U.S. Department
of Transportation
Federal Transit Administration

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Mr. Mark Zabaneh
Executive Director
Transbay Joint Powers Authority
201 Mission Street, Suite 2100
San Francisco, California 94105

JUL 22 2019

Re: Amended Record of Decision for the Transbay Terminal/Caltrain Downtown Extension/ Redevelopment Project

Dear Mr. Zabaneh:

The Federal Transit Administration (FTA) has completed its review of the public and interagency comments on the Supplemental Final Environmental Impact Statement (SFEIS) for the Transbay Joint Powers Authority (TJPA) Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project. FTA has issued the enclosed Amended Record of Decision (ROD) for the Project.

If the TJPA contemplates any change to the Project, TJPA must notify FTA immediately and refrain from taking any action related to the proposed change until FTA has determined what, if any, additional environmental analysis is necessary, and that analysis has been completed and approved by FTA. For example, should TJPA wish to make a change to the mitigation measures in the Final SEIS, the ROD, or a change to the Project that would cause new or changed environmental or community impacts not presented in the Final SEIS, then TJPA must notify FTA in writing of the desire to make a change.

Any such change will be reviewed in accordance with FTA environmental procedures (23 CFR § 771.129-130) on supplemental documentation. FTA will determine the appropriate level of environmental review for this or any other proposed change (i.e., a written re-evaluation of the Final SEIS, an environmental assessment of the change, or a supplemental EIS), and the NEPA process for this supplemental environmental review will conclude with a separate NEPA determination or, if necessary, with an amendment to this ROD.

Please make the Amended ROD and supporting documentation available to affected government agencies and the public. Availability of the document should be published in local newspapers and should be posted on the Project website. The document also should be provided directly to affected government agencies, including the State Inter-governmental Review contact established under Executive Order 12372.

If you have questions about our review, please contact Mr. Ted Matley at (415) 734-9468.

Sincerely,

Ray Tellis
Regional Administrator

AMENDED RECORD OF DECISION
ON
TJPA TRANSBAY TERMINAL/CALTRAIN DOWNTOWN EXTENSION/REDEVELOPMENT PROJECT
BY THE
FEDERAL TRANSIT ADMINISTRATION

Decision

The Federal Transit Administration (FTA), pursuant to Title 23 of the Code of Federal Regulations (CFR) Part 771 and Title 40 CFR Parts 1500-1508, has determined that the requirements of the National Environmental Policy Act (NEPA) of 1969 and related federal environmental statutes, regulations, and executive orders have been satisfied for the refinements to the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project, also known as the Transbay Transit Center Program or Transbay Program, in San Francisco, California. FTA served as the federal lead agency under NEPA, and the Transbay Joint Powers Authority (TJPA) served as the lead agency under the California Environmental Quality Act (CEQA).

This Amended Record of Decision (ROD) amends the ROD previously issued by FTA on February 8, 2005 (2005 ROD) for the Transbay Program. This Amended ROD applies to the proposed project (project) described and evaluated in the Draft Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR) (December 2015) and the Final SEIS/EIR (November 2018), prepared pursuant to NEPA and CEQA. The project consists of the design, construction, and future operation of refinements to the previously approved Phase 2 of the Transbay Program and other transportation improvements within the City and County of San Francisco (City), as described in the "Description of the Project" section below. The decisions and determinations made in the 2005 ROD remain unaltered, except as expressly altered by this Amended ROD.

TJPA will seek financial assistance from FTA for the project to carry out the project's engineering, construction, and property acquisition. If FTA provides financial assistance for final design or construction of the project, FTA will require the project to be designed and built as presented in the Final SEIS/EIR and in the Amended ROD. Any proposed change must be evaluated in accordance with 23 CFR Section 771.129-130 and FTA must approve the change before the agency requesting the change can proceed.

Background

The Transbay Program, as adopted in 2004, includes the Downtown Rail Extension (DTX), the establishment of a redevelopment area plan, and the construction of the Transit Center on the site of the former Transbay Terminal at First and Mission Streets, which was demolished in 2011. The purpose of the Transbay Program is to improve public access to bus and rail services, modernize the Transbay Terminal and improve service, reduce non-transit vehicle usage, alleviate blight, and revitalize the Transbay Terminal area.

The Transbay Program is divided into two construction phases. Phase 1 was completed in 2018 and consisted of the above-ground portion of the new Transbay Transit Center (Transit Center), built on the site of the former Transbay Terminal, and below-grade train station facilities at the Transit Center for Caltrain and future high speed rail (HSR). Phase 2 includes the Downtown Rail Extension (DTX), which enables direct below-ground Caltrain and future HSR service to the Transit Center by extending Caltrain tracks approximately 1.3 miles from its present San Francisco terminus at Fourth and King Streets to the Transit Center. Phase 2 will also build a new underground train station along the DTX alignment at Fourth and Townsend Streets, an intercity bus facility, and a pedestrian tunnel between the Transit Center and the Embarcadero BART/ Muni Metro station.

Proposed refinements to Phase 2 of the Transbay Program and other transportation improvements (the project) were the subject of the 2018 Final SEIS/EIR. The project seeks to advance the original goals and objectives of the Transbay Program. The purpose is also to serve the growing transportation needs in the project area, to enhance system safety and meet emergency response needs of system operations, and to enhance intermodal connectivity and to increase modal options. Other objectives of the project include supporting local and regional land use plans and transit investments and supporting future HSR service.

Planning for the Project

A decade of planning preceded the Transbay Program to identify replacement solutions for the former Transbay Terminal, which did not meet modern seismic safety or space utilization standards. Planning studies were primarily conducted between 1992 and 1999. In November 1999, the voters of San Francisco approved Proposition H, which requires the extension of Caltrain from its present terminus at Fourth and King Streets to the site of the transit center.

Following voter approval in 1999, further definition of the terminal design concepts was undertaken for analysis in the environmental document. On October 4, 2002, a Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) for the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project was released for public comment. The Final EIS/EIR was prepared and certified by the Peninsula Corridor Joint Powers Board, a predecessor of the TJPA, in April 2004. FTA issued the ROD for the project in 2005.

Since the issuance of the 2005 ROD, the TJPA has identified modifications to the Transbay Program and prepared six addenda under CEQA to the 2004 Final EIS/EIR from 2006 to 2011. The Federal Railroad Administration (FRA) conducted an environmental reevaluation in 2010 in accordance with NEPA to assess the train box design to accommodate potential HSR service. FRA would provide funding of the train box under the High-Speed Intercity Passenger Rail Program that would serve both Caltrain and HSR. The 2010 Reevaluation analyzed construction of the Transit Center train box as defined by the Transbay Program. The reevaluation explained that changes to the train box associated with Phase 2, including modifications to the track curvature in the throat structure, a widened throat structure, and an increase in the tangent length of the HSR rail platforms (i.e., the project for this Amended ROD) would occur in the future and were not part of the FRA action in 2010. The FRA issued a ROD on August 4, 2010 and adopted relevant findings in the 2004 Final EIS/EIR.

Preliminary engineering for Phase 2 was completed in July 2010. Subsequently, new design requirements by the CHSRA, Caltrain, and the City, as well as other factors, added or modified elements of Phase 2. In 2013, consistent with 23 CFR Part 771.130(a), FTA in cooperation with FRA and TJPA, initiated the preparation of a SEIS/EIR to examine changes to Phase 2 of the Transbay Program. The SEIS/EIR discusses if those changes would result in possible significant environmental impacts that were not evaluated in the 2004 Final EIS/EIR. The SEIS/EIR also analyzes if new information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts would result in significant environmental impacts not evaluated in the 2004 Final EIS/EIR.

Alternatives Considered

The alternatives evaluated in the Final SEIS/EIR included the No Action Alternative and the project.

No Action Alternative. The No Action Alternative consists of the previously approved Transbay Program and the associated mitigation measures, as amended through 2012. The No Action Alternative includes the future land use, urban design, open space, and local transportation network surrounding the Transit Center as defined in the Transit Center District Plan adopted by the City in 2012 and which superseded portions of the Redevelopment Plan originally approved as part of the Transbay Program.

