttime hours at residential uses, or 100 dBA at commercial or industrial land uses at any time. |

Analysis Thresholds – Operational Noise

| Impact Intensity | Impact Description |
|--------------------|----------------------------------------------------------------|
| Negligible: | Project Noise increase in un-shaded areas in Figure 4.6-1 |
| Minor: | Project Noise increase in un-shaded areas in Figure 4.6-1 |
| Moderate: | Project Noise increase in lightly shaded areas in Figure 4.6-1 |
| Major: | Project Noise increase in dark shaded areas in Figure 4.6-1 |

| Type | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Beneficial | Beneficial impacts would be associated with reduced noise levels that would occur as the result of decreased roadway volumes from streetcar transit users that would have otherwise driven to Fort Mason. |
| Adverse | Adverse project impacts would be associated with increased noise and vibration to sensitive land uses along new streetcar routes from operation of streetcars. |

Vibration Analysis Threshold. The City of San Francisco does not address vibration within its municipal code.

Vibration criteria in the FTA Guidance Manual are commonly used in assessing potential vibration impacts from new transit projects, and provide guidance on acceptable levels. These criteria, summarized in **Table 4.6-2**, are based on the vertical vibration velocity level of the building floor, in decibels. To avoid confusion with noise levels in decibels, the vibration velocity level is usually referred to as VdB. Vibration levels of as low as 65 VdB can be perceptible to people.

"Frequent Events" are defined as more than 70 vibration events of the same source per day, for example, more than 70 train or streetcar pass by events per day. "Occasional Events" are defined as between 30 and 70 events per day, and "Infrequent Events" are defined as less than 30 events per day. Thus, the vibration criteria for residential buildings applicable to most rapid transit or light rail systems are either 72 VdB or 75 VdB, depending on the frequency of daily operations.

TABLE 4.6-2: GROUNDBORNE VIBRATION IMPACT CRITERIA

| Land Use Category | Groundborne Vibration Impact Levels in VdB | | |
|-------------------|--------------------------------------------|-------------------|-------------------|
| | Frequent Events | Occasional Events | Infrequent Events |
| Category 1 | 65 | 65 | 65 |
| Category 2 | 72 | 75 | 80 |
| Category 3 | 75 | 78 | 83 |

SOURCE: U.S. Department of Transportation, Federal Transit Administration, Traffic Noise and Vibration Impact Assessment, May 2006.

| Impact Intensity | Impact Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Project contribution does not alter existing vibration levels. |
| Minor: | Project increases vibration levels, but levels are below those indicated for each land use type and frequency combination in Table 4.6-2 |
| Moderate: | Project increases vibration levels, but levels are at those indicated for each land use type and frequency in Table 4.6-2 |
| Major: | Project increases vibration levels and levels exceed those indicated for each land use type and frequency in Table 4.6-2 indicated for each land use type in Table 4.6-2 |

4.6.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Alternative 1 would not require the construction of any new roadway, transit or utility improvements. No new construction-related noise or vibration sources or impacts would occur under Alternative 1.

New transit service would not be introduced under this alternative. Consequently, Alternative 1 would not have any new operational noise or vibration impacts related to streetcar operations or benefits from vehicle trip reduction.

Because the roadway network, parking supply and transit service would not be altered under Alternative 1, there would be no traffic volume changes or other changes to the distribution of mobile noise sources within Fort Mason and the surrounding area under this Alternative. Therefore there would be no traffic-related noise impacts.

Cumulative Impacts. There would be no incremental noise impacts under Alternative 1. Therefore this Alternative would not contribute to any potential cumulative noise or vibration impacts that may result from other development in Fort Mason and surrounding area.

Conclusions. Alternative 1 would not propose the construction of any new roadway, transit or utility improvements and would therefore not result in any new short- or long-term noise or vibration impacts, either beneficial or adverse.

4.6.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

In-Street and Transition Segment Construction Noise Impact Analysis. Alternative 2 would require the use of various pieces of construction equipment (presented in Table 4.6-1) that would be in operations during different phases of construction. FTA Guidance regarding a quantitative assessment of noise impacts from construction activities state that the following assumptions are adequate for a general assessment of each phase of construction:

- Full power operation for a time period of one hour;
- Free-field conditions are assumed and ground effects are ignored;
- Emission level of 50 feet;
- All pieces of equipment are assumed to operate at the project centerline in the case of a guideway; and
- The predictions include only the two noisiest pieces of equipment expected to be used in each construction phase.

As can be seen from the values in Table 4.6-1, the two noisiest pieces of equipment would be a concrete saw and a mounted impact hammer, each of which operate with a maximum noise level of 90 dBA at 50 feet. Resultant noise levels for simultaneous operation of these pieces of equipment are presented in **Table 4.6-3** for nearby sensitive receptors along the project alignment. Supporting calculation sheets for these predicted noise levels are presented in Appendix F.

TABLE 4.6-3: PREDICTED COMPOSITE CONSTRUCTION NOISE LEVELS AT NEARBY RECEPTORS

| Receptor | Hotels and Commercial uses abutting Beach Street | 2765 Hyde Street Upstairs Residences | Maritime Museum | Fontana Towers Residential | Fort Mason Landmark Building A (North Loop/South Loop) | Laguna Street Condominiums (North Loop/South Loop) |
|---------------------------------------------------------------|--------------------------------------------------|--------------------------------------|----------------------------------|----------------------------|--------------------------------------------------------|----------------------------------------------------|
| Distance from rail centerline | 50 feet assumed per FTA Guidance | 50 feet assumed per FTA Guidance | 50 feet assumed per FTA Guidance | 250 feet | 80 feet/ 250 feet | 400 feet/ 100 feet |
| Predicted composite noise level (dB, Leq) | 93.0 | 93.0 | 93.0 | 79.0 | 88.9 | 74.9/87.0 |
| Applicable FTA Construction Noise Criterion (daytime) dB, Leq | 100 | 90 | 100 | 90 | 100 | 90 |
| Exceeds Assessment Criteria? | No | Yes | No | No | No | No |

As can be seen from the data presented in Table 4.6-3, construction activities would exceed FTA daytime impact criteria at the Hyde Street residential receptor nearest the project alignment. All other receptors in the In-Street and Transition Segments would be below these FTA criteria.

If construction work were to occur during nighttime hours, noise levels would also exceed FTA nighttime criteria at the Hyde Street residential receptor. Consequently, the predicted composite construction noise levels of 93 dBA at the nearest sensitive receptor would exceed the FTA daytime residential exposure criterion of 90 dBA and could be considered a major adverse impact at the residences and hotels within 50 feet. At distance beyond 75 feet, the annoyance construction vibration impact would be reduced to a minor to moderate adverse impact.

In addition to FTA construction noise criteria, the City of San Francisco noise ordinance prohibits the operation of any powered construction equipment emitting noise at a level in excess of 80 dBA at 100 feet, or an equivalent sound level at some other distance. This limit does not apply to impact tools and equipment, such as pile drivers, pavement breakers, and jackhammers, provided such equipment is fitted with approved noise control features.

Construction equipment noise levels in Table 4.6-1 are presented for a distance of 50 feet. At the 100-foot distance designated in the City's noise ordinance, the noise levels in Table 4.6-1 would be 6 dBA less. Therefore, any non-impact construction equipment in the table that exceeds 86 dBA would have the potential to exceed the standards of the City noise ordinance. The only non-impact piece of construction equipment with the potential to exceed the City of San Francisco noise ordinance standards would be the concrete saw.

In-Street and Transition Segment Vibration Impact Analysis. Groundborne vibration from activities that involve "impact tools," especially pile driving, could produce significant vibration. However, pile driving would not be a building technique used during construction of the proposed project. Other construction equipment that can have measureable vibration impacts at close distances would include auger drill rigs, jackhammers and loaded haul trucks (assuming surface irregularities in construction roads). Of these sources, the most significant vibration source would be auger drill rig operations that can result in peak particle velocities (PPV) of up to 0.089 inches per second at a distance of 25 feet, which would be below the criteria published by the U.S. Department of Transportation, which uses a standard of 0.12 inches per second for the protection of fragile buildings (defined as "buildings extremely susceptible to vibration damage").

The closest structures to the project alignment in the straightaway and transition segments would be the Maritime Museum and the west speaker tower, and western Convenience Station (roundhouse) which would be as close as 15 feet from the tracks at some locations. The Maritime Museum is a historic building with frescoes and would be considered extremely susceptible to vibration damage. Commercial uses and one residential land use along either side of Beach Street are approximately 25 feet from the alignment centerline.

Assuming auger drill operations as close as 25 feet to structures on Beach Street, auger drill vibration would be 0.089 PPV at the nearest commercial and residential structures.⁴ Therefore, construction-related vibration levels would be considered a minor adverse impact at these receptors, even if the closest buildings were considered to be “fragile.” For structures closer than 25 feet, specifically the Maritime Museum and its west speaker tower, construction-related vibration would have the potential to exceed DOT construction vibration damage criterion for buildings considered extremely sensitive to vibration damage. Vibrations from auger drill operations at distance of 15 and 20 feet would be 0.191 and 0.124 PPV, respectively, which would exceed the vibration criterion of 0.12 for fragile buildings. Consequently, construction-related vibration levels would be considered a major adverse impact for the Maritime Museum and its west speaker tower.

Vibration levels can also result in interference or annoyance impacts to residences or other land uses where people sleep, such as hotels and hospitals. Vibration impact criteria published by the U.S. Department of Transportation relative to these land uses are established in terms of VdB. For frequent events, a criterion of 72 VdB has been established, while for infrequent events a criterion of 80 VdB has been established. As frequent events are defined as more than 70 vibration events per day, intermittent construction-related vibration from augering would be considered as an infrequent event and, therefore, the 80 VdB criterion would apply to residences and a criterion of 83 VdB would apply to institutional uses, such as the Maritime Museum.

Auger drill operations can result in typical vibrations of 87 VdB at a distance of 25 feet. The nearest residences and hotels to the proposed project construction alignment would be residential dwellings on Hyde Street and hotels along Beach Street, located as close as 25 feet from the project alignment. Additionally, the Maritime Museum, which would be as close as 15 feet from construction activities, would be exposed to vibration levels of 94 VdB which would exceed the 83 VdB criterion for institutional uses. Consequently, the predicted auger drill vibration of 87 VdB at the nearest sensitive receptors would exceed the infrequent event criterion of 80 VdB and could be considered a major adverse annoyance impact at the residences, hotels and the Maritime Museum within 50 feet. At distance beyond 50 feet, the annoyance construction vibration impact would be reduced to a minor to moderate adverse impact.

Operational Noise. Noise from intermittent streetcar operations does not significantly contribute to the existing Ldn values measured at long term noise monitoring station along existing portions of the F-line which are dominated by semi-continuous traffic noise (Wilson Ihrig & Associates 2009). However, noise from wheel/rail interactions and warning bells are generally noticeable, although were not observed to be overly intrusive.

Maximum pass-by noise from existing historic streetcars on the F-line is comparable to those from vehicular pass-by events and is dependant upon speed. Maximum streetcar noise levels from a streetcar pass-by event were recorded to range from 82 to 91 dBA at 25 feet from the track centerline with cars travelling at approximately 20-25 mph. At lower speeds (as along Jones Street) these noise levels were recorded to be 66 to 70 dBA. These noise levels were monitored in the absence of wheel squeal.

⁴ United States Department of Transportation, Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, p. 12-11, May 2006.

A majority of the streetcars observed during the 2009 noise monitoring study negotiated the 90 degree turns at Jones and Beach Streets with little to no wheel squeal.⁵ One streetcar however was observed to generate a high, subjectivity unpleasant noise level in excess of 100 dBA at this location due to wheel squeal.

The extent of noise impacts to land uses surrounding the proposed F-line extension alignment would depend upon the type of land use impacted, the existing noise levels at that land use and the distance of that land use from the proposed alignment. FTA guidance identifies three categories of land use sensitivity, each with its own impact criteria depending on existing noise levels. Sensitive land uses along the project alignment would primarily be hotels and residences which are characterized as Land Use category 2 (residences and buildings where people normally sleep). The Fort Mason Landmark buildings would be characterized as Land Use Category 3 (Institutional land uses with primarily daytime and evening use). Commercial land uses are considered compatible with higher transit-related noise levels by FTA guidance and are not recognized as a sensitive land use for the purposes of noise impact assessment. Table 4.6-4 presents a summary of sensitive land uses along the project alignment, the existing noise levels at these receptors and the applicable noise impact criteria for these conditions. These levels reflect site-specific application of the generalized criteria presented in Figure 4.6-1.

TABLE 4.6-4: EXISTING NOISE LEVELS AT NEARBY RECEPTORS AND CORRESPONDING IMPACT CRITERIA

| Receptor | Hotels and Ghirardelli Square and 2765 Hyde Street Upstairs Residences | Maritime Museum | Fontana Towers Residential | Fort Mason Landmark Buildings A-F | Laguna Street Condominiums (North Loop/ South Loop) |
|-----------------------------------------------------------------|------------------------------------------------------------------------|-------------------|----------------------------|-----------------------------------|-----------------------------------------------------|
| Land Use Impact Category | 2 - Residences/hotels | 3 - Institutional | 2 - Residences/hotels | 3 - Institutional | 2 - Residences/hotels |
| Distance from rail centerline | 25 feet | 15 feet | 250 feet | 80 feet | 400 feet/ 100 feet |
| Existing Noise Level (dB, Ldn) | 70 | 70 | 65 | 60 | 65 |
| Predicted Project Contribution (Ldn) | 72.5 | 73 + | 52.8 | 65.8/50.8 | 45.8/63.3 |
| No Impact Noise level (Ldn) (project contribution) | Less than 65 | Less than 69 | Less than 61 | Less than 63 | Less than 61 |
| Moderate Impact Noise level (Ldn) (project contribution) | 65 to 69 | 69 to 74 | 61 to 66 | 63 to 68 | 61 to 66 |
| Severe Impact Noise level (Ldn) (project contribution) | Greater than 69 | Greater than 74 | Greater than 66 | Greater than 68 | Greater than 66 |

⁵ Wilson Ihrig & Associates, Noise and Vibration Setting Report Historic Streetcar Service to Fort Mason, April 2009.

Operational noise impacts from the extended rail service would affect receptors differently, depending on whether the receptor would be predominantly exposed to a straightaway section where cars travel at cruising speed (approximately 20 to 30 miles per hour) or a curved turning segment where speeds are reduced but the potential exists for wheel squeal from older streetcars. Consequently, the impact of each of these scenarios is evaluated independently.

In-Street and Transition Segment Operational Noise Impacts (Streetcar Impacts along Straight Rail Sections). To determine the contribution of streetcar noise to nearby sensitive receptors, a detailed analysis was performed in accordance with the methodology described in the Federal Transit Authority's document *Transit Noise and Vibration Impact Assessment*. To determine the resultant project contribution in terms of the Ldn noise descriptor it is necessary to either estimate (from look-up tables) or monitor the noise generated by a single pass-by event. Pass-by events are measured in terms of the sound exposure level (SEL) noise descriptor which normalizes the sound energy of the single pass-by event into a single second. Supporting data sheets for these monitored noise levels are presented in Appendix F.

Because the streetcar fleet is not homogeneous, a sample of SEL was collected for pass-by events of 12 different streetcars along a straightaway section where streetcars achieve a cruising speed (Beach Street between Mason and Taylor Streets). The six noisiest of these twelve SEL readings were then logarithmically averaged to obtain a conservative composite SEL. This conservative approach was employed because of the potential for other streetcars not in service or still in restoration to elevate the future SEL above what would be reflected by a composite SEL of all streetcars monitored. Six cars were selected as this is the number of hourly headways scheduled for the F-line extension. Averaging is performed not only to reflect the heterogeneity of the streetcar fleet but also because federal significance criteria for the FTA are established in terms of the day-night noise level which is a 24-hour noise descriptor.

SEL readings along this straightaway ranged from 78.1 dB (car 1010) to 96.3 dB (car 1818). The composite SEL for streetcars along the straightaway section was 91.8 dB. This composite SEL was then used as input into the FTA model, separating daytime operations (7 a.m. to 10 p.m.) and nighttime operations (10 p.m. to 7am) to determine the resultant Ldn of 68.0 at 50 feet. The resultant Ldn values at 25 and 250 feet were estimated at 72.5 dB and 58.0 dB, respectively, using FTA distance correction curves for fixed guideway noise sources. Supporting calculation sheets for these predicted noise levels are presented in Appendix F. Standardized noise propagation curves for linear noise sources become inaccurate in the "near field" (distances closer than 25 feet) and prediction of noise levels within the near field cannot reliably be estimated. However, resultant Ldn values at the Maritime Museum for which the rail tracks would be as close as 15 feet from the building façade, would likely exceed 73 dBA.

Receptors affected by streetcar noise along proposed straightaway sections would be hotels along Beach Street and the residence at 2765 Hyde Street as well as the Maritime Museum all of which would be approximately 25 feet or closer from the rail centerline and the Fontana apartments which would be 250 feet from the rail centerline. Receptors at a distance of 25 feet would be exposed to a streetcar contribution of 72.5 dB, Ldn which would be defined as a major adverse impact for residential and hotel receptors indicated in Table 4.6-4. Impacts at the Maritime Museum would approach the 74.0 dB criterion for institutional land uses and be considered a moderate adverse impact. Fontana Towers, at

a distance of 250 feet, would be exposed to a streetcar contribution of 58.0 dB, Ldn which would be characterized as a minor adverse impact, as indicated in Table 4.6-4.

Operational Vibration – In-Street Segment. A survey of groundborne vibration levels from streetcar operations was conducted in 2006⁶ to determine the range of vibration levels that may be expected at sensitive receptors along the proposed alignment. The maximum vibration level monitored at the corner of Jones Street and Beach Street, where streetcars negotiate a 90 degree turn, was 75 VdB. The maximum vibration level monitored along a straightaway segment of Beach Street between Mason Street and Taylor Street was 81 VdB at 25 feet. Because of the proximity of these monitored locations to proposed extension area, it is assumed that underlying geological conditions would be similar and that propagation of vibrations would not be measurably different. Resultant VdB values from streetcars during turning operations and along straightaway segments at 250 feet were estimated to be 61 VdB and 55 VdB, respectively, using FTA ground surface vibration curves for light rail vehicles.

Receptors potentially affected by streetcar vibration along proposed straightaway sections would be hotels along Beach Street and the residence at 2765 Hyde Street., all of which would be within 25 feet of the rail centerline and the Fontana apartments which would be 250 feet from the rail centerline. On straightaways, resultant VdB values from streetcars at 25 and 250 feet were estimated to be 81 VdB and 61 VdB, respectively. Predicted vibration levels at receptors at a distance of 25 feet would be characterized as a major adverse impact with regard to FTA criteria for residential and hotel land uses. Fontana Towers, at a distance of 250 feet, would be exposed to a streetcar contribution of 61 VdB which would be characterized as a minor adverse impact.

Operational Vibration – Transition Segment. The Maritime Museum, west Convenience Station and west speaker tower of the Maritime Museum are located along the Transition Segment and approximately 15 feet of the rail center. The nuisance impact on people at these institutional uses is not as much of a consideration as the potential for structural damage from operational vibration generated by streetcars. Streetcar speeds along this segment would likely be reduced compared with those monitored at the existing Beach Street straight-aways. However, as a conservative analysis, a straightaway vibration level of 81 VdB may be assumed. This vibration level at a distance of 15 feet would be further increased to 88 VdB, which corresponds to a PPV of approximately 0.107. This would be below the U.S. DOT criterion of 0.12 PPV (or 90 VdB) for buildings extremely susceptible to vibration damage. Therefore operational vibration impacts with regard to the structural integrity of the Maritime Museum and its west speaker tower is considered a minor adverse impact⁷. However, mitigation measures identified with regard to major adverse nuisance vibration impacts along the In-street segment are recommended to be extended to the Museum and speaker tower to minimize the potential for structural damage to these historic structures and reduce this minor adverse impact.

⁶ Wilson Ihrig & Associates, Noise and Vibration Setting Report Historic Streetcar Service to Fort Mason, April 2009.

⁷ The FTA states: *it is extremely rare for vibration from train operations to cause any sort of building damage, even minor cosmetic damage. However, there is sometimes concern about damage to fragile historic buildings located near the right-of-way. Even in these cases, damage is unlikely except when the track will be very close to the structure.* FTA recommends use of its 0.12 in/sec (or 90 VdB) criterion for buildings extremely susceptible to vibration damage. United States Department of Transportation, Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, p. 8-4, May 2006.

Fort Mason Tunnel Segment Construction Noise. Construction noise generated within the tunnel would be substantially reduced from the construction noise levels presented in Table 4.6-3. While construction noise would emanate from the two tunnel portals, even the composite equipment noise of 93.0 dBA can reasonably be assumed to be attenuated by tunnel walls by a minimum of 5 dBA. Therefore, construction noise impacts within the Fort Mason Tunnel Segment would be considered a minor adverse impact.

Fort Mason Tunnel Segment Construction Vibration. Construction vibration within the tunnel would be substantially reduced from predicted auger drill vibration would be 0.089 PPV at 25 feet. Tunnel construction activities would not require auger drill operations. Therefore, construction vibration impacts at buildings above the tunnel would be below the 80 VdB criterion for infrequent events as therefore represent a minor adverse construction vibration impact.

Fort Mason Tunnel Segment- Operational Noise. Operational noise generated within the tunnel would be substantially reduced from the operational noise levels presented in Table 4.6-4. While streetcar noise would emanate from the two tunnel portals, operational streetcar noise can reasonably be assumed to be attenuated by tunnel walls by a minimum of 5 dBA. Therefore, operational noise impacts within the Fort Mason Tunnel Segment would be considered a minor adverse impact.

Fort Mason Tunnel Segment- Operational Vibration. Vibration impacts to buildings above the tunnel within Fort Mason would experience lesser operational vibration impacts than those predicted for the straightaway segments because of the propagation distances involved. Vibrations would travel laterally out of the rail toward the sides of the tunnel approximately 10 feet before it could then travel upwards through the soil from a track elevation of approximately 40 feet to an elevation of 100 feet or more in locations where buildings are present. Vibrations at this approximated distance of 70 feet are estimated to be 74 VdB which would be considered a minor adverse impact for Category 3 land uses and would not approach the 90 VdB criterion for the protection of extremely fragile structures.

Alternative 2A: North Loop Option - Construction Noise. The two noisiest pieces of equipment in Table 4.6-1 would be a concrete saw and a mounted impact hammer, each of which operate with a maximum noise level of 90 dBA at 50 feet. Resultant noise levels for simultaneous operation of these pieces of equipment are presented in Table 4.6-3 for nearby sensitive receptors along the project alignment and indicate a noise level of 88.9 dBA at the Landmark building. This noise level is below the FTA criterion of 100 dBA for institutional land uses and would be considered a minor adverse impact. Calculations used the Landmark building as a worst-case scenario for Fort Mason as other buildings would be located substantially further from construction activity not occurring within the tunnel. The nearest residential land use to the North Loop construction area would be Laguna Street condominiums located approximately 400 feet away where resultant noise levels would be 74.9 dbA. This noise level would be below the FTA criterion of 90 dBA for institutional land uses and would be considered a minor adverse impact.

Alternative 2A: North Loop Option - Construction Vibration. Auger drill operations would have the greatest potential to generate vibration and can result in typical vibrations of 87 VdB at a distance of 25 feet. The nearest residences to the proposed North Loop alignment would be Laguna Street condominiums located approximately 400 feet away where resultant vibration levels would be reduced to of 51 VdB which would be well below the 80 VdB criterion for residential uses. Vibrations at the

Landmark Building, approximately 80 feet away, would be 72 VdB. This predicted vibration level would be below the 83 VdB criterion for institutional land uses and would be considered a minor adverse impact.

Alternative 2A: North Loop Option Operational Noise. Streetcar impacts along curved segments were estimated using the same methodology as straightaway segments except that the baseline SEL measurements from streetcars used were collected from the corner of Beach Street and Jones Street where streetcars negotiate a 90 degree turn. Generally, streetcars are travelling slower at turning points and therefore noise levels are less than those monitored along straightaways. However, older streetcars can produce noticeable wheel squeal when negotiating turns.

Again, because the streetcar fleet is not homogeneous, a sample of SEL was collected for pass-by events of 15 different streetcars. Of these 15 different cars only one produced wheel squeal of a nature that significantly increased the monitored SEL. The highest six of these 15 SEL readings were then logarithmically averaged to obtain a conservative composite SEL. This conservative approach was employed because of the potential for other streetcars not in service or still in restoration to elevate the future SEL above what would be reflected by a composite SEL of all streetcars monitored. Six cars were selected as this is the number of hourly headways scheduled for the F-line extension. SEL readings along this curve ranged from 71.2 dB (car 1015) to 84.9 dB (car 162) with the exception of car 952, an older (1923) streetcar from New Orleans which resulted in a pass-by SEL of 98.9 dB.⁸

Table 4.6-5 presents the SEL and Maximum noise levels recorded for each of these events. Maximum noise (Lmax) levels are presented for reader reference only as significance thresholds for transportation sources are not established in terms of the Lmax descriptor.⁹

While only a single streetcar produced subjectively adverse wheel squeal during a two hour monitoring effort, it was conservatively assumed that this phenomena would occur on an hourly basis, given that other fleet streetcars with this capability may also be in operation. The composite SEL for streetcars along a curved section of track was 91.6 dB. This composite SEL was then used as input into the FTA model, separating daytime operations (7 a.m. to 10 p.m.) and nighttime operations (10 p.m. to 7 a.m.) to determine the resultant Ldn of 67.8 dB at 50 feet.

Receptors affected by streetcar noise along proposed North Loop section would be Fort Mason Landmark Building A which would be within approximately 80 feet from the rail centerline and the Laguna Street Condominiums which would be 400 feet from the rail centerline at the western portal of the tunnel. Receptors at a distance of 80 feet would be exposed to a streetcar contribution of 65.8 dB, Ldn which would be defined as a moderate adverse impact as indicated in Table 4.6-4. This would be the maximum operational noise impact for any receptor in Fort Mason. Residential receptors on Laguna Street, at a distance of 400 feet, would be exposed to a streetcar contribution of 45.8 dB, Ldn which would be characterized as a negligible adverse impact, as indicated in Table 4.6-4.

⁸ The 952 streetcar is not owned by SFMTA and is likely to be returned to its owner, New Orleans Regional Transit Authority, prior to its potential use on the F-line extension.

⁹ Standards for stationary equipment are occasionally set in terms of maximum noise levels as equipment can commonly have a consistent operational characteristic. Mobile source impact criteria are not established in terms of maximum noise levels because of the intermittent character of transportation noise. Additionally, there can be large variations in existing background levels for this descriptor, particularly in urban areas. For example, a ubiquitous occurrence such as a car door slam at a distance of 20 feet can easily produce an Lmax of 90 dBA.

TABLE 4.6-5: MONITORED AND ATTENUATED STREETCAR NOISE LEVELS AT CURVED TRACK SECTIONS

| Streetcar Number/Type ^a | Monitored SEL (dBA)at 50 feet | Monitored Lmax at 50 feet | Attenuated Lmax at 100 feet | Attenuated Lmax at 200 feet | Attenuated Lmax at 400 feet |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|
| 1015/PCC | 71.2 | 61.1 | 58.1 | 55.1 | 52.1 |
| 1062/PCC | 80.1 | 71.9 | 68.9 | 65.9 | 62.9 |
| 952/NO | 98.9 | 94.9 | 91.9 | 88.9 | 85.9 |
| 1077/PCC | 79.1 | 69.9 | 66.9 | 63.9 | 60.9 |
| 1010/PCC | 75.0 | 68.1 | 65.1 | 62.1 | 59.1 |
| 1059/PCC | 75.5 | 68.5 | 65.5 | 62.5 | 59.5 |
| 1060/PCC | 76.1 | 69.0 | 66.0 | 63.0 | 60.0 |
| 1075/PCC | 74.1 | 66.6 | 63.6 | 60.6 | 57.6 |
| 1007/PCC | 76.3 | 69.0 | 66.0 | 63.0 | 60.0 |
| 1051/PCC | 74.2 | 66.7 | 63.7 | 60.7 | 57.7 |
| 1056/PCC | 77.2 | 70.8 | 67.8 | 64.8 | 61.8 |
| 162/SF | 84.9 | 76.5 | 73.5 | 70.5 | 67.5 |
| 1859/Milan | 81.7 | 78.8 | 75.8 | 72.8 | 69.8 |
| 1818/Milan | 83.2 | 77.6 | 74.6 | 71.6 | 68.6 |
| 1057/PCC | 77.7 | 69.8 | 66.8 | 63.8 | 60.8 |
| Monitored Lmax along Beach street | | 85 | | | |
| Monitored Lmax near Fontana Towers | | | | | 83 |
| Existing monitored Lmax at Building A | | 91 | | | |
| Existing monitored Lmax at Laguna Street Residences | | | | | 83 |
| ^a PCC=Presidents Conference Committee car. Double- or single-end coach cars built 1946-1948.; NO=New Orleans streetcar built in 1923; Milan=Milan Streetcars built from 1930s to 1970s. | | | | | |

Alternative 2A: North Loop Option Operational Vibration. Receptors affected by streetcar vibration along the proposed North Loop section would be Fort Mason Landmark Building A which would be within approximately 80 feet from the rail centerline and the Laguna Street Condominiums which would be 400 feet from the rail centerline at the western portal of the tunnel. Receptors at a distance of 80 feet would be exposed to streetcar vibration of 72 VdB which would be a minor adverse impact indicated in Table 4.6-2. Residential receptors on Laguna Street, at a distance of 400 feet, would be exposed to a streetcar vibration of less than 50 VdB which would be characterized as a minor adverse impact and similar to existing vibration levels monitored in the area.

Alternative 2B: South Loop Option Construction Noise. Construction noise impacts of the South Loop option would differ from those described in the North Loop option only for receptors near the west Tunnel portal. Fort Mason Landmark Building A would be approximately 250 feet from the rail centerline at the tunnel portal, as opposed to the 80 foot distance from the North Loop. However, the

Laguna Street Condominiums would be approximately 100 feet from the rail centerline at the southernmost arc of the Southern Loop, as opposed to the 400 foot distance from the tunnel portal in the North Loop scenario.

Construction noise at Building A would be 79.0 dBA with simultaneous operation of the two noisiest pieces of equipment. This would be less than the 100 dBA criterion of the FTA for non-residential land uses and be considered a minor adverse impact.

Construction noise at Laguna Street condominiums would be 87.0 dBA with simultaneous operation of the two noisiest pieces of equipment. This would be less than the 90 dBA criterion of the FTA for residential land uses and be considered a minor adverse impact.

Alternative 2B: South Loop Option Construction Vibration. The most significant construction-related vibration source would be auger drill rig operations that can result in PPV of up to 0.089 inches per second at a distance of 25 feet, which would be below the criteria published by the U.S. Department of Transportation, which uses a standard of 0.12 inches per second for the protection of fragile buildings. The closest structures to the South Loop area would be residential condominiums approximately 100 feet away. At which distance vibration would be reduced to 0.011 inches per second, which would be below the criteria published by the FTA, which uses a standard of 0.12 inches per second for the protection of fragile buildings. Therefore, construction-related vibration levels would be considered a minor adverse impact, even if the closest buildings were considered to be “fragile.”

Vibration levels can also result in interference or annoyance impacts to residences or other land uses where people sleep and, for infrequent events, a criterion of 80 VdB has been established.

Auger drill operations can result in typical vibrations of 87 VdB at a distance of 25 feet. The nearest residence or hotel to the South Loop would be condominium residential dwellings on Laguna Street 100 feet from the project South Loop at which distance vibrations would be reduced to 69 VdB. This predicted auger drill vibration at the nearest sensitive receptor would not exceed the infrequent event criterion of 80 VdB and could be considered a minor adverse annoyance impact at the residences on Laguna Street.

Alternative 2B: South Loop Option Operational Noise. Operational noise impacts of the South Loop option would differ from those described in the North Loop option only for receptors near the west Tunnel portal. Fort Mason Landmark Building A would be further away from streetcar operations at approximately 250 feet from the rail centerline, while the Laguna Street Condominiums would be approximately 100 feet from the rail centerline at the southernmost arc of the Southern Loop, as opposed to the 400 foot distance from the tunnel portal in the North Loop scenario.

Receptors at a distance of 100 feet would be exposed to a streetcar contribution of 63.3 dB, Ldn which would be considered a moderate adverse impact as indicated in Table 4.6-4. Non-residential receptors in Landmark Building A, at a distance of 250 feet, would be exposed to a streetcar contribution of 50.8 dB, Ldn which would be characterized as a negligible adverse impact.

The above analysis is based on monitoring of existing turning radius for the comparatively wide turns from Jones Street onto Beach Street. The turning radius proposed for the South Loop would be sharper

and potentially more susceptible to wheel squeal impacts. To investigate this possibility, additional noise monitoring was conducted at the sharpest turn of the existing F-line at the corner of 17th Street and Market Street. Because of the sharpness of this turn (approximately a 45-foot turning radius), streetcars negotiate this curve at a very low speed. During a two hour survey of streetcar operations at this curve no pronounced wheel squeal was observed during noise monitoring. This may be the result of the slower speeds streetcars operate on this curve or a result of older, noisier cars not being in service that day. Additionally, floating slab construction has been implemented on sections of 17th Street between Sanchez and Market Streets because of the proximity and density of residential receptors adjacent to the tracks in the area (Katz 2010) and may have resulted in decreased rail/wheel interactions. Regardless, as a conservative analysis, the potential for the increase in occurrence of wheel squeal at the South Loop was accounted for by assuming that squeal events similar to those monitored at Jones and Beach Streets would occur every hour, twice as frequently as those which were currently observed to exist.

Alternative 2B: South Loop Option Operational Vibration. Operational vibration impacts of the South Loop option would differ from the North Loop option only for Fort Mason Landmark Building A and Laguna Street residences. Fort Mason Landmark Building A would be approximately 250 feet from the rail centerline, while the Laguna Street Condominiums would be approximately 100 feet from the rail centerline at the southernmost arc of the Southern Loop.

Receptors at a distance of 250 feet would be exposed to streetcar vibration of 57 VdB which would be a minor adverse impact and similar to existing vibration levels monitored in the area. Residential receptors on Laguna Street, at a distance of 100 feet, would be exposed to a streetcar vibration of less than 65 VdB which would be characterized as a minor adverse impact.

Cumulative Impacts. Cumulative effects to noise and vibration should consider the past present and reasonable foreseeable actions in the study area in addition to potential affects of Alternative 2. The projects identified include only those projects that could affect transit operations and thus noise and vibration within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on noise and vibration include the Presidio Transit Program, the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fisherman's Wharf Public Realm Plan, Van Ness Bus Rapid Transit, E-Embarcadero Historic Streetcar Line, and SFMTA's Transit Effectiveness Project. The beneficial impacts would result from increased use of transit (with a corresponding decrease use of private automobiles). The degree of travel mode shift away from private automobiles is not certain. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to noise and vibration conditions within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, SF Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive could result in short-term adverse impacts on noise and vibration. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction equipment. The intensity of the adverse effects from the construction-related noise and vibration would range from minor to moderate, depending on

which, if any, of the construction projects occurred simultaneously. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to noise and vibration.

Mitigation Measures

NOISE-1: Construction Noise Mitigation. Proximity to construction operations would impact the residential units on the corner of Hyde and Beach Streets. Because units are within 25 feet of the rail centerline, construction noise levels would exceed FTA suggested thresholds at this one location by 3 dBA and result in a major adverse impact. To reduce the severity of this construction noise impact the following measures are recommended to be incorporated into the construction contract agreement documents to be implemented by the construction contractor:

- Provide enclosures and mufflers for stationary equipment, shroud or shield impact tools, and install barriers around particularly noisy activities at the construction sites so that the line of sight between the construction activities and nearby sensitive receptor locations is blocked;
- Use construction equipment with lower noise emission ratings whenever possible, particularly for air compressors;
- Provide sound-control devices on equipment no less effective than those provided by the manufacturer;
- Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptor locations;
- Prohibit unnecessary idling of internal combustion engines;
- Require applicable construction-related vehicles and equipment to use designated truck routes to access the project sites; and
- Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures shall be reviewed and approved by the Director of Public Works prior to issuance of development permits for construction activities.

VIBR-1: Construction Vibration Mitigation. Proximity to construction operations would result in a major adverse annoyance vibration impacts the residential units on the corner of Hyde and Beach Streets as well as hotels along Beach Street. Auger drilling operations would exceed the FTA annoyance criterion for infrequent events by 7 VdB at receptors within 25 feet. This annoyance criterion is established for “residential land uses and any buildings where people sleep, such as hotels and hospitals”. As such, it reflects the increased sensitivity of persons to vibration while they sleep. Therefore, the following measure is recommended to be incorporated into the construction contract agreement documents to be implemented by the construction contractor:

- Conduct auger drilling activities during daytime hours to reduce potential construction-related annoyance vibration impacts to residents and hotel guests sleeping within 50 feet of drilling locations.
- Require vibration monitoring as a specification in construction contract. Construction vibration monitoring should be conducted when construction activities approach within 50 feet of the Maritime Museum, west Convenience Station or the west speaker tower. If

monitored values reach 0.10 in/sec, the vibration-causing activity should be halted and an alternative, low impact method implemented until the construction phase is beyond 50 feet of the Maritime Museum or tower.

NOISE-2: Operational Noise Mitigation. Proximity to streetcar operations (within 25 feet) would result in a major adverse impact at the residential units on the corner of Hyde and Beach Streets and at Ghirardelli Square as well as hotels along Beach Street. Standards would be exceeded by 3.5 dBA. To reduce the severity of this operational noise impact, the following measures are recommended:

- Retrofit cars with resilient or damped wheels – Resilient and damped wheels reduce rolling noise by approximately 2 dBA; or
- Application of shielding and/or absorptive material under the car. Acoustical absorption under the car has been demonstrated to provide up to five decibels of mitigation for wheel/rail noise.

VIBR-2: Operational Vibration Mitigation. Proximity to streetcar operations (within 25 feet) would result in a major adverse impact to the residential units on the corner of Hyde and Beach Streets and at Ghirardelli Square as well as hotels along Beach Street. Annoyance (not structural) standards would be exceeded by 9 VdB. Additionally, there is a potential for a minor adverse structural impact to occur at the Maritime Museum due to proximity of the rail lines to the building and the west speaker tower the fragile nature of the structures and interior murals and the unconsolidated soils of the area.

Streetcar operations during the “nighttime” hours of 6 a.m. to 7 a.m. and 10 p.m. to 12a.m. would cause noise and vibration levels to exceed “nighttime” annoyance standards. However, regulations governing the preservation of historic streetcars limit the types of improvements to vehicle specifications that might otherwise have been able to reduce operational vibration. FTA guidance indicates that reducing vehicle speeds by a factor of two would reduce vibration levels by approximately 6VdB. Therefore, in order to lessen potential vibration impacts during “nighttime” hours, SFMTA would consider reducing vehicle speeds along Beach Street by a factor of two during these times. Implementation of this measure would not reduce the severity of the predicted major adverse impact from operational vibration.

Specialized track support systems (e.g., resilient fasteners and floating slabs) of at-grade track, if economically feasible, would further reduce vibration. For example, implementation of resilient fasteners has been documented to reduce vibration by 5 to 10 VdB at frequencies above 40 Hertz and could potentially reduce operational vibration impacts to from major to moderate. Alternatively, floating slab construction which has been used to address vibration impacts in other areas of the F-line could be implemented to further reduce potential vibration impacts to a moderate level. Floating slab technology would also be evaluated by SFMTA for areas within 50 feet of the Maritime Museum, west Convenience Station and the west speaker tower to mitigate potential structural impacts to these historic structures.