Project. The project consists of the following refinements to Phase 2 of the Transbay Program and other transportation improvements, which are described in Chapter 2 of the Final SEIS/EIR:

Phase 2 Refinements

- Widen throat structure at west end of the train box from the Transit Center to Clementina Street, along Second Street
- Extend the train box one block to the east to Main Street
- Realign the underground Fourth and Townsend Street Station within Townsend Street
- Relocate, add, and modify the emergency vent structures
- Construct an underground train box (tunnel stub box) at the west end of the Caltrain railyard
- Install rock dowels along Second Street and along the curve to Townsend Street
- Add a turnback and maintenance-of-way (MOW) track between Hooper and Mariposa Street, east of Seventh Street within the Caltrain right-of-way

Other Transportation Improvements

- Construct an intercity bus facility at the Transit Center above the extended train box
- Site new taxi staging areas at the Transit Center
- Construct a new bicycle ramp, bike storage facility, and a ramp for maintenance vehicles at the Transit Center
- Add off-hour/nighttime public parking at the approved AC Transit bus storage facility
- Shift a proposed underground pedestrian connector between the Transit Center and the Embarcadero BART/Muni Metro Station from Fremont Street to Beale Street

Alternatives Withdrawn From Consideration. Alternatives to Phase 2 of the Transbay Program were discussed in the 2004 FEIS/EIR and included alternative alignments, station configurations, and construction methods for the DTX. A review of alternatives to the project was conducted in the Final SEIS/EIR, but those alternatives were withdrawn from further consideration. These alternatives include a smaller horizontal curve radius in the widened throat structure, a greater horizontal curve radius, modified construction methods, alternative vent structure sites in the vicinity of Second and Harrison Streets and at Third and Townsend Streets, alternative sites for the intercity bus facility, or alternative loading spaces for taxi pick-up and staging. These alternatives were withdrawn because they would not substantially reduce significant impacts or would result in greater environmental impacts (particularly land acquisition, displacement, and potential noise and vibration impacts), were not reasonable due to cost, did not comply with life safety requirements, conflicted with local land use plans, and/or would not achieve the project purpose and need (see Chapter 1 of the Draft SEIS/EIR, as updated in Section 2.3 of the Final SEIS/EIR).

Following the receipt of comments on the Draft SEIS/EIR, the TJPA issued a *Tunnel Options Study* in 2017 and subsequently amended it in 2018. The study looked at possible construction methods that could lessen the surface disruption and the traffic circulation, environmental, and socioeconomic impacts associated with cut-and-cover construction techniques. The *Tunnel Options Study* identified two segments, at the widened throat structure and along Townsend Street, generally between Third and Fourth Streets, where mined tunnel methods could enable construction to occur below the surface, reducing the intensity and duration of construction impacts due to cut-and-cover methods. However, these other construction methods have not been included as part of the project, because they require further review by the TJPA in terms of their risk, cost, and schedule. Should these other construction methods be considered preferable to the current cut-and-cover construction techniques in the future, they will be evaluated in accordance with 23 CFR Section 771.129-130 and FTA must approve the change before the TJPA can proceed.

The San Francisco County Transportation Authority conducted a peer review to review DTX rail operations, including consideration of whether a two-track DTX, instead of a three-track DTX, as proposed, would be feasible. The *Peer Review Panel Report on Findings – Review of Three Operational Studies for the Design of the Caltrain Downtown Extension* concluded that the third track, included as part of the project, provides operational flexibility during normal operations

and allows for efficient recovery from delays. In comparison, a two-track configuration would be susceptible to unacceptable delays and would not provide operational flexibility.

See Table 2-7 of the Final SEIS/EIR for additional detail regarding alternatives withdrawn from consideration.

Environmentally Preferable Alternative

The "environmentally preferable alternative" is the alternative required by 40 CFR Part 1505.2(b) to be identified that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources.

FTA determined that the project is the environmentally preferable alternative when the alternatives were weighed and balanced in terms of their environmental effects. The project would result in adverse effects to transportation; historic and cultural resources; biological resources; water resources and water quality; geology, soils, and seismicity; electromagnetic fields; noise associated with project operations; and air quality. However, the project would incorporate measures to reduce construction air and greenhouse gas emissions and avoid and protect migratory birds and paleontological resources.

The project also would result in long-term operational benefits. It would enhance rail operations, improve safety, enable efficient and reliable operations between the Caltrain railyard and the Transit Center, and support and not preclude potential HSR service to travel to the Transit Center. It would also help to realize regional and statewide air quality, greenhouse gas, and energy benefits identified with that enhanced rail system. In addition, the project would have transportation benefits of enhanced mobility and accessibility to local and regional transit services and employment and activity centers in the San Francisco Bay Area. The proposed Fourth and Townsend Street Station and Transit Center are within walking distance of environmental justice communities, who would benefit from the improved access to employment and community facilities in the City and throughout the larger Bay Area due to the project. The project would also preserve a portion of the building at 165-173 Second Street (also referred to as 171 Second Street), which would be demolished under the No Action Alternative, thereby eliminating a significant and unavoidable adverse effect on an historical resource. The project would enhance transit system resiliency and seek to minimize hazards from flooding and sea-level rise; would minimize transit operations and safety impacts; and reduce construction impacts for future rail grade separation opportunities.

The No Action Alternative lacks the environmental benefits and transportation benefits of the project. The No Action Alternative would not include the design updates consistent with the current HSR design and safety standards. The inability to accommodate future HSR service would also mean that the No Action Alternative would confer fewer benefits related to enhanced transit connections, reduced vehicle miles traveled, and lower air and greenhouse gas emissions. Therefore, in consideration of the damage to the physical environment and the long-term benefits to environmental resources, particularly air quality, the project is the environmentally preferable alternative.

Description of the Project

The project described as the proposed project in the Final SEIS/EIR is the subject of this Amended ROD and is the NEPA Preferred Alternative. The project consists of proposed refinements to Phase 2 of the Transbay Program improvements to the DTX and other transportation improvements to the Transbay Program in San Francisco. A description of each element of the project is provided below.

Additional Trackwork South of the Caltrain Railyard. New at-grade trackwork includes a turnback track and a MOW track, which relocates the current MOW track to the west side of the mainline tracks. The turnback track allows train movements between the surface Caltrain railyard and the Transit Center. Caltrain would store trains at the Transit Center, both overnight and during off-peak periods and would not use the turnback track during morning (AM) and afternoon (PM) peak hours.

Tunnel Stub. A tunnel stub box, located in the Caltrain yard at Fourth and King Streets, would be constructed to allow construction of a future southward underground extension of the DTX.

Fourth and Townsend Street Station. An underground station at Fourth and Townsend Streets, which would serve Caltrain commuters, would be located into the Townsend Street right-of-way.

Ventilation and Emergency Egress Structures. Six ventilation and emergency egress structures are proposed along the DTX alignment: each end of the Fourth and Townsend Street Station; 699 Third Street and 180 Townsend Street; southeast corner of Second and Harrison Streets; and at each end of the Transit Center.

Widened Throat Structure. The throat structure connects the three-track tunnel along Second Street to the western end of the constructed transit center train box. Updated design requirements for HSR require the widening of the throat structure, affecting approximately 14,000 more square feet than the previously approved Phase 2 throat structure.

Transit Center Train Box Extension. The train box would extend across Main Street to meet the length requirements for the HSR platforms.

Rock Dowels. Construction of the mined tunnel segment from the Townsend Street curve onto and along Second Street would require installation of rock dowels to temporarily support the tunnel during construction.

Intercity Bus Facility (IBF). The IBF, proposed at-grade above the train box extension across the street from the east end of the Transit Center between Beale and Main streets, would be dedicated to intercity bus services, such as Greyhound and Amtrak. These bus services would operate from the Transit Center bus deck during Phase 1 and are anticipated to be relocated to the IBF in Phase 2 to accommodate the operational needs and anticipated increase in ridership of the Transit Center's primary bus agency tenant, AC Transit. The IBF would house a passenger waiting area, ticketing counters, retail space, transit agency operations space, and mechanical space.

BART/Muni Pedestrian Connector. The BART/Muni pedestrian connector would connect the east end of the Transit Center's lower concourse with the Embarcadero BART/Muni Metro station, providing passengers with a direct connection between the two stations. The block-long pedestrian tunnel would be in the center of the Beale Street right-of-way, entering the Embarcadero Station at the mezzanine level outside paid fare zones.

Bicycle/Controlled Vehicle Ramp and Below Grade Bicycle Facilities. A bicycle ramp from Howard Street on the south side of the transit center to the lower concourse of the transit center would provide access to a proposed 500-bicycle storage facility, with room to potentially expand storage to 1,000 bicycles. A separate controlled vehicle ramp for service and maintenance vehicles would run parallel to the bike ramp to access the lower concourse.