Conclusions. Alternative 2 would result in major adverse impacts to the residential units on the corner of Hyde and Beach Streets and at Ghirardelli Square as well as hotels along Beach Street and the Maritime Museum. Impacts would result from construction noise, construction-related vibration, operational noise and operational vibrations. Identified mitigation would reduce these major adverse impacts to the moderate level.

4.7 CULTURAL RESOURCES

4.7.1 Methodology and Assumptions

Cultural resources are protected through the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.), and its implementing regulations, Protection of Historic Properties (36 CFR Part 800). Prior to implementing an “undertaking” (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) a reasonable opportunity to comment on any undertaking that would potentially affect properties listed or eligible for listing in the National Register. Section 110 (f) of the NHPA provides additional considerations for any undertakings that may have an adverse impact on National Historic Landmarks (NHLs).

Section 106 Regulations (36 CFR Part 800.8) state that preparation of an EIS and ROD under NEPA should include appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects. To that end, this section will assess the effects (or impacts) of the project (or undertaking) on these historic properties.

Compliance with the NHPA has been conducted by the National Park Service as a separate effort that has been coordinated with NEPA compliance. Documentation relating to the Section 106 process for NHPA compliance can be found in Appendix C of this document. Compliance with Section 110(f) will be addressed in a separate submittal to the ACHP.

Assessing Impacts Thresholds. Assessing impacts on historic properties under Section 106 of the NHPA is regulated at 36 CFR Part 800.5. An adverse effect to a historic property “is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the Nation Register” (36 CFR Part 800.5(1)). Characteristics that qualify a property for inclusion include the seven integrity factors listed in Section 3.7.4 (location, design, setting, materials, workmanship, feeling, and association). Adverse impacts can include “reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.” A determination of effects analysis for NEPA should include: direct and indirect effects; duration of the effect (short-term, long-term); context of the effect (site-specific, local, regional); intensity of the effect (negligible, minor, moderate, major, both adverse and beneficial); and the cumulative nature of the effect.

Historic Architectural Resources Analysis Thresholds. Historic architectural resources are typically determined eligible for listing in the National Register under criteria A through C, listed above, for their association with historical events, important people, or for their exhibition of distinctive characteristics of type, period, and method of construction. Eligible resources must also retain sufficient integrity to convey their historical significance. Provided below are the thresholds for determining the intensity of impacts to historic architectural resources.

| Impact Intensity | Impact Description |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The undertaking would cause no alteration to a district, building, structure, object, or site that is listed or eligible for listing on the National Register of Historic Places (or alterations would be so minor as to be imperceptible). For the purposes of the National Historic Preservation Act Section 106, the determination of effect would be "no adverse effect." |
| Minor Adverse: | The undertaking would result in a modification to an eligible or listed district, building, structure, object, or site, but would not modify or alter any of the characteristics that qualify the property for National Register inclusion. The Section 106 determination of effect would be "no adverse effect." |
| Moderate Adverse: | The undertaking would alter, directly or indirectly, one or more character-defining features of a district, building, structure, object, or site that is listed or eligible for listing on the National Register, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. However, this impact would not diminish the integrity of the resource such that its eligibility for the National Register would be jeopardized. The Section 106 determination of effect would be "adverse effect." |
| Major Adverse: | The undertaking would have a substantial, noticeable, and permanent impact to a district, building, structure, object, or site listed or eligible for listing in the National Register. The undertaking would result in the alteration or modification of one or more characteristics that qualify the resource's inclusion in the National Register, diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling or association to such an extent that it is no longer eligible for listing in the National Register. The Section 106 determination of effect would be "adverse effect." |

Archeological Resources Impacts Thresholds. Archeological resources (districts and sites) can be determined eligible for listing in the National Register under any of the four criteria listed above, but are most often found eligible under Criterion D for their potential to yield information important to prehistory or history. Resources must retain sufficient integrity to contribute to our understanding of current research questions, which means they must be relatively intact and undisturbed. Provided below are the thresholds for determining the intensity of impacts to archeological resources.

| Impact Intensity | Impact Description |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The undertaking would not modify or alter archeological districts or sites listed or eligible for listing in the National Register. The Section 106 determination of effect would be "no adverse effect." |
| Minor Adverse: | The undertaking would result in a slight modification or alteration of an archeological district or site eligible for listing or listed in the National Register, but would not affect any of the characteristics that qualify the resource for National Register inclusion. The integrity of the resource would not be compromised. The Section 106 determination of effect would be "no adverse effect." |
| Moderate Adverse: | The undertaking would result in the modification or alteration of one or more of the characteristics that qualify the archeological district or site for inclusion in the National Register. The resource's integrity would be diminished, but not to the extent that the National Register eligibility of the resource would be jeopardized. The Section 106 determination of effect would be "adverse effect." |
| Major Adverse: | The undertaking would have a substantial, noticeable, and permanent impact to a district or site listed or eligible for listing in the National Register. The undertaking would result in the alteration or modification of one or more characteristics that qualify the resource for inclusion in the National Register, diminishing the integrity of the resource to such an extent that it is no longer eligible for listing in the National Register. The Section 106 determination of effect would be "adverse effect." |

Cultural Landscape Impacts Thresholds. A cultural landscape is “a geographic area, including both cultural and natural resources, that is associated with a historic event, activity, person, or exhibiting other cultural or aesthetic values” (NPS 1998). Cultural landscapes can be related to use of the landscape by peoples in either pre-contact or historic times. The assessment of impacts on cultural landscapes can include archeological resources, ethnographic resources, and historic or prehistoric structures. Historic viewsheds are analyzed in Section 4.9 Visual and Aesthetic Resources. Provided below are the thresholds for determining the intensity of impacts to cultural landscapes.

| Impact Intensity | Impact Description |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | The undertaking would not alter (or alterations would be unperceivable) cultural landscapes listed or eligible for listing in the National Register. The Section 106 determination of effect would be “no adverse effect.” |
| Minor Adverse: | The undertaking would slightly alter the cultural landscape, but would not affect any of the characteristics that qualify the landscape for inclusion in the National Register. The Section 106 determination of effect would be “no adverse effect.” |
| Moderate Adverse: | The undertaking would result in the alteration or modification of one or more of the characteristics that qualify the cultural landscape for inclusion in the National Register. The cultural landscape’s integrity would be diminished, but not to the extent that the National Register eligibility of the cultural landscape would be jeopardized. The Section 106 determination of effect would be “adverse effect.” |
| Major Adverse: | The undertaking would have a substantial, noticeable, and permanent impact to a cultural landscape listed or eligible for listing in the National Register. The undertaking would result in the alteration or modification of one or more characteristics that qualify the cultural landscape for inclusion in the National Register, diminishing the integrity of the cultural landscape to such an extent that it is no longer eligible for listing in the National Register. The Section 106 determination of effect would be “adverse effect.” |

4.7.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Alternative 1 would not require the construction of any new roadway, transit or utility improvements. As a result, no new construction-related impacts to cultural resources would occur under Alternative 1.

New transit service would not be introduced under this alternative. Consequently, Alternative 1 would not have any new operational impacts to cultural resources such a noise or vibration.

Because the roadway network, parking supply and transit service would not be altered under Alternative 1, there would be no change in the use or character of either the San Francisco Maritime National Historic Park or Fort Mason, which are National Historic Landmarks and are listed in the National Register.

Cumulative Impacts. There would be no incremental impacts to cultural resource under Alternative 1. Therefore this Alternative would not contribute to any potential cumulative impacts to cultural resources that may result from other development in Fort Mason and surrounding area.

Conclusions. Alternative 1 would not propose the construction of any new roadway, transit or utility improvements and would therefore not result in any new short- or long-term impacts, either beneficial or adverse, to cultural resources.

4.7.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Alternative 2A: North Loop Option. The potential construction and operational impacts of the North Loop option of the proposed streetcar line extension have been incorporated into a table (Table 4.7-1) arranged according to the four project segments (in-street, transition, tunnel, and turnaround), going from east to west. This Table was designed to describe impacts that are for the most part minor or negligible. The cultural resources are described individually, and include only those buildings, structures, objects, sites, or cultural landscape features that are recognized as primary or contributing resources to National Register-listed or eligible properties. The analysis of overall impacts to the Aquatic Park NHL District and the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District are discussed separately in text after Table 4.7-2. Additional analysis of impacts to archeological resources follows this discussion.

Where a moderate or major adverse effect has been identified, mitigation measures are provided to avoid, reduce, or mitigate that effect. No mitigation measures are recommended for impacts that are negligible or minor, with the exception of impacts to archeological resources.

Alternative 2B: South Loop Option. The Construction and operational impacts of the South Loop Option would be identical to the in-street, transition, and tunnel impacts of Alternative 2A: North Loop Option described in Table 4.7-1, above. However, the South Loop Option would differ in terms of impacts within the tunnel and turnaround segments. These impacts are described below in Table 4.7-2. Like Table 4.7-1, the following (Table 4.7-2) was designed to describe impacts that are for the most part minor or negligible. The table includes individual NRHP-listed, eligible, or contributing buildings, structures, objects, or sites or contributing features to a cultural landscape. The analysis of overall impacts to the Aquatic Park NHL District and the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District are discussed separately in text after Table 4.7-2. Potential impacts to archeological resources that could result from the extension of historic streetcar service along the South Loop alignment are also described below in further detail.

Impacts to Aquatic Park National Historic Landmark District

Impacts to the NHL District as a Whole: The introduction of streetcar tracks, an overhead contact system, lights, signals, and passenger platforms would add new, non-contributing and incompatible elements to the western end of Aquatic Park, and therefore result in an adverse impact to the historic setting, feeling, and association of the NHL District as a whole. The addition of streetcar-associated noise, vibration, and new uses that would be incompatible with the historic feeling and association of the District would also contribute to the adverse impact. The demolition of a contributing stone retaining wall and removal of historic State Belt Line railroad tracks as they cross Van Ness Avenue would be a direct adverse impact on the historic design, materials and workmanship of the District. The overall impact of these changes is deemed as a moderate adverse impact to the Aquatic Park NHL District because it would result in the alteration or modification of one or more of the characteristics

TABLE 4.7-1: SUMMARY OF CULTURAL IMPACTS BY PROJECT SEGMENT – ALTERNATIVE 2A: NORTH LOOP OPTION

| NRHP-Listed, Eligible or Contributing Building, Structure, Object, Site, or Cultural Landscape Feature | Potential Project Impact(s) | Assessment of Project Impact(s) | Term | Potential Mitigation Measures |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In-Street Segment | | | | |
| California Fruit Cannery Association (Haslett) Warehouse | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Cable Cars NHL | <ul style="list-style-type: none"> Track crossing | Negligible | Long | N/A |
| Aquatic Park East Convenience Station (Roundhouse) | <ul style="list-style-type: none"> Visual: overhead contact system | Negligible | Long | N/A |
| Aquatic Park Sea Wall | <ul style="list-style-type: none"> Visual: overhead contact system | Negligible | Long | N/A |
| Aquatic Park East Speaker Tower | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| Aquatic Park East Bleachers | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| Aquatic Park Bathhouse | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse* | Long | N/A |
| Pioneer Woolen Mills & D. Ghirardelli Company | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| Potential archeological Site CA-SFr-23 at Hyde/Beach Street Intersection | <ul style="list-style-type: none"> Ground-disturbing construction for new tracks | Negligible | Short | Worker education, construction monitoring, and inadvertent discovery mitigation |
| Transition Segment | | | | |
| Aquatic Park West Bleachers | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| Aquatic Park Stone Retaining Wall | <ul style="list-style-type: none"> Removal of wall segment for track ROW | Major adverse | Long | <ul style="list-style-type: none"> HABS/HALS documentation Retain/reuse wall materials for new construction Interpretation of wall history or contribution to cultural landscape |
| Historic rail tracks within the western end of Aquatic Park and near the terminus of Van Ness Avenue. | <ul style="list-style-type: none"> Removal of historic rail segment and replacement with new tracks | Moderate adverse | Long | <ul style="list-style-type: none"> Same as above for stone retaining wall |

TABLE 4.7-1: SUMMARY OF CULTURAL IMPACTS BY PROJECT SEGMENT – ALTERNATIVE 2A: NORTH LOOP OPTION (CONTINUED)

| NRHP-Listed, Eligible or Contributing Building, Structure, Object, Site, or Cultural Landscape Feature | Potential Project Impact(s) | Assessment of Project Impact(s) | Term | Potential Mitigation Measures |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transition Segment (cont.) | | | | |
| Aquatic Park West Speaker Tower | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system • Visual: passenger loading platform | Moderate adverse* | Long | N/A |
| Aquatic Park Promenade Retaining Wall | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system | Minor adverse | Long | N/A |
| Aquatic Park West Convenience Station (Roundhouse) | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system | Minor adverse | Long | N/A |
| Aquatic Park Sea Scout Building & Dock | <ul style="list-style-type: none"> • Visual: overhead contact system | Negligible | Long | N/A |
| Pumping Station No. 2, S.F.F.D. Auxiliary Water Supply | <ul style="list-style-type: none"> • Visual: overhead contact system | Negligible | Long | N/A |
| Municipal Pier | <ul style="list-style-type: none"> • Visual: overhead contact system | Negligible | Long | N/A |
| State Belt Railroad Tracks | <ul style="list-style-type: none"> • Removal of tracks near entrance to Fort Mason Tunnel | Moderate adverse | Long | N/A |
| Aquatic Park Cultural Landscape Features: Van Ness Avenue Sidewalks | <ul style="list-style-type: none"> • Reconstruction of portion of sidewalk | Negligible | Long | N/A |
| Fort Mason Tunnel Segment | | | | |
| Fort Mason Tunnel | <ul style="list-style-type: none"> • Removal of historic tracks; replacement with new tracks • Installation of a new tunnel lining/stabilization materials • Installation of overhead wires and signals | Moderate adverse | Long | <ul style="list-style-type: none"> • HABS/HALS documentation of tunnel portals • Interpretation of tunnel’s historic use • Stabilize walls with compatible materials • Ensure new elements are compatible with historic design |
| North Retaining Wall | <ul style="list-style-type: none"> • Demolition of north retaining wall near West Portal | Major adverse | Long | <ul style="list-style-type: none"> • HABS/HALS documentation of retaining walls at west portal |

TABLE 4.7-1: SUMMARY OF CULTURAL IMPACTS BY PROJECT SEGMENT – ALTERNATIVE 2A: NORTH LOOP OPTION (CONTINUED)

| NRHP-Listed, Eligible or Contributing Building, Structure, Object, Site, or Cultural Landscape Feature | Potential Project Impact(s) | Assessment of Project Impact(s) | Term | Potential Mitigation Measures |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fort Mason Turnaround Segment – North Loop | | | | |
| San Francisco Port of Embarkation Building A (FM-308) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system Visual: passenger loading platform | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Building B (FM-310) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Building C (FM-312) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Building D (FM-314) | <ul style="list-style-type: none"> Visual: overhead contact system | Negligible | Long | N/A |
| San Francisco Port of Embarkation Building E (FM-315) | <ul style="list-style-type: none"> Visual: overhead contact system | Negligible | Long | N/A |
| San Francisco Port of Embarkation Entrance Wall and Gate (FM-301) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system Visual: passenger loading platform | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Gatehouse (FM-302) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system Visual: passenger loading platform | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Guard Station (FM-303) | <ul style="list-style-type: none"> Noise/vibration: streetcar operation Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Railroad Tracks (FM-406) | <ul style="list-style-type: none"> Removal of track sections along ROW | Moderate adverse | Long | <ul style="list-style-type: none"> Include tracks in HABS/ HALS documentation Retain existing rails wherever possible Interpretation of historic rail service at the Port of Embarkation |
| * Operational vibration would constitute a major nuisance impact for the institutional uses at the Bathhouse; structural vibration impacts would be minor at both the Bathhouse and the West Speaker Tower. See Section 4.6 Noise and Vibration for additional discussion of the applicable impact thresholds and assessments for historic buildings and structures. | | | | |

TABLE 4.7-2: SUMMARY OF CULTURAL IMPACTS – ALTERNATIVE 2B: SOUTH LOOP OPTION

| NRHP-Listed, Eligible or Contributing Building, Structure, Object, Site, or Cultural Landscape Feature | Potential Project Impact(s) | Assessment of Project Impact(s) | Term | Potential Mitigation Measures |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fort Mason Tunnel Segment – South Loop | | | | |
| Fort Mason Tunnel | <ul style="list-style-type: none"> • Removal of historic tracks; replacement with new tracks • Installation of a new tunnel lining/stabilization materials • Installation of overhead wires and signals • Demolition of south retaining wall near West Portal | Moderate adverse | Long | <ul style="list-style-type: none"> • HAER/HALS documentation of tunnel portals and retaining walls at west portal • Interpretation of tunnel’s historic use • Stabilize walls with salvaged and/or compatible materials • Ensure new elements are compatible with historic design |
| Fort Mason Turnaround Segment – South Loop | | | | |
| San Francisco Port of Embarkation Gate to Port Area (FM-301) | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Gatehouse (FM-302) | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system | Minor adverse | Long | N/A |
| San Francisco Port of Embarkation Guard Post (FM-303) | <ul style="list-style-type: none"> • Noise/vibration: streetcar operation • Visual: overhead contact system | Minor adverse | Long | N/A |
| Fort Mason Cultural Landscape Features: Specimen trees west of Fort Mason Great Meadow | <ul style="list-style-type: none"> • Relocation of pedestrian paths • Removal of turf • Possible removal of specimen tree(s). • Noise/vibration: streetcar operation • Visual: overhead contact system | Moderate adverse | Long | <ul style="list-style-type: none"> • Avoid removal of specimen tree(s) • Replace specimen trees in-kind if removal is unavoidable |
| Potential archeological Site CA-SFr-29 at Fort Mason Great Meadow | <ul style="list-style-type: none"> • Ground-disturbing construction for turnaround | Negligible | Short | Worker education and inadvertent discovery mitigation |

that qualify the District for inclusion in the National Register, and for designation as a National Historic Landmark. The District's integrity would be diminished, but not to the extent that Aquatic Park's eligibility for National Historic Landmark status or National Register listing would be jeopardized. Measures to mitigate these impacts are described below.

Impacts to San Francisco Port of Embarkation U.S. Army National Historic Landmark District/Fort Mason National Register Historic District

Impacts to the NHL District/National Register Historic District as a Whole: The introduction of streetcar tracks, an overhead contact system, lighting, signage, and passenger platforms would constitute an adverse impact to the historic setting, feeling, and association of the NHL and National Register Districts at Fort Mason. The partial demolition of a retaining wall associated with the Fort Mason Tunnel, and physical alterations to the tunnel and existing tracks, would adversely impact the design, materials and workmanship of the NHL District (retaining wall only) and the National Register Historic District (tunnel, tracks, and retaining wall). The addition of streetcar-associated noise, vibration, and new uses would adversely impact the historic feeling and association of the Districts. The overall impact of these changes is deemed as a moderate adverse impact to the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District because it would result in the alteration or modification of one or more of the characteristics that qualify the Districts for inclusion in the National Register and/or as a National Historic Landmark. The Districts' integrity would be diminished, but not to the extent that it would jeopardize the listing status of either the Fort Mason National Register Historic District or the San Francisco Port of Embarkation U.S. Army NHL District. Measures to mitigate these impacts are described below.

Impacts to Known and Unknown Archeological Sites. Two recorded archeological sites are located in the APE. Site CA-SFr-23, a prehistoric shell midden site, is purportedly located near the intersection of Hyde and Beach Streets and was last recorded in 1954. Although no evidence of the site is currently visible it is possible that subsurface cultural material is present. Site CA-SFr-29, a pre-contact habitation site, was originally recorded in the western portion of the Fort Mason Great Meadow in 1978. Test excavations to identify the exact location of this site in 2010 revealed no cultural materials immediately below the ground surface, although a single auger core revealed culturally altered sediments at a depth of nearly one meter. This auger core was taken from outside the area that would be impacted by construction for Alternative 2B: South Loop (Holman & Associates 2010).

Ground-disturbing activities related to installation of new tracks at Hyde and Beach Streets could disturb cultural materials at site CA-SFr-23 if present beneath the ground surface. Similarly, ground-disturbing activities in the Great Meadow associated with construction of Alternative 2B: South Loop could disturb cultural materials at site CA-SFr-29 if present beneath the ground surface. Although the impact is negligible because no cultural materials are anticipated in these areas, measures described below would nonetheless mitigate the potential for damage due to inadvertent discovery. Damage to previously unknown and unrecorded archeological resources due to ground-disturbing construction activities could also occur anywhere along the ROW, given the area's archeological sensitivity. As such, the measures described below would also mitigate the potential for damage of previously unknown archeological resources.

Cumulative Impacts. Cumulative effects to cultural resources should consider the reasonably foreseeable actions in the APE and immediate vicinity in addition to potential effects of the proposed action. The projects identified include those which could affect cultural resources within the APE or immediate vicinity by substantially altering or impairing them, as well as ground-disturbing activities in archeologically sensitive areas.

There are a number of projects planned within or in the vicinity of the APE. Two projects at the Port of Embarkation, U.S. Army NHL District/Fort Mason Historic District, include seismic upgrades to Building E and a solar panel installation project on the roof of the Pier 2 Shed. Projects at San Francisco Maritime NHP include the Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Aquatic Park Bathhouse Exhibit Plan and Installation. Other projects in proximity to the APE include the San Francisco Marina Renovation Project; 721 Beach Street Development and the Fisherman's Wharf Public Realm Plan.

Implementation of standard mitigation measures to ensure the protection of both known and unknown cultural resources are included in the various environmental documents which have evaluated, or will evaluate, the environmental effects of each of these projects. In addition, effects to historic properties at any of the projects located on NPS-managed properties would be required to comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties, further mitigating the intensity of the effects to cultural resources. All reasonably foreseeable projects would also have to undergo additional environmental review, thus ensuring further consideration and minimization of effects.

Projects such as the Aquatic Park Bathhouse Exhibit Plan and Installation, San Francisco Maritime NHP Municipal Pier Rehabilitation Project, and Seismic Upgrades to the Maritime Heritage Learning Center, specifically, would be subject to the provisions in the Aquatic Park Cultural Landscape Report, which is intended to minimize adverse effects to the Aquatic Park cultural landscape. Similarly, Seismic Upgrades to Building E of the San Francisco Maritime NHP, and the Pier 2 Shed Solar Installation Project, would be subject to the Fort Mason Cultural Landscape Report, which is intended to minimize adverse effects to both the San Francisco Port of Embarkation, U.S. Army NHL District and the Fort Mason National Register Historic District. The Pier 2 Solar Panel Installation Project, specifically, was evaluated by the California SHPO and the Heritage Preservation Services Division of the National Park Service in October, 2010, which determined that this tax incentive project would comply with the Secretary of the Interior's Standards for Rehabilitation (see enclosure). Finally, effects to both known and unknown archeological resources as a result of any or all of these projects would be mitigated by implementing standard worker education and inadvertent discovery measures, and as required by NEPA and Section 106 of the NHPA. Therefore, based on available information, these projects in and of themselves are unlikely to have adverse effects on historic properties within the APE. However, when combined with the proposed undertaking to extend the streetcar service, which is considered on its own merits to be an adverse effect, the cumulative effect to historic properties would be considered moderate adverse.

The measures identified below to mitigate the effects of the undertaking at a project level would also be implemented to mitigate the effects at a cumulative level.

Mitigation Measures. The measures below have been designed to mitigate adverse effects pursuant to the requirements of NEPA and of Section 106 of the NHPA. A Memorandum of Agreement (MOA) between NPS and the SHPO has been drafted to document the recommended mitigation measures for compliance with Section 106. A draft of the MOA is provided in Appendix C. The final MOA will be executed prior to issuance of the Record of Decision (ROD).

CUL-1: Measures to mitigate the adverse impacts of the loss of individual resources at Aquatic Park NHL District (stone retaining wall) include the following:

- Conduct Historic American Building Survey (HABS), and/or Historic American Landscape Survey (HALS) documentation of the stone retaining wall.
- Retain/reuse stone wall materials in new construction as appropriate.
- Interpretation of wall history and its contribution to the cultural landscape

CUL-2: Measures to mitigate the adverse impacts due to the introduction of new, incompatible uses to the Aquatic Park NHL District include the following:

- HABS/HALS documentation, focused on the western area of Aquatic Park. Documentation of the stone retaining wall, described above, can be incorporated into this effort.
- Ensure that all new design elements, such as overhead contact poles and platforms, are compatible with the Streamline Moderne architecture of Aquatic Park. To preserve views of San Francisco Bay, the platforms should be devoid of roofs.
- Restore the Beach Street and western Aquatic Park landscape in accordance with the Aquatic Park Cultural Landscape Report.
- Install appropriate landscaping elements along the Beach Street portion of Victorian Park in accordance with the Aquatic Park Cultural Landscape Report.
- Public interpretation of Aquatic Park history in the western portion of the park, potentially integrated with new station platforms to maximize visitation. Interpretation of wall history, described above, could be included in this effort.
- Implement measures for reduction of noise/vibration as described in Section 4.6 of this document.

CUL 3: Measures to mitigate the adverse impacts of the alteration of individual resources at San Francisco Port of Embarkation U.S. Army NHL District and Fort Mason National Register Historic District include the following:

- HABS/HALS documentation that includes tunnel portals, railroad tracks (FM-406), and retaining wall at west portal
- Interpretation of the Fort Mason Tunnel's historic use
- Stabilize tunnel walls with compatible materials
- Retain existing fabric wherever possible
- Interpretation of historic rail service at the San Francisco Port of Embarkation

- Avoid removal of specimen tree(s) in Fort Mason Great Meadow, and replace specimen trees in-kind if removal is unavoidable, in accordance with the Fort Mason Cultural Landscape Report (Alternative 2B: South Loop Option only).

CUL 4: Measures to mitigate the adverse impacts due to the introduction of new, incompatible uses to the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District include the following:

- Conduct HABS/HALS documentation, focused on the western area of Lower Fort Mason but inclusive of all contributing elements that may be adversely impacted by the Proposed Project. Documentation of the tunnel portals, tunnel retaining walls, and railroad tracks described above can be incorporated into this effort.
- Ensure that all design elements, such as overhead contact poles and platforms near the Fort Mason Center are compatible with the architectural character of Lower Fort Mason. In order to reduce visual impacts, the platforms should be devoid of roofs.
- Public interpretation of San Francisco Port of Embarkation/Fort Mason history in the western portion of the site, potentially integrated with new station platforms to maximize visitation. Interpretation of historic rail service, described above, could be included in this effort.

CUL-5: Measures to mitigate negligible impacts to archeological resources due to inadvertent discovery during ground-disturbing activities include the following:

- Cultural Resources Education for Workers. NPS would provide training to all members of the construction team. Training would involve information regarding what types of cultural materials are likely present in the project area, how to identify cultural materials, and the procedures for contacting the appropriate parties in the event that cultural materials are encountered during construction activities. All construction personnel would be required to participate in the training, and written guidelines would be prepared and distributed to aid in identification of cultural materials and to inform workers of the procedures to follow in case of a discovery or potential discovery.
- Construction Monitoring in Vicinity of Reported Site CA-SFr-23. A qualified archeological monitor and/or Ohlone Tribal representative shall be present to observe ground-disturbing project construction activities at the Hyde/Beach Street intersection, the reported location of indigenous site CA-SFr-23. Given the highly sensitive nature of this area for archeological resources, construction personnel should be prepared to immediately cease any excavation or grading work if so directed by the monitor.
- Discovery of Archeological Resources During Construction. If buried cultural resources such as chipped stone or groundstone, historic debris, building foundations, or human bone are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within a 100-foot radius of the find until a qualified archeologist can assess the significance of the find.

Inadvertent discoveries would be treated in accordance with 36 CFR 800.13 (Protection of Historic Properties: Post-review discoveries). The archeological resource would be assessed for its eligibility for listing on the NRHP in consultation with the SHPO and Ohlone/Costanoan Representatives (if it is an indigenous archeological site) and a determination of the project effects on the property would be made. If the site would be adversely affected, a treatment plan would also be prepared as needed during the assessment of the site's significance. Assessment of

inadvertent discoveries may require archeological excavations and/or archival research to determine resource significance. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.

If human skeletal remains are encountered, protocols under either federal or state law may apply depending on the jurisdiction. Regardless, all work shall stop in the vicinity of the discovery, and the find would be secured and protected in place.

The San Francisco County coroner and Park Archeologist would both be immediately notified. If a determination finds that the remains are Native American, and that no further coroner investigation of the cause of death is required, the coroner would then be required to contact the NAHC (pursuant to Section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs. If the remains are on federal land or under federal jurisdiction, they would also be treated in accordance with the Native American Graves Protection and Repatriation Regulations at 43 CFR 10.4 (Inadvertent discoveries).

Conclusions. Alternative 2 would result in long-term, moderate to major adverse impacts to certain historic architecturally and culturally significant features of two National Historic Landmark Districts (NHLDs) in the APE; the Aquatic Park National Historic Landmark District and the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District. The introduction of streetcar tracks, overhead contact system, lights, signals, and passenger platforms would add new, non-contributing and incompatible elements to the western end of Aquatic Park NHLD, and therefore result in an adverse impact to the historic setting, feeling, and association of the NHL District as a whole. The addition of streetcar-associated noise, vibration, and new uses that would be incompatible with the historic feeling and association of the District would also contribute to the adverse impact. The demolition of a contributing stone retaining wall and removal of historic State Belt Line railroad tracks as they cross Van Ness Avenue would be a direct adverse impact on the historic design, materials and workmanship of the District. The overall impact of these changes is deemed as a moderate adverse impact to the Aquatic Park NHL District because it would result in the alteration or modification of one or more of the characteristics that qualify the District for inclusion in the National Register, and for designation as a National Historic Landmark. The District's integrity would be diminished, but not to the extent that Aquatic Park's eligibility for National Historic Landmark status or National Register listing would be jeopardized.

Similarly, the introduction of streetcar tracks, overhead contact system, lights, signals, and passenger platforms would also constitute an adverse impact to the historic setting, feeling, and association of the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District. The partial demolition of a retaining wall associated with the Fort Mason Tunnel, and physical alterations to the tunnel and existing tracks, would adversely impact the design, materials and workmanship of the NHL District. The addition of streetcar-associated noise, vibration, and new uses would adversely impact the historic feeling and association of the Districts. The overall impact of these changes is deemed as a moderate adverse impact to the San Francisco Port of Embarkation U.S. Army NHL District/Fort Mason National Register Historic District because it would result in the alteration or modification of one or more of the characteristics that qualify the Districts for inclusion in the National Register and/or as a National Historic Landmark. The Districts' integrity would be diminished, but not to the extent that it would jeopardize the listing status of either the Fort Mason National Register Historic District or the San Francisco Port of Embarkation U.S. Army NHL District.

ENVIRONMENTAL CONSEQUENCES

Measures to mitigate these impacts include preparation of HABS and/or HALS documentation of both NHLDs, reuse of historic materials where appropriate, compatible designs for new station platforms, signage, and other project elements, public interpretation of the area's historical significance, and noise reduction measures.

While potential impacts to known and unknown architectural resources under Alternative 2 are expected to be negligible, additional mitigation is identified to ensure that potential impacts associated with inadvertent discovery remain negligible.

4.8 RECREATION AND VISITOR USE

4.8.1 Methodology and Assumptions

Potential effects on recreation and the visitor experience were evaluated consistent with the criteria presented in *Analysis Thresholds* below. The area of focus for study include: Fort Mason, San Francisco Maritime NHP, and amenities in the Fisherman’s Wharf area including Ghirardelli Square. This entailed identifying the physical changes in site conditions within the existing recreational area expected to occur under each alternative and then evaluating whether any anticipated site changes would be likely to:

- alter visitor perception of Fort Mason, San Francisco Maritime NHP, and amenities in the Fisherman’s Wharf area including Ghirardelli Square, or enjoyment of existing uses at these sites;
- eliminate or reduce existing uses, or provide new and/or beneficially modified uses;
- otherwise contribute to increases or decreases in use at the site.

The analysis will address short-term (temporary) construction-related impacts and long-term (permanent) site changes resulting from all alternatives of the proposed project. All anticipated changes in site condition (temporary and long-term) were evaluated under the following criteria, which reflect factors identified as essential to the quality of the visitor experience.

- Access to the sites.
- Vehicle, bicycle, public transit, and pedestrian access to, from, and within the area.
- Recreational opportunities and visitor experience
- Availability and quality of various recreational opportunities, such as walking/hiking, dining, site seeing, harbor use, etc.
- Public safety during short-term construction related activities.

NPS also identifies safety of visitors and area residents as a priority. Accordingly, construction activities were also analyzed for their potential to affect the safety of visitors and area residents, including all age groups and those with disabilities. Pedestrian and vehicle conflicts are analyzed in Section 4.4 Transportation and Circulation. All facilities would be designed and operated to meet applicable safety and accessibility (ADA) standards.

Effects on recreation and the visitor experience were evaluated as negligible, minor, moderate, or major, based on the thresholds described below.

| Impact Intensity | Impact Description |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Alternative would result in little or no noticeable change in visitor experience or appreciation of the site, or recreation opportunities. Visitors are likely unaware of the effects associated with proposed changes at the site. |

| Impact Intensity | Impact Description |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Minor: | Alternative would result in changes detectable to the areas visitors and residential community, but would not affect normal visitor use or reduce visitor enjoyment of the area. Visitors would be aware of the effects associated with the changes proposed; however, alterations in visitor use and experience would be slight. Other aspects of the visitor experience would remain available for visitor use and enjoyment without degradation of site resources and values. |
| Moderate: | Alternative would result in changes readily apparent to the visitor and residential community, and would affect visitor use. Access and/or recreational opportunities would be altered, and use of the area would be measurably affected (visitors could either be more satisfied or less satisfied). Some visitors would be likely to pursue their recreational choice at another location. |
| Major: | Alternative would result in changes that would be highly noticeable to the visitor and residential community, and intrusive to the visitor experience. Alternative would also likely change the character of the landscape or soundscape, and/or change important vistas or keystone features of the site. Original, pre-project perceptions of the area and traditional visitor uses at the site would be highly altered. Some visitors wishing to continue their use and enjoyment of walking/hiking, dining, sightseeing, harbor use, etc would be required to pursue their choice in other available local or regional areas to obtain the desired experience. |

4.8.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. There would be no changes to existing recreational opportunities or visitor use in the Fort Mason, San Francisco Maritime NHP, and amenities in the Fisherman’s Wharf area including Ghirardelli Square, under Alternative 1. Visitor perceptions and enjoyment of Fort Mason, San Francisco Maritime NHP and amenities in the Fisherman’s Wharf area would remain unchanged. No existing uses would be altered or eliminated, and no new uses would be provided under Alternative 1. Local and visitor use of the recreational opportunities in the area would remain the same, with an expected commensurate increase as local population levels rise in the coming years. Local public transit accessibility of Fort Mason, San Francisco Maritime NHP and the Fisherman’s Wharf area would continue to require a minimum of two transfers. This indirect link to the area on public transit would continue to deter use for some local visitors, conference attendees and tourists.

As no construction activities are proposed under Alternative 1, there would be no expected short-term changes to site access or area access to and from the sites, no temporary changes to recreational opportunities, and no public safety concerns to address.

Cumulative Impacts. Cumulative effects to recreation and visitor use are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect recreation and visitor use within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on recreation and visitor use include the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fort Mason Cultural Landscape, Fort Mason Sidewalk Replacement, Fort Mason Hazard Tree Replacement, upper Fort Mason Entry at Bay and Franklin Streets, Removal of Accessibility Barriers in upper Fort Mason. The beneficial impacts would result from improving safety and accessibility of features within the project study area. The Bay Trail at Laguna Street and Marina Boulevard was

recently renovated and expanded to alleviate congestion at “the squeeze”; however, the Project would not undermine the newly expanded area. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to recreation and visitor use within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman’s Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Fort Mason Center Pier 2 shed restoration, Maritime Heritage Learning Center, and Doyle Drive are for the most part improvements to existing facilities in the long-term but could result in short-term adverse impacts to recreation and visitor use during construction. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-generated activity in areas that may have a high density of recreational use, including pedestrians, and bicycles, however they would not significantly change the recreation and visitor use in the respective areas of these projects. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to recreation and visitor use.

The Alcatraz Ferry Embarkation and Education Feasibility Study examines nine potential locations for the establishment of a new passenger ferry embarkation site along the San Francisco waterfront. Four of the sites evaluated are located within Fort Mason. The other five sites include Port of San Francisco sites between Piers 45 and 19-1/2 along the northern waterfront. No final site has been selected. The planning phase of that project has only just begun and will undergo its own separate environmental review process. However, conservatively assuming that if one of the Fort Mason sites is selected, that project – in combination with the F-Line extension – could reasonably be expected to have both adverse and beneficial impacts to recreation and visitor use within the project area. Establishment of such a facility at Fort Mason would be expected to result in a substantial increase in visitation to the park. At the same time, a primary objective of the embarkation project is to enhance visitor experience through, among other things, facilities enhancements and educational installations. The latter would be facilitated through revenues generated by the former. The extent of such impacts has yet to be evaluated and is beyond the scope of this EIS. However, while both projects would be expected to result in an overall increase in visitation to Fort Mason, they would also be expected to enhance the visitor experience and recreational opportunities through facilities upgrades and better connectivity of NPS parklands.

Collectively, the cumulative projects discussed above would have a long-term, minor to moderate, beneficial impact to recreation and visitor use within the project area.

The impacts of Alternative 1, when combined with the impacts of the cumulative projects described above, would result in a long-term, minor to moderate, beneficial cumulative impact and short-term, minor to moderate, adverse impact on recreation and visitor use in the project area.

Conclusions. The No Action alternative would result in no measurable change to recreational opportunities or visitor use in Fort Mason, San Francisco Maritime NHP, and amenities in the Fisherman’s Wharf area including Ghirardelli Square.

4.8.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. Phased road closures at the intersection of Hyde and Beach streets could have potential negative impact on tourism to Ghirardelli Square. Road closures due to construction activities are discussed further in Section 4.4 Transportation and Circulation.

The at-grade crossing of Powell/Hyde Street cable car line (Line 60) at Hyde and Beach streets would require the loss of this cable car line for as much as one month. The temporary loss of the Powell/Hyde cable car is discussed further in Section 4.4 Transportation and Circulation.

Installation of traffic signals to accommodate streetcar operations would cause a potential disruption to tourist traffic in the Fisherman's Wharf area. Disruptions to pedestrian, automobile and bicycle traffic resulting from construction activities are discussed further in Section 4.4 Transportation and Circulation.

Under Alternative 2, the bocce ball courts on the corner of Van Ness and Beach streets within Aquatic Park may need to be relocated to an area that has yet to be determined. The National Park Service is committed to replacing the bocce ball court and would evaluate suitable alternatives during a separate planning effort and in conjunction with the new General Management Plan for the San Francisco Maritime NHP that is scheduled to begin in late 2011. The timescale for re-opening of the bocce ball courts has yet to be determined. Relocation of the bocce ball courts would produce a moderate, temporary impact to recreational opportunities and the visitor experience.