Basis For The Decision

FTA weighed the ability of project alternatives to meet the purpose and need, the environmental effects of the alternatives, and the comments from the public and agencies. FTA has reviewed the public and agency comments on the Draft SEIS/EIR, Final SEIS/EIR, the transcripts of the public hearings, and additional comments received immediately prior to the December 13, 2018 TJPA Board hearing to certify the Final SEIS/EIR pursuant to CEQA. Appendix A to the Final SEIS/EIR includes a summary of comments received on the Final SEIS/EIR and responses to comments during the public circulation period. A summary and responses to the comments received immediately prior to the TJPA Board hearing are included as Attachment B to this Amended ROD. Based on these factors, FTA has determined that the project meets the purpose and need of the proposed action as outlined in Chapter 2 of the Final SEIS/EIR and as discussed below.

Enhance Intermodal Connectivity and Services. The project would improve intermodal connectivity by providing design refinements necessary to extend Caltrain and HSR to the Transit Center and to provide an IBF for better interconnections with other transportation services such as AC Transit, Golden Gate Transit, Greyhound, San Francisco Municipal Railway (Muni), SamTrans, WestCAT Lynx, Amtrak, and Paratransit. The DTX will enable Caltrain service to better interconnect with local and regional transit services at the new multimodal Transit Center, and provide a transit alternative for commuters who currently do not have a direct Caltrain link to the core employment and financial area of San Francisco. The intercity bus facility will accommodate bus operations and shuttle services, and the taxi staging area will enhance the multimodal function and connectivity of the Transit Center by providing for taxi operations directly adjacent to the Transit Center.

The project would enable connectivity of transit and alternative modes by enhancing pedestrian, bicycle, and transit connections. The BART/Muni underground pedestrian connector will provide direct access between the Transit Center and the Embarcadero BART/Muni Metro Station at Market Street. The project adds a bicycle ramp and bicycle storage facilities for 500 bicycles with room for expansion to 1,000 bicycles to accommodate projected future demand.

Support HSR Service. To support and not preclude HSR service in the future, the track alignment, throat structure, and length of the train box designs were refined to satisfy design specifications for HSR service. In addition, installation of a tunnel stub box during the DTX

construction would also reduce environmental impacts associated with subsequent construction needed to enable a Caltrain and HSR tunnel at a later date.

Serve Growing Transportation Needs in the Area. The 2004 FEIS/EIR identified a pressing need to alleviate a burdened transportation network and to serve new development envisioned as part of the Redevelopment Plan component of the Transbay Program. Since 2004, the transportation needs have continued to expand with new development and City-sponsored plans promoting growth and transportation improvements in the vicinity of the Transit Center. The project would help meet the transportation needs by providing modal alternatives and connections to the new developments, employment and activity centers throughout the local area and the region. The project would help meet a parking shortage in the Transit Center area, by allowing the AC Transit bus storage facility to be used for off-hours, nighttime, and event parking (e.g., sporting and other special events).

Improve Transportation and Environmental Quality. An estimated reduction of 42,000 tons of carbon dioxide and 3.8 million gallons of gasoline per year will result from construction of the DTX. Local residents will experience health benefits from improved air quality, worth $8 million in cost savings from reduced emissions. The DTX will reduce carbon dioxide emissions by tens of thousands of tons each year. Development of the project will yield additional health benefits for area residents.

Enhance System Safety. The project updates the design and identifies specific locations for all ventilation/ emergency access structures necessary to safe Transbay Program system operations. The design and location of these emergency structures complies with National Fire Protection Association ("NFPA") Standard 130.

Public Involvement and Outreach

Chapter 7, Coordination and Consultation in the Draft SEIS/EIR, as updated in Section 2.21 of Chapter 2 in the Final SEIS/EIR, describes extensive outreach to the public and federal, state, and local agencies during the environmental process. On April 30, 2013, TJPA distributed a Notice of Preparation (NOP) to advise interested agencies and the public that TJPA intended to prepare an SEIS/EIR for the project. TJPA distributed the NOP to approximately 41 agencies, elected officials, and interested parties and organizations in the study area. TJPA used multiple methods to announce the scoping process and scoping meeting, including display advertisements in local newspapers, mailings to addresses located in the vicinity of the project, emails sent to recipients on the TJPA emailing list, and news releases posted on the TJPA website.

TJPA distributed approximately 4,500 postcards to property owners within 300 feet of each project component. The mailers provided an overview of the project, information regarding the scoping meeting, and instructions on how to submit comments. TJPA conducted a public scoping meeting on May 24, 2013 to gather input and comments prior to the development of the SEIS/EIR. Approximately 20 individuals attended the scoping meeting.

Notice of the Availability (NOA) for the Draft SEIS/EIR was published in the Federal Register on December 24, 2015. The public comment period for the Draft SEIS/EIR ended February 29, 2016. The Draft SEIS/EIR was distributed to approximately 200 agencies, elected officials, and

interested parties and organizations in the study area. The NOA was distributed to approximately 5,800 addresses within 300 feet of each project component. Emails were sent to approximately 4,500 recipients on the TJPA emailing list. A public meeting was held on February 10, 2016.

In total, 22 comment submittals (e.g., comment cards, e-mails, and letters) containing 153 individual comments were received: two submittals from federal agencies, four from state agencies, three from local agencies, and thirteen from individuals and organizations. Responses to these comments were provided in the Final SEIS/EIR. The Final SEIS/EIR was published in the Federal Register on December 7, 2018 *(Federal Register,* Vol. 83, No. 235), and the review period concluded on January 7, 2019.

The NOA for the Final SEIS/EIR and announcement of the December 13, 2018 TJPA Board meeting to act on the Final SEIS/EIR was distributed using multiple methods, including a November 26, 2018 notice to all public agencies that had commented on the Draft SEIS/EIR; sending emails, also on November 26, 2018, to about 13,000 parties who had previously signed up to receive Transbay Program updates; mailing about 200 postcards on November 27, 2018 to interested parties, including those who had previously expressed interest, who submitted comments, who were included on three Planning Department outreach lists, and others; and posting the NOA on the TJPA website along with the TJPA Board agenda on December 9, 2018. Copies of the Final SEIS/EIR and supporting documents were made available online at http://tjpa.org/documents/final-supplemental-eiseir and at TJPA's office at 201 Mission Street, Suite 2100, San Francisco, CA 94105.

Since the release of the Final SEIS/EIR in late 2018, three letters were received on the Final SEIS/EIR and members of the public commented at the TJPA Board hearing on December 13, 2018. Attachment B to this Amended ROD includes a summary of comments and responses to public comments received on the Final SEIS/EIR since its circulation. TJPA and FTA have considered all of the public comments in concert with the information presented in this document prior to selection of the NEPA Preferred Alternative. Public outreach will continue throughout construction of the project.

The TJPA Citizen's Advisory Committee (TJPA CAC) was created to advise the TJPA Board of Directors on matters of public interest relating to the Transbay Program. Representing the diversity of the Bay Area, the CAC includes fifteen voting members appointed by the TJPA Board of Directors, plus one non-voting TJPA staff member liaison. TJPA CAC members represent specific constituencies, including riders of Caltrain, AC Transit and Muni; advocates for the bicycle, transit and disabled communities; and representatives with labor, real estate development/finance, non-profit, business, residential and environmental interests. The TJPA CAC meets monthly and updates on the SEIS/EIR were given in 2014, 2016, 2017 and 2018.

Determination and Findings

Section 106 of the National Historic Preservation Act (36 CFR Part 800)

FTA and the California State Historic Preservation Office (SHPO) executed a Memorandum of Agreement (MOA) for the Transbay Program in June 2004. It was amended on July 27, 2010 to add FRA and TJPA as signatories. It was amended again on June 23, 2016 to promote closer

coordination and consultation with Native American tribes and to extend the duration of the MOA. The MOA contains stipulations and guidance covering, but not limited to, ongoing consultation with SHPO and consulting parties, preparation of treatment plans, and protective measures to avoid or minimize damage to historical resources.

In a letter dated September 11, 2015, FTA consulted with the SHPO per Section 106 to solicit comments on the revised Area of Potential Effects (APE) and in a subsequent letter dated February 17, 2017 to request concurrence on the determinations of eligibility and findings of effect. SHPO accepted the APE revisions on December 8, 2015 and concurred with FTA findings on March 1, 2017 (see Attachment C).