Operation of the F-line extension as proposed in Alternative 2 is expected to have a moderate, beneficial effect on the visitor perception and enjoyment of the Fisherman's Wharf area, Ghirardelli Square, Fort Mason and the San Francisco Maritime NHP. The Project, as designed, would increase public access to the area's attractions by extending public transportation to these amenities, with station platforms conveniently placed directly adjacent or in the attractions themselves. By decreasing the number of transfers required to access the area on public transit, local users from within the Bay Area would have increased opportunities to enjoy the attractions. Furthermore, tourists and others, who may not utilize the F-line extension, are likely to enjoy viewing the functioning historic streetcars as a compliment to the area's historic feel.

Increased public transportation access could result in increased visitor use and subsequent increased wear to park facilities. The proposed project is anticipated to increase the number of visitors in Fort Mason, San Francisco Maritime NHP, and amenities in the Fisherman's Wharf area including Ghirardelli Square. It is difficult to accurately predict which attractions and recreational opportunities would experience the most increases in public use; however, it follows that an increase in use would result in increased need for park maintenance to maintain the current level of visitor experience. Increased maintenance may be required to clear out trash bins, clean and restock public restrooms, repair vandalism, maintain trails, and/or other routine maintenance activities. If park management does not increase person-hours for maintenance at the park facilities, degradation in the visitor experience may result. This impact may result in a moderate, adverse impact to recreation within the area.

Alternative 2A: North Loop Option. Noise from construction activities may temporarily disrupt some events at the Fort Mason Center, particularly in Landmark Building A. Temporary noise impacts to Fort Mason from construction activities are further discussed in Section 4.7 Noise and Vibration.

The construction lay down area may further reduce potential parking at Fort Mason. Although a lay down area has not been identified for the North Loop Option, it is likely that the Fort Mason parking lot would be utilized for construction staging. This would cause the loss of additional parking spaces that serve the Fort Mason Center. This temporary adverse impact is considered short-term and minor.

Utilization of the North Loop option for Alternative 2 would result in the loss of up to 35 parking spaces within the Lower Fort Mason Parking Lot which equates to an 8 percent loss of the existing 440 parking spaces. This lot is the closest to the Fort Mason Center which is utilized for approximately 11,400 events annually with as many as 7,000 attendees at the largest events. For various reasons including poor access by public transit, the primary access and mode of transportation to Fort Mason Center is by automobile and parking within this lot is known to be inadequate for demands during popular events. Under the current situation, parking already spills over into neighborhoods and Fisherman's wharf area parking facilities. Some users may be dissuaded from attending events at the Fort Mason Center as a result of the increased difficulty in finding parking, while others may choose to utilize the extended F-line. To reduce the number of parking spaces that would be lost due to construction of the turn-around, the Fort Mason Center parking lot would be reconfigured so as to make more efficient use of the area for parking, thereby reducing the overall number of parking spaces that might otherwise be displaced.

Construction of the North Loop option could affect the insufficient parking situation for recreational users of the Fort Mason Center. No additional parking has been proposed to compensate for the loss of 35 parking spaces as the project provides an alternative means of transportation to the Fort Mason Center. This impact is considered a minor, long-term adverse impact; no mitigation is currently proposed to off-set the impact.

Conclusion. Alternative 2A: North Loop Option would result in short and long-term minor adverse impacts.

Alternative 2B: South Loop Option. Construction of the South Loop would result in a temporary disruption to use of the San Francisco Bay Trail with meanders along the northern edge of the Great Meadow and cuts through the area proposed for the South Loop Option. Users of the San Francisco Bay Trail would be required to cut across the meadow's grassy fields, reroute to stairs that connects to the Fort Mason Center parking lot, or possibly cross Laguna and Marina streets to reconnect with the Bay Trail to the east of Fort Mason.

Construction activities may cause a visual and auditory disruption to recreational activities within the Great Meadow. Temporary noise impacts to individuals utilizing the Great Meadow during construction activities are further discussed in Section 4.7 Noise and Vibration.

The construction lay down area would further reduce potential parking at Fort Mason. Although a lay down area has not been identified for the South Loop Option, it is likely that the Fort Mason parking

lot would be utilized for construction staging. This would cause the loss of additional parking spaces that serve the Fort Mason Center. This temporary adverse impact is considered short-term and minor.

As a result of the proposed option, less than one acre of open space within the Great Meadow would be converted to looping tracks and station platform. This would reduce the area available for recreational activities within the meadow. As the Fort Mason area of San Francisco is already densely and completely developed, there is little opportunity to mitigate this permanent loss to open space. Seekers of open space could utilize nearby areas, some of which also offer attractive views of the San Francisco Bay and/or Golden Gate Bridge. The northern shore of San Francisco contains many other existing options of open space, including nearby Crissy Fields, the Marina Green, Victorian Park, the Presidio and adjacent beaches. Because the immitigable loss of less than one acre of the Great Meadow that offer attractive views of the Golden Gate Bridge may cause a small portion of current park visitors to seek recreational opportunities at another location, this permanent adverse impact is minor.

Construction of the South Loop would directly cross a portion of the San Francisco Bay Trail that connects the Bay Trail eastern in the Great Meadow to the sidewalk along Laguna Street. Because an intersection of the trail and rail creates an unsafe pedestrian crossing, this portion of the Bay Trail would be eliminated and a new section of trail would be created that meanders around the upper margins of the proposed loop and connects to the sidewalk along Laguna Street nearer to the corner of Laguna and Bay streets. This trail would be longer than the current trail with the Great Meadow and would occupy more distance along the Laguna Street sidewalk. As a result of the increased distance along Laguna Street, the Bay Trail would have a shared interface with the F-line rail platform. This would potentially create an unsafe situation for disembarking passengers and bicyclists using the Bay Trail.

Conclusion. Alternative 2B: South Loop Option would result in short and long-term minor adverse impacts.

Cumulative Impacts. The impacts of the other actions (past, present, and reasonably foreseeable future actions) for recreation and visitor use under Alternative 2 would be the same as described under Alternative 1. See the discussion of cumulative effects under Alternative 1.

Collectively, the cumulative projects discussed above would have a long-term, minor to moderate, beneficial impact to recreation and visitor use within the project area. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to recreation and visitor use.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would result in a long-term, minor to moderate, beneficial cumulative impact and short-term, minor to moderate, adverse impact on recreation and visitor use in the project area.

Mitigation Measures

REC-1: If necessary, relocate the bocce ball courts to suitable location. Prior to the start of construction, the NPS shall initiate a planning project to determine suitable alternative locations for the bocce ball courts. The bocce ball court should preferably be relocated within a quarter-mile from the existing location on federal- or City of San Francisco-owned land.

REC-2: Post signage to direct Bay Trail users of temporary re-routes. At the Van Ness Avenue and Great Meadow intersections of the Bay Trail and proposed F-line extension, the NPS shall post adequate signage notifying the public of the re-routed Bay Trail.

REC-3: Coordinate the Bay Trail reroutes with Association of Bay Area Governments (ABAG). To ensure temporarily and permanently rerouted Bay Trail segments meet the policies and guidelines of the Bay Trail Plan, the NPS shall coordinate trail details with ABAG. Where the Bay Trail and the F-line extension intersect, the Bay Trail shall be clearly and well physically separated from the rail alignment to ensure public safety. This shall include areas where passengers are disembarking from the streetcar onto the Bay Trail route to prevent collisions between Bay Trail bicycle and pedestrian users and public transit users.

Conclusions. Alternative 2 would have short-term and long-term, minor, adverse impacts on recreation and visitor use in the project area.

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4.9 VISUAL AND AESTHETIC RESOURCES

4.9.1 Methodology and Assumptions

The analysis of visual resources for the study area is based on viewsheds found within the three project segments: Turnaround Segment; Transition Segment; and In-Street Segment. Ten important viewpoints were identified within these segments for further evaluation.

Impacts for each alternative are described based on the analysis performed at the ten important viewpoints, as well as an overall assessment of the alternative's ability to preserve scenic qualities of the planning area, including scenic vistas, historic resources and landforms. The assessment of impacts considers whether the resulting visual change would have an adverse or beneficial effect on a viewshed, would substantially damage or improve scenic resources, or substantially degrade or improve the existing visual character of the site. The assessment also evaluates each alternative's consistency with applicable NPS design goals and policies, including preservation of the National Historic Landmark Districts and compatibility of design features within the NHL, and with standard visual impact criteria. Visual simulations prepared from key observation points from the three priority sites are included in this section.

| Impact Intensity | Impact Description |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Would result in little or no detectable change in visual character or views of the site. |
| Minor: | Changes to the visual character and views of the site would be detectable, but the landscape has the capability to visually absorb and incorporate most of the changes. Changes would not appreciably alter important landscape characteristics, and views would change only slightly, so as not to negatively affect scenic quality. |
| Moderate: | Changes to the visual character and views of the site would be readily noticeable. One or more secondary features of views of the site would be altered, but effects would be short-term and/or the keystone features of the views would remain intact. |
| Major: | Changes to the visual character and views of the site would be highly noticeable and severe, such as the original, pre-project landscape would be altered beyond recognition. Keystone features of views would change. |

4.9.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Alternative 1 establishes the baseline for comparing the action alternative since it represents no change from the existing management direction or level of management intensity. The No-Action Alternative would not facilitate transit connectivity or accessibility nor increase access to NPS facilities beyond those measures identified in the management plans.

Turnaround Segment: No changes are proposed in the Turnaround Segment under Alternative 1; therefore the existing visual character of Upper Fort Mason and Lower Fort Mason in the GGNRA as depicted in the five viewsheds identified for analysis would remain the same.

Transition Segment: No changes are proposed in the Transition Segment under Alternative 1; therefore the existing visual character of the San Francisco Maritime NHP as depicted in the two viewsheds identified for analysis would remain the same.

In-Street Segment: No changes are proposed in the In-Street Segment under Alternative; therefore the existing visual character of the San Francisco Maritime NHP as depicted in the two viewsheds identified for analysis would remain the same.

Cumulative Impacts. Alternative 1 would have no direct or indirect impacts on visual resources. As a result, there would be no cumulative impacts under this alternative.

Conclusions. Alternative 1 would not result in any direct, indirect, or cumulative impacts to visual resources.

4.9.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. Alternative 2-Action Alternative would introduce new elements to the landscape associated with the infrastructure of the Historic Streetcar including: tracks, streetcars, overhead wires and lights, signals, and platforms.

The overhead contact system (OCS) is assumed to be a simple, single-wire system similar to the existing Muni OCS on the F-line trackage in the Fisherman’s Wharf area on Jefferson, Jones and Beach Streets. The system assumed would be configured for trolley pole operation by historic streetcars. Poles would be spaced approximately every 100 feet on tangent track. On streets with only one track the OCS will normally be suspended from a mast arm attached to a pole on the sidewalk, (similar to current poles and mast arms on Jefferson and Beach Streets), incorporating decorative streetlights similar to those used for the F-line project (URS 2009e).

Alternative 2A: North Loop Option. Project construction activities would result in temporary exposure of graded surfaces, construction debris and the presence of construction equipment and truck traffic. Construction equipment for grading activities would be stored at various locations throughout the Project site. In addition, the identification and maintenance of staging areas away from heavily traveled roadways and sidewalks would reduce these short-term adverse impacts. Implementation of mitigation measures would reduce these short-term aesthetic impacts to minor adverse impacts.

Alternative 2B: South Loop Option. Project construction activities would result in temporary exposure of graded surfaces, construction debris and the presence of construction equipment and truck traffic. Construction equipment for grading activities would be stored at various locations throughout the Project site. In addition, the identification and maintenance of staging areas away from heavily traveled roadways and sidewalks would reduce these short-term adverse impacts. Implementation of mitigation measures would reduce these short-term aesthetic impacts to minor adverse impacts.

Turnaround Segment. **Figures 4.9-1 and 4.9-2** – Changes depicted in the conceptual visual simulation of the North Loop Turnaround show the addition of the streetcar where it would be visible between the main gate at Lower Fort Mason and the gatehouse and the introduction of overhead poles and



Existing view - Marina Boulevard at Laguna Street looking northeast



Conceptual visual simulation of North Loop alternative

Source: Environmental Vision

**VISUAL SIMULATION MARINA BOULEVARD
(NORTH LOOP – CLOSE IN)**



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FIGURE 4.9-1



Existing view - Marina Boulevard near Laguna Street looking east (panorama)



Conceptual visual simulation of North Loop alternative

**VISUAL SIMULATION MARINA BOULEVARD
(NORTH LOOP)**

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FIGURE 4.9-2

Source: Environmental Vision

wires. These views (both close-up and long-range) depict change in the background of the vantage point and would result in a minor adverse long-term impact because the change would be detectable, but the landscape has the capability to visually absorb and incorporate most of the changes.

Figure 4.9-3 – Changes depicted in the conceptual visual simulation of Alternative 2B: South Loop Turnaround shows the addition of the streetcar where it would be visible after it emerges from the Fort Mason Tunnel and turns south to the Great Meadow. This visual simulation shows the introduction for the station platform and overhead canopy as well as overhead poles and wires. These changes in the middleground of this vantage point would be detectable, but the landscape has the capability to visually absorb and incorporate most of the changes, resulting in a minor adverse long-term impact.

Figure 4.9-4 – The conceptual visual simulation of Alternative 2A: North Loop from the Fort Mason Building C stairway looking south is depicted in this photo. This vantage point introduces major visual changes in the foreground of the view including the historic streetcar, tracks and trackbed, overhead wires and lights as well as station platform and overhead canopies. The introduction of these new visual elements has direct impacts on the visual resources of Building A in the San Francisco Port of Embarkation (Fort Mason) NHL. While the introduction of these elements would be readily noticeable, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.

Figure 4.9-5 – The conceptual visual simulation of Alternative 2B: South Loop from the intersection of Laguna Street and North Point Street looking north is depicted in this photo. This vantage point shows the South Loop retaining wall as a major visual element introduced into the Great Meadow.

The retaining wall would be approximately 5-10 feet tall. It replaces a landscaped setting and approximately five small trees. The historic streetcar, station platform, overhead canopies as well as overhead wires and lighting are additional visual elements introduced into the middleground of this vantage point. While the introduction of these elements would be readily noticeable, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.

Figure 4.9-6 – The conceptual visual simulation of Alternative 2B: South Loop of the Fort Mason path looking northwest is depicted in this photo. This viewpoint depicts an important historic viewshed as identified in the Cultural Landscape Report (CLR) for Fort Mason: Golden Gate National Recreation Area (2004). The CLR identifies the important viewshed from Upper Fort Mason of the view to the Golden Gate Bridge from Great Meadow. The conceptual simulation shows that even with the introduction of new visual elements into this area, the view to the Golden Gate Bridge remains unobstructed. The new visual elements include the historic streetcar, station platform, overhead wires and lighting, realignment of the Bay Trail, hand railing and retaining wall, tracks, and a vegetated island within the inner track loop. Five small trees would be removed as part of this alternative; however, the CLR emphasizes that the growth of vegetation in and around Fort Mason actually detracted from the historic viewshed of the Golden Gate Bridge and the San Francisco Bay. In addition, historically this view was obstructed by buildings, whereas today, the views are and would continue to be open even with the implementation of the South Loop option. While the introduction of these elements would be readily noticeable, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, minor, adverse effect.



Existing view - Marina Boulevard near Laguna Street looking east (panorama)



Conceptual visual simulation of South Loop alternative

**VISUAL SIMULATION MARINA BOULEVARD
(SOUTH LOOP)**

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FIGURE 4.9-3

Source: Environmental Vision



Existing view - Fort Mason Building C stairway looking south



Conceptual visual simulation of North Loop alternative

Source: Environmental Vision

Note: Parking will be removed from this area for operational and pedestrian safety

**VISUAL SIMULATION FORT MASON
(NORTH LOOP)**

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FIGURE 4.9-4



Existing view - Laguna Street at North Point Street looking north



Conceptual visual simulation of South Loop alternative

Source: Environmental Vision

**VISUAL SIMULATION LAGUNA AND NORTH POINT
(SOUTH LOOP)**



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FIGURE 4.9-5



Existing view - Fort Mason path looking northwest



Conceptual visual simulation of South Loop alternative

**VISUAL SIMULATION FORT MASON PATH
(SOUTH LOOP)**

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FIGURE 4.9-6

Source: Environmental Vision

Transition Segment. Figure 4.9-7 – This view captures the western edge of the Maritime Museum in the foreground of the right side of the photo and a portion of the Bocce Court in the left side of the photo in the middleground. The West Speaker Tower peaks up from the surrounding trees in the background. A walkway leads from the front of the Maritime Museum to the promenade at Aquatic Park. The conceptual simulation shows the proposed platform and path. The view of the museum is not changed and the historic Speaker Tower is actually more prominent with the removal of vegetation that would be required in this location. While the introduction of these elements would be readily noticeable, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.

Figure 4.9-8 – Visual resources from this vantage point, include the Aquatic Park NHLD. Contributing features to the NHLD includes the Maritime Museum, West Speaker Tower, the State Belt Railroad Tracks, and the paved walkway system from Van Ness Avenue past the West Speaker Tower. Ghirardelli Square is in the background. The conceptual simulation shows the proposed platform and path and two street cars. The view of the museum and Ghirardelli Square is not changed and the historic Speaker Tower is actually slightly more prominent with the removal of vegetation that would be required in this location. While the introduction of these elements would be readily noticeable, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.

In-Street Segment. Figure 4.9-9 – The Maritime Museum is the focal point of this view at the intersection of Polk Street and Beach Street. There is a pedestrian walkway in front of the Museum and three crosswalks at this intersection allow pedestrians to directly access the Museum entrance from the opposite side of the street.

The conceptual simulation shows a street car and two poles and the overhead wire. The view of the museum is not significantly changed. The introduction of the streetcar in this vantage point is readily noticeable; however, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.

Figure 4.9-10 – This view shows the two-lane east-bound and one-lane west-bound street in the foreground. Parking spaces line both sides of the street. Street vendors occupy the north-side of the street on the sidewalk in the middleground. Victorian Park is not visible in this view, but it is located adjacent to the north sidewalk behind the street vendors. The Cable Car NHLD turnaround is at the Hyde Street intersection within Victorian Park in the background. Streetlamps are positioned at the corner of Hyde Street. The conceptual simulation shows two street cars, corresponding poles and overhead wires and the platform in the easterly direction. The introduction of these elements in this vantage point is readily noticeable; however, the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term, moderate, adverse effect.



Existing view (photos taken during 2010 renovations) - Beach Street near Polk Street looking northwest



Conceptual visual simulation of Proposed Project

Source: Environmental Vision

VISUAL SIMULATION TRANSITION SEGMENT



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FIGURE 4.9-7



Existing view (photos taken during 2010 renovations) - Van Ness Avenue looking south



Conceptual visual simulation of Proposed Project

Source: Environmental Vision

VISUAL SIMULATION TRANSITION SEGMENT



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FIGURE 4.9-8



Existing view - Polk Street at Beach Street looking north



Conceptual visual simulation of the proposed project

Source: Environmental Vision

**VISUAL SIMULATION IN-STREET SEGMENT
(POLK AT BEACH)**

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FIGURE 4.9-9



Existing view - Beach Street near Hyde Street looking east



Conceptual visual simulation of Proposed Project

Source: Environmental Vision

**VISUAL SIMULATION IN-STREET SEGMENT
(BEACH NEAR HYDE)**

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FIGURE 4.9-10

* Platform locations are for illustrative purposes only and subject to change. Final platform locations will be determined through a separate local planning process that will take into account operational and design considerations, as well as public comment.

Mitigation Measures

The NPS shall ensure that all construction contracts for the proposed Project incorporate and implement the following measures:

VIS-1: To the extent feasible, during all site preparation and exterior construction activities, the NPS and its contractors shall place and maintain a screened security fence around the perimeter of the project site and removed upon completion of construction activities. The NPS shall determine the height, material and placement of such fencing, as appropriate and effective given the relative change in elevation and viewpoints to the site.

VIS-2: To the extent feasible, construction staging areas shall be located to the largest extent possible away from view of public viewsheds and remain clear of all trash, weeds and debris etc. Construction staging areas may include other areas of the project site when necessary, but shall be located away from adjacent properties, to minimize visibility from public view to the extent feasible.

VIS-3: Signs will be limited to the minimum necessary to meet information, warning, and regulatory needs and to avoid confusion and visual intrusion.

Cumulative Impacts. Cumulative effects to visual and aesthetic resources are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect visual and aesthetic resources within the project area.

Past, present, and reasonably foreseeable projects include the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fort Mason Cultural Landscape, Fort Mason Sidewalk Replacement, Fort Mason Hazard Tree Replacement, upper Fort Mason Entry at Bay and Franklin Streets, Removal of Accessibility Barriers in upper Fort Mason, Pier 2 shed restoration, San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive. The adverse effects of these projects would be localized and short-term in nature, and primarily related to construction-generated activity such as staging of material and equipment in areas in and around the national parks; however, they would not significantly change the visual and aesthetic resources for the long-term in the respective areas of these projects. Activities related to the construction of the reasonably foreseeable projects would result in a short-term, minor to moderate, adverse impact to visual and aesthetic resources.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a local, short-term and long-term, minor to moderate, adverse cumulative impact on visual and aesthetic resources in the project area.

Conclusions. Overall, Alternative 2-Action Alternative changes the visual landscape along the alignment of the project, but the pre-project landscape would not be altered beyond recognition, therefore the resulting impact would be a long-term moderate adverse impact.

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4.10 NIGHT SKY VISIBILITY AND LIGHT POLLUTION

4.10.1 Methodology and Assumptions

The night sky visibility and light pollution impact assessment process involves identification of the following:

- existing nighttime visual resources (i.e., night sky, attractively lit structural icons such as the Ghirardelli Square sign, etc.), including their visual character and quality, within the region, the immediate action area, and the project site
- properties within 200 feet of proposed artificial light locations within the action area using descriptions, maps and photographs
- sensitive receptors to night time light pollution generally considered residential buildings and hospitals/convalescence facilities

The degree of impact considered both the magnitude of change in the visual resource (i.e., visual character and quality) and viewers’ responses to and concern for those changes.

To determine impacts, the following methods and assumptions will be used to evaluate changes that could occur with implementation of the alternatives.

- A review of state and local ordinances, and regulations and professional standards pertaining to lighting standards and visual quality will be conducted.
- Direct field observation conducted at night and day from multiple vantage points around proposed public transit stops.
- Review of nighttime photographs taken of existing visual resources and sensitive receptors.
- Individual impacts were considered to be those that would result in direct or indirect changes to existing night sky visibility, and night time viewsheds within the action area.

| Impact Intensity | Impact Description |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Would result in little or no detectable change in night time visual character or views of the site. |
| Minor: | Changes to the night time visual character and views of the area would be detectable, but the landscape has the capability to visually absorb and incorporate most of the changes. Would not appreciably alter important landscape characteristics, and view intactness would change only slightly, so as to not negatively affect scenic quality. |
| Moderate: | Changes to the nighttime visual character and views within the area would be readily noticeable. One or more views of the site would be altered, but sensitive receptors are likely to consider the changes inconsequential to the existing viewshed. |
| Major: | Changes to the visual character and views of the site would be highly noticeable and severe, such that the original, pre-project night time condition would be altered beyond recognition. Keystone features of views would change. |

4.10.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Alternative 1 establishes the baseline for comparing the action alternative since it represents no change from the existing management direction or level of management intensity. Alternative 1 would not facilitate transit connectivity or accessibility nor increase access to NPS facilities beyond those measures identified in the management plans. No new sources of lighting would be introduced to the project area under the Alternative 1.

In-Street Segment. Under the Alternative 1, the existing night lighting along Beach Street would remain unchanged. Streetlamps illuminate the street, as well as lights emanating from nearby restaurants and stores. The historic radio tower also projects a light at night.

Transition Segment. The visual character of this area at night is very dark as there are no stores or restaurants at this end of Beach Street or Van Ness Avenue. The walking path that connects Beach Street to Van Ness Avenue along the western side of the Maritime Museum is illuminated by one streetlamp. The main feature of the night sky in this segment is the illuminated Ghirardelli sign, which is visible from the intersection of the foot path with Van Ness Avenue looking southwest.

Turnaround Segment. The Great Meadow is not lighted at night and is characterized by pervasive darkness since there are no structures within the park that project lights. The area of the proposed South Loop would be adjacent to Laguna Street, which is currently illuminated by three streetlamps on the east side of the street, and one streetlamp on the west side of the street along the segment between Bay Street and Marina Boulevard. The Safeway parking lot (across Laguna Street) is also illuminated at night, however there is little to no spillover into the Great Meadow.

The lower Fort Mason parking lot is illuminated by six streetlamps as well as lighting at the entry gate and along the gatehouse structure. All lamps appear to be low-wattage and downward cast.

Cumulative Impacts. Alternative 1 would have no direct or indirect impacts on night sky visibility. As a result, there would be no cumulative impacts under this alternative.

Conclusions. Alternative 1 would not result in any direct, indirect, impacts to night sky visibility.

4.10.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. The overhead contact system (OCS) is assumed to be a simple, single-wire system similar to the existing Muni OCS on the F-line trackage in the Fisherman's Wharf area on Jefferson, Jones and Beach Streets. The system assumed would be configured for trolley pole operation by historic streetcars. Poles would be spaced approximately every 100 feet on tangent track. On streets with only one track the OCS would normally be suspended from a mast arm attached to a pole on the sidewalk, (similar to current poles and mast arms on Jefferson and Beach Streets), incorporating decorative streetlights similar to those used for the F-line project (URS 2009e).

The track lights, if needed, would be attached to overhead poles at 100 feet maximum spacing. 1.1 to 2.0 foot candles are required for track lighting with 3:1 uniformity ratio for average to minimum and

5:1 for maximum to minimum for street/trackway. Five-foot candles are required for general boarding platform area (Wong 2010).

While the project would require additional lighting, the ability to use light shielding fixtures and the fact that facilities would be placed in an already light environment would not appreciably alter important landscape characteristics, and view intactness would change only slightly, so as to not negatively affect scenic quality, thus a long-term minor impact would be realized.

Cumulative Impacts. Cumulative effects to night sky visibility and light pollution are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect night sky visibility within the project area.

There are very few reasonably foreseeable projects that could contribute to light pollution. Projects that introduce a new structure that could be lit at night or incorporate outside lighting such as the 721 Beach Street Development and the Fisherman's Wharf Public Realm Plan could cumulatively contribute to the night sky light pollution. The adverse effects of these projects would be long-term in nature depending on the quantity of lights that are added.

Collectively, the cumulative projects discussed above would have a long-term, minor to moderate, adverse impact to night sky visibility within the project area.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would result in a long-term, minor to moderate, adverse cumulative impact on night sky visibility in the project area.

Mitigation Measures

NIGHT-1: The project would be required to minimize the use of lighting in areas already well lit and to use full cutoff light fixtures throughout the project.

Conclusions. Alternative 2 would have long-term minor impacts due to increased night lighting.

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4.11 GEOLOGY, SOILS AND SEISMICITY

4.11.1 Methodology and Assumptions

This section evaluates the project alternatives qualitatively in terms of their effect on soil and mineral resources, as well as the potential for damage to proposed structures or increased risk of injury due to geologic and seismic hazards. This evaluation is based upon existing studies and maps prepared by the United States Geological Survey (USGS) and California Geologic Survey (CGS), and a geotechnical report prepared by Kleinfelder Associates, a geotechnical engineering firm that evaluated the geology, stability and structural condition of the Fort Mason tunnel. In addition, the conclusions and recommendations provided in the tunnel geotechnical report are evaluated, and if appropriate, incorporated into the analysis of environmental consequences and mitigation measures.

The following issues, based on the NPS Management Policies, were considered in the analysis of impacts related to geology and soils for each alternative:

- Accelerated and/or environmentally harmful soil erosion;
- Damage to project elements or increased exposure of the public to risks from rupture of a known earthquake fault;
- Injury, death, or property damage as a result of earthquake induced ground deformations (e.g., lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils;
- Injury, death, or property damage as a result of an onsite or offsite landslide;
- Loss of or damage to known geologic, paleontological or mineral resources.

Based on the environmental setting of the study area and the features of the proposed project, there would be no adverse impact from either of the project alternatives for the two following issues:

- *Impacts from rupture of a known earthquake fault.* While there are distant regional faults capable of producing strong ground-shaking at the site, there are no active or potentially active faults that cross the project study area. Thus, ground rupture along an earthquake fault within the project area would not occur, and does not represent a hazard to the project study area.
- *Loss of or damage to known geologic, paleontological or mineral resources.* The project is located in an urban area where there are no significant mineral deposits present (see Section 3.11), and the grading to occur for the project alternatives would occur in soils with little to no potential to uncover paleontological resources. Dune sands and artificial fills are recently deposited material that have not formed over a period of time long enough to mineralize or preserve floral or faunal remains.

Thus, the above issues were determined to not be applicable to the proposed alternatives and are not discussed further. The following thresholds are used in determining the significance of impacts with respect to each of the other applicable issues:

| Impact Intensity | Impact Description |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Risks to the public and the environment from soil erosion and seismic or landslide events would remain unchanged, or the change in risk would be at such low levels of detection that it would not have a discernible effect on resources or public safety. |
| Minor: | The change in risks to the public and the environment from soil erosion and seismic or landslide events would be detectable but would not be appreciable. |
| Moderate: | The change in risks to the public and the environment from soil erosion and seismic or landslide events would be readily apparent and long-term, with substantial, noticeable changes in risks to the public and the environment locally within the study area. |
| Major: | The change in risks to the public and the environment from soil erosion and seismic or landslide events would be readily apparent, long-term, and would result in substantial, changes in risks to the public and the environment throughout the study area. |

Short-term impacts are temporary in nature (and often associated with construction), whereas long-term impacts would have a continuing effect on the natural and human environment.

Beneficial impacts would reduce soil erosion and reduce risks to the public from seismic and landslide events, whereas adverse impacts would increase soil erosion and increase risks to the public from seismic and landslide events.

4.11.2 Impacts of Alternative 1 — No-Action Alternative

Impact Analysis. Under Alternative 1, the occurrence of or potential for soil erosion and seismic or landslide events would remain similar or the same as current conditions for all portions of the project study area except for the Fort Mason Tunnel Segment. Under the no-action alternative, the in-street, transition, and turnaround segments would result in negligible adverse impacts to geology and soils.

The western half of the tunnel, which was built using cut and cover methods, is within artificial fill that has not likely been properly engineered (see unit Qaf in Figure 3.11-3). Dynamic compaction of the fill materials during previous earthquakes may have contributed to a large longitudinal crack along the tunnel's crown (Kleinfelder 2005). It is estimated that a future design basis earthquake could cause as much of 8 inches of additional settlement in the artificial fills overlying the tunnel. This additional settlement could increase the vertical stresses on the tunnel walls, and would further compromise the structural stability of the tunnel.

For the Fort Mason Tunnel segment, repair measures would not be implemented and the structural condition of the tunnel could worsen over time. In the long-term, the tunnel could deteriorate further through continued inflow of water through construction joints and other cracks. This water infiltration has caused and may continue to cause spalling¹, efflorescence and degradation of concrete around the cracks. Further, future earthquakes could be substantial enough to cause dynamic

¹ Spalling occurs when flakes of a material break off a larger solid body and can be produced by a variety of mechanisms, including as a result of projectile impact, corrosion, weathering, cavitation, or excessive rolling pressure.

compaction of fill materials overlying the western segment of the tunnel (causing as much as 8 inches of settlement for a design-basis earthquake²), potentially worsening longitudinal cracks within the crown of the tunnel, or creating new cracks.

Under the no action alternative, the tunnel would remain closed to the public, thus preventing risks to the public within the tunnel itself. However, it is unknown whether, in its current condition, the tunnel would remain structurally stable during future earthquake scenarios. If the tunnel were to fail, the overlying fill material could cave, possibly resulting in offsite ground failure, such as landslide or collapse. This would present a substantial risk to the general public as well as a number of buildings within the Fort Mason complex that overlie the tunnel, several of which are historic structures. While the potential for this impact to occur is low, it is possible based on the available information and the current condition of the tunnel. For these reasons, the no action alternative represents a moderate, long-term, adverse impact with respect to the stability of the Fort Mason Tunnel segment.

The geotechnical report for the tunnel alignment recommended that numerical analyses be conducted to evaluate how the dynamic compaction of overlying fill materials during a design earthquake would affect the stability of the tunnel walls. This recommendation is presented as mitigation measure GEO-1. If numerical analyses indicate that the tunnel would remain stable under a design earthquake, repair measures would not be necessary, and the impact would be shown to be to minor. Should the analysis indicate that the tunnel would not be stable or would otherwise be prone to collapse; the NPS shall implement tunnel repair measures as described in mitigation measure GEO-3 in order to reduce this potential impact to minor levels.

Cumulative Impacts. The entire Bay Area lies within a seismically-active region with geologic, soil, and seismic conditions that vary substantially within short distances. The geographic scope for cumulative impacts from geologic and seismic hazards is very localized, and restricted to the rock unit, soil unit, or slope condition directly affected by the project. Thus, for cumulative impacts to occur, projects in the cumulative scenario would have to be located within or immediately adjacent to the no-action alternative. Because the no-action alternative would have negligible impacts with respect to geologic and seismic hazards there would be no cumulative impacts related to these issues as a result of this alternative. The one exception is the stability of the Fort Mason Tunnel, which represents a moderate, long-term, adverse impact of the no action alternative. However, none of the projects in the cumulative scenario (Section 4.1.2) would overlie or otherwise affect the potentially unstable portion of the tunnel.

The geographic scope for cumulative impacts from soil erosion includes the project study area and all downstream drainage areas. Because there would be no additional impacts with respect to soil erosion, there would be no cumulative impacts as a result of the no-action alternative.

² The design basis earthquake (DBE) represents an earthquake that has a 1 in 1000 chance of occurring in the next 50 years. The DBE determined by Kleinfelder (2005) for the Fort Mason Tunnel has a peak ground acceleration (PGA) of 0.674g (see chapter 3.11 for an explanation of PGA).

Mitigation Measures

GEO-1: As recommended in the geotechnical investigation for the Fort Mason Tunnel (Kleinfelder 2005), further analyses shall be conducted to determine whether or not the tunnel is vulnerable to additional damage due to compaction of soil during an earthquake. Further geotechnical study shall be conducted to evaluate the effect of additional strains caused by dynamic compaction of fill sand, and how these strains would be transferred to the tunnel liner. This analysis shall be conducted by a registered geotechnical engineer, and shall include an assessment of the risk for structural failure or collapse of the tunnel during a design earthquake, and possible ramifications for overlying property.

Conclusions. The no action alternative would result in negligible impacts with respect to soil erosion and seismic or landslide events for all segments of the alternative, except for the Fort Mason Tunnel Segment. The western portion of the tunnel, overlain by un-compacted fills, could experience a moderate, long-term, adverse impact from dynamic settlement caused by a design-basis earthquake. This moderate impact would be reduced to minor intensity with implementation of the proposed mitigation measure(s).

4.11.3 Impacts of Alternative 2 — Action Alternative (with Turnaround Options)

Impact Analysis for Construction. Preliminary stages of construction, including the excavation, grading and installation of new rail tracks, could leave loose soil exposed to the erosive forces of rainfall and high winds. Construction of tracks and rail along each block segment is anticipated to take three weeks on each side of the road, for a total of six weeks per block. This means that soils underlying the street pavement would not be exposed for long at any one time. The alignment for construction activities is generally at low grades and thus the potential for substantial surface water runoff and erosion is considered unlikely.

Because soil surface disturbance for the proposed project would be greater than one acre, specific erosion control measures would be identified as part of the National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would be implemented that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the construction area; maintaining equipment and vehicles used for construction; developing and implementing a spill prevention and cleanup plan. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit. In addition, the construction general permit required under the NPDES program would require that the topsoil (if present) be preserved in areas requiring grading in order to ensure proper implementation of post-construction BMPs for site restoration.

For these reasons, construction of the action alternative would result in a minor, short-term, adverse impact related to soil erosion.

Because construction activities would be short-term, it is highly unlikely that a strong earthquake would occur during construction of the action alternative. Further, should an earthquake occur during construction of the action alternative, the ground-shaking effects would not threaten the public, because construction zones would be off limits. Construction works would be inspected for damage and repaired, if needed. For these reasons, construction of the proposed project would result in a minor, short-term, adverse impact with respect to earthquake-induced ground deformation.

Generally the action alternative is located on flat ground that would not be prone to on or off-site landslides. For the in-street segment, portions of the transition segment, and the north loop options of the turnaround segment, the effect of landslides would be a negligible, short-term (and long-term) adverse effect of the project.

As discussed in Section 3.11, seismically-induced landslide zones have been mapped by CGS along the slopes adjacent to the east portal of the Fort Mason Tunnel Segment. However, the geotechnical study completed for the Fort Mason Tunnel determined that these areas, rather than being composed of slope debris and ravine fill, are actually composed of artificial fills from the historical development of Fort Mason (Kleinfelder 2005). The study analyzed the stability of this area under both normal conditions and during a design basis earthquake, and concluded that the area would be stable during construction. Construction of the action alternative would not require significant cuts into these slopes. For these reasons, seismically induced landslides in or adjacent to the eastern portal of the Fort Mason Tunnel are considered a negligible, short-term adverse impact of construction for the action alternative.

Two areas of concern for slope stability include the construction of the transition segment and the south loop option of the turnaround segment. In both these areas, significant cuts into the land surface would be required to accommodate the new railway alignment. For the transition segment, a retaining wall 5 to 10 feet high would be constructed south of the streetcar alignment within an area mapped as being composed of artificial fill. For the south loop option of the turnaround segment, another retaining wall 5 to 10 feet high would be constructed east of the streetcar alignment within the dune sands of the Fort Mason park area. Both these soil units are potentially unstable due to their lack of cohesion. Without proper controls, these cuts could undermine the base of slopes, potentially removing materials that support upland soils which could slough, slump or ravel if unsupported. For these reasons, the effect of landslides could result in a moderate, short-term adverse impact for the portions of the railway alignment requiring retaining walls.

Modern engineering standards of care, the California Building Code, and CalOSHA requirements contain provisions that sufficiently address these potential hazards of construction. These include standard practices such as the following: minimizing the amount of grading required; installing adequate drainage of improved areas; bracing, underpinning, or other methods of temporary support; and slope armoring or revegetation. However, to ensure the safety and stability of upland slopes during construction, mitigation measure GEO-2 shall be implemented, which would reduce the potential for landslides to a minor, short-term adverse impact.

Impact Analysis for Operation. Operation and maintenance of the action alternative would have a negligible, long-term adverse impact on soil erosion. This is because all areas of soil exposed due to

excavation and grading during construction would be repaved, revegetated or landscaped according to the requirements of the legally-required SWPPP (described above) and the design of the action alternative, which includes landscaping. These measures would result in negligible changes to soil erosion occurring under existing conditions.

Throughout the project area there is potential for strong seismic ground shaking in the event of a regionally-significant earthquake. A peak ground acceleration of 0.59g has a 10 percent chance of occurring in the next fifty years at the site. This PGA value means that in an unlikely event, ground shaking could reach very strong levels, capable of causing considerable damage in older buildings not built to modern building codes, and also capable of inducing liquefaction in susceptible soils. Subsurface soils of the in-street segment, the transition segment and part of the turnaround segment may be prone to liquefaction as discussed in the setting (Figure 3.11-2). In these areas, there is a potential for permanent ground displacement due to the historic occurrence of liquefaction, and local geological, geotechnical and groundwater conditions. Within dune sands along the tunnel segment, however, a review of historic liquefaction effects indicated a low susceptibility to liquefaction due to deep groundwater and dense nature of dune sands (Kleinfelder 2005).

The western half of the tunnel, which was built using cut and cover methods, is within artificial fill that has not likely been properly engineered (see unit Qaf in Figure 3.11-3). Dynamic compaction of the fill materials during previous earthquakes may have contributed to a large longitudinal crack along the tunnel's crown (Kleinfelder 2005). It is estimated that a future design basis earthquake could cause as much of 8 inches of additional settlement in the artificial fills overlying the tunnel. This additional settlement could increase the vertical stresses on the tunnel walls, and would further compromise the structural stability of the tunnel.

Several laws and policies impose stringent seismic safety requirements on the design and construction of new structures. All buildings in California are subject to the standards in the California Building Code (CBC), which requires engineers to develop seismic design criteria that reflect the nature and magnitude of maximum ground motions that can be reasonably expected. These seismic design criteria allow engineers to apply appropriate building codes and design structures to withstand the effects of earthquakes. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. Standard construction practices and adherence to the provisions of the CBC or other applicable building standards would ensure that operation and maintenance of the streetcar would not substantially increase risks to the public from strong ground shaking and related effects.

Operation of the streetcar through the tunnel segment would substantially increase risks without proper repair and improvements. The condition of the tunnel is not up to modern building standards, and has serious structural flaws (see Section 3.11). A geotechnical investigation has been conducted to characterize the condition of and seismic risks to the Fort Mason Tunnel segment and its recommendations shall be implemented as described in mitigation measure GEO-3. Proper repair and stabilization of the tunnel would ensure that the risk to the public from an earthquake, and earthquake induced settlement on the western half of the tunnel would be minor.

The majority of the project alignment is on flat ground that would not be susceptible to future landslides. The geotechnical characterization of the Fort Mason Tunnel concluded that the slopes adjacent to the eastern portal would remain stable under both normal conditions and during an earthquake (Kleinfelder 2005). Proper characterization and installation of the planned retaining walls along the transition segment and the south loop option of the turnaround segment, as described in mitigation measure GEO-2, would ensure that operation and maintenance of the proposed project would not be threatened by an on or offsite landslide. For these reasons the potential impact due to landslides would be minor.

Alternative 2A: North Loop Option. Construction and operation of the North Loop Option would require minor grading, concrete removal, excavation, utility work, and installation of project improvements. The environmental impacts would be similar or the same as those discussed above. One advantage of the north loop option from a geotechnical standpoint is that it would require much less grading and excavation than the south loop option. The north loop option would not require a retaining wall and would thus have fewer slope stability concerns. Implementation of mitigation measure GEO-3 would ensure that the north wing wall of the tunnel adjacent to the north loop option be anchored with tie backs to ensure the wall remains stable during an earthquake. In addition, the north loop option would result in no net increase in impervious surfaces, as the area is already paved, thus preventing any increases in the amount of stormwater runoff received by the city's storm drain system.

Alternative 2B: South Loop Option. Construction and operation of the South Loop Option would require substantial grading, concrete removal, excavation, utility work, and installation of project improvements. The environmental impacts would be similar or the same as those discussed above. The south loop option has several disadvantages from the north loop option from a geotechnical standpoint. Installation of the South Loop Option would require grading the hillside within Fort Mason park area and installing a retaining wall. Mitigation measure GEO-2 would be needed to ensure proper installation of the retaining wall. Further, the South Loop Option would result in a net increase in the amount of impervious surfaces in the project area, because it would pave a substantial area that is currently vegetated. This could result in a minor increase in the amount of stormwater delivered to nearby storm drains.

Cumulative Impacts. Cumulative effects to geology are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The Bay Area is a seismically-active region with highly localized geological and soil conditions. Thus the cumulative context for potential impacts to people and structures related to geologic and seismic hazards tends to be site-specific.

The following projects are reasonably foreseeable structural projects: San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Maritime Heritage Learning Center, and Doyle Drive. Implementation of the Alternative 2 combined with other past, ongoing or foreseeable developments in the area could expose the public to seismic and geological hazards resulting in a minor to moderate adverse impact. However each of these projects, and planned future projects on adjacent sites, would be required to adhere to all

applicable building codes and ordinances as well as all federal, state, and local programs, requirements and policies pertaining to building safety and construction permitting. Therefore, the project's incremental contribution to any cumulative impact from exposing people or structures to geologic hazards, soils, and/or seismic conditions would not be cumulatively considerable.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a long-term, minor to moderate, adverse cumulative impact on geology in the project area.

Mitigation Measures

GEO-2: A California licensed geotechnical engineer or engineering geologist shall conduct a slope stability evaluation for all areas where retaining walls would be installed, such as the area south of the Transition Segment, and east of the south loop option of the Turnaround Segment. Prior to the final design, the geotechnical engineer or engineering geologist shall prepare recommendations applicable to structural design, earthwork, backfill and site preparation prior to or during the project design phase. The recommendations of the geotechnical engineer or engineering geologist shall be incorporated into the design and construction specifications and shall be implemented by the construction contractor. The construction manager would conduct inspections and certify that all design criteria have been met in accordance with the most recent version of the California Building Code.

GEO-3: The Fort Mason Tunnel shall be rehabilitated according to the recommendations of the geotechnical assessment performed by Kleinfelder (2005). The tunnel improvements shall include sealing existing cracks with polyurethane grout; providing drainage paths for groundwater via weep holes in the tunnel sidewalls and invert; backfilling voids behind the tunnel lining; cleaning and roughening the existing lining to ensure adequate bond; and adding new tunnel lining composed of steel-reinforced, cast-in-place concrete or "shotcrete," which shall vary from 6 to 16 inches in thickness depending on location within the tunnel. In addition, to ensure the stability of the north wing/retaining wall for the western portal during an earthquake, tie-back anchors shall be installed.

Conclusions. Generally, the action alternative would result in minor effects with respect to soil erosion and seismic or landslide events. The installation and operation of a street car, with adherence to modern building codes and the CBC, would not substantially increase risks to the public from seismic or geologic hazards. The streetcar line would be built on low grades and thus risks from landslides or slope stability are generally minor. The one exception is that the Fort Mason Tunnel would be opened and used as a public transit tunnel, thereby potentially increasing risks from structural instability. Implementation of the geotechnical recommendations contained in mitigation measure GEO-3 would repair the tunnel and ensure proper performance during an earthquake.

4.12 BIOLOGICAL RESOURCES

4.12.1 Methodology and Assumptions

The alternatives are evaluated qualitatively in terms of their effect on biological resources, including vegetation communities, wildlife, and special-status species. Potential effects on these resources are assessed based on:

- The project description and project plans.
- Recent (2010) CDFG, USFWS, and CNPS lists for special-status species with potential to occur in the study area, and a map of CDFG records in the vicinity of the Project Area.
- Two reconnaissance field surveys, conducted in the Project Area in 2006 (by URS biologist M. Newman) and 2010 (by ESA biologist D. Ostfeld), to identify vegetation and habitat types.

Vegetation. Available information on vegetation (including trees¹) was compiled and data related to vegetative communities potentially impacted at the project site was reviewed. Predictions about short- and long-term site impacts were based on previous projects with similar vegetation and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

| Impact Intensity | Impact Description |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | No effects would occur, or effects would result in no measurable or perceptible changes in plant community size, continuity, or integrity. |
| Minor: | Effects would be measurable, but localized and within a relatively small area, and the overall viability of the plant community would not be affected. These impacts can be mitigated relatively easily through avoidance/minimization measures, revegetation of the impacted area, or replacing the impacted vegetation nearby. |
| Moderate: | Effects to vegetation or a vegetation community would be measurable and perceptible over a larger area and could affect its overall amount and integrity in the study area. Impacts could be mitigated by implementation of impact avoidance/minimization measures, restoration of the vegetation community, or restoration of a previously lost or degraded vegetation community. |
| Major: | Effects would permanently, drastically alter the size or integrity of a vegetation community. Impacts to the vegetation community would not be fully mitigable. |

| Duration | |
|-------------------|---------------------------------------------------|
| Short-term | Recovers in less than three growing seasons. |
| Long-term | Takes more than three growing seasons to recover. |

¹ Although species using trees are analyzed for impact, the trees themselves are more properly considered a cultural resource and are evaluated in that section.

Wildlife. According to National Park Service *Management Policies 2006*, the restoration of native species is a high priority. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals. While Fort Mason and the San Francisco Maritime National Historic Park are not known for their biological diversity, the remaining open spaces are nevertheless an important component to these parks.

| Impact Intensity | Impact Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | No measureable or perceptible changes would occur to the amount, distribution, connectivity, or integrity of wildlife habitat or populations. |
| Minor: | Impacts may affect wildlife habitat, but impacts would be relatively small in scale. Impacts to wildlife such as temporary disturbance or the loss of an individual of a common species would be detectable, but these disturbances would not be expected to be outside the natural range of variability of species' populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful. |
| Moderate: | Effects to wildlife habitat would be measurable and perceptible over a larger area and could affect its overall amount, integrity, and connectivity in the study area. Habitat changes and disturbance and loss of individuals could affect the overall size of wildlife populations, but reductions in population size would not threaten the continued existence of a species' local population. Impacts could be mitigated by implementation of impact avoidance/minimization measures, restoration of the vegetation community or habitat, restoration of previously lost or degraded wildlife habitat, or creation of new wildlife habitat. |
| Major: | Effects would permanently, drastically alter the amount, integrity, or connectivity of wildlife habitat. Changes in the size and integrity of a wildlife population could threaten the continued existence of a species' local population. Impacts to the wildlife habitat and associated populations could not be mitigated. |

| Duration | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------|
| Short-term | Habitat or wildlife species population is temporarily disturbed, such as during a portion of the construction activities. |
| Long-term | Habitat or wildlife species population takes more than one year to recover, if they recover at all. |

Special-status Species. The Endangered Species Act (16 USC 1531 et seq.) mandates that federal agencies must consider the potential effects of their actions on species listed as threatened or endangered. If the National Park Service determines that an action may adversely affect a federally listed species, consultation with the U.S. Fish and Wildlife Service is required to ensure that the action would not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. National Park Service *Management Policies 2006* state that potential effects of agency actions will also be considered on state or locally listed species. The National Park Service is required to control access to critical habitat of such species, and to perpetuate the natural distribution and abundance of these species and the ecosystems upon which they depend. Information on possible threatened, endangered, candidate species and species of special concern was gathered

from the National Park Service and U.S. Fish and Wildlife Service. The thresholds of change for the intensity of an impact are defined as follows:

| Impact Intensity | Impact Description |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | No measureable or perceptible changes would occur to the amount, distribution, connectivity, or integrity of special-status wildlife habitat or populations. |
| Minor: | Impacts may affect some individual plants and a portion of the vegetation community as a whole, but impacts would be relatively small in scale. Impacts to special-status wildlife would be detectable, but they would not be expected to be outside the natural range of variability of species' populations, their habitats, or the natural processes sustaining them. No loss of special-status species individuals would be expected to occur. Mitigation measures, if needed to offset adverse effects, would be simple and successful. |
| Moderate: | Effects to habitat for special-status wildlife would be measurable and perceptible over a larger area and could affect its overall amount, integrity, and connectivity in the study area. Habitat changes and disturbance and loss of individuals could affect the overall size of wildlife populations, but reductions in population size would not threaten the continued existence of a species' local population. Impacts could be mitigated by implementation of impact avoidance/minimization measures, restoration of the habitat, restoration of previously lost or degraded habitat, or creation of new wildlife habitat. |
| Major: | Effects would permanently, drastically alter the amount, integrity, or connectivity of habitat for special-status species. Changes in the size and integrity of a wildlife population could threaten the continued existence of a species' local population. Impacts to the wildlife habitat and associated populations could not be mitigated. |

| Duration | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------|
| Short-term | Habitat or wildlife species population is temporarily disturbed, such as during a portion of the construction activities. |
| Long-term | Habitat or wildlife species population is permanently disturbed or lost. |

The historic streetcar alignment alternatives are described in Chapter 2, and include: (1) Alternative 1 – No Action; and (2) Alternative 2 – Action Alternative, including the north loop option and south loop option. The potential biological impacts under each of these alternatives are described below.

4.12.2 Impacts of Alternative 1—No-Action Alternative

Vegetation. There would be no tree or vegetation removal under the Alternative 1; therefore there would be negligible or no impact.

Wildlife. There would be no impacts to wildlife under Alternative 1.

Special-status Species. There would be no impacts to special-status species under Alternative 1.

Cumulative Impacts. Alternative 1 would have no direct or indirect impacts on biological resources. As a result, there would be no cumulative impacts under this alternative.

Conclusions. The No Action alternative would result in no measurable change to vegetation, wildlife, or special-status species.

4.12.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Alternative 2A: North Loop Option

Vegetation. As part of the North Loop option, approximately 400 linear feet of new track and two platforms would replace existing cultivated vegetation (non-native grasses and between 1 and 5 trees) on the east side of the Fort Mason tunnel. If it is determined that the bocce court is to be relocated, then it would be relocated in an area that is predominantly paved. These areas are largely maintained as an urban park, with special attention given to preserving the historic character of these areas.

Additional vegetation could be temporarily disturbed through potential access roads and staging areas, although none have been identified at this time. If these areas are not revegetated, then they can be taken over by exotic and weedy species such as French broom and pampas grass.

None of the vegetation that would be impacted from project construction is native, and any cultural significance that this vegetation might have for Fort Mason and the San Francisco Maritime National Historic Park is addressed in Section 4.8 Cultural Resources.

The overall biological impact of removing non-native grasses and trees would be long-term, minor, and beneficial because this vegetation is not native. Operation of the proposed streetcar would not result in any greater significant loss to this vegetation.

Wildlife. Most of the streetcar alignment would be constructed in a paved street, which provides little existing habitat for wildlife. However, urban wildlife species such as raccoons, skunks, Brewer's blackbirds, and song sparrows may forage or travel through the area. In addition, squirrels and birds may nest or forage in undeveloped portions of the study area such as in the Great Meadow, near the bocce ball court, and in Victorian Park. The construction of the streetcar alignment could result in short-term, minor, adverse effects to common wildlife if increased noise causes wildlife to travel and forage elsewhere. Alternatively, earthwork and disturbance to groundcover may expose seeds, insects, and mammals (e.g., Botta's pocket gopher) which could also result in short-term, minor, beneficial effects to nearby wildlife.

Streetcar operations are unlikely to adversely affect wildlife in the area. However there is a small chance that the streetcar operations would result in injury/mortality of wildlife (e.g., raccoons, opossums, and birds) that are hit by moving streetcars. Impacts as a result of the project compared to existing conditions would be negligible.

Special-status Species. Special-status bats such as the Townsend's big-eared bat could roost within the Fort Mason tunnel. Special-status bats such as the hoary bat and western red bat could also roost individually in eucalyptus or cottonwood trees in the project area. However, special-status bats are unlikely to occur because there is limited foraging habitat in the study area and a limited number of trees in the project area for habitat. Furthermore, no bats have been identified roosting in the study

area, and there is no sign of active bat roosts (e.g., guano, or urine staining) in the tunnel or trees proposed for removal.

Proposed reconstruction of the Fort Mason Tunnel interior and renewed operations of streetcars in the tunnel could result in temporary or permanent displacement of bats within the tunnel, and thus have short-term or long-term moderately adverse affects on special-status bats, if present. Alternatively, reconstruction of the tunnel interior could result in long-term, moderately beneficial impacts on special-status bats, if the tunnel modifications include measures such as reduced air-flow through the tunnel or creation of small crevices in the tunnel for crevice-roosting bats. Streetcar operations could result in long-term, moderate, adverse affects on special-status roosting bats in the Fort Mason tunnel, if bats are currently present in the tunnel but streetcar operations in the tunnel make it unsuitable for roosting.

Special-status birds could nest in trees or buildings within or near the historic streetcar alignment. If present, it is assumed that these birds are fairly tolerant to noise disturbance, given the urban nature of the project site, with high visitor use and large roads nearby (e.g., Laguna Street, Van Ness Avenue, Beach Street, and Jefferson Street). Nevertheless, loud construction noise could stress nearby nesting birds and result in nest failure or abandonment, or the bird's nesting habitat (e.g., shrubs or trees) could be removed as part of ground clearance for the project. Thus, proposed project construction could result in short-term, moderately adverse impacts on nesting birds during construction. Black-crowned Night-herons, whose rookeries are mentioned as a resource in the California Special Animals List, regularly roost in trees at the foot of Van Ness in the project area. This long-term roosting site would likely be disturbed by the project. However, there are other sites available nearby for roosting and nesting populations would not be affected.

Operation of the streetcar would likely result in negligible impacts on special-status birds in the study area.

Alternative 2B: South Loop Option

Vegetation. As part of the South Loop option, approximately 400 linear feet of new tracks and two platforms would replace existing cultivated vegetation (non-native grasses and trees) on the east side of the Fort Mason tunnel. The bocce court would be relocated in an area that is predominantly paved, but that also contains a small amount of cultivated vegetation, including non-native palm trees. In addition, construction of the South Loop, a retaining wall, and a platform would result in the loss of trees and landscaped grassland at the west end of the Great Meadow. These areas are maintained as an urban park, with special attention given to preserving the historic character but not their natural habitat.

Additional vegetation could be temporarily disturbed through potential access roads and staging areas, although none have been identified at this time. If disturbed areas are not revegetated, then they can be taken over by exotic and weedy species such as French broom and pampas grass.

None of the vegetation that would be impacted by project construction is native vegetation, and any cultural significance that this vegetation might have for Fort Mason and the San Francisco Maritime National Historic Park is addressed in Section 4.8 Cultural Resources.

The overall biological impact of removing non-native grasses and trees would be long-term, minor, and beneficial because although the vegetation cover would be lost, this vegetation is not native.

Operation of the proposed streetcar would not result in any greater significant loss to this vegetation.

Wildlife. Most of the streetcar alignment would be in a paved street, which provides little habitat for wildlife. However, urban wildlife species may forage and travel through the area, such as striped skunk (*Mephitis mephitis*), Brewer's blackbird (*Euphagus cyanocephalus*), and song sparrow (*Melospiza melodia*). In addition, squirrels and birds may nest/forage in undeveloped portions of the study area such as in the Great Meadow, near the bocce ball court, and in Victorian Park. The construction of the streetcar alignment could result in short-term, minor, adverse effects to common wildlife if increased noise causes wildlife to travel and forage elsewhere. Alternatively, digging up groundcover and exposing seeds, insects, and mammals (e.g., Botta's pocket gopher [*Thomomys bottae*]), could also result in short-term, minor, beneficial effects to nearby wildlife.

While there is a small chance that common wildlife (e.g., raccoons, opossums, and birds) could be injured or killed from moving streetcars, the overall project impacts compared to existing conditions would be negligible.

Special-status Species. Special-status bats such as the Townsend's big-eared bat could roost within the Fort Mason tunnel. Special-status bats such as the hoary bat and western red bat could roost individually in eucalyptus trees or cottonwood in the project area. However, special-status bats are unlikely to occur because there is limited foraging habitat in the study area and a limited number of trees in the project area. Furthermore, no bats have been identified roosting in the study area, and there is no sign of bat roosts (e.g., guano, or urine staining) in the tunnel or trees that are proposed for removal.

Proposed reconstruction of the Fort Mason Tunnel interior and renewed operations of streetcars in the tunnel could result in temporary or permanent displacement of bats in the tunnel, and thus have short-term or long-term moderately adverse affects on special-status bats, if present. Alternatively, reconstruction of the tunnel interior could result in long-term, moderately beneficial impacts on special-status bats, if the tunnel modifications include measures such as reduced air-flow through the tunnel or creation of small crevices in the tunnel for crevice-roosting bats. The removal of trees during construction could also have short-term, minor, adverse effects on bats.

Streetcar operations could result in long-term, moderate, adverse affects on special-status roosting bats in the Fort Mason tunnel, if bats are currently present in the tunnel but streetcar operations in the tunnel make it unsuitable for roosting.

Special-status birds could nest in trees or buildings within or near the historic streetcar alignment. If present, it is assumed that these birds are fairly tolerant to noise disturbance, given the urban nature of the project site, with high visitor use and large roads nearby (e.g., Laguna Street, Van Ness Avenue, Beach Street, and Jefferson Street). Nevertheless, loud construction noise could stress nearby nesting birds and result in nest failure or abandonment, or the bird's nesting habitat (e.g., shrubs or trees) could be removed as part of ground clearance for the project. Thus, proposed project construction could result in short-term, moderately adverse impacts on nesting birds during construction. Black-

crowned night-herons, whose rookeries are mentioned as a resource in the California Special Animals List, regularly roost in trees at the foot of Van Ness Avenue in the project area. This long-term roosting site would likely be disturbed by the project. However, there are other sites available nearby for roosting and nesting populations would not be affected. Operation of the streetcar would likely result in negligible impacts on special-status birds in the study area.

Cumulative Impacts. Cumulative effects to biological resources are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. Past actions in the study area have resulted in the almost complete removal of vegetation native to California (except for native vegetation at Black Point, and perhaps a few other small pockets of native vegetation), the alteration of the Bay coastline, and the removal of suitable habitat for special-status species. Present and future actions include transportation systems improvements (e.g., present actions include the Third Street Light Rail Project, and the Presidio Transit Program; and future actions include the Van Ness Bus Rapid Transit, the E-Embarcadero Historic Streetcar Line, and the Doyle Drive Replacement Project) and some restoration of historic buildings and piers as well as site improvements to Fort Mason for safety and accessibility. These present and future projects would have negligible to minor adverse impacts on biological resources in the area, as they would predominantly impact already developed streets and buildings. Because this alternative would have a relatively small impact on any remaining biological resources in the project area, there would be an overall long-term negligible impact on biological resources when Alternative 2 is cumulatively combined with other past, present, and future projects in the area.

Mitigation Measures

Vegetation. No mitigation would be needed for impacts to cultivated vegetation (grass and non-native trees), because cultivated vegetation is common locally and regionally, is not protected by state or federal law, and impacts are expected to be minor. Any adverse effects potentially resulting from the introduction and spread of invasive weeds throughout the study area as a result of construction would be minor, and federal agencies are mandated by Executive Order 13112 (“Invasive Species”) and other federal laws to prevent the spread of invasive species, so no additional mitigation would be needed.

Wildlife. The following measures to avoid and minimize potential effects to nesting birds shall be implemented as mitigation for project impacts.

BIO-1: Preconstruction Nesting Bird Surveys. Tree removal shall occur outside of the nesting bird season (January 15 through August 15) to the greatest extent possible. If not possible, then a qualified biologist shall conduct nesting bird surveys in the trees to be removed and surrounding 300 feet. If nesting raptors or other native nesting birds are detected, then a qualified biologist shall delineate a suitable no-disturbance buffer, and construction activities shall avoid this buffer until the young birds have fledged or active nests have been abandoned.

BIO-2: Preconstruction Roosting Bat Surveys. A qualified bat biologist shall survey the Fort Mason Tunnel itself and any trees proposed for removal, prior to reconstruction of the tunnel and tree removal activities. If it is determined that the tunnel or trees provide roosting habitat for special-status bats, then a qualified bat biologist shall develop measures to avoid and minimize adverse effects to the bats to the greatest extent feasible. Such measures may include seasonal avoidance of a bat roost, and/or including bat-friendly habitat characteristics into the tunnel

reconstruction design (e.g., crevices for crevice-roosting bats, or open spaces for Townsend's big-eared bats to cluster).

Conclusions. After implementation of the mitigation measures BIO-1 and BIO-2, construction and operation impacts would have negligible impacts on biological resources, and the overall vegetation and wildlife habitat in the study area would remain the same. Overall long-term cumulative impacts on biological resources would be negligible to minor adverse.

4.13 PUBLIC HEALTH AND SAFETY

4.13.1 Methodology and Assumptions

This section discusses the potential for construction and operation of the proposed streetcar line to affect public health and safety and evaluates to what degree, and for what duration, these projected changes would occur. Because the construction of the proposed streetcar alternatives would require grading and possible soil excavation, this analysis addresses the potential to encounter hazardous materials in the subsurface. Database searches conducted using information from California Department of Toxic Substances Control, California Water Resources Control Board, and Environmental Data Resources (EDR) were used to identify potential hazardous materials sites within a mile radius of the Project alignment. The sites were then evaluated, based on the nature of the hazard and distance from the Project alignment, to assess whether soil and groundwater contamination could be encountered during Project construction or operation. In addition, the potential hazards to the public and the environment were assessed based on proposed construction and operating activities. Potential risk to public health and safety resulting from geologic and seismic hazards are discussed in Section 4.11, Geology, Soils and Seismicity.

The following issues were considered in the analysis of impacts related to public health and safety for each alternative:

- Transport, use or disposal of hazardous materials;
- Reasonably foreseeable upset and accident involving the release of hazardous materials into the environment;
- Emission or release of hazardous materials in proximity to sensitive receptors; or
- Location on or near a hazardous materials site as listed by Federal or State regulatory agencies.

The following thresholds are used in determining the significance of impacts with respect to each of the above issues:

| Impact Intensity | Impact Description |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | Alternative would result in no discernable changes in level of public health and safety. |
| Minor: | Alternative would result in changes in the conditions of public health and safety, although the changes would be slight. The public may or may not be aware of the effects associated with the alternative. This may include release or clean-up of small quantities of hazardous materials. It may also include slightly increased or decreased exposure of the public to existing hazards. |
| Moderate: | Alternative would result in distinct changes in the health and safety of the public. Changes would be readily apparent. The impacts could have an appreciable health and safety effect. This may include releases or clean-up of moderate quantities of hazardous materials. It may also include noticeably heightened or diminished risk of exposure to existing hazards. |
| Major: | Alternative would result in substantial changes in the conditions of public health and safety. Impact would be apparent and could have a severe health and safety impact. This may include releases or remediation of large quantities of hazardous materials. It may also include substantially increased or decreased exposure to existing hazards. |

4.13.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. Under Alternative 1, the conditions of public health and safety in the project area would be similar to current conditions. This Alternative does not propose any construction activity or changes to the existing street car alignment. There would be no transport, use or disposal of hazardous materials for construction or operation. In addition, there would not be any grading or excavation that could foreseeably result in the release of hazardous materials that may be present in the subsurface. While there are several hazardous materials sites listed by regulatory databases in the project area, the No-Action Alternative would not affect on-going investigations and cleanups at these sites or cause exposure to hazardous materials. The deteriorated condition of the Fort Mason Tunnel poses a public safety concern under this Alternative. These concerns are analyzed in Section 4.11 Geology, Soils and Seismicity.

Cumulative Impacts. No additional cumulative impacts would occur under Alternative 1.

Conclusions. Alternative 1 would not result in any direct or indirect impacts.

4.13.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Hazardous Materials Sites. Project construction activities may involve grading and excavation to install streetcar tracks and turnaround. If hazardous materials were present in excavated soil or groundwater, construction workers and the public could be exposed to hazardous materials or a release to the environment could occur. The greatest potential for encountering contaminated soil and groundwater during Project construction would be in areas where past or current land uses on or near the Project alignment may have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials. Properties with known soil and/or groundwater contamination are referred to as “environmental cases.” As discussed in Section 3.13, a regulatory database review was performed to identify environmental cases in the Project area with the potential to affect soil or groundwater conditions along the Project alignment. There are eleven identified environmental cases along the proposed Project alignment (see Table 3.13-2) and seven environmental cases within approximately one quarter-mile of the Project alignment (see Table 3.13-3). Most of these cases are considered to have a low potential to affect subsurface conditions along the Project alignment based on the status of the environmental case or its proximity to the alignment. Only those environmental cases considered to present a moderate or high potential of creating subsurface contamination at the Project site are discussed below.

The Gashouse Cove facility is considered to have a moderate potential to affect site conditions because of a leaking underground storage tank (LUST) that is still under investigation. Two environmental cases within the Fort Mason area itself are considered to have a high potential for release of hazardous materials into the subsurface. These cases are known as U.S. Department of Interior Golden Gate National Recreation Area and the former Fort Mason military site. Further information regarding cleanup investigations at Fort Mason is discussed below specifically for the North Loop and South Loop areas.

Storage, Use and Transport of Hazardous Materials. Construction and operation of the Project could involve storage, use and transportation of hazardous materials. Construction activities would require the use of certain hazardous materials such as fuels, oils, solvents, and glues. Accidental release of hazardous materials used could degrade soil and groundwater quality, surface water quality in downstream water bodies, or expose construction workers and the public to the harmful effects of these materials.

Sensitive Receptors. Sensitive receptors include schools, hospitals, daycares and nursing homes as these populations are considered to be more sensitive to hazardous materials exposure. There are no hospitals located within a quarter mile of the Project site. One nursing home, The Heritage, is located within a quarter mile of the Project site at 3400 Laguna Street. One preschool, Marina Children's Center, is located at 3219 Laguna Street. There are four schools located approximately a quarter mile from the Project site. These schools include the following: Francisco Middle School, 2190 Powell Street; Marina Middle School, 3500 Fillmore Street; Galileo Academy, 1150 Francisco Street, and Hergl School; 1570 Greenwich Street.

Alternative 2A: North Loop Option. As discussed above, hazardous materials could be encountered in soil and groundwater along the Project alignment during construction of Alternative 2. If these hazardous materials are not properly handled and disposed, a risk to human and environmental health may result. As shown in Table 3.13-2, there are three potential areas of contamination in the vicinity of the North Loop Option, according to the U.S. Army Corps of Engineers' Final Site Investigation Work Plan for Fort Mason (USACE 2009). These areas of concern include: four diesel tanks (D-10 through D-13); a gas station, and a transformer vault. Because this site investigation has not yet been conducted, the potential presence of contamination at these locations of concern is currently unknown. The results of this investigation should be reviewed prior to construction in order to further evaluate hazardous materials concerns. Exposure to or release of hazardous materials in soil and groundwater during construction would be a moderate, short-term adverse impact. Implementation of mitigation measures HEA-1 through HEA-3, would reduce this effect by requiring a pre-construction hazardous materials assessment to evaluate the presence and extent of contamination; a soil and groundwater management plan in the event hazardous materials are encountered; and a Project-specific Health and Safety Plan to ensure worker safety when handling hazardous materials.

Construction of the North Loop Option would involve storage, use and transportation of hazardous materials such as fuels, oils, solvents, and glues. Potential impacts associated with the use and potential inadvertent releases of hazardous materials used for construction activities would be considered a moderate, short-term, adverse impact. This impact would be reduced to less than significant with implementation of mitigation measure HEA-2 and HEA-3, which require that the project sponsor develop a site specific health and safety plan as well as implement Best Management Practices (BMPs) for the use, storage, and disposal of hazardous materials and petroleum products.

The North Loop Option is located just over a quarter mile from several sensitive receptors. As discussed above, Project construction could result in inadvertent spills of hazardous materials. Release of small quantities of hazardous materials during construction would not result in an emission with the potential to result in harmful exposures to individuals at nearby sensitive receptors. Standard construction BMPs, as well as those required under mitigation measure HEA-2, include measures for the safe handling and

storage of hazardous materials to prevent a release as well as methods to contain any such release if it should occur. This would be considered a minor, short-term, adverse impact.

Operation of the North Loop Option would not result in exposures to hazardous materials potentially present in the subsurface. All streetcar maintenance would occur at the Muni yard, not along the alignment. Because the Project would not require the transport, use and disposal of hazardous materials, there would be no increased risk of accidental release of hazardous materials into the environment or near sensitive receptors.

Alternative 2B: South Loop Option. As shown in Table 3.13-2, there are three potential areas of contamination in the vicinity of the proposed South Loop Option, according to the U.S. Army Corps of Engineers' Final Site Investigation Work Plan for Fort Mason. These areas of concern include: a transformer vault; the PX Service Station; and the Boiler House. Because this site investigation has not yet been conducted, the potential presence of contamination at these locations of concern is currently unknown. The results of this investigation should be reviewed prior to construction in order to evaluate hazardous materials concerns. Exposure to or release of hazardous materials in soil and groundwater during construction would be a moderate, short-term adverse impact. Implementation of mitigation measures HEA-1 through HEA-3, would reduce this effect by requiring a pre-construction hazardous materials assessment to evaluate the presence and extent of contamination; a soil and groundwater management plan in the event hazardous materials are encountered; and a project-specific Health and Safety Plan to ensure worker safety when handling hazardous materials.

As above, construction of the South Loop Option would involve storage, use and transportation of hazardous materials such as fuels, oils, solvents, and glues. Potential impacts associated with the use and potential inadvertent releases of hazardous materials used for construction activities would be considered a moderate, short-term, adverse impact. This impact would be reduced to less than significant with implementation of mitigation measures HEA-2 and HEA-3, which require that the project sponsor develop a site specific health and safety plan as well as implement Best Management Practices (BMPs) for the use, storage, and disposal of hazardous materials and petroleum products and other fuels and chemicals.

The South Loop Option is also located just over a quarter mile from several sensitive receptors. As discussed above, Project construction could result in inadvertent spills of hazardous materials. Release of small quantities of hazardous materials during construction would not result in an emission with the potential to result in harmful exposures to individuals at nearby sensitive receptors. Standard construction BMPs include measures for the safe handling and storage of hazardous materials to prevent a release and well as methods to contain any such release if it should occur. This would be considered a minor, short-term, adverse impact.

Operation of the North Loop Option would not result in exposures to hazardous materials potentially present in the subsurface. In addition, it would not require the transport, use and disposal of hazardous materials so there would be no increased risk of accidental release of hazardous materials into the environment or near sensitive receptors.

Cumulative Impacts. Cumulative effects to public health and safety are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this

alternative. The projects identified include only those projects that could affect exposure to hazardous materials and public health and safety within the project area.

Past, present, and reasonably foreseeable projects that could have a long-term beneficial effect on public health and safety include the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fort Mason Cultural Landscape, Fort Mason Sidewalk Replacement, Fort Mason Hazard Tree Replacement, upper Fort Mason Entry at Bay and Franklin Streets, Removal of Accessibility Barriers in upper Fort Mason. The beneficial impacts would result from improving safety and accessibility of features within the project study area. Therefore, the above-cited projects would result in a long-term, minor to moderate, beneficial impact to public health and safety within the project area.

Construction of some of the reasonably foreseeable projects, such as the San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Pier 2 shed restoration, Maritime Heritage Learning Center, and Doyle Drive are for the most part improvements to existing facilities in the long-term but could result in short-term adverse impacts to public health and safety during construction. The foreseeable development within the area, although likely increasing the potential to disturb existing contamination and the handling of hazardous materials, would be required to comply with the same regulatory framework as the Project. This includes federal and state regulatory requirements for transporting (Cal EPA and Caltrans) hazardous materials or cargo (including fuel and other materials used in all motor vehicles) on public roads or disposing of hazardous materials.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a local, short-term, minor, adverse cumulative impact on public health and safety in the project area.

Mitigation Measures

HEA-1: Pre-Construction Hazardous Materials Assessment. Within six months prior to construction, NPS shall retain a qualified environmental professional to conduct a regulatory agency database review to identify environmental cases along the Project alignment and a review of appropriate standard information sources to determine the potential for soil or groundwater contamination to occur at the sites. Follow-up sampling would be conducted as necessary to characterize soil and groundwater quality prior to construction and, if needed, site investigations or remedial activities would be performed in accordance with applicable laws. The environmental professional shall prepare a report that includes the following: activities performed for the assessment; summary of anticipated contaminants and contaminant concentrations at the Project site; or interfere with ongoing site remediation; and recommendations for appropriate handling of any contaminated materials during construction. The contractor shall also prepare a contingency plan identifying measures to be taken should unanticipated contamination be identified during construction.

HEA-2: Soil and Groundwater Management Plan. For all locations requiring soil disturbance where the pre-construction hazardous materials assessment (HEA-1) indicates the potential to encounter hazardous materials in the soil, the contractor shall prepare a soil and groundwater management plan that specifies the method for handling and disposal of contaminated soil and groundwater prior to

construction. The plan shall identify the disposal method for soil and the approved disposal site, and include written documentation that the disposal site will accept the waste. Contract specifications shall mandate full compliance with all applicable local, state, and federal regulations related to the identification, transportation and disposal of hazardous materials, including those encountered in excavated soil. The contractor shall provide the NPS with copies of hazardous waste manifests documenting that disposal of all hazardous materials has been performed in accordance with the law.

In addition, a water management plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff water used for dust control, stormwater runoff, and any other fluids generated during construction. Consistent with the requirements of the SWRCB construction general permit for Storm Water Discharges Associated with Construction Activity, Project construction activities in San Francisco County shall be undertaken in accordance with a project-specific Storm Water Pollution Prevention Plan (SWPPP). The San Francisco Bay RWQCB, the primary agency responsible for protecting water quality within the Project area, would be responsible for reviewing and ensuring compliance with the SWPPP. This review is based on the construction general permit issued by the SWRCB.

The recommended BMPs, subject to the review and approval of the RWQCB, shall include the following measures. However, the measures themselves may be altered, supplemented or deleted during the RWQCB review process, since the RWQCB has final authority over the terms of the SWPPP.

- Store all hazardous materials in an area protected from rainfall and stormwater run-on and prevent the offsite discharge of leaks or spills.
- Prohibit on-site fueling of vehicles and construction equipment.
- Install coir rolls or other suitable measures to prevent sediment and potential contaminants from entering storm drain inlets.
- Minimize the potential for contamination of San Francisco Bay waters by maintaining spill containment and clean up equipment onsite, and by properly labeling and disposing of hazardous wastes.
- Locate waste collection areas close to construction entrances and away from roadways and storm drains.
- Inspect dumpsters and other waste and debris containers regularly for leaks and remove and properly dispose of any hazardous materials and liquid wastes placed in these containers.
- Train construction personnel in proper material delivery, handling, storage, cleanup, and disposal procedures.

HEA-3: Health and Safety Plan (HSP). The Project applicant shall prepare a project-specific Health and Safety Plan (HSP) in accordance with 29 CFR 1910 to protect construction workers and the public during all excavation, grading, and construction services. The HSP shall identify the following, but not be limited to:

- A summary of all potential risks to construction workers and maximum exposure limits for all known and reasonably foreseeable site chemicals present in soil, groundwater or surface water;
- Specified personal protective equipment and decontamination procedures, if needed;
- Safety procedures to be followed in the event suspected hazardous materials are encountered;
- Emergency procedures, including route to the nearest hospital; and
- The identification of a site health and safety officer and responsibilities of the site health and safety officer.

Conclusions. Alternative 2 would result in a short-term, minor, adverse impact because construction activities could expose the public to hazardous materials. However, this exposure would be minimal after implementation of the proposed mitigation measures and would be limited to the construction period.

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4.14 PUBLIC SERVICES AND UTILITIES

4.14.1 Methodology and Assumptions

Public services and utilities, for the purpose of this analysis, refers to the elements of infrastructure and services needed to support operation of the proposed historic streetcar extension.

The potential for change in public services and utilities proposed by the alternatives was evaluated by identifying projected changes in the ability of public service providers and utilities to adequately serve visitors and NPS employees of the San Francisco Maritime NHP and Fort Mason. The degree and duration of projected changes to public services and utilities was also evaluated.