Potential impacts on historic districts, eligible for listing or listed in the National Register of Historic Places (NRHP) within the APE were analyzed as follows:

- The 2004 FEIR/EIS indicated that 165-173 Second Street (the current street address is 171 Second Street), a contributor to the Second and Howard Streets Historic District, was identified for demolition and an indirect adverse effect would occur on 163 Second Street, also a contributor to the same historic district. With the proposed eastward shift of the throat structure, demolition of the building and adverse impacts to these historic properties would be avoided. Piles and underpinning of 589 Howard Street, also a contributor to the historic district, and 165-173 Second Street would be installed. A Memorandum of Agreement among the FTA, FRA, and the SHPO that was executed in June 2004 after the 2004 FEIS/EIR includes stipulations and protective measures to be implemented during construction, so that there would be no adverse effect to these properties.

- The project would not impact the Bluxome and Townsend Warehouse Historic District, the South End Historic District, or the Rincon Point/South Beach Historic Industrial/Warehouse District, because the project would not be within the districts, the alignment would be underground, and above-ground facilities (i.e., stations and vent structures/emergency exits) would be sufficiently distant and small in scale to avoid indirectly and adversely affecting the historic integrity of the districts.

- Demolition of a contributor to the South End Historic District and Rincon Point/South Beach Historic Industrial Warehouse District (180 Townsend Street) would be not adverse because the historic integrity of the districts would remain intact. The districts' remaining contributing buildings would continue to represent a high percentage of the total buildings in the districts, and the visual quality and character of the remaining contributing buildings would continue to convey the districts' significance. In addition, the design of the vent structure/emergency exit that would displace the contributor would follow accepted preservation standards for context-sensitive infill development in historic districts.

- The relocation or replacement of San Francisco Fire Department Auxiliary Water Supply System components in a relatively small area of the system that spans the entire City would not constitute an adverse effect on the historic property because the work would not impair the district's ability to convey its historical significance, nor would it alter its NRHP eligibility status.

No NRHP-eligible archaeological resources were identified or detected within the archaeological APE. Although no archaeological resources were identified within the APE, the potential for unanticipated discoveries still exists within the APE. Therefore, measures for the treatment of unanticipated archaeological resources discovered during construction are set forth in the Final SEIS/EIR and the Mitigation Monitoring and Report Program (MMRP) included in Attachment A.

On February 21, 2017, FTA determined that there would be no additional adverse effects to historic resources for the project beyond those documented in the finding of effect for the Transbay Program that was submitted on August 29, 2003. Measures to avoid and minimize effect previously identified in the 2004 FEIS/EIR and as outlined in the MOA would continue to apply. The SHPO concurred with FTA's finding in a letter dated March 1, 2017, which is included as Attachment C to this Amended ROD.

Air Quality Conformity

The project conforms to the State Implementation Plan (SIP) pursuant to Clean Air Act Section 176(c) (42 USC 7506(c)), because it is identified in "Plan Bay Area," the 2040 Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area adopted in July 2017 (RTPID 17-10-0038). The regional emissions analysis for Plan Bay Area found that the Plan, and therefore, the individual projects contained in the Plan, including the project, are conforming and will have air quality impacts consistent with those identified in the SIP for achieving the National Ambient Air Quality Standards. The Federal Highway Administration and FTA determined that the Plan conformed to the SIP on August 23, 2017, pursuant to the EPA's Transportation Conformity Rule, 40 CFR Parts 51 and 93, and the FHWA/FTA Metropolitan Planning Rule, 23 CFR 450.

Phase 2 of the Transbay Program does not meet the criteria that would classify it as a Project of Air Quality Concern (POAQC) under EPA's final rule. Phase 2 of Transbay Program was presented to the Interagency Consultation Task Force on January 24, 2013. The Task Force determined on February 21, 2013 that the Transbay Program, including Phase 2, is not a POAQC. The project is included in a conforming regional transportation plan, and thus the project is included in emission budgets developed for the region. The project would not result in adverse effects related to worsening existing, or contributing to new, localized particulate matter hot spots.

Section 4(f) of the Department of Transportation Act of 1966 (49 USC § 303)

FTA determined that the project would result in Section 4(f) use with *de minimis* impacts on the following Section 4(f) historic resources:

- The widened throat structure would pass under 589 Howard Street and 165-173 Second Street, both contributing elements of the Second and Howard Streets Historic District. Subsurface easements would be required, but easements are not anticipated for construction of piles and underpinning of the structures. A portion of the basement of the building at 589 Howard Street would also be removed, but the basement is not a contributor to the historic district.

- 180 Townsend Street, a contributing element to the Rincon Point/South Beach Historic Warehouse-Industrial District and South End Historic District, would be acquired and demolished.
- Pipes associated with the San Francisco Fire Department AWSS Historic District would be removed and/or replaced.

Per 23 CFR 774.5(b), SHPO, the official with jurisdiction for historic resources, was informed of the intent to make a *de minimis* impact determination, because the project would not adversely affect the features, activities, or attributes of the property that qualify it for protection under Section 4(f). In their letter dated March 1, 2017, SHPO concurred with FTA's finding of no adverse effect to historic properties in accordance with 36 CFR Part 800. In addition, the project would not require temporary construction easements on historic properties. The proximity impacts from construction and operation of the project would not substantially impair the features, activities, or attributes of the property that qualify it for protection under Section 4(f). Therefore, FTA has determined that the use of these Section 4(f) historic resources would result in *de minimis* impacts, consistent with 23 CFR 774.17(5). FTA also determined that the project would have no temporary occupancy or constructive use of Section 4(f) historic resources.

No known Section 4(f) public parks, recreational areas, or wildlife or waterfowl refuges are within project area. No permanent incorporation of land, construction staging and/or construction easement would be required from any of these Section 4(f) properties. No proximity impacts would be experienced at any of these Section 4(f) resources. Therefore, no Section 4(f) use, temporary occupancy, or constructive use of these Section 4(f) resources would occur as a result of the project.

Endangered Species Act

The project area does not contain listed species covered by the California Endangered Species Act or the Federal Endangered Species Act. The project area is located in downtown San Francisco and does not contain suitable habitat and is not in proximity to suitable habitat for threatened or endangered species.

Disruption of nesting birds is not permitted under the federal Migratory Bird Treaty Act or the California Fish and Game Code. The project construction activities have the potential to affect migratory and nesting birds at several locations within the project area, including the vent structure at the realigned Fourth and Townsend Street Station, the intercity bus facility, AC Transit bus storage facility parking, and BART/Muni underground pedestrian connector. In addition, temporary or permanent buildings and structures associated with the project may be attractive as nesting habitat to certain migratory bird species. With the implementation of mitigation measure New-MM-C-BR-1.1 to conduct pre-construction bird surveys, adverse effects to migratory birds would be avoided. Therefore, no adverse effects pursuant to the Endangered Species Act or Migratory Bird Treaty Act would occur.

Sections 402 and 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act

The project area is in a developed, urban area and contains no waterways, lakes, or other impoundments of water. No waters of the United States (jurisdictional waters) or wetlands occur

within the project area. Therefore, the project would not encroach upon or affect riparian habitat or waters of the United States. No Section 404 permit or a permit pursuant to Section 10 of the Rivers and Harbors Act is required. Therefore, during project construction and operations, there would be no construction in or over any navigable waters and no adverse effects on waters of the United States.

The project will comply with the Clean Water Act and National Pollution Discharge Elimination System (NPDES) standards during and following construction. Coverage under the NPDES Construction General Permit is not required for projects in areas of San Francisco that drain to the combined sewer system. Because the project would be located in the combined sewer area of the City, the project would require a Construction Site Runoff Control Permit from the San Francisco Public Utilities Commission (SFPUC) and an erosion and sediment control plan (ESCP) that sets forth best management practices (BMPs) to control erosion control and sediment. If dewatering is required, the contractor must submit a dewatering plan and obtain a Batch Industrial Wastewater Discharge Permit from the SFPUC if the effluent is discharged to the City's sewerage system. The quality of the effluent would need to meet the NPDES General Permit (NPDES No. CA0037681) discharge standards. Therefore, temporary and permanent dewatering, if necessary, would not affect surface waters or groundwater resources.