The following thresholds were used in determining the significance of impacts to public services or utilities:

| Impact Intensity | Impact Description |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible: | No effects on public services or utilities would occur, or the effects would be below or at low levels of detection. |
| Minor: | The effects on public services or utilities would be small but detectable, in a manner that would be noticeable to NPS staff and the public. In the case of adverse impacts, the Project would affect utilities or public services, but would not result in substantial degradation of service. |
| Moderate: | The effects on public services and utilities would be readily apparent. Substantial adverse or beneficial changes would be noticeable to NPS staff and the public. In the case of adverse impacts, the Project would result in short interruptions of utility services or substantial degradation in provision of public services such as fire protection response times. |
| Major: | The effects on public services or utilities would be readily apparent. Substantial adverse or beneficial changes would be noticeable to NPS staff and the public. In the case of adverse impacts, the Project would result in prolonged interruptions of utility services or inability to provide public services such as fire protection. |

4.14.2 Impacts of Alternative 1—No-Action Alternative

Impact Analysis. The No Action Alternative would result in continued operation of the F-Line Streetcar service to its existing terminal at Jones Street. No construction of the proposed extension to Fort Mason would occur. This alternative would not attract additional visitors to the study area. Therefore, the demand for public services or utilities would remain unchanged. Police and fire protection services would continue to be provided to the study area and utilities would continue to meet demand generated by visitors and employees within the study area.

Cumulative Impacts. Alternative 1 would have no direct or indirect impacts on public services and utilities. As a result, there would be no cumulative impacts under this alternative.

Conclusions. There would be no impact to public services or utilities under this alternative.

4.14.3 Impacts of Alternative 2—Action Alternative (with Turnaround Options)

Impact Analysis. This alternative would result in the construction of new streetcar tracks along the following public streets: Jefferson, Leavenworth, and Beach. Construction of the proposed lines is anticipated to require the removal and/or replacement of existing utility lines within the public right-of-way along these streets as well as within the San Francisco Maritime NHP and Fort Mason. A critical utility in the study area is the Auxiliary Water Supply Source (AWSS) 20-inch line located within the street bed of Van Ness Avenue. The AWSS line would be cased for protection during the construction of the streetcar tracks as well as during operation.

Construction of the tracks along each block segment, between the existing terminal at Jones Street and the tunnel under Fort Mason, is anticipated to be 3 weeks on each side of the road, for a total of 6 weeks per block. Advance utility work prior to this construction is anticipated to be 4 weeks/side/block for a total of 8 weeks per block.

Any relocation or removal of utility lines, such as water, wastewater, gas, electricity, etc., would potentially result in the temporary disruption of service to visitors and employees of the San Francisco Maritime NHP and Fort Mason, and potentially to nearby residents and businesses. This would be considered a moderate adverse impact. Implementation of the mitigation measure discussed below would reduce the impact to minor and adverse.

Temporary minor adverse impacts would potentially result if construction activities such as lane closures, movement of construction equipment, or rerouting of public streets, cause an increase in vehicle, bicycle, or pedestrian accidents requiring response by emergency response providers. The ability of public safety providers to access areas affected by potential incidents would not be significantly constrained, either during construction or operation of the Proposed Action. It is also possible that personal safety could be at greater risk during construction activities because of the movement of large construction equipment and other construction activities. However, best management practices would be followed during construction and would minimize possible risks to personal safety.

Proposed improvements to the Fort Mason Tunnel could potentially subject construction workers to a greater risk of accident or injury due to its unique, confined construction work area. Operation of the F-Line through the tunnel would similarly impact visitors and operators of the streetcar line in the event of an accident in the tunnel. However, tunnel improvements would include ventilation systems, signals, lighting, and other safety system devices. Additional capacity would be built into the system to control the number of streetcars allowed west of the tunnel's eastern portal in order to ensure that more streetcars did not proceed west through the tunnel than could be handled by the proposed Fort Mason terminal. In addition, the SFMTA Muni currently operates streetcar lines through several existing tunnels in San Francisco; therefore, local emergency service providers would be adequately prepared for potential accidents and/or rescue operations within the tunnel.

Pacific Gas & Electric would provide traction power for SFMTA. The San Francisco Public Utilities Commission would provide power for streetlights for the operation of the historic streetcar.

Alternative 2A: North Loop Option. This option for the Fort Mason terminal would require reconfiguration of the existing parking lot at Fort Mason. Temporary minor adverse impacts would potentially result if construction activities within the parking lot cause an increase in accidents involving access to Fort Mason by vehicles, bicycles, or pedestrians. However, the ability of public safety providers to access the parking area would not be significantly constrained.

The proposed Fort Mason terminal location in the existing parking lot could also result in minor adverse impacts during operation of the F-Line due to an increase in accidents involving streetcars and/or other vehicles, bicycles, and pedestrians. Access to this area by emergency responders would not be significantly constrained by this configuration.

Alternative 2B: South Loop Option. Construction of the Fort Mason terminal in the Great Meadow would not require reconfiguration of the parking lot, thereby avoiding potential accidents involving access to the parking lot during the construction period. Partial lane closures of Laguna Street may be necessary to construct the new line and platform that is proposed adjacent to this street. The ability of safety providers to access the parking lot or the Great Meadow would not be significantly constrained.

The proposed Great Meadow location for the Fort Mason terminal would avoid potential accidents between streetcars and vehicles; incidents involving bicyclists and/or pedestrians with streetcars would remain a possibility, but access by emergency responders would not be significantly diminished.

Cumulative Impacts. Cumulative effects to public services and utilities are based on analysis of past, present, and reasonably foreseeable future actions, in combination with potential effects of this alternative. The projects identified include only those projects that could affect public services and utilities within the project area.

Past, present, and reasonably foreseeable projects in the project study area include: Fort Mason Sidewalk Replacement, Fort Mason Hazard Tree Replacement, upper Fort Mason Entry at Bay and Franklin Streets, Removal of Accessibility Barriers in upper Fort Mason, San Francisco Marina Renovation Project, 721 Beach Street Development, Aquatic Park Bathhouse Exhibit Plan and Installation, Fisherman's Wharf Public Realm Plan, San Francisco Maritime NHP, Municipal Pier Rehabilitation Project, Pier 2 shed restoration, Maritime Heritage Learning Center, and Doyle Drive. These projects are for the most part improvements to existing facilities in the long-term but could result in short-term adverse impacts to public services and utilities during construction.

The impacts of Alternative 2, when combined with the impacts of the cumulative projects described above, would have a local, short-term, minor, adverse cumulative impact on public services and utilities in the project area. The local, short-term, minor effect on public services and utilities would result from construction activities.

Mitigation Measures

PUB-1: Maintain Utility Services. A detailed study identifying locations of utilities within the study area shall be conducted during the design phase of the Proposed Action. For areas with the potential for adverse impacts to utility services, the NPS or its contractors shall implement the following mitigation measures:

ENVIRONMENTAL CONSEQUENCES

- Utility excavation or encroachment permits shall be required from the appropriate agencies. The permits include measures to minimize utility disruption. The NPS and its contractors shall comply with permit conditions. Such conditions shall be included in construction contract specifications.
- Utility locations shall be verified through a field survey (potholing) and use of the Underground Service Alert services.
- Detailed specifications shall 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 shall be notified of NPS's construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services.
- Residents and businesses in the Project area shall be notified of planned utility service disruption in advance, in conformance with City and State standards.
- Disconnected cables and lines shall be reconnected promptly.
- Stormwater management controls shall be implemented to mitigate additional runoff in the South Loop (Alternative 2B) if it is selected, and in the Transition Segment to maintain a no net increase in runoff rate and volume in conformance with the San Francisco Stormwater Design Guidelines.

Conclusions. Moderate adverse impacts regarding the provision of public services and utilities could occur as a result of construction activities. These impacts would be reduced to minor adverse through implementation of the above mitigation measure.

5.0 SUSTAINABLE AND LONG-TERM MANAGEMENT

5.1 RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the environment would result from project construction of the Streetcar Extension Project. In general, these activities would be of short duration, but the Project would have the potential to enhance long-term physical conditions and productivity of the environment because the Project would increase the use of transit.

Short-term impacts associated with construction activities include traffic disruption; restricted access to visitor resources such as parking areas and trails; disruption of vegetation; increased noise; fugitive dust emissions; and visual intrusions to visitors. The benefits of providing increased transit and access to long-term productivity would outweigh the short-term impacts resulting from construction.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments of resources are commitments where the resource would be permanently lost or consumed. Irreversible commitments would result from the construction of the new extension systems and the operation of a new system that would consume fossil fuels, labor, and roadway construction materials such as concrete and aggregate. The expenditure of federal funds and funds from other sources would be irretrievable. Some historic resources would be affected; impacts to these resources would be mitigated through various cultural landscape management requirements, but the impact would be irreversible.

The use of recreational land for track and platforms would be an irretrievable commitment of resources during the period the land is used for transportation infrastructure. However, the land could be converted to another use at a future date.

5.3 ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Adverse impacts to historic resources in the Fort Mason Center and the Aquatic Park National Historic Landmark District would be unavoidable adverse impacts that could not be mitigated through alteration of the project's design.

The National Park Service also avoids impacts that it determines to be unacceptable (NPS 2006). Based on the analysis in this Environmental Impact Statement, there would be no "unacceptable impacts" under the proposed project.

5.4 GROWTH-INDUCING IMPACTS

The Project would have no measurable impacts on growth in and around the Project. Although the project is expected to reduce the use of cars and encourage attendance to Fort Mason Center events, these impacts would not in and of themselves encourage population shifts.

6.0 CONSULTATION AND COORDINATION

This chapter provides an overview of public involvement, consultation, and other requirements for the Project. It also includes a list of preparers.

6.1 HISTORY OF PUBLIC INVOLVEMENT

The Notice of Intent (NOI) for the project was published in the Federal Register on March 29, 2006. The NOI announced the preparation of an EIS by the National Park Service, as the federal lead agency. The NOI also provided information on project issues and potential impacts and invited comments, questions, and suggestions on the scope of the EIS during the 60-day public scoping period, which ended on May 29, 2006.

Public notification of the commencement of the planning process was made with postcards sent to approximately 4,000 individuals; the mailing list was developed from GGNRA, San Francisco Maritime NHP, and SFMTA databases. A half-page ad announcing the public scoping meeting and requesting input was placed in the *San Francisco Examiner* on May 3, 2006, and a legal notice was posted in the *San Francisco Chronicle* on May 6, 2006. Public and agency scoping meetings were held on May 9, 2006 at the Fort Mason Officer's Club in San Francisco. A meeting with the National Park Service and the cooperating agencies was held from 2:00 p.m. to 4:00 p.m. and the public meeting was held from 6:00 p.m. to 9:00 p.m.

During the scoping period, the National Park Service received over 100 comments from individuals, organizations representing environmental, conservation and recreational interests, and governmental agencies. The primary environmental concerns focused on changes in traffic and parking, impacts on parklands and recreational facilities, noise and vibration, visual impacts, and cultural resources.

The Draft EIS was published in March of 2011. Government agencies and the general public had the opportunity to review and comment on the document during a 60 day formal comment period. The public comment period began on March 18, 2011 with publication of a Notice of Availability (NOA) for the DEIS in the Federal Register. NPS also distributed a news release and mailed approximately 3,750 NOAs announcing the DEIS' availability and describing the public commenting process and review schedule. Members of the public were invited to attend an open house meeting on April 20, 2011, during which time NPS collected written comments on the DEIS. The public comment period officially closed on May 17, 2011.

Public comments were recorded and categorized in order for the National Park Service to prepare responses to the comments, which are incorporated into this Final EIS (FEIS). The FEIS incorporates revisions to the text that correspond to the comments received and identifies the lead agency's reasons for selecting the preferred alternative. A more detailed discussion of the comments analysis process, and reference to specific changes to the document resulting from those comments, is provided in Chapter 7. The release of the FEIS was announced through publication of a Notice of Availability (NOA) in the Federal Register. A minimum of 30 days must pass between publication of the NOA and issuance of a Record of Decision (ROD). A ROD notifies the public of the alternative that the agency

has selected to be carried forward for more detailed engineering and design and the rationale for that decision. The EIS analysis is considered as part of the decision-making process, which may also include consideration of other decision factors such as costs, technical feasibility, agency statutory mission, project purpose and need, and goals and objectives.

6.2 CONSULTATIONS WITH OTHER AGENCIES AND ORGANIZATIONS

Input was also solicited from the National Park Service Historic Streetcar Extension Technical Advisory Committee (TAC), which consists of members of GGNRA, San Francisco Maritime NHP, SFMTA, Fort Mason Center, Market Street Railway, San Francisco County Transportation Authority, Golden Gate National Parks Conservancy, San Francisco Recreation and Park Department, and the Federal Transit Administration (FTA). National Park Service staff with expertise on park resources was also consulted. After the initial scoping period, the National Park Service continued to update the public about the project during the park's quarterly open houses.

6.3 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT (NHPA)

6.3.1 Tribal Consultation

June 18, 2010 – Tribal Consultation Initiation letter submitted from NPS to Ohlone and Costanoan representatives inviting them to participate in consultation regarding the proposed undertaking in accordance with Section 106. The letter also provided information about and invited consultation on the efforts to identify indigenous archeological sites CA-SFr-23 and CA-SFr-29, including the findings of an archeological testing program near the South Loop Alternative (Great Meadow). One written response was received on July 15, 2010. Additional comments on the project were received during follow-up phone calls to letter recipients. These collective comments included concerns for protection of Ohlone sites and cultural materials, requests for additional information as it becomes available, offers to monitor future stages of project work if monitoring is required, and suggestions for the development of a treatment plan to address potential encounters with Ohlone cultural resources.

6.3.2 Agency Consultation

May 2, 2006 – Initiation of consultation including identification of APE

October 4, 2007 – Submittal of request for comment pursuant to NHPA for the project's undertaking to SHPO

December 3, 2007 – Receipt of letter acknowledging adequacy of NPS project scope and APE from SHPO to GGNRA and SF Maritime NHP

January 28, 2009 – Office of Historic Preservation briefing meeting in San Francisco

September 29, 2009 – Submittal of historic structures and archeological reports for historic property identification to SHPO

December 17, 2010 – Submittal of Finding of Effects letter from NPS to SHPO

February 2, 2011 – Letter from NPS to the Secretary of the Interior inviting consultation on resolution of adverse effects Draft Memorandum of Agreement (MOA)

March 23, 2011 – Adverse Effect Notification Letter from NPS to ACHP

November 7, 2011 – Concurrence letter from SHPO to NPS

Winter 2012 – Final MOA between NPS and SHPO (anticipated).¹

6.4 FUTURE COMPLIANCE REQUIREMENTS

The following is a preliminary list of potential compliance requirements for the project.

| Regulation | Permitting Authority | Compliance Requirement |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Section 106, National Historic Preservation Act (1966) | Advisory Council on Historic Preservation and State Historic Preservation Officer | Section 106 consultation, memorandum of agreement on the undertaking |
| San Francisco Bay Plan (2003) | San Francisco Bay Conservation and Development Commission (BCDC) | Permit approval for work within 100 feet of Bay shoreline |
| Coastal Zone Management Act (1972) | San Francisco Bay Conservation and Development Commission (BCDC) | Federal Consistency determination |
| Clean Water Act (1972), Section 402, National Pollutant Discharge Elimination System (NPDES) | Regional Water Quality Control Board | General Construction Permit |
| Clean Water Act (1972) | State Water Resources Control Board | Storm Water Pollution Prevention Plan (SWPPP) |
| City Codes | City and County of San Francisco (may include the Port San Francisco, San Francisco Public Utilities Commission, the Department of Public Works and others) | construction permits as appropriate |
| State safety oversight for rail transit systems | California Public Utilities Commission | Safety Certification Plan |

¹ The draft MOA is included in Appendix C. The final MOA is expected to be completed and executed by winter 2012. The Record of Decision will not be issued until the final MOA has been executed.

6.5 LIST OF PREPARERS / LIST OF PERSONS AND AGENCIES CONSULTED

6.5.1 National Park Service

Golden Gate National Recreation Area

Frank Dean, Superintendent
Aaron Roth, Acting Deputy Superintendent
Rick Foster, Transportation Planner (preparer)
Carey Feierabend, Chief of Project Management
Daphne Hatch, Chief of Natural Resources
Nancy Hornor, Chief of Planning and Technical Services
Lance Lewis, Safety Officer
Bill Merkle, Wildlife Ecologist
Yvette Ruan, Chief of Fire and Emergency Services
Steve Ortega, Environmental Protection Specialist (preparer)
Michael Savidge, Program Management
Jerry Scheumann, Facility Manager
Paul Scolari, PhD., Historian
Tamara Williams, Hydrologist
Brian Ullensvang, Environmental Engineer

San Francisco Maritime National Historical Park

Craig Kenkle, Superintendent
Lynn Cullivan, Management Assistant
Robbyn Jackson, Chief of Cultural Resources and Museum Management
Tim Przygocki, Safety Officer

Denver Service Center

Patrick Shea, Project Manager, Transportation Technical Specialist (preparer)
Steven Culver, Natural Resource Specialist (preparer)
Lee Terzis, Cultural Resource Specialist (preparer)

Pacific West Regional Office of the National Park Service

Alan Schmierer, Regional Environmental Coordinator
Elaine Jackson-Retondo, PhD., National Register & National Historic Landmarks Program
Judy Rocchio, Air Quality - Natural Sounds - Dark Night Skies

National Park Service Washington Support Office

Vicki McCusker, Natural Resources Specialist, Natural Sounds and Night Skies Division

6.5.2 Consultants

ESA

Darcey Rosenblatt, Project Manager (preparer)
Erin Higbee-Kollu, Deputy Project Manager (preparer)
Elijah Davidian, Deputy Project Manager (preparer)
Jack Hutchison, P.E., Senior Transportation Engineer (preparer)
W. Brad Brewster, Manager, Bay Area Cultural Resources (preparer)
Nik Carlson, Socioeconomics section (preparer)
Chris Sanchez, Noise and Air Quality section (preparer)
Kirstin Conti, Geological Resources section (preparer)
Dana Ostfeld, Biological Resources section (preparer)
Cory Barringhaus, Public Services and Utilities section (preparer)

Page & Turnbull

Rich Sucre, Architectural Historian (preparer)
Jay Turnbull, Architectural Historian (preparer)

Kirk Associates, LLC

Steve Garrett, Value Analysis Facilitator (preparer)

Environmental Vision

Chuck Cornwall, Principal Visual Specialist (preparer)
Marsha Gale, Managing Principal (preparer)

URS Corporation

Linda Peters, Environmental Specialist
Sandy Stadtfeld, Vice President at URS
Duncan Watry, Senior Transportation Planner

6.5.3 State Historic Preservation Officer, Advisory Council, Tribes

Milford Wayne Donaldson, State Historic Preservation Officer
Advisory Council on Historic Preservation
Ohlone/Costanoan Tribe

6.5.4 San Francisco Municipal Transportation Agency

Dan Rosen, Transit Manager
Darton Ito, Manager of Long Range & Capital Planning, Sustainable Streets Division
John Sadorra, Deputy Director, Fleet Services & Constructability
Daniel Pulon, Principal Transportation Planner, Capital System Planning

6.5.5 Federal Transit Administration

Alexander Smith, Community Planner

6.5.6 Technical Advisory Committee

Fort Mason Center (FMC):

Rich Hillis, Fort Mason Center Executive Director

Ann Lazarus, Fort Mason Center Former Executive Director

Doug Wright, Consultant

Jerry Goldberg, Consultant

Market Street Railway:

Rick Laubscher, Market Street Railway President

San Francisco County Transportation Authority:

Jesse Koehler, Transportation Planner

Richard Crockett

6.6 LIST OF RECIPIENTS AND REVIEWERS

A copy of the *Draft and Final Environmental Impact Statement* has been provided to the following agencies. A complete list of EIS recipients that includes organizations and individuals is available from GGNRA. A Notice of Availability of the EIS has been sent to attendees of the public meetings, park partners, and others listed on the project mailing list.

Federal Agencies

Advisory Council on Historic Preservation

Army Corps of Engineers

Golden Gate Bridge Highway & Transportation District

Gulf of the Farallones National Marine Sanctuary

National Marine Fisheries Service

National Park Service

Department of Transportation, Federal Highway Administration

Department of Transportation, Federal Transit Administration

Environmental Protection Agency

Fish & Wildlife Service

The Presidio Trust

Tribes

Ohlone/Costanoan Tribe

California State Agencies

Office of Historic Preservation
Air Resources Board
Coastal Commission
Coastal Conservancy
Department of Boating and Waterways
Environmental Protection Agency
Department of Fish and Game
Department of Parks and Recreation
Department of Transportation, District 4
Department of Water Resources
Heritage Council
Native American Heritage Commission
Office of Planning and Research
Resources Agency
Regional Water Quality Control Board
San Francisco Bay Conservation and Development Commission
State Lands Commission
State Water Resources Control Board

Regional and Local Agencies

Association of Bay Area Governments
Bay Area Air Quality Management District
City and County of San Francisco
–Office of the Mayor
–San Francisco Planning Department
–Department of Environment
–Department of Parking and Traffic
–Department of Public Works
–Department of Recreation and Parks
–Fire Department
–Municipal Transportation Agency
–Planning Department
–Port of San Francisco
–Public Utilities Commission
–Transportation Authority
–Water Department
Metropolitan Transportation Commission
San Mateo County Transit District
Transportation Authority of Marin (TAM)

Elected Officials and Committees

Office of Senator Barbara Boxer

Office of Senator Dianne Feinstein

Office of Representative Nancy Pelosi

Office of Representative Jackie Speier

Office of Representative George Miller

Office of Representative Lynn Woolsey

United States House of Representatives Committee on Resources

Office of Mayor Gavin Newsom

San Francisco Board of Supervisors

-Mark Farrell

-David Chiu

7.0 SUMMARY OF PUBLIC COMMENTS AND RESPONSES

7.1 ANALYSIS OF PUBLIC COMMENTS

As required under NEPA public comments on draft plans for major NPS actions are solicited. These comments are viewed by the National Park Service as critical in helping NPS managers shape responsible plans for our national park units that best meet the Service's mission, the goals of NEPA, and the interests of the American public. This chapter of the *Final Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center* describes the process used to assess and consider the public comments received (from March 18, 2011 through May 17, 2011) on the *Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center*. This chapter also identifies public concerns, provides responses, and includes copies of public agency correspondence received during the comment period.

7.1.1 Screening Process

A comprehensive process was implemented to screen public concerns and identify planning issues derived from public input. This process involved the following steps:

1. Receive correspondence and conduct preliminary review.
2. Enter correspondence into the Planning, Environment and Public Comment (PEPC) database.
3. Identify and code comments within each correspondence.
4. Identify substantive and non-substantive comments
5. Identify concern statements representing individual or groups of substantive comments.
6. Write responses to concern statements.

Receive Correspondence. A total of 97 separate pieces of correspondence were received on the *Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center*. Public correspondence was accepted online at the NPS Planning, Environment and Public Comment (PEPC) website and by e-mail, fax, or letter to the project team. The correspondence also includes any public comments that were generated on the flip-charts at the public open house.¹

Enter Correspondence into PEPC. All correspondence received on the *Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center* was read, analyzed, and entered into the PEPC database.

¹ NPS and SFMTA received several pieces of correspondence after the official comment period for the Draft EIS ended. These documents are included as part of the administrative record for the project. The late correspondences identified the same concerns raised in other correspondence received during the official comment period for the Draft EIS. Therefore, all such substantive concerns are addressed in the FEIS. All substantive concerns and issues included in the administrative record will also be considered by SFMTA during the design phase of the project.

Identify and Code Comments. A coding structure was developed to help categorize the content of the comments identified within each correspondence (**Table 7-1**). Discrete comments within each correspondence were identified and coded in PEPC according to the topics addressed. A total of 314 separate public comments were identified from the correspondences received and then these comments were coded. The total number of coded comments (379) exceeds the total number of comments received (314) because some comments addressed more than one topic and therefore received more than one code.

Identify Non-Substantive and Substantive Comments. This process identified comments that were out of the scope of the *Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center* planning process, or were non-substantive and therefore did not warrant further consideration. Comments are classified as either substantive or non-substantive. NEPA requires the National Park Service to respond to substantive comments. As defined in the National Park Service's NEPA guidance (Director's Order #12) and based on the Council of Environmental Quality regulations, a substantive comment is one that:

- Questions, with reasonable basis, the accuracy of the information in the environmental impact statement
- Questions, with reasonable basis, the accuracy of environmental analysis
- Presents reasonable alternatives other than those presented in the environmental impact statement
- Causes changes or revisions to the proposed alternatives
- Makes factual corrections

Non-substantive comments include those that simply state a position for or against the proposed alternative, merely agree or disagree with National Park Service policy, are out of the scope of the plan, reiterate parts of the document, or otherwise express an unsupported personal preference or opinion. Although a commenter's personal opinions on a subject may influence the development of the final plan, they generally would not affect the impact analysis.

The total number of coded comments described above (379) includes both substantive and non-substantive comments. While each code was categorized as substantive or non-substantive, in some cases individual comments within a substantive code were non-substantive in content and therefore were not incorporated into a concern statement. In addition, some codes that were created with substantive comments in mind only had non-substantive comments coded to them; therefore, the entire code was later categorized as non-substantive. Such is the case with NR100, shown in Table 7-1. In that example, the comments received were non-substantive in nature.

The National Park Service is required to respond only to substantive comments, which can result in changes to the text of the final environmental impact statement.

Identify Concern Statements. Substantive comments were reviewed to identify concern statements that represented either individual or groups of comments. For example, if several individuals expressed comments about the same issue, one comment from the group was selected to represent all

TABLE 7-1: COMMENT CODES AND DESCRIPTIONS

| Code | Code Description | Substantive | Total |
|--------|-------------------------------------------------------------------------------------|-------------|-------|
| AL100 | Alternatives Screening | Yes | 6 |
| AL110 | Support Alternative 1 - No Action | No | 1 |
| AL200 | Turnaround Options: New Alternatives Or Elements | Yes | 4 |
| AL210 | Turnaround Options: Support Turnaround Option 1 (North Loop - Alternative 2A) | No | 21 |
| AL220 | Turnaround Options: Oppose Turnaround Option 1 (North Loop - Alternative 2A) | No | 1 |
| AL230 | Turnaround Options: Comment about Turnaround Option 1 (North Loop - Alternative 2A) | Yes | 0 |
| AL240 | Turnaround Options: Support Turnaround Option 2 (South Loop - Alternative 2B) | No | 0 |
| AL250 | Turnaround Options: Oppose Turnaround Option 2 (South Loop - Alternative 2B) | No | 6 |
| AL260 | Turnaround Options: Comment about Turnaround Option 2 (South Loop - Alternative 2B) | Yes | 0 |
| AQ100 | Air Quality | Yes | 4 |
| BR100 | Biological Resources | Yes | 2 |
| CE100 | CEQA Exemption | Yes | 6 |
| CF100 | Neighborhoods, Community Facilities and Services | Yes | 9 |
| CR100 | Cultural Resources | Yes | 11 |
| CU100 | Cumulative Impacts | Yes | 4 |
| ED1000 | Editorial | Yes | 12 |
| MM100 | Mitigation Measures | Yes | 8 |
| MU200 | Muni: System Operations | Yes | 3 |
| NE100 | NEPA EIS Process | Yes | 2 |
| NR100 | Natural Resources | No | 1 |
| NS100 | Night Sky, Visibility, and Light Pollution | Yes | 1 |
| NV100 | Noise and Vibration | Yes | 15 |
| OP100 | General Project Opposition | No | 8 |
| OS100 | Out of Scope comment | No | 4 |
| PA100 | Public Access | Yes | 1 |
| PC100 | Project Cost | Yes | 8 |
| PC300 | Project Cost: Funding | No | 2 |
| PD100 | Project Design | Yes | 9 |
| PD200 | Project Design: Track Alignment | Yes | 6 |
| PD500 | Project Design: Green Design | Yes | 1 |
| PH100 | Public Health and Safety | Yes | 7 |
| PK100 | Parklands, Recreational Facilities and Visitor Use | Yes | 3 |
| PN100 | Purpose and Need | Yes | 18 |
| PP100 | Plans and Policies | Yes | 7 |
| RE100 | Recreation | Yes | 3 |
| SE100 | Socioeconomics and Environmental Justice | Yes | 11 |
| ST100 | Streetcars | Yes | 2 |

TABLE 7-1: COMMENT CODES AND DESCRIPTIONS (CONTINUED)

| Code | Code Description | Substantive | Total |
|--------|-------------------------------------------------------------------------|-------------|-------|
| ST200 | Streetcars: Function and design | Yes | 2 |
| SU100 | General Project Support - Alternative 2 | No | 68 |
| TT100 | Transportation: Traffic and Parking | Yes | 7 |
| TT200 | Transportation: Parking | Yes | 27 |
| TT300 | Transportation: Impacts from additional Vehicles in Marina Neighborhood | Yes | 8 |
| TT400 | Transportation: SF Transit Expansion | Yes | 23 |
| TT500 | Transportation: Transportation Demand Management | Yes | 3 |
| TT600 | Transportation: Bicycles/Bay Trail | Yes | 7 |
| TT700 | Transportation: Public Transit | Yes | 10 |
| UT100 | Utilities | Yes | 8 |
| VI100 | Visual and Aesthetic Resources | Yes | 2 |
| VU100 | Visitor Use | Yes | 9 |
| VU2000 | Visitor Use: Methodology And Assumptions | Yes | 1 |
| | | | 379 |

of them. The selected comment typically included the most detail or best description of the nature of the issue. As described above, where several similar concerns were identified, one single concern statement was written to capture them all. If a comment was unique and no one else expresses similar sentiments, that individual comment was identified as a concern statement as well. A total of 100 concern statements were identified from the substantive public comments.

During the process of identifying concerns, all comments were treated equally — they were not weighted by organizational affiliation or other status, and it did not matter if an idea was expressed by a majority of people or an individual. All public concerns identified by the National Park Service are included in this chapter, whether supported by one person or several people.

Write Responses. Responses were developed for all concern statements, and any changes that needed to be made to the text of the EIS based on concern statements are identified in the response.

Agencies, organizations, and number of individuals who provided comments to the *Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center* include:

Agencies

- Advisory Council on Historic Preservation
- Bay Conservation and Development Commission
- California Public Utilities Commission
- San Francisco County Transportation Authority
- San Francisco Public Utilities Commission
- Environmental Protection Agency - Region 9
- San Francisco Recreation and Parks
- San Francisco Board of Supervisors

Organizations

- Blue Bear School of Music
- Dolphin Swimming and Boating Club
- Driven Innovation
- Fort Mason Center
- Fort Mason Center Board of Trustees
- Golden Gate Bridge, Highway and Transportation District
- Marina Community Association
- Marina Neighborhood Association
- Market Street Railway
- Museo Italo Americano
- Pacific Heights Residents Association
- People For a GGNRA
- Readers Cafe and Bookstore
- Red and White Fleet
- Rincon Point-South Beach CAC
- San Francisco Bay Trail
- San Francisco Bicycle Coalition
- San Francisco Chamber of Commerce
- San Francisco Planning and Urban Research Association (SPUR)
- San Francisco Senior Centers
- Street Artist Program

Unaffiliated Individuals

There were 61 individuals who commented and did not specify an affiliation with one (or more) of the agencies or organizations listed above.

7.2 PUBLIC CONCERNS AND RESPONSES

This section provides the public concerns regarding the DEIS and NPS responses. Although the analysis process attempted to capture the full range of public comments, those people who provided comments do not constitute a valid random or representative sample of the general public. Therefore, this information can provide insight into the perspectives and values of the specific commenters, but does not necessarily represent the desires of society as a whole. The comment response report for representative concerns is included in this section. Comments received from public agencies are identified as such in the Public Concerns and Responses Report. Copies of the original public agency correspondence are provided in the section 7.2.2, below.

7.2.1 Public Concerns and Responses Report

Report Date: 10/12/2011

AL100 - Alternatives Screening

Concern ID: 30187

CONCERN STATEMENT: *The DEIS fails to comply with section 1502.14 of NEPA.*

Response: Section 1502.14 requires a presentation of the environmental impacts of the proposal and the alternatives in comparative form, including an evaluation of all reasonable alternatives and discussion of why certain alternatives were eliminated. Table 2-5, Alternatives Comparison Summary, presents the alternatives selected for analysis in a comparative form and Table 2-6, Summary of Impacts and Mitigation, compares the impacts of each alternative. Section 2.5 contains a description of the alternatives selection process including the screening process and why certain alternatives were eliminated. This is described in greater detail in Appendix A, which presents the eight In-Street Segment alternatives, three transition segment alternatives, and eleven turnaround segment alternatives that were considered and dismissed from further analysis.

Concern ID: 30189

CONCERN STATEMENT: *The DEIS did not present a range of alternatives including non-rail alternatives such as buses, trolleys or shuttles.*

Response: Commenter is referred to the first concern statement response under AL100 - Alternatives Screening. Both motor coach and trolley coach were considered as an alternative and dismissed because they did not meet the purpose and need of the project.

AL200 - Turnaround Options: New Alternatives or Elements

Concern ID: 29882

CONCERN STATEMENT: *Consider other turnaround options such as a turntable or parallel tracking or a different location farther down Marina Boulevard.*

Response: Commenter is referred to Appendix A for further descriptions of alternatives considered. Extending the F-Line further than the Fort Mason Center is beyond the scope of this project.

AQ100 - Air Quality

Concern ID: 29883

Commenting Agency: *U.S. Environmental Protection Agency*

CONCERN STATEMENT: *Include in the Final Environmental Impact Statement a discussion of the potential air quality impacts of increased vehicle congestion at the affected in-street segment of the project.*

Response: The only intersection within the affected in-street segment projected to operate at an unacceptable condition is Jefferson Street at Leavenworth Street during the weekend mid-day period. The Bay Area Air Quality Management District (BAAQMD) provides guidance on assessing localized carbon monoxide impacts at congested roadways. This guidance provides a preliminary 3-step screening procedure to determine if a project would result in the generation of CO concentrations that would substantially contribute to an exceedance of the thresholds of significance. It should be noted that BAAQMD data indicate that the San Francisco area has not experienced a violation of CO standards in over 10 years due primarily to improvements in fuel.

The first step is to determine whether the project is consistent with the local congestion management plan. The proposed project would extend public transit it, resulting in a reduction in vehicle trips and associate vehicle miles travelled within the project area. Therefore, the proposed project would be considered consistent with the San Francisco 2009 Congestion Management Program, which has a consistency goal of reducing by 10 percent VMT within the City by 2035.

The second step is to determine if the project would increase traffic volumes at affected intersections in excess of 44,000 vehicles per hour. As the hourly traffic volume on Jefferson Street and Leavenworth Streets are projected by the Public Realm Plan to be 519 vehicles per hour or less, the project would not exceed the threshold for the second step. The third step applies to a determination of traffic volumes along roadways with restricted horizontal mixing (e.g., tunnels, parking garages, or sub-grade roadways), which is not a characteristic of the project area. Therefore conditions along the only intersection within the affected in-street segment projected to operate at an unacceptable condition would meet the BAAQMD screening criteria and would not result in a localized CO impact.

Concern ID: 29884

Commenting Agency: *U.S. Environmental Protection Agency*

CONCERN STATEMENT: *As practicable and advantageous, identify in the Final EIS mitigation measures to directly reduce adverse air quality impacts from increased congestion.*

Response: While there would be no significant adverse air quality impacts resulting from increased roadway congestion within the proposed project area, as noted in Mitigation Measure TRANS-1, a combination of traffic signal timing and implementation of the Public Realm Plan would reduce congestion impacts at Leavenworth and Jefferson Streets to a minor level.

BR100 - Biological Resources

Concern ID: 29885

Commenting Agency: *San Francisco Recreation and Parks Department*

CONCERN STATEMENT: *Preserve the magnificent pine tree at the east entrance of the Fort Mason Tunnel.*

Response: Guidance for management of trees within GGNRA and SAFR jurisdictions is described in section 3.12.6.

Concern ID: 29886

CONCERN STATEMENT: *While the potential for finding endangered species in the area is low, according to the Draft EIS, please consider bird habitat, other wildlife habitat, and plant habitat needs.*

Response: Potential impacts to vegetation, wildlife, and special-status species are evaluated in section 4.12, Biological Resources.

CE100 - CEQA Exemption

Concern ID: 30191

CONCERN STATEMENT: *The decision of the City Planning Department to exempt this project from CEQA will enable a piecemeal extension beyond Fort Mason to occur without ever being subjected to review by the City Planning Department, the Planning Commission or the Board of Supervisors.*

Response: As described in the Certificate of Determination of Statutory Exemption from Environmental Review, dated April 20, 2006, because the extension is less than four miles in length it meets the terms of statutory exemption and is exempt from the requirements of CEQA. The purpose of this project is to provide improved public transportation to the Fort Mason Center. Extension of this line beyond this point is not under consideration at this time.

Concern ID: 30192

CONCERN STATEMENT: *By exempting this current project from CEQA the City Planning Department has effectively circumvented a law, Chapter 29 of the City Administrative Code that was intended to protect San Francisco taxpayers from the unwise expenditure of their money.*

Response: Certificate of Determination of Statutory Exemption from Environmental Review was issued by the City and County of San Francisco Planning Department for the proposed project. Questioning the validity of this certificate is beyond the scope of this EIS as that decision was made independently by the City and County of San Francisco.

Concern ID: 30193

CONCERN STATEMENT: *The current DEIS process for the extension to Fort Mason does not allow concerns to be heard in a forum before our elected local representatives and thus denies us our basic rights as taxpayers of San Francisco.*

Response: The EIS underwent a thorough and open public participation process as required under NEPA. A public scoping meeting for the EIS was held in May of 2006 and attended by more than 200 members of the public. The DEIS was made available for public review for 60 days (March through May 2011). A newsletter was sent out to all addressees on the Parks' mailing lists, including public officials and agencies, announcing the publication of the DEIS, the commencement of the public comment period, and the date of an open house meeting. A public open house on the proposed action was held on April 20, 2011. The meeting was attended by 81 members of the public, all of whom were encouraged to submit comments. The NEPA process does not, however,

require a forum to be conducted before elected local representatives.

CF100 - Neighborhoods, Community Facilities and Services

Concern ID: 30097

CONCERN STATEMENT: *The EIS does not analyze the impact of bringing more people into Fort Mason and the effects on the Marina community.*

Response: Increased visitor use to the GGNRA, SF Maritime NHP, and Fisherman's Wharf area are analyzed in section 4.8 (Recreation and Visitor Use) and section 4.14 (Public Services and Utilities). As this project is designed to serve Fort Mason and, in part, to replace existing car traffic, it is assumed that impacts to the Marina community - much of which is already served by public transportation - would be limited to those identified in the EIS.

Concern ID: 30099

CONCERN STATEMENT: *Alternative 2A would remove a heavily utilized area of the Fort Mason parking lot and could affect events that use this such as the Sunday Farmer's market.*

Response: Implementation of Alternative 2A would necessitate relocation of the Sunday Farmer's Market and other events that generally occur in the vicinity of the turn-around. However, it is anticipated that these events would still be able to occur in other areas of the Fort Mason Center parking lot, and with minimal additional planning.

CR100 - Cultural Resources

Concern ID: 30100

CONCERN STATEMENT: *The Plan ignores or does not take into consideration or address mitigation on impacts to the San Francisco Maritime National Historical Park's National Historic Landmark resources.*

Response: Project impacts to historic resources located within the San Francisco Maritime National Historical Park (SAFR or Aquatic Park) are addressed in section 4.7.3. As described in that section, the introduction of streetcar tracks, an overhead contact system, lights, signals, and passenger platforms would add new, non-contributing and incompatible elements to the western end of Aquatic Park, and therefore result in an adverse impact to the historic setting, feeling, and association of the San Francisco National Historic Landmark (NHL) District as a whole. The addition of streetcar-associated noise, vibration, and new uses that would be incompatible with the historic feeling and association of the District would also contribute to the adverse impact. The demolition of an historic stone retaining wall and removal of historic State Belt Line railroad tracks within Aquatic Park would also have a direct adverse impact on the historic design, materials and workmanship of the District.