The project components would not impact surface or groundwater resources, because stormwater runoff would be conveyed to the City's combined storm/sanitary sewer system and would not directly discharge into surface water bodies in the project area (China Basin Channel and San Francisco Bay). In addition, the project components would be required to comply with the City's Stormwater Design Guidelines to minimize the discharge of pollutants into the San Francisco Bay.

Therefore, the project would not violate water quality standards or waste discharge requirements and would not have adverse effects on surface water bodies.

Executive Order 11988: Floodplain Management

The most recent preliminary Flood Insurance Rate Maps (2013) shows none of the proposed project components within the 100-year floodplain; however, the eastern edge of the extended train box, vent shaft and emergency exit, IBF, and taxi staging area are partially or completely within the 500-year flood zone or 100-year floodplain base flood elevation plus 2 feet. The project includes elements connecting to the existing Transbay Center, Caltrain facilities, and other facilities; therefore, options to relocate the project components outside the floodplain are not practicable or feasible. The project components would primarily be below ground and would not occupy flood storage space within the floodplain, and therefore would not result in substantial encroachment into a floodplain or alteration to the floodplain. The project vicinity is urbanized. Project elements would not result in a change in impervious surface area, increase fill inside the floodplain, or result in a change in the 100-year water surface elevation. Therefore, the project would not adversely affect natural and beneficial floodplain values and developments in the project area would not be subject to increased flood hazard risk as a result of the project.

Although the project would not alter or exacerbate flood hazard risks, the project would be exposed to flood hazards and would have to be protected from flooding. With implementation of mitigation measure New-MM-WQ-4.1 (included in Attachment A to this Amended ROD),

station entrances and other points of access to below-ground portions of the DTX system would be designed to maintain sufficient freeboard above the 100-year base flood elevation to protect the rail facilities and the public from 100-year storm water entering the stations and the tunnel. There would be no adverse effects related to floodplains or increased flood hazards.

Executive Order 12898: Environmental Justice

The project would have direct and indirect effects on populations within the project area. The project would have adverse impacts prior to the implementation of avoidance, minimization, and/or mitigation measures to transportation; historic and cultural resources; biological resources; water resources and water quality; geology, soils, and seismicity; electromagnetic fields; noise associated with project operations; and air quality. As the majority of the project area includes high concentrations of minority and/or low-income populations (environmental justice (EJ) populations), the effects may be predominately borne by those populations. However, impacts on land use, socioeconomics, population and housing, visual quality/aesthetics, hazardous materials, greenhouse gas and climate change, public and community services, safety and security, and utilities would be similar in nature and magnitude in both EJ and non-EJ communities, so that the project would not result in appreciably more severe or greater in magnitude impacts for EJ populations compared to non-EJ populations. Furthermore, after the implementation of mitigation, there would be no adverse effect for transportation, historic and cultural resources, biological resources, water resources and water quality, geology, electromagnetic fields, noise during project operations, and air quality. The same type, level, and quality of mitigation for effects would be applied in both EJ and non-EJ communities, so there would be no disproportionately high and adverse effects to EJ populations.

However, both EJ populations and non-EJ populations would experience adverse effects associated with construction noise and vibration because such effects would continue to be adverse with mitigation. These effects would only occur for nighttime construction (between 8pm and 7am). Due to the proximity of construction activities to EJ populations, the project would be expected to result in nighttime construction noise impacts predominately borne by EJ populations and appreciably more severe or greater in magnitude for EJ populations compared to non-EJ populations.

Implementation of the project would have a long-term beneficial effect on the community by enhancing regional connectivity, improving mobility options, and improving regional air quality. Improved connectivity to local and regional transportation options would enhance access to places of employment, public facilities, and social, religious, and community facilities in the City of San Francisco and the greater Bay Area. Both EJ populations and non-EJ populations would experience these long-term benefits. As the majority of the project area includes EJ populations, these populations would directly benefit.

With consideration to the implementation of mitigation and offsetting benefits, FTA has concluded, in accordance with Executive Order 12898, that the project would not result in disproportionately high and adverse human health or environmental effects to EJ populations.

Measures That Mitigate Adverse Effects

Per 40 CFR Part 1505.2, all practicable means to avoid or minimize environmental harm have been adopted for the project. The mitigation commitments are described in Attachment A (Mitigation Monitoring and Reporting Program) and include relevant measures from the 2004 Final EIS/EIR, amendments to two cultural resources mitigation measures (CH 11 and CH 12) from the 2004 Final EIS/EIR, and additional measures to avoid and minimize impacts from the 2018 Final SEIS/EIR. Any change to these environmental and related commitments from the description in the Final SEIS/EIR will require a review in accordance with 23 CFR Parts 771.129-130 and must be approved by FTA.

Ray Tellis

Regional Administrator
Federal Transit Administration, Region IX

7-22-2019
Date

Attachments:

Attachment A: Mitigation Monitoring and Reporting Plan

Attachment B: Summary of Comments and Responses after the Final SEIS/EIR

Attachment C: National Historic Preservation Act - Section 106 Correspondence

- SHPO Letter Concurring with Area of Potential Effect, December 8, 2015
- SHPO Letter Concurring with Findings of Effect, March 1, 2017

Attachment A

Mitigation Monitoring and Reporting Plan for the

Transbay Transit Center Program

Final Supplemental Environmental Impact Statement/ Environmental Impact Report (Final SEIS/EIR)

TRANSBAY TERMINAL/CALTRAIN DOWNTOWN EXTENSION/ REDEVELOPMENT PROJECT MITIGATION MONITORING AND REPORTING PROGRAM

INTRODUCTION

Assembly Bill (AB) 3180 was enacted by the State Legislature to provide a mechanism to ensure that mitigation measures adopted through the California Environmental Quality Act ("CEQA") process are implemented in a timely manner and in accordance with the terms of project approval. Under AB 3180, local agencies are required to adopt a monitoring or reporting program designed to ensure compliance during project implementation.

The Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project Mitigation Monitoring and Reporting Program ("Mitigation Monitoring Program"), pursuant to AB 3180, CEQA Section 21081.6 and CEQA Guidelines Section 15091, provides the basic framework through which adopted mitigation measures will be monitored to ensure implementation.

Changes to the Mitigation Monitoring Program adopted by the TJPA Board in 2004 to incorporate updates from the Final Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR) are indicated by underlining for new text and ~~strikethroughs~~ for deleted text.

ORGANIZATION

The Mitigation Monitoring Program is organized in a table format, keyed to each adopted Final EIS/EIR mitigation measure. For each measure, the table: (1) lists the mitigation measure; (2) specifies the party responsible for implementing the measure; (3) establishes a schedule for mitigation implementation; (4) assigns mitigation monitoring responsibility; and (5) establishes monitoring actions and a schedule for mitigation monitoring.

IMPLEMENTATION

While the Mitigation Monitoring Program generally outlines the actions, responsibilities and schedule for mitigation monitoring, it does not attempt to specify the detailed procedures to be used to verify implementation (e.g., interactions between the Project Sponsor – the Transbay Joint Powers Authority, the San Francisco Redevelopment Agency and City departments, use of private consultants, signed-off on plans, site inspections, etc.). Specific monitoring procedures are either contained in approval documents or will be developed at a later date, closer to the time the mitigation measures will actually be implemented.