Mitigation measures to lessen or avoid these effects are also described in section 4.7.3. Mitigation measure CUL-1 (measures to mitigate the adverse impacts of the loss of individual resources at Aquatic Park NHL District), would include conducting an Historic American Building Survey (HABS) and/or Historic American Landscape Survey (HALS) documentation of the stone retaining wall, retaining/reusing stone wall materials in new construction as appropriate, and interpretation of the wall's history and its contribution to the cultural landscape.

Mitigation measure CUL-2 (measures to mitigate the adverse impacts due to the introduction of new, incompatible uses to the Aquatic Park NHL District), would include HABS/HALS documentation of the western area of Aquatic Park, ensuring that all new design elements, such as overhead contact poles and platforms, are compatible with the Streamline Moderne architecture of Aquatic Park, restoring the Beach Street and western Aquatic Park landscape, installing appropriate landscaping elements along the Beach Street portion of Victorian Park, public interpretation of Aquatic Park history in the western portion of the park, and implementation of noise/vibration reduction measures. As such, the EIS adequately addresses the impacts and mitigation of impacts to the San Francisco Maritime National Historical Park's historic resources.

Concern ID: 30101

CONCERN STATEMENT: *The seismic stability of historic structures will be compromised with the implementation of this project.*

Response: Section 4.11 Geology, Soils and Seismicity addresses the potential for seismic disturbance and cumulative impacts in the project area. As discussed in section 4.11.2, the Fort Mason Tunnel seismic retrofit would reduce the risk of impact to several Ft. Mason historic structures that could result from a seismic-induced tunnel collapse. As described in section 4.11.3, there are stringent safety requirements for the design and construction of new structures including seismic design criteria. The analysis in that section also indicates the project's incremental contribution to seismic structural hazards would be less than cumulatively considerable.

CU100 - Cumulative Impacts

Concern ID: 30102

Commenting Agency: *San Francisco Recreation and Parks*

CONCERN STATEMENT: *How would the project interact with the San Francisco Marina West Harbor Renovation Project?*

Response: As stated in section 4.1.2, the San Francisco Marina Renovation Project would be constructed in two phases: Phase I at the West Harbor, with construction anticipated October 2008 to March 2010; and Phase II at the East Harbor, with construction anticipated July 2010 to June 2012. It is unlikely that there would be any overlap in construction time between this project and the proposed F-line extension. However, in the event of potential overlap, the NPS and SFMTA would coordinate with the appropriate San Francisco departments, including Recreation and Parks, during the project design and construction phases, to avoid or minimize any adverse interactions with the Marina Renovation Project.

Concern ID: 30103

Commenting Agency: *San Francisco Recreation and Parks*

CONCERN STATEMENT: *There are planned renovations to Marina Boulevard between Baker Street and Scott Street to be managed by the Department of Public Works.*

Response: Planned renovations to Marina Boulevard between Baker Street and Scott Street will be managed by the Department of Public Works. Overlap in construction

timing is not anticipated for the Marina Renovation Project and the proposed F-Line Extension project. However, in the event of potential overlap, the NPS and SFMTA would coordinate with the appropriate San Francisco departments, including Public Works, during the project design and construction phases, to avoid or minimize any adverse interactions with the Marina Renovation Project.

Concern ID: 30104

Commenting Agency: *U.S. Environmental Protection Agency*

CONCERN STATEMENT: *Provide more detail in the Final EIS on how cumulative projects could mitigate vehicle congestion in the area.*

Response: As stated in section 4.4.2 (Alternative 1), and cross referenced in section 4.4.3 (Alternative 2), the long-term, minor to moderate, beneficial transportation impact from past, present, and reasonably foreseeable future actions such as the Presidio Transit Program, the Fort Mason Bay Trail at Laguna Street and Marina Boulevard, Fisherman's Wharf Public Realm Plan, Van Ness Bus Rapid Transit, E Embarcadero Historic Streetcar Line, and SFMTA's Transit Effectiveness Project would result from increased use of public transit (with a corresponding decreased use of private automobiles). Reducing the number of private automobile-based trips to both National Parks would relieve the parking pressure and traffic congestion on the streets controlled by SAFR, the Fort Mason Center parking lot and the surrounding neighborhood streets.

Concern ID: 30131

CONCERN STATEMENT: *Will there be coordination with the Fisherman's Wharf Public Realm Plan and how will the public be informed of improvements on the waterfront?*

Response: SFMTA and the NPS have discussed with the San Francisco Planning Department coordination between this project and the Fisherman's Wharf Public Realm Plan. The public will be informed of improvements on the waterfront as part of the Jefferson Street Design effort, a process that will use the current concept design for Jefferson Street as the basis for completing 30% engineering drawings. This multi-agency effort is about to begin and should run from October 2011 through March 2012. The SFMTA, SFDPW, SF Port, MOD and the Planning Department will work together to develop the plan. There will be two rounds of community outreach to solicit public input on the proposed designs. Additional information about the Fisherman's Wharf Public Realm Plan can be found on the San Francisco Planning Department website: http://www.sf-planning.org/ftp/CDG/CDG_fishermans_wharf.htm

ED1000 - Editorial

Concern ID: 30272

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *On Page 72 of the DEIS under the Section entitled "3.2.4 Regulations and Policies." Correct the statement pertaining to the authority of the federal Coastal Zone Management Act (CZMA) (see 15 CFR, Section 930.4). The Commission can in fact impose special conditions on its federal consistency decisions and does so*

SUMMARY OF PUBLIC COMMENTS AND RESPONSE

regularly when it issues consistency determinations to federal entities.

Response: The EIS has been revised as follows: The Commission can impose conditions on its federal consistency decisions.

Concern ID: 30273

CONCERN STATEMENT: *The term "Class I" refers to a multi-use (bicycle, pedestrian, and wheelchair) facility and is not limited to use by bicycles.*

Response: Section 3.4 has been revised to clarify that the term "Class I" refers to a multi-use path, per the California Streets and Highways Code, Section 890.4.

Concern ID: 30274

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 24, please clarify which permit is intended for reference under the Water Resources bullet. The text says "National Pollutant discharge Elimination System general permit" is this a reference to the SWRCB Construction General Permit or the NPDES Individual permit (MS4 areas)?*

Response: This refers to the SWRCB General Construction Permit. The EIS has been revised to clarify this as follows: If the Proposed Action were implemented, a Construction General Permit issued by the State Water Resources Control Board, including a Storm Water Pollution Prevention Plan, would be obtained prior to construction and would incorporate best management practices to reduce storm water pollution and erosion.

Concern ID: 30276

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 323 under the Agency column of the table, City and County of San Francisco is NOT an agency. Permits will be required from a variety of agencies which include the Port of SF, SFPUC, and DBI (although more agencies could be involved in issuing permits i.e. the fire dept)*

Response: The text has been revised as suggested.

Concern ID: 30277

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 323 under the Agency column of the table, the RWQCB does not need the 'and'.*

Response: The text has been revised as suggested.

Concern ID: 30278

CONCERN STATEMENT: *On page 363, the text under the heading "Turnaround Option 2: Fort Mason Short Loop" does not conform to the image of that option shown on the facing page and indeed describes an alternative that extends beyond the boundaries of NPS property.*

Response: The text has been replaced with the following: This Option would be a loop north of the existing trackway, in the current Fort Mason parking lot, but

shorter than Option 1, with less room available for cars. One platform would be provided. A storage track would be created extending west from the loop, adjacent to the Guardhouse.

Concern ID: 30279

Commenting Agency: *Golden Gate Bridge, Highway and Transportation District*

CONCERN STATEMENT: *As described under "Transit Operations" in Section 3.4.2, please note that as of February 2011 Golden Gate Transit operates 14 bus routes along Beach and North Point streets in the project area.*

Response: The text of section 3.4.2 has been revised accordingly.

Concern ID: 30308

CONCERN STATEMENT: *A westbound station is planned for Leavenworth near Jefferson (page 35, Table 2-1, Station Platforms). However Figure 2-2 (Alternative 2 Action Alignment) on page 37 incorrectly shows that westbound platform to be on Jefferson, and not Leavenworth.*

Response: Figure 2-2 has been revised accordingly.

MM100 - Mitigation Measures

Concern ID: 30105

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *Is it feasible to provide new parking to mitigate for parking spaces that are lost as a result of the implementation of the project?*

Response: To reduce the number of parking spaces that would be lost due to construction of the turn-around, the Fort Mason Center parking lot would be reconfigured so as to make more efficient use of the area for parking, thereby reducing the overall number of parking spaces that might otherwise be displaced. This point has been added to section 4.4.3. Noted in that section, Alternative 2 would be expected to result in a shift from private automobile to use of other modes of travel, including the F-Line; and the degree of that shift in travel mode would be clearly detectable. In addition, as discussed in section 4.4.3, the Fisherman's Wharf Public Realm Plan contains parking management policies to provide more efficient use of the existing area parking garages. Dynamic signage with real-time parking information will be used to direct drivers to those garages with the greatest number of available parking spaces.

Concern ID: 30106

Commenting Agency : *San Francisco Recreation and Parks*

CONCERN STATEMENT: *Please consider protection measures (dust, etc) for park users during construction.*

Response: Mitigation Measure AIR-1, presented in section 4.5.3, identifies five separate measures to reduce and control fugitive dust generated during construction activities. These measures include:

1. All exposed surfaces shall be watered two times daily.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet-power vacuum street sweepers at least once per day.
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.

Concern ID: 30107

CONCERN STATEMENT: *The proposed mitigation to address the potential parking impact from North Bay commuters, TRANS-4, is inadequate because it fails to consider the potential impact on other users of the area and it fails to indicate any coordination with San Francisco's MTA and its SFPark Program.*

Response: The intent of Mitigation Measure TRANS-4 (time limitations on parking spaces in the marina lot in proximity to the Fort Mason Center) is to prohibit long-term parking by North Bay-based commuters. The time limit for the affected parking spaces would be set to minimize the impact on short-term (visitor) parking. In addition, implementation of Mitigation Measure TRANS-4 would not happen without SFMTA's approval.

Concern ID: 30108

CONCERN STATEMENT: *How will it be assured that mitigation measures will be implemented and enforced especially with tight budgets?*

Response: Before the project can be implemented, pursuant to the National Environmental Policy Act (NEPA) regulations (Section 1505.2(c)), SFMTA would have to adopt a monitoring and enforcement program for the mitigation commitments in the Record of Decision. This is to ensure that the mitigation measures and project revisions identified in the EIS are implemented. These measures include but are not limited to elements which would be designed into the new facility, continued coordination with affected parties, and implementation of best management practices during construction. If mitigation is deleted for any reason, a reconsideration of the EIS will be circulated to the public to explain what mitigation is proposed as an alternative to the mitigation presented in the Record of Decision.

Concern ID: 30186

Commenting Agency: *U.S. Environmental Protection Agency*

CONCERN STATEMENT: *In the Final EIS and Record of Decision, commit to implementing the four mitigation measures to improve traffic flow and safety, which will likely have an indirect benefit to the project's potential long-term air quality impacts.*

Response: The Final EIS and Record of Decision require the project to comply with all mitigation measures under SFMTA and NPS jurisdiction.

Concern ID: 30283

Commenting Agency: San Francisco Public Utilities Commission

CONCERN STATEMENT: *On page 318, Section 4.14.3, the SFPUC suggests adding the following text to Mitigation Measures: The South Loop (Alternate 2b) and Transition Segment (between Beach Street and the Ft Mason Tunnel / GGNRA land) have the potential to increase stormwater runoff entering into the combined sewer system due to the planned increase in impervious surface. These planned segments are served by the City of San Francisco combined sewer area. While these areas are under federal jurisdiction, it is encouraged that the plan implement stormwater management controls to mitigate the additional runoff and maintain a no net increases in runoff rate and volume in line with the San Francisco Stormwater Design Guidelines.*

Response: The following bullet has been added to section 4.14.3, Mitigation Measure PUB-1: stormwater management controls shall be implemented to mitigate additional runoff in the South Loop (Alternative 2B) if it is selected, and in the Transition Segment to maintain a no net increase in runoff rate and volume in conformance with the San Francisco Stormwater Design Guidelines.

MU200 - Muni: System Operations

Concern ID: 34370

CONCERN STATEMENT: *This extension mandates more streetcars, and bigger ones, too. The F-Line is already usually over-crowded as it serves Fisherman's Wharf. The schedule should be doubled in summer.*

Response: Project need is discussed in several places throughout the EIS. As discussed in section 3.1, for example, need for the proposed project stems primarily from the following: (1) inadequate regional transit access to Fort Mason Center; (2) limited transportation options for transit-dependent residents; (3) limited connectivity to northeastern waterfront cultural and recreational corridor; (4) insufficient transportation infrastructure to accommodate existing and projected visitor demand; and (5) infrastructure constraints impacting Fort Mason Center operations. Project alternatives were evaluated based upon, among other things, their ability to satisfy those needs. Speed of service is not identified among list of needs the project was designed to address.

Concern ID: 34371

CONCERN STATEMENT: *The existing F line service schedule is so slow that it is useful transit for only tourists and those who have hours to spend riding the slowest form of public transit in San Francisco-the F-Line. Extending the F-Line will do nothing to change that. In fact, it will only slow overall service on the F-Line. In other words, the F-Line fails to serve local resident needs for rapid transit now, and an F-Line extension will not improve that.*

Response: Project need is discussed in several places throughout the EIS. As discussed in section 3.1., for example, need for the proposed project stems primarily from the following: (1) inadequate regional transit access to Fort Mason Center; (2) limited transportation options for transit-dependent residents; (3) limited connectivity to northeastern waterfront cultural and recreational corridor; (4) insufficient transportation infrastructure to accommodate existing and projected visitor demand; and (5) infrastructure constraints impacting Fort

Mason Center operations. Project alternatives were evaluated based upon, among other things, their ability to satisfy those needs. Speed of service is not identified among list of needs the project was designed to address.

Concern ID: 34378

CONCERN STATEMENT: *In the future the full extension can operate at ten or twelve minute headway during peak periods, to match the actual ridership, with half of the trolleys turning back at Jones. In the future this will save Muni operating cost.*

Response: Comment noted.

NE100 - NEPA EIS/EIR Process

Concern ID: 31311

CONCERN STATEMENT: *The DEIS did not comply with Section 1502.23 of NEPA.*

Response: As described in section 2.3, a Value Analysis (VA) Workshop evaluated the North Loop and South Loop turnaround alternatives using a process called Choosing by Advantages (CBA), where decisions are based on the weighted importance of the advantages between alternatives with capital and life cycle costs factored in last, to illustrate benefits to cost. In using CBA to determine a preferred alternative, the VA team identified the alternative that offers the highest total importance of advantages at the lowest cost (in both initial and life cycle). Project costs for the two turnaround options are described in the Socioeconomics sections 3.3 and 4.3. However, as indicated in NEPA Section 1502.23, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations.

NS100 - Night Sky, Visibility, and Light Pollution

Concern ID: 34373

CONCERN STATEMENT: *I would like to see the use of full cutoff light fixtures and less light escaping into the night sky, to reduce light pollution as much as possible.*

Response: Potential impacts to night sky from project lighting are discussed in section 4.10. Mitigation measures designed to minimize lighting impacts are presented in section 4.10.3. Mitigation measure NIGHT-1 would require the project to minimize the use of lighting in areas already well lit and to use full cutoff light fixtures throughout the project.

NV100 - Noise and Vibration

Concern ID: 30124

CONCERN STATEMENT: *The EIS does not measure the noise impact to the Marina neighborhood. Results of noise and vibration monitoring are only discussed for one building in the entire project study area, the Laguna Condos at Laguna and Bay. Noise impacts are not described for the condos at Buchanan and Beach Street. The EIS should report all results for the entire designated study area.*

Response: The Noise and Vibration sections of the EIS (sections 3.6 and 4.6) examine impacts to receptors closest to project elements in order to determine the

scenario of largest potential impact at six locations within the project area. For the Marina neighborhood the closest receptor would be the Laguna Condos at Laguna and Bay Streets, which would be 100 feet from the south loop turnaround and 400 feet from the north loop turnaround. Condos located at Buchanan and Beech Streets would be located, at the closest, approximately 540 feet from the tunnel egress of either the south or north loop turnarounds. Because propagation of both noise and vibration are dependent upon the distance to the receptor, resultant noise and vibration levels from both construction and operation of the F-Line Extension at the condos located at Buchanan and Beach Streets would be less than those predicted in the EIS for the Laguna condos.

Specifically, for construction noise, Table 4.6-3 indicates construction noise levels of 87.0 or 74.9 dBA at the Laguna condominiums for the south loop and north loop turnarounds, respectively. The Table also indicates that these noise levels would be below applicable construction noise criteria of the Federal Transit Administration. Construction noise levels at the condominiums located at Beach and Buchanan Streets would be 72.3 dBA and would also be less than applicable criteria.

With regard to potential consequences of construction-related vibration, the analysis presented in section 4.3.6 indicates that consequences from construction-related vibration would be minor to moderate at receptors located beyond 50 feet from construction areas. Consequently, construction vibration levels at the condominiums located at Beach and Buchanan Streets, at a distance of 540 feet, would be characterized as minor.

With regard to potential consequences of operational noise from the F-line extension, the analysis presented section 4.6.3 indicates that consequences from operational noise would be negligible (45.8 dBA in an existing noise environment of 65 dBA) at the Laguna condominiums, located 400 feet from the north loop turnaround. Consequently, operational noise levels at the condominiums located at Beach and Buchanan Streets, at a distance of 540 feet, would be less than that predicted at the Laguna residences and also characterized as negligible. Likewise, operational vibration levels at the Laguna condominiums, located 400 feet from the north loop turnaround are identified as negligible in section 4.6.3, and operational vibration levels at the condominiums located at Beach and Buchanan Streets, at a distance of 540 feet, would be less than that predicted at the Laguna residences and also characterized as negligible.

Concern ID: 30125

CONCERN STATEMENT: *No vibration results are presented for the historic wall mural on the east side of Safeway just 230 feet away.*

Response: With regard to potential consequences of construction-related vibration, the analysis presented in section 4.6.3 indicates that construction-related vibration levels would be considered a minor adverse impact at structures further than 25 feet, even if the closest buildings were considered to be “fragile”. Accordingly, construction-related consequences to receptors beyond 50 feet from construction areas would be characterized as minor. Because the Safeway is farther than 50 feet from the construction area, construction-related consequences to the structure, including the wall mural, are

considered minor.

Concern ID: 30126

CONCERN STATEMENT: *Traffic outside of the Maritime Museum should be limited to hours before the Museum opens and after it closes, and a "pedestrian only" area should be created during open hours.*

Response: Implementation of these suggestions is inconsistent with the scope of this EIS. The purpose of the proposed project is to serve the Fort Mason Center with public transportation and the limited suggested hours would be contrary to that purpose.

Concern ID: 30127

CONCERN STATEMENT: *The alternatives to the Plan do not mention the impact to the soundscape outside of the Maritime Museum.*

Response: There would be no noise impacts associated with Alternative 1 of the proposed action. Construction noise impacts to the Maritime Museum from Alternative 2 are addressed in section 4.6.3. Table 4.6-3 indicates construction noise levels of Alternative 2 at the Maritime Museum would be below applicable construction noise criteria of the Federal Transit Administration. Operational noise impacts of Alternative 2 at the Maritime Museum are also discussed in section 4.6.3, and are characterized as a moderate adverse impact. Alternatives 2A and 2B address the north and south loop turnaround options and would not affect the determination of Alternative 2 as the loops would be located over 1,500 feet away and separated by the intervening topography of Fort Mason.

Concern ID: 30128

CONCERN STATEMENT: *The specific streetcar identified as making the most noise, No. 952, is not owned by SFMTA (Muni) and is likely to be returned to its owner, New Orleans Regional Transit Authority, before the extension is open, making this measurement moot in all likelihood.*

Response: The following footnote has been added to section 4.6, Noise and Vibration: The 952 streetcar is not owned by SFMTA and is likely to be returned to its owner, New Orleans Regional Transit Authority, prior to its potential use on the F-line extension.

PA100 - Public Access

Concern ID: 30133

CONCERN STATEMENT: *Both turnaround alternatives interfere with public access.*

Response: Section 4.4.3 includes a description of provisions for ensuring public access and safety in both turnaround alternatives. In Alternative 2A (North Loop) the project would be designed to ensure the safety of pedestrians and bicycles including measures such as incorporating traffic signals where appropriate. In Alternative 2B (South Loop) the multi-use pedestrian and bicycle path (Bay Trail) would be realigned around the track configuration.

PC100 - Project Cost

Concern ID: 30134

Commenting Agency: San Francisco County Transportation Authority

CONCERN STATEMENT: *The Alternative project cost of \$28 to 30 million in construction costs (2010\$) does not include soft costs, vehicle costs, and escalation to year-of-expenditure dollars. These construction costs are lower than the figures presented in the earlier Funding Working Paper, which reported construction costs of \$45 to 48 million (2008\$) including soft costs. Please clarify the incremental cost of the vehicles for the project. Subsection 2.2.5, Operation (p. 48), mentions the need for four new historic vehicles to serve the route by 2030. The total project cost should include infrastructure and incremental vehicles costs, similar to other transit expansion projects that the City is planning.*

Response: The capital cost estimate (in 2010 dollars) for the proposed project, inclusive of construction, professional, and contingency costs is between \$52.7 and \$54 million (URS, 2009c). Construction costs represent the largest percentage of the capital cost estimate for the proposed project and are expected to have the largest local economic impact. Professional services costs represent a significantly smaller portion of the capital cost estimate, and it is reasonable to expect that some of this work might be performed by agencies or contractors outside of the region. For these reasons, the impact of construction costs for the two turnaround alternatives is examined in the Socioeconomics sections 3.3 and 4.3. The cost estimates included in Tables 4.3-1 and 4.3-2 reflect construction costs, and do not include additional professional services and contingencies costs.

As noted in section 2.2.5, SFMTA's existing service fleet of historic streetcars is sufficiently large to meet the anticipated 2030 vehicle requirement. The project would not necessitate acquisition of additional vehicles (URS 2009e). SFMTA estimates the rehabilitation costs necessary to meet the F-line extension's projected 2030 vehicle demand to be approximately \$3 million (\$1.5 million each for two vehicles).

Concern ID: 30135

CONCERN STATEMENT: *The cost of the Plan is not addressed, nor are there costs associated with any alternative.*

Response: Construction costs represent the largest percentage of the capital cost estimate for the proposed project and are expected to have the largest economic impact. For these reasons, the impact of construction costs for the two turnaround alternatives is examined in the Socioeconomics sections 3.3 and 4.3. Planning costs represent only a small percentage of the capital cost estimate, are not expected to have a considerable impact on the economy, and were therefore not analyzed separately in the EIS. However, as described in section 2.3, a Value Analysis (VA) Workshop evaluated the various project alternatives using a process called Choosing by Advantages (CBA), where decisions are based on the weighted importance of the advantages between alternatives. Capital and lifecycle costs, inclusive of planning-related costs, were factored into this analysis. In using CBA to determine a preferred alternative, the VA team identified the alternative that offers the highest total importance of advantages at the lowest cost (in both initial and life cycle). Therefore, both planning and construction-related costs were considered in

the alternatives selection and the analysis of those alternatives in the EIS.

Concern ID: 30138

Commenting Agency: *San Francisco County Transportation Authority*

CONCERN STATEMENT: *We suggest that the DEIS append the Funding Working Paper and further ask that the Van Ness and Geary Corridor Bus Rapid Transit (BRT) projects be clearly noted as the City's adopted priorities for Federal Transit Administration (FTA) Small Starts funds.*

Response: The Van Ness Avenue BRT and Geary Boulevard BRT projects are San Francisco's top and sole priorities for Small Starts funding, final design, and implementation based on the City and County of San Francisco Resolution 2009-05035 (April 28, 2009). The Funding Working Paper addresses the BRT projects only briefly, stating, "The MTC Commission has endorsed Small Starts funding for AC Transit's International Boulevard-Telegraph Avenue BRT project. In September 2008, MTC adopted San Francisco's Van Ness BRT project as the second regional priority project for Small Starts funding, with an equal priority to the International Boulevard-Telegraph Avenue BRT project. For Small Starts eligibility several other projects (not including the Historic Streetcar Project) are also under consideration" (URS 2009c). The Small Starts program is discussed in section 3.4.3, in which it is noted that FTA funding is not envisioned for the proposed track extension.

PD100 - Project Design

Concern ID: 30196

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *The Final EIS should provide information as to whether any public access improvements would be proposed as part of the project.*

Response: As discussed in section 4.8.3, Recreation and Visitor Use, operation of the F-line extension as proposed in Alternative 2 would increase public access to the area's attractions by extending public transportation to these amenities, with station platforms conveniently placed directly adjacent or in the attractions themselves. By decreasing the number of transfers required to access the area on public transit, local users from within the Bay Area would have increased opportunities to enjoy the attractions.

Concern ID: 30197

Commenting Agency: *California Public Utilities Commission*

CONCERN STATEMENT: *We encourage SFMTA to approach CPUC staff early in the project development in order to discuss potential safety concerns and associated mitigation related to the track alignment, intersection design and traffic signal configuration.*

Response: Comment noted.

Concern ID: 30198

CONCERN STATEMENT: *A platform could be placed at Marina and Laguna Street to serve the western side*

STATEMENT: *of Fort Mason, then the tracks extended, as double track and along the north side of Marina Blvd., 1/4 mile to Scott Street. At this point, platforms could be placed aligned with Marina Blvd. and a turnaround track could be built along Scott, Marina Green Drive and looping back to the alignment along Marina Blvd.*

Response: As described in Appendix A, several turn-around options were evaluated that extended beyond Fort Mason Center into Gas House Cove (See Figure A-6, Options 9 and 10; Figure A-7 Options 11 and 12.) No options went as far west as Scott Street, but one went around the Safeway. As also described in the corresponding sections of Appendix A, such alternatives did not score well during the alternatives screening process and were eliminated from further consideration.

Concern ID: 30200

CONCERN STATEMENT: *The project should consider eliminating the station near the tunnel entrance and relocate the Beach Street station closer to the Maritime Museum, to be about 1,800 feet from the existing Jones Street Station. Benches should be provided for riders who may need to rest before they complete their walk of one extra block.*

Response: The Alternatives screening examined a variety of alignment options and platform locations, which are documented in Appendix A. The screening process selected the alternative that met the project purpose and need and was operationally feasible. Among the factors that influenced selection of the transition area for platform construction were: (1) the streetcar would already be stopping in that location to ensure the single-track tunnel is clear of oncoming trains, and (2) proximity to existing Muni bus stops in that area, as described in sections 2.2.5 and 1.3, respectively.

SFMTA typically provides benches for curbside and platform seating, with limited exceptions located at narrow island shelters.

Concern ID: 34379

CONCERN STATEMENT: *Will there be traffic management or a signal to direct traffic and pedestrians entering the Ft. Mason?*

Response: Alternative 2A (North Loop) would be designed to ensure the safety of pedestrians and bicycles including measures such as incorporating traffic signals where appropriate.

PD200 - Project Design: Track Alignment

Concern ID: 30132

CONCERN STATEMENT: *Why is there no alternative that would provide protected streetcar lanes in both directions on Beach Street? Without dedicated lanes, the streetcar will get stuck in traffic on busy weekends, which will delay the streetcar and reduce its reliability. This would be a significant impact to streetcars, but this impact is not mentioned in the DEIS.*

Response: The option of constructing protected streetcar lanes in both directions of Beach Street was examined in the Conceptual Engineering Report for this project, which is included as part of the administrative record. The report’s findings state, “On Beach Street, limited street width on several blocks means that configuring the street in this manner for both the eastbound and westbound trackway for the Fort Mason extension would require converting some or all blocks of Beach Street between Jones and Polk Streets to one-way auto traffic, and would result in unusual street and lane configurations that could create pedestrian safety issues” (URS 2009e). For these reasons, protected streetcar rights-of-way in both directions along Beach Street was considered infeasible and dismissed from further review. However, as described in Section 2.2.3, the concept of a protected right – of –way was carried forward as part of Alternative 2 (Semi-Exclusive Eastbound Option) and analyzed in the EIS.

Concern ID: 30205

CONCERN STATEMENT: *The streetcar extension should re-use the old State Belt tracks that pass the Maritime Museum at Aquatic Park. This alternative should be brought back for consideration instead of being dismissed out of hand.*

Response: This option was considered during the alternatives screening and is called Alignment Option 1: Promenade and Beach Street in Appendix A. It was dismissed as being inconsistent with park management objectives because it would use the waterfront Promenade, thereby creating significant affects to the NHLD by splitting the district and introducing new visual elements to the NHLD, as well as creating streetcar conflicts with exiting high pedestrian and bicycle traffic on the Promenade. The Promenade/Bay Trail through Aquatic Park is also subject to storm wave over wash.

Concern ID: 30206

CONCERN STATEMENT: *Single track should be studied for the entire extension starting just west of Jones Street.*

Response: There are a number of reasons that single tracking is not desirable west of Jones Street: single tracking limits the frequency of the streetcar; it creates a single point of failure when trains break down or are stopped; and for safety reasons, the design would require extensive protection to avoid head-on collisions.

Concern ID: 35003

Commenting Agency: *California Public Utilities Commission*

CONCERN STATEMENT: *CPUC staff recommends that the side-running track alignment, while providing for the safe boarding of passengers along the side of the roadway, may present a confusing situation for motorists where a street car continues straight from a*

dedicated right-turn lane, or where a street car turns left from the right side of the roadway. Therefore it may be appropriate to consider a mixed-traffic alignment in some locations.

Response: Comment noted.

PD500 - Project Design: Green Design

Concern ID: 30139

Commenting Agency: U.S. Environmental Protection Agency

CONCERN STATEMENT: *The EPA encourages NPS, SFMTA, and FT A to implement "green infrastructure," such as bioretention areas, vegetated swales, porous pavement, and filter strips in any onsite storm water management features. These features can serve as both storm water treatment and visual enhancements (EPA Comment).*

Response: Comment noted. The project may consider green infrastructure during the design phase of the project.

PH100 - Public Health and Safety

Concern ID: 30208

CONCERN STATEMENT: *The plan does not adequately address or mitigate the safety issues that it creates, particularly for bicyclists and pedestrians.*

Response: In Alternative 2A (North Loop) the project would be designed to ensure the safety of pedestrians and bicycles including measures such as incorporating traffic signals where appropriate. In Alternative 2B (South Loop) the multi-use pedestrian and bicycle path (Bay Trail) would be realigned around the track configuration. In addition Mitigation Measure REC-3 states: Coordinate the Bay Trail reroutes with Association of Bay Area Governments (ABAG). To ensure temporarily and permanently rerouted Bay Trail segments meet the policies and guidelines of the Bay Trail Plan, the NPS shall coordinate trail details with ABAG. Where the Bay Trail and the F-line extension intersect, the Bay Trail shall be clearly and well physically separated from the rail alignment to ensure public safety. This shall include areas where passengers are disembarking from the streetcar onto the Bay Trail route to prevent collisions between Bay Trail bicycle and pedestrian users and public transit users.

PK100 - Parklands, Recreational Facilities and Visitor Use

Concern ID: 34372

CONCERN STATEMENT: *The preferred alternative (which is the only alternative both in the document and in reality if the project is about sending historic streetcars through the historic Fort Mason Tunnel), will destroy forever the natural, scenic and recreational values of west Aquatic Park, a good portion of the National Historic Landmark District. Currently, this area of the park, bordering Fort Mason and away from the cacophony of Fisherman's Wharf, is a great place to sit on a bench or the lawn and enjoy the sounds of waves lapping on the shore, birds crying overhead and children laughing on the beach, while gazing at the historic ships. High school kids from Galileo are often seen running through the park during gym class. A game of Bocce Ball may be enjoyed in this area. This will all be gone as historic streetcars rumble through every few minutes with the clack, clack and screech as the cars*

make the curve from Beach Street through Aquatic Park across Van Ness Avenue to the tunnel. Add to that the incessant ring of the bell as the streetcar crosses 4 (four) sidewalks in western Aquatic Park.

Response: With regard to potential cultural resource impacts, the commenter is referred to the first comment response under CU100, and the second comment response under PN100. Potential noise-related impacts associated with operational use of the streetcar near Aquatic Park are discussed in section 4.6.3. Mitigation measures to lessen or avoid these effects are also described in that section. Specifically, mitigation measure NOISE-2 would require retrofitting the streetcars with resilient or dampened wheels to reduce rolling noise, and the application of shielding and/or absorptive material under the streetcar.

PN100 - Purpose and Need

Concern ID: 30201

CONCERN STATEMENT: *The project objectives could be met through an enhancement of the MUNI system in the area - utilizing buses or trolleys on surface streets or providing a shuttle service for Fort Mason Center.*

Response: Several alignment alternatives considered the use of motor coach and trolley coach. These were ultimately dismissed from further analysis because they did not meet the purpose of the project of providing a rail transit connection, nor could they meet the purpose and need criteria of connecting NPS sites directly to traffic generators along the northern waterfront corridor or the current historic streetcar. This is documented in Appendix A.

Concern ID: 30202

CONCERN STATEMENT: *The preferred alternative appears to be in direct conflict with the objectives to "Avoid or minimize adverse effects to the NHLDs and NRHP-listed or eligible properties, and maintain the integrity of related cultural and historic resources." and "Maintain the natural, scenic, and recreational values of SF Maritime NHP and GGNRA."*

Response: Efforts to avoid or minimize adverse effects to historic properties through the alternatives selection process are described in section 2.1 (Alternatives) and in Appendix A (Alternatives Considered and Dismissed). As discussed in section 2.1.1, the preliminary alternatives were developed based on previous planning studies, public scoping and agency working group input.

One of the major screening criteria for the alternatives was "Park Preservation", which relates to the various objectives of the National Park Service in operating the national parks where the line extension would be located. As also discussed in section 2.1.1, specific alternatives screening criteria included: (1) minimize impact on National Historic Landmark (NHL) Properties - the degree to which each alternative minimizes adverse effects on the Aquatic Park National Historic Landmark District (NHLD) and the San Francisco Port of Embarkation NHLD. There are several historic properties within the project study area. Any effects to these properties would be taken into account and avoided, minimized or mitigated. (2) Minimize impact on the existing historic and cultural setting - the degree to which each alternative minimizes visual, noise, or other impacts on historic and cultural facilities. (3) Minimize use of parkland for non-park purposes - the degree to which each alternative minimizes the use of parkland for a non-park use (e.g., incorporation into a transportation facility, temporary

occupancy of park land that would result in permanent adverse physical impacts, or would interfere with the activities or purpose of the park).

The results of the preliminary alternatives evaluation yielded one alignment alternative and two turnaround options within Fort Mason. Together, these alternatives fully address the project objectives and project purpose and need while also avoiding or minimizing impacts to nearby resources, including the two NHLDs. Among all the preliminary alternatives considered technically feasible, they are considered the only reasonable alternatives that were analyzed in the EIS.

Although the preferred alternative(s) would cause impacts to NRHP-listed or eligible properties, such impacts have been reduced or avoided to the greatest extent possible through the alternative selection process.

Concern ID: 30203

CONCERN STATEMENT: *The estimate of 1.6 million annual visitors to the Fort Mason Center merits closer scrutiny.*

Response: The Fort Mason Center reports between 1.5-1.7 million visitors per year.

Concern ID: 30204

CONCERN STATEMENT: *The Fort Mason Center estimates of annual attendance are projected on page 9 of the DEIS to increase to 1.9 million if Pier One at Fort Mason were restored. There is no estimate of when or if that might occur, and it is compounding speculation with further speculation to use the higher estimate to attempt to bolster projections based on a survey sample of .02%.*

Response: A date for Pier One renovation has not been set, as funding for that work has not been secured. However, the Fort Mason Center reports present visitation ranges between 1.5-1.7 million visitors per year.

PP100 - Plans and Policies

Concern ID: 30180

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *The Final Environmental Impact Statement (FEIS) should include a discussion and a map that delineates the boundaries of the Bay Conservation and Development Commission's jurisdiction and should also discuss the relevant policies, including recreation, public access, and appearance, design, and scenic views, which address the potential impacts of the proposed project.*

Response: Pursuant to section 307 of the Coastal Zone Management Act of 1972, BCDC's jurisdiction extends to any portion of a federal agency action that has the potential to impact any land or water use, or natural resource of the coastal zone. Consideration of this boundary (100 feet landward of the shoreline of the San Francisco Bay) is important to this project, as the study area either slightly overlaps or is adjacent to the coastal zone (see Figure 3.2.3.). Implications of the proposed project for coastal resources within BCDC's purview are addressed in various sections throughout the EIS. For example, recreation is addressed in section 4.8.3, public access is addressed in section 4.4.3, and visual resources are addressed in 4.9.3. Before a federal agency can take action on a project that could impact the coastal zone, it must first provide to BCDC a determination

that the action under consideration is consistent with the applicable enforceable policies of the state coastal management program (e.g., the McAteer Petris Act and the San Francisco Bay Plan). This document is commonly known as a “consistency determination”. NPS has initiated the consistency determination process with BCDC. Should BCDC wish to see additional project details of particular relevance to the coastal management program; NPS would be happy to provide such information through the consistency determination process.

Concern ID: 30181

Commenting Agency: *California Public Utilities Commission*

CONCERN STATEMENT: *The proposed modification or construction of track across roadways will require authorization of CPUC. CPUC needs to be identified as a permitting authority in all project documentation. The construction of a new rail transit extension requires a Safety Certification Plan to be approved by the CPUC as the State Safety Oversight Agency for rail transit systems.*

Response: SFMTA will coordinate with the CPUC during the design and implementation phase. In the EIS, the table in section 6.4, Future Compliance Requirements has been updated to include CPUC as the state safety oversight agency and a Safety Certification Plan has also been added as a requirement.

Concern ID: 30182

Commenting Agency: *San Francisco County Transportation Authority*

CONCERN STATEMENT: *The DEIS's public outreach materials state that transit service improvements are needed along the northern waterfront to serve a neighborhood with growing numbers of residents and jobs. Please clarify this statement, as forecast land use growth in the project vicinity is quite limited, particularly as compared to San Francisco's Priority Development Areas, where major planning efforts have been completed or are underway.*

Response: The commenter is directed to sections 1.2 and 1.3. The purpose and need for the proposed project are described in these sections, and are among the bases upon which the preferred alternative was selected. Neighborhood population and job growth along the northern waterfront are not identified in these sections as underlying the project's purpose and need.

RE100 - Recreation

Concern ID: 30179

CONCERN STATEMENT: *Recreational access will be impacted due to a lack of parking and the presence of the F-line near recreational areas in the Great Meadow and west Aquatic Park.*

Response: As discussed in section 4.8.3 (Recreation and Visitor Use), operation of the F-line extension as proposed in Alternative 2 would increase public access to the area's attractions by extending public transportation to these amenities, with station platforms conveniently placed directly adjacent or in the attractions themselves. By decreasing the number of transfers required to access the area on public transit, local users from within the Bay Area would have increased opportunities to enjoy the attractions.