The majority of the measures will be monitored primarily by the Transbay Joint Powers Authority (TJPA), in consultation with other City and non-City agencies, as part of the site permit, building permit processes or other report.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
Wind				
W 1 – Consider potential wind effects of an individual project for the Redevelopment area. If necessary, perform wind tunnel testing in accordance with City Planning Code Section 148. If exceedences of the wind hazard criterion should occur for any individual project, require design modifications or other mitigation measures to mitigate or eliminate these exceedences. Tailor mitigation measures to the individual needs of each project. Examples of mitigation measures include articulation of building sides and softening of sharp building edges.	San Francisco Redevelopment Agency (Agency)	During environmental review process preceding approval of each individual project in Transbay Redevelopment Area	Agency	Apply project review procedures for wind when projects are developed by or proposed to Agency.
Property Acquisition/Relocation				
Prop 1 – Apply federal Uniform Relocation Act (Public Law 91 646) and California Relocation Act (Chapter 16, Section 7260 et seq., of the Government Code) and related laws and regulations governing both land acquisition and relocation. All real property to be acquired will be appraised to determine its fair market value before an offer is made to each property owner. (Minimum relocation payments are detailed in the laws, and include moving and search payments for businesses.) Provide information, assistance, and payments to all displaced businesses in accordance with these laws and regulations.	City and County of San Francisco (CCSF), Agency, and TJPA	Prior to and during property acquisition and relocation activities	TJPA	TJPA to report to Board on compliance during acquisition and relocation activities.
Safety and Emergency Services				
Saf 1 – Provide project plans to the San Francisco Fire Department for its review to ensure that adequate life safety measures and emergency access are incorporated into the design and construction of Project facilities.	Transbay Joint Powers Authority (TJPA)	Prior to project facility permitting and during construction	TJPA	Project facility plans to be forwarded to CCSF Fire Department prior to permit issuance. Inspect installation during construction.
Saf 2 – Prepare a life safety plan including the provision of on-site measures such as a fire command post at the Terminal, the Fire Department's 800-megahertz radio system and all necessary fire suppression equipment.	TJPA	Prior to project facility permitting	TJPA	TJPA to develop life safety plan during facility design phases and implement during testing and startup up phase.
Saf 3 – Prepare a risk analysis to accurately determine the number of personnel necessary to maintain an acceptable level of service at Project facilities.	TJPA	Prior to project facility permitting	TJPA	TJPA to develop risk analysis during facility design phase.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
Noise – Operations				
NoiO 1 – Apply noise mitigation at the following locations adjacent to the bus storage facility: • Provide sound insulation to mitigate noise impacts at the residences north of the AC Transit Facility at the corner of Perry and Third Street. At a minimum, apply sound insulation to the façade facing the bus storage facility (the south façade). • Construct two noise barriers to mitigate noise impacts to residences south of the AC Transit Facility along Stillman Street. The first noise barrier would be approximately 10 to 12 feet high and run along the southern edge of the AC Transit storage facility. The second noise barrier would be approximately 5 to 6 feet high and would be located on the portion of the ramp at the southwestern corner of the AC Transit facility. Treat the noise barriers with an absorptive material on the side facing the facility to minimize the potential for reflections off the underside of the freeway. • Construct a noise barrier to mitigate noise impacts to residences south of the Golden Gate Transit Facility along Stillman Street. The barrier would be approximately 10 to 12 feet high and run along the southern and a portion of the eastern edge of the Golden Gate Transit storage facility. Treat the noise barriers with an absorptive material on the side facing the facility to minimize the potential for reflections off the underside of the freeway.	TJPA	During construction	TJPA	TJPA to design detailed noise mitigation during preliminary and final design phases. TJPA engineering staff to inspect installation and/or construction of mitigation measures.
NoiO 2 – Landscape the noise walls. Develop the actual design of the walls in cooperation with area residents.	TJPA	During preliminary and final design	TJPA	TJPA to work with area residents during design of noise walls.
NoiO 3 – Construct noise walls prior to the development of the permanent bus facilities.	TJPA	During schedule development, construction document preparation and construction	TJPA	TJPA to develop program schedule and contract documents to implement this construction sequencing requirement.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
New-MM-NO-1.1 – *Design Ventilation Shaft to Avoid Noise Effects on Nearby Uses.* Ventilation shafts shall be designed in accordance with the APTA guidance for controlling noise, which includes a 60 dBA noise level at 50 feet from the facility, at the setback line of the nearest building, or at the nearest occupied area, whichever is nearest to the source. Treatments may include applying acoustical absorption materials to shaft surfaces or attaching silencers to fans.	TJPA	During final design	TJPA	TJPA to incorporate noise abatement and control features and measures as part of the ventilation shaft design during final design and include appropriate specifications in the contract documents. TJPA engineering staff to inspect installation and/or construction of ventilation shafts.
Noise – Construction				
NoiC 1 – Comply with San Francisco noise ordinance. The noise ordinance includes specific limits on noise from construction. The basic requirements are: • Maximum noise level from any piece of powered construction equipment is limited to 80 dBA at 100 feet. This translates to 86 dBA at 50 feet. • Impact tools are exempted, although such equipment must be equipped with effective mufflers and shields. The noise control equipment on impact tools must be as recommended by the manufacturer and approved by the Director of Public Works. • Construction activity is prohibited between 8 p.m. and 7 a.m. if it causes noise that exceeds the ambient noise plus 5 dBA. The noise ordinance is enforced by the San Francisco DPW, which may waive some of the noise requirements to expedite the project or minimize traffic impacts. For example, along Townsend Street where much of the land use is commercial, business owners may prefer nighttime construction since it would reduce disruption during normal business hours. The DPW waivers usually allow most construction processes to continue until 2 a.m., although construction processes that involve impacts are rarely allowed to extend beyond 10 p.m. This category would include equipment used in demolition such as jackhammers and hoe rams, and pile driving. It is not anticipated that the construction documents would have specific limits on nighttime construction. There may be times when nighttime construction is desirable (e.g., in commercial districts where nighttime construction would be less disruptive to businesses in the area) or necessary to avoid unacceptable traffic disruptions. Since the construction would be subject to the requirements of the San Francisco noise regulations, in these cases, the contractor would need to work with the DPW to come up with an acceptable approach balancing interruption of the business and residential community, traffic disruptions, and reducing the total duration of the construction.	TJPA	During preparation of construction contract documents and construction	TJPA	TJPA to work with CCSF Department of Public Works (DPW) regarding construction noise mitigation program.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
NoiC 2 – Conduct noise monitoring. The purpose of monitoring is to ensure that contractors take all reasonable steps to minimize noise.	TJPA	During construction	TJPA	Monitoring data to be provided to CCSF DPW.
NoiC 3 – Conduct inspections and noise testing of equipment. This measure will ensure that all equipment on the site is in good condition and effectively muffled.	TJPA	During construction	TJPA	Perform monitoring during construction.
NoiC 4 – Implement an active community liaison program. This program would keep residents informed about construction plans so they can plan around periods of particularly high noise levels and would provide a conduit for residents to express any concerns or complaints about noise.	TJPA	During construction	TJPA	TJPA to develop and initiate community liaison program during final design prior to construction. Program will continue during construction.
NoiC 5 – Minimize use of vehicle backup alarms. Because backup alarms are designed to get people's attention, the sound can be very noticeable even when their sound level does not exceed the ambient, and it is common for backup alarms at construction sites to be major sources of noise complaints. A common approach to minimizing the use of backup alarms is to design the construction site with a circular flow pattern that minimizes backing up of trucks and other heavy equipment. Another approach to reducing the intrusion of backup alarms is to require all equipment on the site to be equipped with ambient sensitive alarms. With this type of alarm, the alarm sound is automatically adjusted based on the ambient noise. In nighttime hours when ambient noise is low, the backup alarm is adjusted down.	TJPA	During construction document preparation and construction	TJPA	Review contract specifications during final design and inspect construction.
NoiC 6 – Include noise control requirements in construction specifications. These should require the contractor to • Perform all construction in a manner to minimize noise. The contractor should be required to select construction processes and techniques that create the lowest noise levels. Examples are using predrilled piles instead of impact pile driving, mixing concrete offsite instead of onsite, and using hydraulic tools instead of pneumatic impact tools. • Use equipment with effective mufflers. Diesel motors are often the major noise source on construction sites. Contractors should be required to employ equipment fitted with the most effective commercially available mufflers. • Perform construction in a manner to maintain noise levels at noise sensitive land uses below specific limits. • Perform noise monitoring to demonstrate compliance with the noise limits. Independent noise monitoring should be performed to check compliance in particularly sensitive areas. • Minimize construction activities during evening, nighttime, weekend and holiday periods. Permits would be required before construction can be performed in noise sensitive areas during these periods.	TJPA	Final design and construction	TJPA	TJPA to develop detailed noise control requirements during preliminary engineering and final design. Ensure contractor obtains permits if necessary. Inspect construction activities for compliance and monitor noise levels. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as CCSF Department of Parking and Traffic (DPT) and DPW.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
• Select haul routes that minimize intrusion to residential areas. This is particularly important for the trench alternatives that will require hauling large quantities of excavation material to disposal sites. Controlling noise in contractor work areas during nighttime hours is likely to require some mixture of the following approaches: • Restrictions on noise producing activities during nighttime hours. • Laying out the site to keep noise producing activities as far as possible from residences, to minimize the use of backup alarms, and to minimize truck activity and truck queuing near the residential areas. • Use of procedures and equipment that produce lower noise levels than normal. For example, some manufacturers of construction equipment can supply special noise control kits with highly effective mufflers and other materials that substantially reduce noise emissions of equipment such as generators, tunnel ventilation equipment, and heavy diesel power equipment including mobile cranes and front-end loaders. • Use of temporary barriers near noisy activities. By locating the barriers close enough to the noise source, it is possible to obtain substantial noise attenuation with barriers 10 to 12 feet high even though the residences are 30 to 40 feet higher than the construction site. • Use of partial enclosures around noisy activities. It is sometimes necessary to construct shed-like structures or complete buildings to contain the noise from nighttime activities.				
Vibration – Operations				
VibO1 – Use high-resilience track fasteners or a resiliently supported tie system for the Caltrain Downtown Extension for areas projected to exceed vibration criteria, including the following locations: (1) Live/Work condos, 388 Townsend Street (Hubbell an Seventh), (2) San Francisco Residences on Bryant (Harrison Parking Lot Site), (3) Clock Tower Building, and Second Street High Rise and (4) new Marriott Courtyard (Marine Firefighter's Union).	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to develop locations/use of resilience track fasteners or resiliently supported tie system during preliminary engineering and final design. Review construction documents and inspect installation. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as CCSF Department of Building Inspection (DBI) and DPW.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
Vibration – Construction				
VibC 1 – Limit or prohibit use of construction techniques that create high vibration levels. At a minimum, processes such as pile driving would be prohibited at distances less than 250 feet from residences.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to ensure preliminary design, final design and contract documents preclude use of pile driving equipment within 250 feet of residences. Construction management and inspection will monitor contractors' activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
VibC 2 – Restrict procedures that contractors can use in vibration sensitive areas. (It is often possible to employ alternative techniques that create lower vibration levels. For example, unrestricted pile driving is one activity that has considerable potential for causing annoying vibration. Using the cast-in-drilled-hole piling method instead will eliminate most potential for vibration impact from the piling.)	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to establish construction vibration design standards during final design. Include provisions in contract documents and monitor contractors' activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
VibC 3 – Require vibration monitoring during vibration intensive activities.	TJPA	During construction	TJPA	TJPA to include provisions for vibration monitoring in construction contract documents or perform monitoring under a separate contract. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
VibC 4 – Restrict the hours of vibration intensive activities such as pile driving to weekdays during daytime hours.	TJPA	During design and construction	TJPA	TJPA to include provisions in contract documents and monitor contractors' activities to ensure compliance.
VibC 5 – Investigate alternative construction methods and practices to reduce the impacts in coordination with the construction contractor if resident annoyance from vibration becomes a problem.	TJPA	During final design and during construction	TJPA	TJPA to include provisions in contract documents and monitor contractors' activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
VibC 6 – Include specific limits, practices and monitoring and reporting procedures for the use of controlled detonation. Control and monitor use of controlled detonation to avoid damage to existing structures. Include specific limits, practices, and monitoring and reporting procedures within contract documents to ensure that such construction methods, if used, would not exceed safety criteria.	TJPA	During final design and during construction	TJPA	TJPA to establish detailed limits, practices, and monitoring program for controlled detonation during final design. Include provisions in contract documents and monitor contractors' activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
Soils/Geology				
SG 1 – Monitor adjacent buildings for movement, and if movement is detected, take immediate action to control the movement.	TJPA	During construction	TJPA	TJPA to include provisions in contract documents requiring such monitoring and corrective measures and inspect contractors' activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
SG 2 – Apply geotechnical and structural engineering principles and conventional construction techniques similar to the design and construction of high-rise buildings and tunnels throughout the downtown area. Apply design measures and utilize pile-supported foundations to mitigate potential settlement of the surface and underground stations.	TJPA	During preliminary engineering and final design	TJPA	TJPA to review design and contract documents to ensure implementation. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
SG 3 – Design and construct structural components of the project to resist strong ground motions approximating the maximum anticipated earthquake (0.5g). The cut-and-cover portions will require pile supports to minimize non-seismic settlement in soft compressible sediments (Bay Mud). The underground Caltrain station at Fourth and Townsend will require pile-supported foundations due to the presence of underlying soft sediments.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to design structural components to meet seismic standards during preliminary engineering and final design. Review design, contract documents and construction activities to ensure implementation. Where applicable, coordinate with JPB and CCSF departments with jurisdiction over activities, such as DBI and DPW.
SG 4 – Underpin existing building, where deemed necessary, to protect existing structures from potential damage that could result from excessive ground movements during construction. Design the tunneling and excavation procedures (and construction sequence), and design of the temporary support system with the objective of controlling ground deformations within small enough levels to avoid damage to adjacent structures. Where the risk of damage to adjacent structures is too great, special measures will be implemented such as: (1) underpinning, (2) ground improvement, and/or (3) strengthening of existing structures to mitigate the risks. Underpinning may include internal strengthening of the superstructure, bracing, reinforcing existing foundations, or replacing existing foundations with deep foundations embedded outside the tunnel zone of influence. Alternatives, in lieu of underpinning, involve strengthening the rock between the building and crown of tunnel. Grouting in combination with inclined pin piles can be used not only to strengthen the rock, but also make the rock mass over the tunnel act as a rigid beam, allowing construction of tunnels with no adverse effects on the buildings supported on shallow foundations over the tunnel.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to design tunneling, excavation procedures, underpinning, strengthening existing structures or ground improvement to protect existing structures from damage. Include provisions in contract documents requiring contractors to implement measures during construction. Monitor construction activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
SG 5 – TJPA shall assure proper design and construction of pile-supported foundations for structures to control potential settlement of the surface. Stability of excavations and resultant impacts on adjacent structures can be controlled within tolerable limits by proper design and implementation of the excavation shoring systems.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to ensure foundations and excavation shoring systems are designed and constructed to minimize and control settlement and impacts on adjacent structures. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DBI and DPW.
New-MM-C-GE-4.1 – *Groundwater Control during Construction.* Groundwater control shall be implemented to reduce ground instability in the construction area, where excavations encroach into the prevailing groundwater table. • For excavations with the cut-and-cover technique, the groundwater level within the footprint of the excavation shall be maintained a minimum of 2 feet or more beneath the bottom of the excavation throughout construction to minimize the potential for failure of the base of the excavation due to high groundwater seepage at construction sites. The groundwater level outside of the excavation footprint shall remain unchanged. • For excavations with the SEM construction method in rock, groundwater intrusion into the tunnel excavation is expected to be minimal and localized at joints in the rock. Groundwater seeping into the excavation shall be controlled locally by panning and piping channel inflows to sump pumps located in the portal area. • For excavations with the SEM construction method in soft ground conditions (i.e., sands and clays), the groundwater level shall be locally drawn down to below the bottom of the excavation in order to increase the strength of the ground and reduce potential ground instability.	TJPA	During construction	TJPA	TJPA to design DTX facilities to protect structures from damage related to high seepage gradients. Include provisions in contract documents requiring contractors to implement measures during construction. Monitor construction activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities.
Utilities				
Util 1 – Coordinate with utility providers during preliminary engineering, continuing through final design and construction. Utilities would be avoided, relocated, and/or supported as necessary during construction activities to prevent damage to utility systems and to minimize disruption and degradation of utility service to local customers.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to identify utilities; design relocations or protection measures where required; and include requirements in contract documents. Monitor construction activities to ensure implementation of all required measures.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
Cultural and Historic Resources				
CH 1 – Comply with the provision of the signed Memorandum of Agreement (MOA) between the Federal Transit Administration, the State Historic Preservation Officer, and the TJPA.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA will assure compliance with MOA provisions during preliminary engineering, final design and construction, as described below.
CH 2 – Professional Qualifications. Assure all activities regarding history, historic preservation, historic architecture, architectural history, historic and prehistoric archaeology are carried out by or under the direct supervision of persons meeting, at a minimum, the Secretary of the Interior's professional qualifications standards (48 FR 44738-9) (PQS) in these disciplines. Nothing in this stipulation may be interpreted to preclude any signatory or any agent or contractor thereof from using the properly supervised services or persons who do not meet the PQS. **Historic Preservation Standards.** Assure all activities regarding history, historic preservation, historic architecture, architectural history, historic and prehistoric archaeology are carried out to reasonably conform to the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44740) as well as to applicable standards and guidelines established by SHPO. **Curation and Curation Standards.** Ensure that FTA and TJPA shall, to the extent permitted under sections 5097.98 and 5097.991.[sic] of the California Public Resources Code, materials and records resulting from any archaeological treatment or data recovery that may be carried out pursuant to this MOA, are curated in accordance with 36 CFR Part 79.	TJPA	During preliminary engineering, final design and construction	TJPA	Prior to initiation of design and construction activities, TJPA will require submission of and review qualifications of professionals performing the MOA activities to assure that Secretary of Interior standards are met.
CH 3 – Integrate into the design of the new terminal a dedicated space for a permanent interpretive exhibit. The interpretive exhibit will include at a minimum, but is not necessarily limited to: plaques or markers, a mural or other depiction of the historic Transbay Transit Terminal (TTT), ramps, or Key System, or other interpretive material.	TJPA	During preliminary engineering and final design	TJPA	TJPA will include space for interpretive exhibit in terminal during design. Review contract documents and construction submittals and activities to ensure implementation.

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CH 4 – Consult with the State Department of Transportation (Department) regarding the availability of historical documentary materials for the creation of the permanent interpretive display of the history of the original TTT building and its association with the San Francisco-Oakland Bay Bridge. Department will assist TJPA in planning the scope and content of the proposed interpretive exhibit. Invite the Oakland Heritage Alliance, the San Francisco Architectural Heritage, the California State Railroad Museum, and the Western Railway Museum to participate in this consultation. While retaining responsibility for the development of the exhibit, TJPA will jointly consider the Department's and participating invitees' recommendations when finalizing the exhibit design. TJPA will produce, install, and maintain the exhibit.	TJPA	During preliminary engineering and final design	TJPA	TJPA will consult with Department regarding availability of documentary materials. TJPA will invite participation in this review from the other designated parties. TJPA will produce, install, and maintain the exhibit in the new Transbay Terminal.
CH 5 – Consult with the City of Oakland about its possible interest in having a similar interpretive exhibit in the East Bay. If agreement is reached prior to completion of final design of the Transbay Terminal, TJPA will provide and deliver exhibit materials to a venue that is mutually satisfactory to TJPA and the City of Oakland.	TJPA	During preliminary engineering and final design	TJPA	During preliminary engineering and final design, TJPA will consult with City of Oakland regarding its possible interest in establishing an exhibit. TJPA will provide and deliver exhibit materials to a venue in the City of Oakland that is mutually satisfactory to TJPA and the City of Oakland should such an exhibit be developed.
CH 6 – Identify, in consultation with Department, elements of the existing TTT that may be suitable for salvage and interpretive use by museums. Within two years following execution of this MOA by FTA and SHPO, TJPA will offer any elements identified as suitable for salvage and interpretive use to San Francisco Architectural Heritage, the California State Railroad Museum, Sacramento, the Western Railway Museum, the Oakland Museum, and any other interested parties. Remove any elements selected in a manner that minimizes damage and deliver with legal title to the recipient. Items not accepted by interested parties for salvage or interpretive use within the time frame specified herein will receive no further consideration.	TJPA	During preliminary engineering and final design	TJPA	Acceptance of items by interested parties must be completed at least 90 days prior to demolition of the Transbay Terminal.
CH 7 – Consult with Department and the Oakland Museum about contributing to Department's exhibit and the production of an interpretive video at the Oakland Museum relating to the history and engineering of the major historic state bridges of the San Francisco Bay Area. TJPA will propose contributions to such an exhibit and video that would be related to the history of the TTT, bus ramp loop structures, and the Key System. Items contributed by TJPA to such an exhibit may include photographs, drawings, videotape, models, oral histories, and salvaged components from the TTT.	TJPA	During preliminary engineering and final design	TJPA	TJPA will produce and deliver to the Oakland Museum agreed-upon materials for such an exhibit and interpretive video.