SE100 - Socioeconomics and Environmental Justice

Concern ID: 30309

CONCERN STATEMENT: *If the westbound platform structure were located between Hyde and Larkin and within 12 removed parking spaces, it would by local ordinance cause the permanent loss of 30 street artist selling spaces. The loss of these 30 selling spaces represents a 55% decrease in the number of viable selling spaces for street artists at the wharf.*

Response: The EIS analyzes the potential impact of a conceptual station platform configuration, assuming a platform length of 155 feet long (a 75 foot platform plus the mini-high platform). Actual platform length, depending on location and design considerations, could range between 110 feet and 155 feet (URS 2009e). The latter number was evaluated in the EIS to ensure that all potential impacts of the most conservative scenario were considered. As noted below, operational and design elements, which will ultimately dictate platform length, will be determined in the design phase of the project.

The DEIS incorrectly states, however, that a platform of 155 feet in length on Beach Street would result in the displacement of 12 parking spaces. Section 4.3.3 has been revised to clarify the implications of a new platform along Beach Street, between Polk and Columbus Streets, including a “worst case” scenario under which parking spaces and street artist spaces could be impacted. Parking stalls on Beach Street measure approximately 22 feet in length. As discussed below, the final platform location will be determined through a subsequent local public planning process that takes into account operational and design considerations, as well as public comment. Conservatively assuming that the platform cannot be placed one block to the east or west, and cannot be configured in a way that would allow the street artists to continue operations as normal, construction of a west-bound platform on Beach Street, between Hyde and Larkin, could displace up to 7 parking spaces, potentially impacting up to 17 street artist spaces.

Completion of the NPS environmental review process required by NEPA is not the end of public review and input on the project. After the project completes the environmental review process it enters into the design and engineering phase that will involve stakeholder input and be managed by the SFMTA, with additional oversight provided by the San Francisco Planning Department.

At the outset, all owners and interested parties within 300 feet of a project are sent notification informing them they are adjacent to a planned project. Initial drawings and concepts are shared at one or more public meetings, and after a period of outreach, a general public hearing is held by the SFMTA to receive comments on the initial work. The findings are reported to the San Francisco Planning Department, which may choose to hold their own public meetings on the issue. Following comments from the Planning Department, design and engineering is refined and shared with the stakeholders again, and when the majority of parties are in agreement, the design and engineering work proceeds to the advanced level. The process repeats until the SFMTA completes a final design for the project, and that is the project that is constructed.

Concern ID: 30310

CONCERN STATEMENT: *On page 210 the EIS incorrectly states that the removal of 12 parking spaces would result in the removal of 12 vendor (street artist) spaces. A street artist space is 9 feet in length and a parking space is about 22 feet in length. Therefore, a*

removal of 12 parking spaces would cause the loss of at least 30 spaces.

Response: Comment noted. As discussed above, the final platform location will be determined through a subsequent local public planning process that takes into account operational and design considerations, as well as public comment. Conservatively assuming that the platform cannot be placed one block to the east or west, and cannot be configured in a way that would allow the street artists to continue operations as normal, construction of a west-bound platform on Beach Street, between Hyde and Larkin, could displace up to 7 parking spaces, potentially impacting up to 17 street artist spaces. Section 4.3.3 has been updated to reflect this estimate.

Concern ID: 30311

CONCERN STATEMENT: *On page 209 the EIS states that the platform structure would be predominantly located within the parking space and therefore continued operation of the existing street artist vendors may be permitted. However, the Street Artist Ordinance (Article 24) states that a display cannot be located more than 4.5 feet from the curb line of a sidewalk (Section 2405 c, part 1). Since the platform would "bubble-out" street artist displays would likely have to be more than 4.5 feet from the curb which would put them out of compliance with Article 24.*

Response: Comment noted. Under the most conservative scenario, westbound Beach Street platform would result in the displacement of 7 parking spaces and displace 17 street artist spaces. Section 4.3.3 has been update to reflect this estimate.

Concern ID: 30312

CONCERN STATEMENT: *On page 210 the EIS states: "Although the potential loss of these spaces would result in a net reduction in vendor spaces, there would nonetheless remain approximately 33 neighboring vendor spaces on the Beach Street block with another existing 10 spaces west of Larkin Street." In actuality, it would be 30 selling spaces, out of the 45 viable Beach street spots, that would be lost. Therefore it would be "15 neighboring vendor spaces" that remain on that block, and not "33 neighboring vendor spaces on the Beach Street block". The "10 spaces west of Larkin Street" are not deemed 'viable' and are never used. A 'viable' space is one where a street artist may make an average daily income, and an 'un-viable' space would be one where they would make less than 20% of a day's wage.*

Response: Comment noted. Under the most conservative scenario, westbound Beach Street platform would result in the displacement of 7 parking spaces and displace 17 street artist spaces. Section 4.3.3 has been update to reflect this estimate.

ST200 - Streetcars: Function and design

Concern ID: 30183

CONCERN STATEMENT: *Add more streetcars or run them more frequently by adding more service at peak hours and weekends.*

Response: The operational frequency, including peak hours and weekends, for the F-line extension are described in section 2.2.5. Vehicle requirements including the number of vehicles proposed to meet the weekday peak vehicle demand is also described in this section.

TT100 - Transportation: Traffic and Parking

Concern ID: 30226

Commenting Agency: San Francisco Board of Supervisors - Supervisor Mark E. Farrell

CONCERN STATEMENT: *Chapter 4.4 Traffic and Circulation is lacking in basic transportation data about the number of trips by type that are expected in the study area. In the circulation analysis, how are determinations of the level of impact made? On page 224 the DEIS discusses impacts on parking in the Marina by recognizing that people could seek parking places in the Marina and then walk to reach the F-Line. The DEIS states, "The effect could be adverse if large numbers of people search parking at the marina, creating traffic congestion at local intersections, but it is speculative to quantify. The overall impact would be long-term, minor and adverse." If it is speculative to quantify, how can one conclude the impact would be minor?*

Response: The following explanation has also been added to section 4.4.3 (Overall Alternative 2 (all segments)). While construction of the F-line Historic Streetcar to Fort Mason may generate a small number of new vehicle trips to the Marina Neighborhood, and for the reasons described below, the overall effect is expected to be minor.

First, the proposed extension is not expected to be an attractive transportation supplement for inbound commuters or those traveling beyond Fisherman’s Wharf. For purposes of comparison, travel time for an automobile commuter from the Golden Gate Bridge to Downtown San Francisco (2nd Street and Market Street) is approximately 16 minutes. Using the F-Line to supplement a commute to the same destination would require an approximately 9 minute drive from the Golden Gate Bridge to Fort Mason, plus an additional 21 minute trip on the historic streetcar (URS 2009f). Thus, utilization of the F-Line would add approximately 15 minutes (per direction) to overall commute time. North Bay travelers presently have a number of other more time- and cost-competitive options for accessing San Francisco’s Downtown and Fisherman’s Wharf areas. These include Golden Gate Transit, Golden Gate Ferry, and the Blue and Gold Fleet, each of which has available capacity.

Next, transportation demand model 2030 projections (URS 2009f) indicate that extension of the F-Line would result in an overall decrease in daily vehicle trips to Fort Mason by 42 (15,330 annually) and the Maritime Museum by 160 (58,400 annually). This reduction is expected to offset any potential vehicle trip generation that would occur as a result of the project.

Lastly, in the unexpected event that the proposed extension did result in the generation of new vehicle trips to the Marina Neighborhood beyond the projected offsets, a number measures are available to mitigate those impacts. For example, as discussed in section 4.4.3, and included as mitigation measure TRANS-4, imposing time restrictions on parking spaces in the Marina Neighborhood would deter long-term (i.e., commuter) parking around the proposed Fort Mason turnaround. Other alternatives available to the Marina Neighborhood residents include the establishment of metered parking and the expansion of permit parking.

For these reasons, extension of the F-line is not expected to cause a considerable increase in trip generation to the Marina Neighborhood, or associated vehicle congestion and transit service delays.

- Concern ID:** 30227
- Commenting Agency:** *San Francisco Board of Supervisors - Supervisor Mark E. Farrell*
- CONCERN STATEMENT:** *The DEIS should provide a more thorough analysis of potential traffic congestion in order to review and analyze the potential impacts to transit service on Lombard and Chestnut streets, as well as other MTA bus lines providing transit service in the area.*
- Response:** The focus of the EIS analysis of potential traffic congestion was on the intersections through which the F-Line extension would travel (on Jefferson and Beach Streets) and where lane configurations and traffic control would change under Alternative 2. Nonetheless, for the reasons set forth in response to Concern ID 30226, and as discussed in section 4.4.3, the F-line extension is not expected to result in a considerable increase in new vehicle trips to the Marina Neighborhood. And for those reasons, implementation of the proposed project alternative is not expected to generate traffic congestion or bus service impacts on Lombard and Chestnut Streets, or the broader project area.
- Concern ID:** 30228
- CONCERN STATEMENT:** *The DEIS does not use appropriate traffic metrics to assess the impact on residential, as opposed to commute, streets. Level of Service (LOS) is widely recognized as inadequate for residential streets; various methodologies (e.g. TIRE, Impact Threshold Curve) may be better than LOS at assessing this issue.*
- Response:** The focus of the EIS analysis of potential traffic congestion was on the intersections through which the F-Line extension would travel (on Jefferson and Beach Streets) and where lane configurations and traffic control would change under Alternative 2. Alternative 2 would not cause intrusion of traffic on residential streets and would have no effect on traffic flow conditions on residential streets, and therefore, the suggested alternative analysis methodologies are not relevant to the EIS analysis of potential impacts.
- Concern ID:** 30229
- CONCERN STATEMENT:** *The DEIS must include an alternative that protects the streetcar from congestion and delay.*
- Response:** The option of constructing protected streetcar lanes in both directions of Beach Street was examined in the Conceptual Engineering Report for this project, which is included as part of the administrative record. The report’s findings state, “On Beach Street, limited street width on several blocks means that configuring the street in this manner for both the eastbound and westbound trackway for the Fort Mason extension would require converting some or all blocks of Beach Street between Jones and Polk Streets to one-way auto traffic, and would result in unusual street and lane configurations that could create pedestrian safety issues” (URS 2009e). For these reasons, protected streetcar rights-of-way in both directions along Beach Street was considered infeasible and dismissed from further review. However, as described in Section 2.2.3, the concept of a protected right – of –way was carried forward as part of Alternative 2 (Semi-Exclusive Eastbound Option) and analyzed in the EIS. does consider a semi-exclusive

Concern ID: 30230

CONCERN STATEMENT: *The potential for an increase in traffic along Bay Street and Marina Boulevard, as well as the residential streets in the Marina east of Fillmore has not been evaluated adequately.*

Response: Alternative 2 would not generate an increase in traffic volumes on area roads (including those cited in the comment). Rather, as described in the EIS, it is expected that Alternative 2 would result in people shifting from use of their private automobile to other modes of travel including the F-Line, and the degree of that shift in travel mode would be clearly detectable. In addition, the level of congestion at intersections under Alternative 2 generally would be acceptable. Therefore, there would be no reason for drivers to divert from Beach Street to other streets in the area.

TT200 - Transportation: Parking

Concern ID: 30292

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *Further analyze the location and estimate the number of parking spaces that would be lost to shoreline visitors accessing the Bay for swimming, boating, and other water-oriented public access activities.*

Response: Section 4.4.3 includes a thorough evaluation of the location and number of parking spaces that would be displaced by Alternative 2. Commenter is also referred to concern statement response under RE100, regarding the effect on public access to recreational uses.

Concern ID: 30293

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *Provide additional information as to whether it would be feasible to provide new parking to mitigate for parking spaces that are lost as a result of the construction of the project.*

Response: Commenter is referred the first concern statement response under MM100, concerning loss of parking spaces.

Concern ID: 30294

CONCERN STATEMENT: *The issue of tourist parking has not been discussed in the DEIS, and peak impacts for the tourist use are not in the peak am/peak pm periods that the DEIS considered when evaluating traffic impact.*

Response: Section 4.4.3 includes a thorough evaluation of the location and number of parking spaces that would be displaced by Alternative 2. The EIS analysis of the effects on parking conditions is not limited to peak traffic periods, as suggested by the Concern Statement.

Concern ID: 30295

CONCERN STATEMENT: *Loss of parking will result in reducing access to green space for recreation and should be considered an adverse effect.*

Response: Commenter is referred to the concern statement response under RE100, concerning the effect on public access to recreational uses.

Concern ID: 30296

CONCERN STATEMENT: *The streetcar tracks would eliminate all of the truck loading spaces on the west side of Leavenworth, and most of the spaces on the east side. Already there are not enough truck loading spaces, and trucks have to double-park. Without any analysis or discussion, the DEIS concludes that the removal of all of these truck loading spaces is not problematic because other general parking spaces could be converted into loading spaces. Where would that be? Also the DEIS fails to mention that the streetcar tracks on the south side of Beach between Leavenworth and Jones would remove another entire block of on-street truck loading.*

Response: Mitigation Measure TRANS-3 stipulates that SFMTA would change general metered spaces to metered truck loading spaces in Alternative 2's in-street segment to minimize the incidence of double parking caused by removal of truck loading spaces under either alignment options. In addition, the Fisherman Wharf Public Realm Plan contains policies to better manage parking in the area. The 14 on-street truck loading spaces on the south side of Beach Street between Leavenworth and Jones Streets (included in Table 3.4-4, section 3.4.2) were mistakenly omitted from section 4.4.3, which list on-street parking spaces that would be removed under Alternative 2 in order to accommodate (a) the streetcar tracks and platforms, and (b) turn lanes for automobile/truck traffic. The EIS has been updated accordingly.

Concern ID: 30297

CONCERN STATEMENT: *This project fails to address or mitigate loss of critically important free 4 hour parking-particularly along the north side of Beach west of Polk and on lower Van Ness Avenue. Without nearby affordable vehicle parking neither Dolphin Swimming and Boating Club nor South End Rowing Club cannot continue to operate.*

Response: Free public on-street parking is not a right, and should not be relied upon. In addition, as stated in section 3.4.2, there are parking spaces on Van Ness Avenue near, but not across, the track alignment in this area. Those parking spaces would not be affected by the Project.

TT300 - Transportation: Impacts from additional Vehicles in Marina Neighborhood

Concern ID: 30216

CONCERN STATEMENT: *The DEIS does not assess the impact the proposed project will have on the Marina. An extension of the F-Line to Fort Mason Center will attract additional vehicles into the Marina and those additional vehicles will have an impact.*

Response: The only people who would drive to the area to use the F-Line would be North Bay commuters, and as noted in section 4.4.3, parking on Marina Boulevard and on the street network south of the marina area is restricted to two hours between 8:00 a.m. and 6:00 p.m. (Monday through Friday) for nonresidents. Residents (with residential zone "M" parking permits) have no time limit. Also, Mitigation Measure TRANS-4 would implement time limits for parking in the marina lot in proximity to the Fort Mason Center, so there is no reason to believe that additional vehicles would be attracted into the Marina by the proposed project.

TT400 - Transportation: SF Transit Expansion

Concern ID: 30217

CONCERN STATEMENT: *Has consideration been given to extending the line to the Presidio?*

Response: Extending the F-Line further than the Fort Mason Center is beyond the scope of this project.

TT500 - Transportation: Transportation Demand Management

Concern ID: 30218

Commenting Agency: *San Francisco County Transportation Authority*

CONCERN STATEMENT: *Transportation and Circulation: Subsection 2.2.5, Operation, and Section 4.4, Transportation and Circulation, include only a brief treatment of the projected transportation-related impacts of the alternatives. We suggest that this material be supplemented to include a more thorough treatment of transportation demand and system impacts, particularly as they relate to visitor and work trips. This discussion should focus on expected impacts to existing F-Line service and Muni system operations, including effects on historic streetcar ridership (including at high-season maximum load points along the Embarcadero) and potential delays to Muni bus lines operating in the project area resulting from traffic circulation. These transportation demand data will also help to substantiate the DEIS's assertion that Alternative 2 "would result in a long-term, moderate, beneficial impact" to transit operations. The Transportation and Circulation Appendix (Appendix B) consists of documentation relating to traffic effects. The DEIS references a technical memorandum (URS, 2009f), which covers many of the above mentioned issues in detail; we suggest that this material be included in whole or in part in the environmental document's appendices to help support local decision-making.*

Response: The cited "(URS, 2009f)" technical memorandum ("Transit Operations Plan", prepared by URS Corporation for the National Park Service, July 2009) is part of the Administrative Record for the EIS and, therefore, is part of the EIS and supports local decision making. Nonetheless, as a courtesy to the commenter, the Transit Operations Plan has been uploaded to the NPS' Planning, Environment, and Public Comment (PEPC) website. The document can be accessed through the following PEPC website address: <http://parkplanning.nps.gov/projectHome.cfm?projectID=15547>. Commenter is also referred to the concern statement response TT100 regarding potential delays to bus lines operating in the project area.

Concern ID: 30219

Commenting Agency: *San Francisco County Transportation Authority*

CONCERN STATEMENT: *The project and DEIS would be strengthened by a discussion of transportation demand management (TDM) strategies that could or would be deployed to help meet transportation needs in the streetcar corridor. Such TDM measures could be used to complement either Alternative 1 or Alternative 2. Potential strategies include: parking pricing and management; co-marketing strategies (e.g. bundling of transit passes with visitor hotel stays and major event tickets); and employer-based programs to encourage non-automobile travel and flex times.*

Response: The purpose of Alternative 2 is to "help meet transportation needs in the street car corridor". The suggested potential TDM strategies could be studied by the City and the Fort Mason Center, but are outside the purview of the proposed project and EIS.

TT600 - Transportation: Bicycles/Bay Trail

Concern ID: 30220

CONCERN STATEMENT: *Clarify the references to the Fisherman's Wharf Public Realm Plan and the Fort Mason Bay Trail at Laguna Street and Marina Boulevard Project. The Fort Mason Bay Trail at Laguna Street and Marina Boulevard Project is alternately referenced as both a future project and a past project. To clarify, in 2009, the National Park Service in coordination with the Golden Gate National Parks Conservancy completed a Bay Trail grant-funded construction project at the intersection of the Fort Mason Bay Trail at Laguna and Marina (a.k.a. "the squeeze"). This is a completed project and should be referenced as such.*

Response: The Fisherman's Wharf Public Realm Plan is described in detail in section 4.1.2. The description of the SF Bay Trail past project construction has been clarified in this same section to read: SF Bay Trail - Improvements to the extensive Bay Trail (including the intersection of the Fort Mason Bay Trail at Laguna Street and Marina Boulevard - known as "the squeeze") were completed in 2009. References to the SF Bay Trail improvements at Laguna and Marina have been clarified as a past project only in section 4.3 (Socioeconomics), Section 4.4 (Transportation), Section 4.5 (Air Quality), Section 4.6(Noise and Vibration), and Section 4.7 (Cultural Resources).

Concern ID: 30221

CONCERN STATEMENT: *Please include reference to the upcoming construction project "Marina Green Zone H Bay Trail", which runs approximately 800 feet from the Fort Mason gate north to the Fort Mason parking lot entrance as well as the City's Marina Green Bike/Pedestrian Improvements Project in the EIS.*

Response: The project to which the commenter refers has been added to the list of Reasonable Foreseeable Future Actions in section 4.1.2.

Concern ID: 30222

CONCERN STATEMENT: *Please coordinate with the City of San Francisco and the Bay Trail Project to ensure that F Line extension plans between Jones and Leavenworth incorporate the "Jefferson Street Redesign", which addresses bicycle and pedestrian circulation issues on the Bay Trail through Fisherman's Wharf as part of the Fisherman's Wharf Public Realm Plan.*

Response: Comment noted. NPS and SFMTA will be coordinating with the San Francisco Planning Department for the Fisherman's Wharf Public Realm Plan and as such will incorporate the Jefferson Street Redesign.

TT700 - Transportation: Public Transit

Concern ID: 30224

CONCERN STATEMENT: *The TEP study cited in the EIS recommended that the Polk 19 bus be re-routed to stop up the hill on the corner of North Point and Polk. Please clarify whether this recommendation is the most up to date version of this plan and whether it has been modified to accommodate the stop on Beach Street in front of the Senior Center.*

Response: Due to constraints at Van Ness/North Point Streets, the working recommendation for the Transit Effectiveness Project is to leave the 19 Polk terminal at its current location. Under this scenario, it would continue to serve the Beach Street Senior Center. More detailed engineering and traffic analysis within the area during the design phase will assist SFMTA to accommodate the most effective, efficient, and safe movement of the multi-modal transportation system in the area.

Concern ID: 30225

CONCERN STATEMENT: *This study should consider traffic impacts on transit with each alternative transit configurations as well as transit's impacts on traffic.*

Response: Commenter is referred to the first concern statement response under TT500, regarding impacts to transit operations.

UT100 - Utilities

Concern ID: 30213

CONCERN STATEMENT: *Electrifying the overhead connector system has not been addressed in the Plan.*

Response: As stated in section 4.14.3, Pacific Gas & Electric would provide traction power for SFMTA. Further detail will be determined during the design phase.

Concern ID: 30214

CONCERN STATEMENT: *The Plan does not address pavement upgrades to the historic Promenade.*

Response: Pavement upgrades to the historic Promenade is beyond the scope of this EIS.

Concern ID: 30215

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *In Section 4.14.3, the primary potential adverse impacts to the sewer system are (1) damage and loss of service due to construction activities (2) permanent loss of access due to the installation of overlying structures including rails, platforms, other utilities and overhead wires, (3) permanent reduction in service due to alteration of infrastructure, including piping and surface drainage. The language in this section addresses items 1 and 2 at least partially, but does not appear to address item 3. All three items should be addressed fully.*

Response: As discussed section 2.2.4, streets where utilities are located would be reconstructed as part of the proposed project. Utilities would be updated and/or relocated within the street ROW on all blocks. Replacement of utilities in accordance with City and County of San Francisco Bureau of Engineering standards would not result in permanent reductions of service.

Concern ID: 30288

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 192, in reality, the proposed rail extension may cross various sewer jurisdictions and boundaries between combined and separated sewer systems. For this reason, this document should carefully and accurately describe the*

various physical and administrative sewer zones and, preferably, depict them graphically.

Response: Graphical representations of utilities within the project vicinity are included in the 2008 URS report, entitled, "Technical Study, Utilities." This document was consulted during the course of the analysis, is part of the Administrative Record for the EIS, and therefore is part of the. Nonetheless, as a courtesy to the commenter, the "Technical Study, Utilities" has been uploaded to the NPS' Planning, Environment, and Public Comment (PEPC) website. The document can be accessed through the following PEPC website address: <http://parkplanning.nps.gov/projectHome.cfm?projectID=15547>.

Concern ID: 30289

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 192 Sanitary Sewer /Storm Drain System, ensure that all technical terms utilized are the correct term; for reference material please look at the SF Public Works code. The terms for the separate systems include 'Sanitary Sewer System and Stormwater Sewer System. Also stormwater is to be used as one word when not using the proper name of a Federal, State, or Regional Permit.*

Response: Section 3.14, Public Services and Utilities has been modified accordingly.

Concern ID: 30290

Commenting Agency: *San Francisco Public Utilities Commission*

CONCERN STATEMENT: *On page 294, in reference to NPDES general permit, the term used under paragraph 2 of section 4.11.3 Impacts of Alt 2, line 12, says 'general construction permit' the correct term is 'construction general permit'. For additional information on this permit please see the following link http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml*

Response: The EIS has been modified accordingly.

VI100 - Visual and Aesthetic Resources

Concern ID: 30212

CONCERN STATEMENT: *Incorporate benches and native plants to soften the look of the turnaround area.*

Response: Comment noted. The inclusion of such features would be addressed during the during the design phase.

VU100 - Visitor Use

Concern ID: 30209

Commenting Agency: *San Francisco Bay Conservation and Development Commission*

CONCERN STATEMENT: *The FEIS should fully assess the potential impacts on waterfront users, including the number of people that the expanded service will bring to the waterfront, and the potential impacts on existing public access to the waterfront required in other BCDC permits.*

Response: Increased visitor use to the GGNRA, SF Maritime NHP, and Fisherman's Wharf area are described in section 4.8 (Recreation and Visitor Use) and Section 4.14 (Public Services and Utilities). Projected visitor numbers are discussed in Section 1.3 (Purpose and Need for Action) and expanded ridership is described in Section 2.2.5 (Alternatives). BCDC permits are discussed in Section 3.2.4 (Land Use); however, public access to the waterfront will not be impacted by this project.

Concern ID: 30210

CONCERN STATEMENT: *Will allowance be made for special event usage of the trolley?*

Response: Authorization for exclusive use of the F-Line Historic Streetcar for private events is not anticipated. SFMTA's policy on Charter service will be developed closer to the implementation date. However, stakeholders should be aware that it would impact the aggregate F line if single tracking is required; already long headways will be more vulnerable to disruption by extra trains.

VU2000 - Visitor Use: Methodology and Assumptions

Concern ID: 30298

CONCERN STATEMENT: *Page 9 of the DEIS quotes a 2007 Fort Mason Center Employee Survey and a 2007 Fort Mason Intercept Survey. The method of sampling and the scientific method for those surveys are not disclosed in the DEIS. The current Fort Mason Center web site lists a total of 27 employees, and 47% of them apparently stated that they would take the F-Line to Fort Mason if were running. That constitutes a total of 13 people. The intercept survey got a positive response from 45% of 729 visitors - or 328 people. If we add the 13 employees to the 328 visitors we get a total of 341 people who would take the F-line out of a total of 1.6 million estimated annual visitors, which constitutes a sample of about .02%.*

Response: In the 2007 Fort Mason Center Employee Survey, 110 surveys were distributed to Fort Mason Center employees, with a response rate of 58 individuals or 53%. While it is true that 47% of respondents stated that they would use the F-line, it is worth noting that 17% of respondents had taken MUNI on the day of the survey, while 67% drove an automobile. This survey also revealed that 96% of respondents stated that the F-line should be extended. (WSA 2007c)

In the 2007 Fort Mason Intercept Survey, 729 individuals completed the survey over a 3 day period, during which 1,227 individuals were approached as they entered the Fort Mason Center. The surveyors were instructed to approach users who were not on their phone or engaged in activity aside from casual conversation. If the surveyor encountered a large group or family, a random sampling methodology was engaged that was based on the closest birthday to a given month for the members of the group. Of the 729 survey respondents 45% stated that they would have taken the F-line that day if it served Fort Mason and 87% responded favorable that the F-line should be extended (WSA 2007b).

7.2.2 Public Agency Correspondence



Making San Francisco Bay Better

May 16, 2011

National Park Service,
Golden Gate National Recreation Area
Fort Mason, Building 201
San Francisco, California 94123

ATTENTION: Mr. Rick Foster

SUBJECT: Draft Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason (SCH# 2011034005); BCDC Inquiry File Nos. MC.MC.0302.1; SF.NW.6903.1; and DF.FW.7315.1)

Dear Mr. Foster:

On March 23, 2011, San Francisco Bay Conservation and Development Commission staff received the Draft Environmental Impact Statement (DEIS) prepared by the National Park Service for the Extension of the F-Line Streetcar Service to Fort Mason, proposed along the northern waterfront of the City and County of San Francisco. The project proposes to improve public transportation by extending the F-Market and Wharves streetcar line from the Fisherman's neighborhood through the San Francisco Maritime National Historic Park (NHP) and into the Golden Gate National Recreation Area (GGNRA), ultimately terminating at the Fort Mason Center.

Commission Jurisdiction Pursuant to State and Federal Law

The Commission's jurisdiction in this area includes all tidal areas of the Bay up to the line of mean high tide (the inland edge of marsh vegetation in marshlands), all areas formerly subject to tidal action that have been filled since September 17, 1965, and a "shoreline band," which extends 100 feet inland from and parallel to the Bay shoreline. Further, both Fort Mason and Aquatic Park are designated as Waterfront Park/ Beach priority-use areas on Map 4 in the Commission's Bay Plan. The Commission has jurisdiction over all federal activities occurring within priority use areas.

Commission authorization is required for certain activities, including construction, changes of use, dredging, and dredged material disposal, within its area of jurisdiction. Permits are issued if the Commission finds the activities to be consistent with the McAteer-Petris Act and the policies and findings of the Bay Plan. In addition to any needed permits under its state authority, federal actions, permits, and grants that affect the Commission's jurisdiction are subject to review by the Commission, pursuant to the federal Coastal Zone Management Act (CZMA), for their consistency with the Commission's federally-approved management program for the Bay. It appears that portions of all of the proposed alternatives would require a Commission permit, since they would require work within the Commission's shoreline band

jurisdiction. Also, the project would require a consistency determination, pursuant to the requirements of the federal Coastal Zone Management Act and the Commission's federally approved Coastal Management Program.

See Concern ID 30180, page 357

The Final Environmental Impact Statement (FEIS) should include a discussion and a map that delineates the boundaries of the Commission's jurisdiction and should also discuss the relevant policies, including recreation, public access, and appearance, design, and scenic views, that address the potential impacts of the proposed project. In addition, the DEIS includes a factually erroneous statement on Page 72 of the document under the Section entitled "3.2.4 Regulations and Policies." Under the authority of the federal Coastal Zone Management Act (CZMA) (see 15 CFR, Section 930.4), The Commission can in fact impose special conditions on its federal consistency decisions and does so regularly when it issues consistency determinations to federal entities.

See Concern ID 30272, page 343

Proposed Project

San Francisco Bay Plan Map 4 includes a note that states, "San Francisco Waterfront - A scenic transit system that incorporates pedestrian and bicycle pathways could be a major waterfront attraction and could eventually operate from Golden Gate Bridge (or even Ocean Beach) to Ferry Building (or south to China Basin)." Clearly, the proposed project to extend transit along the shoreline in this area is consistent with this goal.

The Bay Plan transportation policies also state, in part that, "...transportation projects should be designed to maintain and enhance visual and physical access to the Bay and along the shoreline." Commission staff believes that the Preferred Alternative described in the DEIS (Alternative 2A), which consists of a track extension with a street-running segment along Beach Street, a transition zone between the street-running segment and the Fort Mason Tunnel, a tunnel segment and a turnaround segment in the Fort Mason parking lot (North Loop), is the alternative that is most consistent with the Commission's policies. By locating the terminus of the line within the existing paved parking area at Fort Mason instead of on the Great Lawn, this alternative would have fewer impacts to existing parkland in the area, specifically, it would avoid the loss of recreational uses and aesthetic impacts on the Great Lawn that would result if the South Loop turnaround were to be constructed. Further, Alternative 2A appears to have essentially no impact on the existing Bay Trail alignment, unlike Alternative 2B which would cross the Bay Trail. Alternative 2A appears to minimize potential conflicts between pedestrians and bicyclists and the new transit line.

See Concern ID 30292, page 363

The DEIS provides a detailed assessment of the potential impacts to parking that would result from the construction of the project. However, it would be helpful if the FEIS could further analyze the location and estimate the number of parking spaces that would be lost to shoreline visitors accessing the Bay for swimming, boating, and other water-oriented public access activities. In addition, the FEIS should provide additional information as to whether it would be feasible to provide new parking to mitigate for parking spaces that are lost as a result of the construction of the project.

See Concern ID 30105, page 345

Lastly, the FEIS should fully assess the potential impacts on waterfront users, including the number of people that the expanded service will bring to the waterfront, and the potential impacts on existing public access to the waterfront required in other BCDC permits. The Final EIR should also provide information as to whether any public access improvements would be proposed as part of the project.

See Concern ID 30209, page 368 and Concern ID 30196, page 352

Rick Foster
May 16, 2011
Page 3

Closing Remarks

Thank you for providing the Commission staff with the opportunity to comment on the DEIS. We realize that the project is still in the design stage, however, given that it will require Commission approval, we would be happy to meet with the project proponents to discuss our comments further, discuss any potential changes that may come about through the CEQA/NEPA process, the Commission's policies, permit or federal consistency procedures, etc. Please contact me with any questions at (415) 352-3668 or via email at maxd@bcdca.gov.

Sincerely,

MAX DELANEY
Permit Analyst

cc. National Park Service, Denver Service Center – Transportation Division

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298



May 20, 2011

Rick Foster
National Park Service,
Golden Gate National recreation Area
Golden Gate NRA, Fort Mason, Building 201
San Francisco, Ca 94123

Re: Notice of Completion, Draft Environmental Impact Statement (DEIS)
Extension of F-Line Streetcar Service to Fort Mason Center
SCII# 2011034005

Dear Mr. Foster:

As the state agency responsible for rail safety within California, the California Public Utilities Commission (CPUC or Commission) recommends that development projects proposed near rail corridors be planned with the safety of these corridors in mind. New developments and improvements to existing facilities may increase vehicular traffic volumes, not only on streets and at intersections, but also at at-grade highway-rail crossings. In addition, projects may increase pedestrian traffic at crossings, and elsewhere along rail corridor rights-of-way. Working with CPUC staff early in project planning will help project proponents, agency staff, and other reviewers to identify potential project impacts and appropriate mitigation measures, and thereby improve the safety of motorists, pedestrians, railroad personnel, and railroad passengers.

The CPUC submits the following comments:

See Concern ID 30181, page 357

- The proposed modification or construction of track across roadways will require authorization of CPUC. CPUC needs to be identified as a permitting authority in all project documentation. The construction of a new rail transit extension requires a *Safety Certification Plan* to be approved by the CPUC as the State Safety Oversight Agency for rail transit systems.

See Concern ID 30197, page 352

- We encourage SFMTA to approach CPUC staff early in the project development in order to discuss potential safety concerns and associated mitigation related to the track alignment, intersection design and traffic signal configuration.

- In the past there have been collisions involving streetcars and vehicles in the Fisherman's Wharf area.
- The Draft EIS for "Extension of F-Line Streetcar Service to Fort Mason Center" suggests that the determination of track alignment type will be determined during design, subsequent to an environmental analysis or traffic study that might assess the impacts of such decisions.

Rick Foster
National Park Service
SCH # 2011034005
May 20, 2011
Page 2 of 2

See Concern ID 35003, page 354

CPUC staff recommends that the side-running track alignment, while providing for the safe boarding of passengers along the side of the roadway, may present a confusing situation for motorists where a street car continues straight from a dedicated right-turn lane, or where a street car turns left from the right side of the roadway. Therefore it may be appropriate to consider a mixed-traffic alignment in some locations.

Thank you for your consideration of these comments. If you have any questions, please contact me at (415) 713-0092 or email at ms2@cpuc.ca.gov.

Sincerely,



Moses Stites
Rail Corridor Safety Specialist
Consumer Protection and Safety Division
Rail Transit and Crossings Branch
180 Promenade Circle, Suite 115
Sacramento, CA 95834-2939



MARK E. FARRELL

May 17, 2011

National Park Service
Denver Service Center – Transportation Division
F-Line EIS Planning Team
12795 W. Alameda Parkway
PO Box 25287
Denver, CO 80225-0287

Re: Draft Environmental Impact Statement (“DEIS”) for Extension of F-Line
Streetcar to Fort Mason Center

To Whom It May Concern:

As the District 2 Supervisor in the City and County of San Francisco and as a Commissioner on the San Francisco County Transportation Authority, I write to you to express my concerns regarding the adequacy of the above-referenced DEIS. The project area studied includes portions of the Marina district, which is part of the district I represent.

See Concern ID 30226, page 361

I find the traffic analysis contained in Chapter 4.4 Traffic and Circulation to be incomplete and unclear. The chapter is lacking in basic transportation data about the number of trips by type that are expected in the study area. The chapter is additionally lacking in its circulation analysis. How are determinations of the level of impact made? For example, on page 224 the DEIS discusses impacts on parking in the Marina by recognizing that people could seek parking places in the Marina and then walk to reach the F-Line. The DEIS states, “*The effect could be adverse if large numbers of people search parking at the marina, creating traffic congestion at local intersections, but it is speculative to quantify. The overall impact would be long-term, minor and adverse.*”

If it is speculative to quantify, how can one possibly conclude the impact would be minor? This paragraph acknowledges that large numbers of drivers could create traffic impacts as they search for parking, creating traffic congestion at local intersections. This circling could additionally create conflicts and delays to Muni buses and other road users. A more detailed analysis of these concerns and a more comprehensive approach to project design and/or mitigations to address these issues is absolutely required.

See Concern ID 30227, page 362

In addition to my own review of the DEIS, I have heard from a number of my constituents who are concerned about the additional vehicles the project will deposit into the Marina and the ensuing traffic congestion that will result. The DEIS fails to analyze and/or

estimate the number of additional vehicles coming into the Marina should the F-Line be extended to Fort Mason. Without a thorough analysis of potential traffic congestion, it is also impossible to review and analyze the potential impacts to transit service on Lombard and Chestnut streets, as well as other MTA bus lines providing transit service in the area.

See Concern ID 30227, page 362

As a Commissioner on the San Francisco Transportation Authority, I will be calling for a thorough review of this project, including how this project should be prioritized given the numerous other transportation projects in the City and County of San Francisco. Before any Proposition K funds are allocated to this project, I will make certain that the impacts on the Marina have been fully vetted and that the project is one that is fiscally responsible and financially feasible.

If you have any questions or comments regarding my concerns, please do not hesitate to contact me.

Sincerely,



Supervisor Mark E. Farrell
District 2 Supervisor
City and County of San Francisco



Edwin M. Lee, Mayor
Philip A. Ginsburg, General Manager

May 11, 2011

National Park Service
Attention: F-Line EIS Planning Team
Denver Service Center – Transportation Division
P.O. Box 25287
Denver, CO 80225-0285

RE: Extension of F-Line Streetcar Service to Fort Mason Center Draft EIS

To Whom It May Concern:

Thank you for providing the City of San Francisco's Recreation and Parks Department (RPD) the opportunity to review the Draft Environmental Impact Statement for the Extension of the F-Line Streetcar Service to Fort Mason Center project. As the Assessment indicates, Marina Green (owned and managed by RPD) is adjacent to the Fort Mason site, located to the west of the project. For that reason, we ask for your additional consideration of the following items.

1) San Francisco Marina West Harbor Renovation Project: The Draft EIS mentioned this project, but did not indicate how the proposed F-Line Extension relates to the planned West Harbor Renovation Project, which is in the pre-construction phase. Please coordinate with San Francisco Recreation and Parks Department representatives to discuss potential interactions, if any, between these projects.

See Concern ID 30102, page 342

2) Marina Boulevard Improvements: Planned renovations to Marina Boulevard between Baker Street and Scott Street will be managed by the Department of Public Works. We would be happy to provide contact information.

See Concern ID 30103, page 342

3) Public Health and Safety: Please consider protection measures (dust, etc) for park users during construction.

See Concern ID 30106, page 345

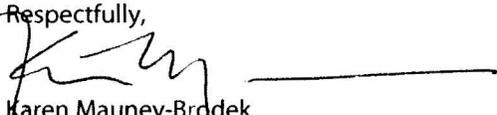
4) Biological Resources: While the potential for finding endangered species in the area is low, according to the Draft EIS, please consider bird habitat, other wildlife habitat, and plant habitat needs.

See Concern ID 29885, page 339

Conducting thorough community outreach on the proposed Alternatives with nearby residents, concerned stakeholders, and potential park visitors is encouraged.

Thank you for taking these comments into consideration.

Respectfully,


Karen Mauney-Brodek
Deputy Director for Park Planning
Planning and Capital Division
City of San Francisco
Recreation and Parks
Karen.Mauney-Brodek@sfgov.org
(415) 575-5601

May 17, 2011

J. Patrick Shea, Jr., FASLA – Project Manager/Transportation Technical Specialist
 National Park Service – Denver Service Center, Transportation Division
 Attention: F-Line EIS Planning Team
 P.O. Box 25287
 Denver, CO 80225

Subject: Draft Environmental Impact Statement (DEIS) for Extension of F-Line Streetcar Service to Fort Mason Center

Dear Mr. Shea:

The San Francisco County Transportation Authority (Authority) is pleased to submit comments on the subject document during the public review period. Our comments are also submitted with reference to the public outreach materials for the DEIS public review period, which were transmitted to the Technical Advisory Committee (TAC) on April 1, 2011. The Authority previously submitted written comments regarding the cost and funding aspects of the project to the National Park Service (NPS), including during DEIS Scoping, Screening, and the development of the Funding Working Paper. The following comments echo our previous comments and additionally highlight transportation impact, policy context, and design aspects of the project.



Moving the City

1. **Transportation and Circulation:** Subsection 2.2.5, *Operation*, and Section 4.4, *Transportation and Circulation*, include only a brief treatment of the projected transportation-related impacts of the alternatives. We suggest that this material be supplemented to include a more thorough treatment of transportation demand and system impacts, particularly as they relate to visitor and work trips. This discussion should focus on expected impacts to existing F-Line service and Muni system operations, including effects on historic streetcar ridership (including at high-season maximum load points along the Embarcadero) and potential delays to Muni bus lines operating in the project area resulting from traffic circulation. These transportation demand data will also help to substantiate the DEIS's assertion that Alternative 2 "would result in a long-term, moderate, beneficial impact" to transit operations. The Transportation and Circulation Appendix (Appendix B) consists of documentation relating to traffic effects. The DEIS references a technical memorandum (URS, 2009f), which covers many of the abovementioned issues in detail; we suggest that this material be included in whole or in part in the environmental document's appendices to help support local decision-making.
2. **Project Cost:** The DEIS public outreach materials list the Alternative project cost at \$28 to 30 million in construction costs (2010\$). Our understanding is that this figure does not include soft costs, vehicle costs, and escalation to year-of-expenditure dollars. Further, these construction costs are lower than the figures presented in the earlier Funding Working Paper, which reported construction costs of \$45 to 48 million (2008\$) including soft costs. Finally, please clarify the incremental cost of the vehicles for the project. Subsection 2.2.5, *Operation* (p. 48), mentions the need for four new historic vehicles to serve the route by 2030. The total project cost should include infrastructure and incremental vehicles costs, similar to other transit expansion projects that the City is planning.
3. **Funding Strategy:** There will be a need for a high level of coordination with the Authority for consideration of all funding-related issues for the Historic Streetcar Extension project. As the San Francisco Municipal Transportation Agency (SFMTA) and the NPS are aware, any future allocation of Prop K funds to support the project is

See Concern ID 30218, page 364

See Concern ID 30134, page 351

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José Luis Moscovich
EXECUTIVE DIRECTOR

See Concern
ID 30138, page 352

dependent upon the completion of the environmental phase and the development of a full funding plan for the project. The DEIS has been released at a time when capital funding for transit expansion projects is extremely competitive—locally, regionally, and nationally—and when transit agency operating budgets are under intense fiscal pressure. We suggest that the DEIS append the Funding Working Paper and further ask that the Van Ness and Geary Corridor Bus Rapid Transit (BRT) projects be clearly noted as the City’s adopted priorities for Federal Transit Administration (FTA) Small Starts funds.

- 4. **Transit Expansion Policy:** The Authority is currently leading the San Francisco Transportation Plan (SFTP) process, which will update San Francisco’s long-range countywide transportation plan. The SFTP will develop San Francisco’s next set of multimodal investment priorities at the citywide level, and provide input into the Bay Area’s next long-range Regional Transportation Plan (RTP) prepared by the Metropolitan Transportation Commission. The next RTP, to be adopted in 2013, will focus in particular on supporting transit-oriented growth in the Bay Area’s Priority Development Areas (PDAs) as a way to reach regional climate management and affordable housing goals.

See Concern
ID 30182, page 358

The DEIS’s public outreach materials state that transit service improvements are needed along the northern waterfront to serve a neighborhood with growing numbers of residents and jobs. Please clarify this statement, as forecast land use growth in the project vicinity is quite limited, particularly as compared to San Francisco’s PDAs, where major planning efforts have been completed or are underway.

- 5. **Programmatic and Transportation Demand Management Strategies:** Although housing and employment growth is expected to be relatively limited in the project area within the planning horizon, travel demand is forecast to grow, including through increased visitor trips along the city’s northern waterfront areas. The project and DEIS would be strengthened by a discussion of transportation demand management (TDM) strategies that could or would be deployed to help meet transportation needs in the streetcar corridor. Such TDM measures could be used to complement either Alternative 1 or Alternative 2. Potential strategies include: parking pricing and management; co-marketing strategies (e.g. bundling of transit passes with visitor hotel stays and major event tickets); and employer-based programs to encourage non-automobile travel and flex times. The concept of bundling transit passes (e.g. Clipper stored value cards) with hotel stays and venue tickets is already in practice internationally and is included in the proposed Treasure Island development plan. The Authority is also partnering with City agencies (SFMTA, Department of the Environment, and Planning Department) on other TDM strategies including parking cash-out and shuttle provision, both of which could also enhance mobility and accessibility in the area.

See Concern
ID 30219, page 365

Thank you for the opportunity to comment on the DEIS. Please feel free to contact me at 415.522.4832 if you would like to discuss these comments.

Sincerely,


Tilly Chang
Deputy Director for Planning

cc: Com. Farrell, Chiu
R. Foster – GGNRA
T. Papandreou, D. Ito, C. Paine – SFMTA
JLM, MEL, AL, BS, LZ, JK, Chron, File: Fort Mason Historic Streetcar Extension



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, CA 94105-3901

May 17, 2011

National Park Service
Denver Service Center – Transportation Division
Attention: F-Line Draft EIS Planning Team
Post Office Box 25287
Denver, Colorado 80225-0287

Subject: Draft Environmental Impact Statement for the Extension of F-Line Streetcar Service to Fort Mason Center, Golden Gate National Recreation Area, San Francisco Maritime National Historical Park, California (CEQ# 20110079)

Dear Planning Team:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the F-Line Streetcar Service Extension, published by the National Park Service, the San Francisco Municipal Transportation Agency, and the Federal Transit Administration. Our review is pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act.

The SFMTA proposes to extend the San Francisco Municipal Railway F-Market and Wharves Line (F-Line) approximately 0.85 miles west from the intersection of Jefferson and Jones Streets to the west side of Fort Mason Center. The Draft EIS analyzes the environmental impacts of the No Action Alternative 1 and two options for Action Alternative 2: Alternative 2A – North Loop Turnaround, which would locate the streetcar turnaround in the Fort Mason parking lot, and Alternative 2B – South Loop Turnaround, which would locate the turnaround in the Great Meadow. The Draft EIS also analyzes the environmental impacts of 8 to 9 station platforms and upgrades to the historic Fort Mason Tunnel.

The EPA supports improving local and regional transit service connections to National Park Service attractions. Of the two Action Alternatives analyzed, the EPA believes Alternative 2A, identified as the Preferred Alternative in the Draft EIS, will result in fewer environmental and community impacts because it is less disruptive to land and existing vegetation, has a lower rate of construction-related emissions, is less likely to conflict with bicycles, automobiles, and pedestrians, and will not increase impervious area when compared to Alternative 2B.

The EPA has rated the Draft EIS as LO, *Lack of Objections*. See attached “Summary of the EPA Rating System” for a description of this rating. The basis for this rating and our recommendations are detailed in our comments below. While we have not identified areas requiring substantive changes to the document, we have identified opportunities for further analyzing and mitigating the project’s potential environmental impacts.

Air Quality

The proposed project is located in the Bay Area Air Quality Management District, which is in non-attainment for ozone and particulate matter (PM₁₀ and PM_{2.5}). Therefore, we recommend all construction and operation emissions be mitigated to the extent feasible. The EPA commends NPS, SFMTA, and FTA for committing to best management practices recommended by BAAQMD for mitigating the impact of construction on air quality.

Extending the F-Line will improve transit access to the historic sites, restaurants, employment centers, and numerous event spaces located around Fort Mason Center, the Great Meadow, and the National Maritime Historical Park. The EPA commends the NPS, SFMTA, and FTA for proposing to increase transit modal share which would likely contribute to long-term air quality improvements in the region. As noted in the Draft EIS, this project could contribute to a decrease in local vehicle emissions, including criteria air pollutants and greenhouse gases, as people shift from using cars to using transit.

The EPA appreciates the thorough analysis of traffic flow and parking impacts in the Marina District neighborhood resulting from the project. The Draft EIS notes that the project will have short- and long-term, minor to negligible adverse impacts on transportation conditions due to its proposal to convert existing street lanes to shared streetcar lanes, reduce on-street parking spaces, and convert a portion of the Fort Mason parking lot into a streetcar station platform and turnaround. The Draft EIS notes that the beneficial effect of cumulative projects, like the Fisherman's Wharf Public Realm Plan, which proposes to divert traffic from Jefferson Street, would likely offset the project's impact on transportation conditions in the area. In addition, the Draft EIS proposes four mitigation measures to improve traffic flow and safety: optimizing traffic signal timing, installing wayfinding devices, reconfiguring on-street parking spaces, and implementing parking time restrictions.

Without taking these mitigating factors into account, a conservative analysis in the Draft EIS shows that the Level of Service at certain intersections of the project's in-street segment could downgrade if it was built. Specifically, the intersection of Leavenworth and Jefferson Streets would downgrade from LOS A to D during weekday PM peak hours and from LOS B to F during weekend mid-day peak hours. LOS would also downgrade to a lesser extent at the intersections of Leavenworth and Beach Streets and Polk and Beach Streets. Based on these findings, the EPA is concerned about the project's potential air quality impacts resulting from increased vehicle congestion.

Therefore, the EPA recommends the following:

Recommendations:

| | | |
|--------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| See Concern ID 29883, page 338 | • | Include in the Final Environmental Impact Statement a discussion of the potential air quality impacts of increased vehicle congestion at the affected in-street segment of the project. |
| See Concern ID 30104, page 343 | • | Provide more detail in the Final EIS on how cumulative projects could mitigate vehicle congestion in the area. |
| See Concern ID 30186, page 346 | • | In the Final EIS and Record of Decision, commit to implementing the four mitigation measures discussed above to improve traffic flow and safety. These mitigation measures will likely have an indirect benefit to the project's potential long-term air quality impacts. |
| See Concern ID 29884, page 339 | • | As practicable and advantageous, identify in the Final EIS mitigation measures to directly reduce adverse air quality impacts from increased congestion. |

Green Design and Operations

Infrastructure Reuse

The EPA commends the NPS, SFMTA, and FTA for proposing the F-Line Extension as an infrastructure reuse project with considerable cultural benefits. Alternative 2's proposal to rehabilitate historic streetcars and the Fort Mason Tunnel makes modern day use of materials and infrastructure that might otherwise deteriorate in disrepair. Rehabilitating existing infrastructure preserves natural resources by decreasing the demand for virgin materials and reduces greenhouse gas emissions and energy use by decreasing demand for energy intensive construction and manufacturing.

Green Infrastructure

See Concern ID 30139, page 355

The EPA encourages NPS, SFMTA, and FTA to implement "green infrastructure," such as bioretention areas, vegetated swales, porous pavement, and filter strips in any onsite storm water management features. These features can serve as both storm water treatment and visual enhancements. More detailed information on these forms of "green infrastructure" can be found at http://cfpub.epa.gov/npdes/home.cfm?program_id=298.

We appreciate the opportunity to review this Draft EIS and look forward to future coordination on the project. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at 415-947-4161 or dunning.connell@epa.gov.

Sincerely,



Connell Dunning, Transportation Team Leader
Environmental Review Office

Enclosure: Summary of the EPA Rating Definitions

CC via email: Frank Dean, Golden Gate National Recreation Area, National Park Service
Rick Foster, Golden Gate National Recreation Area, National Park Service
Steve Ortega, Golden Gate National Recreation Area, National Park Service
Darton Ito, San Francisco Municipal Transportation Agency
Ray Sukys, Federal Transit Administration
Alex Smith, U.S. Department of Transportation

SUMMARY OF THE EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

“LO” (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

“EC” (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. The EPA would like to work with the lead agency to reduce these impacts.

“EO” (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The EPA intends to work with the lead agency to reduce these impacts.

“EU” (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. The EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

Category “1” (Adequate)

The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category “2” (Insufficient Information)

The draft EIS does not contain sufficient information for the EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category “3” (Inadequate)

The EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. The EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From the EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

PEPC Project ID: 15547, DocumentID: 39713

Correspondence: 49

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Status: Reviewed Park Correspondence Log:
Date Sent: 05/11/2017 Date Received: 05/17/2011
Number of Signatures: 1 Form Letter: No
Contains Request(s): No Type: Web Form
Notes:

Correspondence Text

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for Extension of F-Line Streetcar Service to Fort Mason Center. The San Francisco Public Utilities Commission (SFPUC) staff has reviewed DEIS and has the following comments:

See Concern ID 30283, page 347

On page 318, Section 4.14.3, the SFPUC suggests adding the following text to Mitigation Measures: The South Loop (Alternate 2b) and Transition Segment (between Beach Street and the Ft Mason Tunnel / GGNRA land) have the potential to increase stormwater runoff entering into the combined sewer system due to the planned increase in impervious surface. These planned segments are served by the City of San Francisco combined sewer area. While these areas are under federal jurisdiction, it is encouraged that the plan implement stormwater management controls to mitigate the additional runoff and maintain a no net increases in runoff rate and volume in line with the San Francisco Stormwater Design Guidelines.

On page 192, in reality, the proposed rail extension may cross various sewer jurisdictions and boundaries between combined and separated sewer systems. For this reason, this document should carefully and accurately describe the various physical and administrative sewer zones and, preferably, depict them graphically.

See Concern ID 30288, page 367

In Section 4.14.3, the primary potential adverse impacts to the sewer system are (1) damage and loss of service due to construction activities (2) permanent loss of access due to the installation of overlying structures including rails, platforms, other utilities and overhead wires, (3) permanent reduction in service due to alteration of infrastructure, including piping and surface drainage. The language in this section addresses items 1 and 2 at least partially, but does not appear to address item 3. All three items should be addressed fully.

See Concern ID 30215, page 367

Additional global comments are outlined below. These comments apply to all sections of the document, not all sections are identified below.

1. Page 24. Please clarify which permit is intended for reference under the Water Resources bullet. The text says "National Pollutant discharge Elimination System general permit" is this a reference to the SWRCB Construction General Permit or the NPDES Individual permit (MS4 areas)?

See Concern ID 30274, page 344

2. This document should carefully and accurately describe the various physical and administrative sewer zones and, preferably, depict them graphically.

See Concern ID 30288, page 367

3. Page 192. 'Sanitary Sewer /Storm Drain System. Please ensure that all technical terms utilized are the correct term; for reference material please look at the SF Public Works code. The terms for the separate systems include 'Sanitary Sewer System and Stormwater Sewer System. Also stormwater is to be used as one word when not using the proper name of a Federal, State, or Regional Permit.

See Concern ID 30289, page 368

4. Page 294. Same reference to NPDES general permit. The term used under paragraph 2 of section 4.11.3 Impacts of Alt 2, line 12, says 'general construction permit' the correct term is 'construction general permit'. For additional information on this permit please see the following link http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml

See Concern ID 30290, page 368

5. Section 4.14.3. The primary potential adverse impacts to the sewer system are (1) damage and loss of service due to construction activities (2) permanent loss of access due to the installation of overlying structures including rails, platforms, other utilities and overhead wires, (3) permanent reduction in service due to alteration of infrastructure, including piping and surface drainage. The language in this section addresses items 1 and 2 at least partially, but does not appear to address item 3. All three items should be addressed fully.

See Concern ID 30215, page 367

6. Page 323. Under the Agency column of the table, City and County of San Francisco is NOT an agency. Permits will be required from a variety of agencies which include the Port of SF, SFPUC, and DBI (although more agencies could be involved in issuing permits i.e. the fire dept)

See Concern ID 30276, page 344

7. Page 323. Under the Agency column of the table, the RWQCB does not need the 'and'.

See Concern ID 30277, page 344

Thank you for the opportunity to provide the above comments. If you have any questions please contact Kristina Zaccardelli, SFPUC, at 415.554.3114 or kzaccardelli@sfgwater.org.

Thank you.

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REFERENCES

Association of Bay Area Government (ABAG)

- 2009 Association of Bay Area Governments Projections 2009. Forecasts for the San Francisco Bay Area to the Year 2035. December 2006.
- 2010 ABAG Shaking Intensity Maps and Information, available on the internet at <<http://www.abag.ca.gov/bayarea/eqmaps/mapsba.html>>, accessed on June 15, 2010.

Bay Area Air Quality Management District (BAAQMD)

- 2010 California Environmental Quality Act Air Quality Guidelines, p.2-1, available on the internet at <http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_June%202010.ashx>, accessed on September 30, 2010.

Bay Conservation and Development Commission (BCDC)

- 2006 *San Francisco Bay Plan*, adopted in 1968 by BCDC and last amended in 2006
- 2007 “Activities Requiring Permit Approval”, available on the internet at <http://www.bcdc.ca.gov/permits/obtain_permit.shtml>, Accessed July 2, 2007
- 2008 “Shoreline Areas Vulnerable to Sea Level Rise: Central Bay.” Available on the internet at <www.bcdc.ca.gov/planning/climate_change/maps/16_55/cbay.pdf>, accessed July 30, 2010.
- 2009 *San Francisco Bay: Preparing for the next level*. Published September 21, 2009. Available on the internet at <www.bcdc.ca.gov/planning/climate_change/SFBay_preparing_%20for_the_next_Level.pdf>

Beardsley, Richard K.

- 1954 Temporal and Areal Relationships in Central California Archeology. 2 Pts. *University of California Archeological Survey Reports* 24-25. Berkeley.

Beck, Warren A. and Ynez D. Haase

- 1974 *Historical Atlas of California*. University of Oklahoma Press.

Bortugno, E.J., R.D. McJunkin, and D.L. Wagner

- 1991 Map showing recency of faulting, San Francisco-San Jose Quadrangle, California. CDMG Map No. SA,1:250,000.

REFERENCES

California Air Resources Board (CARB)

- 2008 *Climate Change Scoping Plan: a framework for change*. Available at <http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf> Last accessed on June 15, 2010.
- 2009 The California Almanac of Emissions and Air Quality, Chapter 4, Air Basin Trends and Forecasts, Criteria Pollutants. Available at <<http://www.arb.ca.gov/aqd/almanac/almanac06/almanac06iu.htm>> Last accessed on June 11, 2010.

California Department of Conservation (DOC)

- 2000 State of California Seismic Hazard Zones, City and County of San Francisco Official Map.

California Department of Fish and Game (CDFG)

- 2009 California Natural Diversity Database, for USGS 7.5-minute topographic quadrangles San Francisco North, San Francisco South, Hunters Point, Richmond, San Quentin, Oakland West, San Rafael, and Point Bonita, dated January 2009.
- 2010 California Natural Diversity Database, commercial version 3.1.0, for USGS 7.5-minute topographic quadrangles San Francisco North, San Francisco South, and Point Bonita, dated May 1, 2010.

California Department of Mines and Geology (CDMG)

- 2001 GIS Files of Official Alquist-Priolo Earthquake Fault Zones, Central Coastal Region, Developed by William A. Bryant, Ross Martin, Perry Wong, Dinah Maldonado, Jerry Wampole, and David Dixon, DMG CD 2001-04, 2001.

California Department of Toxic Substances Control (DTSC)

- 2010 Envirostor Database, available on the internet at <<http://www.envirostor.dtsc.ca.gov/public/>>, accessed June 28, 2010.

California Employment Development Department (EDD)

- 2010 *Report 400 C – Monthly Labor Force Data for Counties May 2010*, June 2010.

California Environmental Protection Agency (Cal EPA)

- 2010 CUPA Directory, available on the internet at <www.calepa.ca.gov/CUPA/Directory/default.aspx>, accessed June 28, 2010.

California Geologic Survey (CGS)

- 2002 How Earthquakes Are Measured, CGS Note 32, 2002.
- 2010 Probabilistic Seismic Hazards Mapping Ground Motion Page, available on the internet at <<http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamap.asp?Longitude=-122.45&Latitude=37.8>>, accessed on June 17, 2010.

California Native Plant Society (CNPS)

- 2009 Electronic Inventory of Rare and Endangered Plants (online edition, v7-07d). Available on the internet at <<http://www.cnps.org/inventory>>, accessed February 2009.
- 2010 Electronic Inventory of Rare and Endangered Plants (online edition, v7-10b) for 7.5-minute topographic quadrangles San Francisco North, San Francisco South, and Point Bonita. Available on the internet at <<http://www.cal.net/~levinel/cgi-bin/cnps/sensinv.cgi>>, accessed June 2010.

City and County of San Francisco (CCSF)

- 2010 The San Francisco Municipal Code.

Cook, Sherburne F.

- 1943a The Conflict between the California Indian and White Civilization, I: The Indian Versus the Spanish Mission. *Ibero-Americana 21*. Berkeley.
- 1943b The Conflict between the California Indian and White Civilization, II: The Physical and Demographic Reaction of the Non-mission Indians in Colonial and Provincial California. *Ibero-Americana 22*. Berkeley.

Cullivan, Lynn

- 2010 SF Maritime NHP, National Park Service. Personal communication regarding tree removal, September 2010.

Davis, James T.

- 1954 Archeological Site Survey Record, University of California, Berkeley

Delgado, James P.

- 1981 *Pioneers, Politics, Progress and Planning: The Story of San Francisco's Aquatic Park*. Historical Structures Report. Golden Gate National Recreation Area, San Francisco, CA.

Dendero, Raymond

- 1950 "The Italian Settlement of San Francisco." Thesis, University of California, reprinted in 1974 by R and E Research Associates, San Francisco, CA.

Dillon, Richard

- 1985 *The Italian Heart of San Francisco*. Published by the Presidio Press, Novato, CA.

Donley, Michael W., Stuart Allan, Patricia Caro and Clyde P. Patton

- 1979 *Atlas of California*. Pacific Book Center, Culver City, California.

REFERENCES

Environmental Data Resources (EDR)

- 2006 *EDR Data Map Corridor Study – E-Line Extension, San Francisco, Ca*, November 28, 2006.

EIP Associates and Wilbur Smith Associates

- 2003 *Fort Mason Center Long-Term Lease Environmental Assessment*. Prepared for the Fort Mason Foundation and the National Park Service

Federal Transit Administration

- 2006 Transit Noise and Vibration Impact Assessment.

Fort Mason Center (FMC)

- 2009a *Fort Mason Center Annual Report to the National Park Service, October 2008-September 2009*.
- 2009b Fort Mason Center Parking Entry/Exit Report, 2010.
- 2010 Fort Mason Center Parking Impact Notice, 2010.

Foster, Rick

- 2010 Landscape Architect/Transportation Planner, Golden Gate National Recreation Area, e-mail communication regarding construction equipment, April 15, 2010

Fredrickson, David A.

- 1973 “Early Cultures of the North Coast Ranges, California.” Ph.D. Dissertation, University of California, Davis; Department of Anthropology.

Gerow, Bert A. and Roland W. Force

- 1968 *An Analysis of the University Village Complex with a Reappraisal of Central California Archeology*. Stanford University Press. Stanford, California.

Hart, E.W.

- 1990 Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, California Division of Mines and Geology, Special Publication 42, 1990. Revised and updated 1997.

Holman & Associates

- 2010 Postfield Memo of Field Results for F Line Auger Investigations. Prepared for the National Park Service.

Hoover, Mildred B., Hero E. Rensch, and Ethal G. Rensch

- 1990 *Historic Spots in California*. Fourth Edition Revised by Douglas E. Kyle. Stanford University Press. Stanford, California.

Hupman, J. M. and D. Chavez

- 1995 "Archaeological Resources Setting, Caltrain Station Relocation Project, San Francisco, California." David Chavez Associates. Report submitted to DeLeuw, Cather and Co., San Francisco and ICF Kaiser Engineers, Inc., Oakland.

Intergovernmental Panel on Climate Change (IPCC)

- 2007 Fourth Assessment Report. Available on the internet at <<http://www.ipcc.ch/>> Last accessed on June 15, 2010.

Jacobs Associates

- 2005 "Tunnel Rehabilitation and Preliminary Cost Estimate Report Fort Mason tunnel Assessment Project." San Francisco, California.

Katz, John

- 2010 San Francisco Municipal Transportation Agency, personal communication, November 29, 2010.

Kemble, John Haskell

- 1957 *San Francisco Bay, A Pictorial Maritime History*. Bonanza Books, New York.

Kleinfelder, Inc.

- 2005 "Geotechnical Investigation of the Fort Mason Tunnel, Fort Mason, San Francisco, California. Phase 3 – Structural Stability Assessment." San Jose, CA.

Kroeber, Alfred L.

- 1976 *Handbook of the Indians of California*. Reprinted. Dover Publications, Inc., New York. Originally published 1925, Bureau of American Ethnology Bulletin 78, Washington, D.C.

Levy, Richard

- 1978 "Costanoan." In *Handbook of North American Indians*, Volume 8, California, edited by Robert F. Heizer, pp. 485-499. Smithsonian Institution, Washington, D.C.

Lienkaemper, J.J., G. Borchardt, and M. Lisowski

- 1991 "Historic creep rate and potential for seismic slip along the Hayward fault, California." *Journal of Geophysical Research*. 96B:18261-18283.

Lucas, Andrea

- 2006 Landscape Architect, Golden Gate National Recreation Area, National Park Service. Personal communication regarding tree removal methodology, July 2006.

REFERENCES

Metropolitan Transportation Commission

- 2005 *Final Transportation 2030 Plan for the San Francisco Bay Area*. Available on the internet at <http://www.mtc.ca.gov/planning/2030_plan> Last accessed on July 21, 2010.

Michigan State University (MSU)

- 2010 *Money Generation Model 2, Operations (MGM2OPERATE)* available on the internet at <<http://web4.msue.msu.edu/mgm2/>> and accessed on August 26, 2010.

Milliken, Randall

- 1995 *A Time of Little Choice: The Disintegration of Tribal Culture in the SF Bay Area, 1769-1810*. Ballena Press, CA

Milliken, Randall, Lawrence H. Shoup, and Beverly R. Ortiz

- 2009 *Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today*. Prepared for NPS Golden Gate Recreation Area, San Francisco.

Moratto, Michael J.

- 1984 *California Archeology*. Academic Press, New York.

Municipal Railway Planning Division

- 1977 *5 Year Plan 1977-1982 Muni Metro: Issues and Strategies*. On file at the San Francisco Metropolitan Transportation Agency, San Francisco, CA.

Munz, Phillip A. and David D. Keck

- 1973 *A California Flora*. University of California Press, Berkeley, California.

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

- 1977 "Golden Gate Recreational Travel Study Summary Report." On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 1980 *Golden Gate Point Reyes General Management Plan*. On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 1992 "Statement for Management." Golden Gate National Recreation Area California. On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 1997 *San Francisco Maritime National Historical Park California General Management Plan*. On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 1998 *Cultural Resource Management Guideline*. NPS Office of Policy Publication 28.
- 2001 *Director's Order No. 12: Conservation Planning, Environmental Impact Analysis, and Decision-making*. Washington DC.

- 2004a “Golden Gate Project Handbook.” On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 2004b *Cultural Landscape Report for Fort Mason, Golden Gate Recreation Area, Volume One: Site History, Existing Conditions, and Analysis*. Prepared by Amy Hoke and Eliot Foulds. NPS and Olmstead Center for Landscape Preservation, Brookline, Massachusetts.
- 2006 *Management Policies 2006*. Washington, DC. Available at on the internet at <www.nps.gov/policy/mp2006.pdf> Last accessed 6/25/2010.
- 2008a “Strategic Plan for the Golden Gate National Recreation Area (Fiscal Year [FY] 2008–2012.” On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 2008b “Golden Gate National Recreation Area Climate Change Action Plan.” On file at the Golden Gate National Recreation Area, San Francisco, CA.
- 2009 *Cultural Landscape Report Part II: Treatment, Fort Mason Center*. Prepared by Architectural Resources Group for Fort Mason Center, in collaboration with NPS, Golden Gate National Recreation Area.
- 2010a “San Francisco Maritime National Historical Park Climate Change Action Plan.”
- 2010b *Cultural Landscape Report, Aquatic Park, San Francisco Maritime National Historical Park*, National Park Service Pacific West Region.
- Nelson, N. C.
- 1909 Shellmounds of the San Francisco Bay Region. *University of California Publications in American Archeology and Ethnology*. 7(4) 310-357. Berkeley.
- Occupational Safety and Health Administration (OSHA)
- 1996 Underground Construction (Tunneling), available on the internet at <<http://www.osha.gov/doc/outreachtraining/htmlfiles/tunnel.html>>
- Olsen, J.A., M.L. Zoback, R.W. Simpson, and M.S. Marlow
- 1994 “Deformation of the San Francisco Block.” American Geophysical Union, 1994 Fall Meeting, *EOS Transactions* V. 75, No. 44, 683 pp.
- Pacific Institute
- 2009 *Impacts of Sea-Level Rise on the California Coast*. Prepared by Matthew Heberger, Heather Cooley, Pablo Herrera, Peter H. Gleick, and Eli Moore. Available on the internet at <http://www.pacinst.org/reports/sea_level_rise/report.pdf> Accessed on December 14, 2010.
- Pulon, Daniel
- 2010 San Francisco Metropolitan Transportation Agency, personal communication, September 16, 2010.

REFERENCES

San Francisco Arts Commission

- 2010 Personal communication with Howard Lazar, Director of Street Artists Program, October 2010.

San Francisco Convention & Visitors Bureau (SFCVB)

- 2009 Breakdown of San Francisco Annual Visitor Volume and Spending, 2008 & 2009. Available on the internet at <http://www.sfcvb.org/media/downloads/research/2009_spending.pdf>

San Francisco County Transportation Authority

- 2004 *Countywide Transportation Plan*, available on the internet at <<http://www.sfcta.org/content/view/13/30>>

San Francisco Department of the Environment

- 2004 *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions*. Available at <www.sfenvironment.org/downloads/library/climateactionplan.pdf> Last accessed on June 15, 2010.

San Francisco Maritime National Historical Park

- no date Works Progress Administration Fact Sheet; "A Palace for the Public." 1939. Collections of San Francisco Maritime NHP, San Francisco, page 1.

San Francisco Mayor's Office of Community Investment

- 2006 *2005-2010 Consolidated Plan*. Available on the internet at <<http://www.sfgov.org/site/uploadedfiles/mocd/demoprofile.pdf>> last accessed July 29, 2009.

San Francisco Metropolitan Transportation Agency (SFMTA)

- 1970 *5 Year Plan 1977-1982 Muni Metro: Issues and Strategies*
- 2003 "Existing Transportation Conditions Report for the Fisherman's Wharf Area Plan."
- 2006 Letter from Michael Kirchanski, Manager, Office of Health and Safety of the San Francisco Municipal Transportation Agency, regarding Alignment Option 4: North Point via Tunnel, to Rick Foster, Landscape Architect/Transportation Planner, Golden Gate National Recreation Area. July 25, 2006.
- 2007 "Draft FY2008-FY2027 Draft Short Range Transit Plan." Available on the internet at <<http://www.sfmta.com/cms/rsrtp/srtpindx.htm>> last accessed July 29, 2009.
- 2008a *Climate Action Plan*. Available on the internet at <<http://www.sfmta.com/cms/rcap/capindx.htm>> last accessed July 29, 2009.
- 2008b *Transit Effectiveness Project*. Available on the internet at <<http://www.sfmta.com/cms/mtep/teprecs.htm>> last accessed November 29, 2010.

- 2009a *San Francisco Bicycle Plan.*
- 2009b Letter from Carter Rohan, Senior Director Transportation Planning and Development of the San Francisco Municipal Transportation Agency, regarding Historic Streetcar Extension to Fort Mason – Terminal Track Alternatives, to Rick Foster, Landscape Architect/Transportation Planner, Golden Gate National Recreation Area. March 12, 2009.

San Francisco Municipal Railway

- 2000 “Draft Preliminary E-Embarcadero Line Operating Plan.” MUNI Service Planning and Capital Planning & Grants. On file at the San Francisco Metropolitan Transportation Agency, San Francisco, CA.

San Francisco Planning Department

- 1997 San Francisco General Plan: Community Safety Element. Available on the internet at <http://www.sfgov.org/site/planning_index.asp?id=41420> Last accessed March 23, 2009.
- 2000 State of California Seismic Hazard Zones. City and County of San Francisco Official Map. Released November 17, 2000.
- 2005 *City and County of San Francisco General Plan.* May 25, 2005 as amended.
- 2006 Certificate of Determination of Statutory Exemption from Environmental Review, April 28, 2006.
- 2011 Northeastern Waterfront Area Plan. Available on the internet at <http://www.sf-planning.org/ftp/General_Plan/NE_Waterfront.htm> Accessed January 19, 2011.
- 2011 Fisherman’s Wharf Public Realm Plan Preliminary Mitigated Negative Declaration. Available on the internet at http://sfmea.sfplanning.org/2010.0256E_PMND.pdf Accessed November 8, 2011.

San Francisco Public Utilities Commission

- 2010 Wastewater System Map, available on the internet at http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/218 accessed June 17, 2010.

Schlocker, J.

- 1974 Geology of the San Francisco North Quadrangle, California. Geological Survey Professional Paper 782. 109 pp. 1974.

Sedlock, R. L.

- 1995 Tectonic Framework, Origin, and Evolution of the San Francisco Bay Region in *Recent Studies of the San Francisco Bay Area* Society for Sedimentary Geology Book 76, 1-17.

REFERENCES

Shipley, William

- 1978 "Native Languages in California." *In Handbook of North American Indians, Volume 8, California*, edited by Robert F. Heizer, pp. 80-90. Smithsonian Institution, Washington, D.C. Simpson, G.D., W.R. Lettis, and K.I. Kelson

Simpson, G.D., W.R. Lettis, and K.I. Kelson

- 1992 Segmentation model for the northern Calaveras fault, Calaveras Reservoir to Walnut Creek, *Proceedings of the Second Conference on Earthquake Hazards in the Eastern San Francisco Bay Area*. G. Borchardt, S.E. Hirschfeld, 1.1. Lienkaemper, P. McClellan, P.L. Williams, and I.G. Wong (eds.). California Department of Conservation, Division of Mines and Geology. pp. 253-259.

State Water Resources Control Board (SWRCB)

- 2010 Geotracker Database, available on the internet at <geotracker.swrcb.ca.gov/map/?CMD=runreport&myaddress=beach+and+jones+san+francisco+ca>, accessed June 28, 2010.

Stinson, M.C., M.W. Manson, and J.J. Plappert

- 1987 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.

Switzky, Joshua

- 2009 San Francisco Planning Department, personal communication, January 23, 2009.

The Presidio Trust

- 2002 *The Presidio Management Plan of 2002*. Available on the internet at <<http://www.presidio.gov/trust/documents/environmentalplans/ptmp.htm>>

Tosi, Benji

- 2010 Aquatic Park Bocce Club, personal communication regarding Aquatic Park Bocce Club, September 7, 2010.

Transportation Research Board (TRB)

- 2000 *2000 Highway Capacity Manual*.

URS Corporation

- 2006 "Internal Draft Working Paper #2 – Description of Alternatives." Prepared for SFMTA. October 16, 2008.
- 2009a "Technical Study, Utilities." Prepared for the National Park Service. January 2009.

- 2009b “Technical Study, Biological Resources, for the Extension of Historic Streetcar Service from Fisherman’s Wharf to the San Francisco Maritime National Historic Park and Golden Gate National Recreation Area’s Fort Mason Center.” Prepared for the National Park Service, March 2009.
- 2009c “Capital and Operating Funding Needs and Sources - Working Paper #4.” Prepared for the National Park Service, April, 2009.
- 2009d “Working Paper #9A, Cultural Resources – Archeological Resources.” Prepared for the National Park Service, June 2009.
- 2009e “Draft Conceptual Engineering Report.” Prepared for the National Park Service, January 22, 2009.
- 2009f “Transit Operations Plan.” Prepared for the National Park Service, July 2009.
- U.S. Army Corps of Engineers (USACE)
- 2009 *Final Site Investigation Work Plan – Former Fort Mason San Francisco, California*, prepared by CAPE, April 2009.
- U.S. Census Bureau
- 2000 United States Census Bureau American Fact Finder. Available on the internet at <http://factfinder.census.gov/servlet/QTSelectedDatasetPageServlet?_lang=en&_ts=200420795359> Accessed on June 22, 2007.
- 1990 United States Census Bureau American Fact Finder. Available on the internet at <http://factfinder.census.gov/servlet/QTSelectedDatasetPageServlet?_lang=en&_ts=200420795359> Accessed on June 22, 2007.
- U.S. Department of Agriculture, Natural Resources and Conservation Service
- 2009 Soil maps for San Mateo County and San Francisco County. Available on the internet at <<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>> Last accessed March 6, 2009.
- 2010 Soil maps for San Mateo County and San Francisco County. Available on the internet at <<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>>, accessed June 15, 2010.
- U.S. Department of Commerce
- 2000 Census 2000. Bureau of the Census. Washington, DC.
- U.S. Department of Transportation
- 1994 Executive Order 12898 on Environmental Justice. Available on the internet at <www.fhwa.dot.gov/environment/index.htm>
- 2006 Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*.

REFERENCES

U.S. Fish and Wildlife Service

- 2009 Sacramento Endangered Species Office, Quick Endangered Species List for 7.5-minute quadrangles San Rafael, Bolinas, San Geronimo, Novato, Petaluma Point, San Quentin, San Francisco North, and Point Bonita, February 2009.
- 2010 Sacramento Endangered Species Office, Quick Endangered Species List for 7.5-minute quadrangles San Francisco North, San Francisco South, and Point Bonita. <http://www.fws.gov/sacramento/es/spp_lists/QuickList>, accessed 2010 June.

U.S. Forest Service

- 1974 Chapter 1: The Visual Management System. National Forest Landscape Management. Volume 2 (Agriculture Handbook Number 462). Washington, D.C.

Wallace, R.E.

- 1990 The San Andreas Fault System, California. U.S. Geological Survey Professional Paper 1515. 283 pp.

Wilbur Smith Associates (WSA)

- 2004 In Association with EIP Associates, URS Corporation, BMS Design Group, LTK Engineering Services, *Muni E-Line Extension Feasibility Study Final Report*, San Francisco, CA. Prepared for the Presidio Trust, National Park Service, and SFMTA.
- 2007a Fort Mason Center Parking Monitoring Study, July 2007.
- 2007b Fort Mason Center Intercept Survey for the E-Line Streetcar Extension Study, August 10, 2007.
- 2007c Inventory Surveys of On-Street Parking, December 2007.

Wilson Ihrig & Associates

- 2009 Noise and Vibration Settings Report, San Francisco Muni Historic Streetcar Service to Fort Mason, Revised Report.

Wong, Clifton

- 2010 San Francisco Metropolitan Transportation Agency, Engineering Services, personal communication, August 30, 2010.

Working Group on California Earthquake Probabilities

- 2008 The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2), U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203. Available on the internet at <<http://pubs.usgs.gov/of/2007/1437/>>

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