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CH 8 – Assist the Oakland Museum by contributing up to $50,000 toward the cost of preparing and presenting the exhibit and preparing an exhibit catalog or related museum publication in conjunction with the exhibit, in a manner and to the extent that is mutually satisfactory to TJPA, Department, and the Oakland Museum. A separate agreement will outline the negotiated financial contributions. Work with the Oakland Museum and assist in the preparation of an exhibit and interpretive video if consultation results in agreement between TJPA and the Oakland Museum prior to demolition of the existing TTT.	TJPA	During preliminary engineering and final design	TJPA	TJPA will work with Oakland Museum and assist in the preparation of an exhibit and an interpretive video if consultation results in an agreement between TJPA and Oakland Museum prior to demolition of the existing Transbay Terminal.
CH 9 – Request that SHPO, prior to the start of any work that would have an adverse effect on components of the Bay Bridge that are historic properties, determine whether these components, including the TTT and associated ramps, have been adequately recorded in existing documents. If SHPO determines that, collectively, such documents, which include the Department's past recordation of a series of remodeling and seismic retrofit project that have occurred since 1993, adequately document the TTT and ramps, then no further documentation will be necessary. Seek, with the assistance of the Department, to obtain the original drawings of the TTT by architect T. Pflueger. If SHPO determines that existing documentation is adequate, compile such documentation into a comprehensive record. Components to be included in the review of past documentation are: • 425 Mission Transbay Transit Terminal (APN 3719-003, 3720-001, 3721-006); • Upper Deck San Francisco Approaches or North Connector, Bridge #34-116F; • Upper Deck San Francisco Approaches or Center Ramps, Bridge #34-118L; • San Francisco Approaches or Lower Deck On-Ramp, Bridge #34-118R; • Transbay Terminal Loop ramp, Bridge #34-119Y; and • Harrison Street over-crossing Bridge #34-120Y.	TJPA	During preliminary engineering and final design	TJPA	TJPA will consult with the SHPO regarding adequacy of prior recordation efforts. TJPA will work with Department to seek original drawings of the Transbay Transit Terminal. If SHPO determines that existing documentation is adequate, compile such documentation into a comprehensive record.

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Consult further with SHPO, if SHPO determines that existing documentation does not constitute adequate recordation of the Bay Bridge components addressed hereunder. SHPO will determine what level and type of additional documentation is necessary.				If SHPO determines that existing documentation does not constitute adequate recordation of the Bay Bridge components, then TJPA and SHPO will consult further and SHPO will determine what level and type of additional documentation is necessary. If no response from SHPO within 45 days of receipt of each submittal of documentation, TJPA may assume that said documentation is adequate and may proceed with the project.
Provide xerographic copies of this documentation to the SHPO and the Department Headquarters Library, upon a written determination by SHPO that all documentation prescribed hereunder is satisfactory, to the History Center at the San Francisco Public Library, San Francisco Architectural Heritage, the Oakland History Room of the Oakland Public Library, the Oakland Museum of California, the Western Railway Museum, and Department District 4 Office. Thereafter, TJPA may proceed with that aspect of the Project that will adversely affect the historic properties documented hereunder.				TJPA will ensure that these records are accepted by SHPO prior to demolition of the TTT and provide copies of the documentation to designated agencies. Then, TJPA will proceed with the aspect of the project that will adversely affect the historic properties documented.
CH 10 – Within 180 days after FTA determines that the Project has been completed, TJPA, in consultation with FTA and SHPO, will re-evaluate the Bay Bridge, a property listed on the NRHP, and determine whether the National Register nomination should be amended or whether the bridge no longer qualifies for listing and should be removed from the National Register. As appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination or petition for removal, to be processed according to the procedures set forth in 36 CFR Part 60 (60.14 and 60.15).	TJPA	Within 180 days after FTA determines that the Project has been completed	TJPA	As appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination or petition for removal, to be processed according to the procedures set forth in 36 CFR part 60 (60.14 and 60.15). TJPA will coordinate these efforts with the CCSF Planning Department.

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CH 11 – Develop and implement measures, in consultation with the owners of historic properties immediately adjoining the construction sites, to protect the contributing elements of the Second and Howard Streets Historic District and the Rincon Point/South Beach Historic Warehouse Industrial District from damage by any aspect of the Project. Such measures will include, but are not necessarily limited to those identified in the MOA. The protective measures herein stipulated will be developed and implemented by TJPA prior to the commencement of any aspect of the Project that could have an adverse effect on historic properties immediately adjoining the construction sites herein identified. In addition, TJPA will monitor the effectiveness of the protective measures herein stipulated and will supplement or modify these measures as and where necessary in order to ensure that they are effective. The historic properties covered by the terms of this paragraph are: • 589-591 Howard Street/3736-098, NRHP Status: 1D, Contributing Element of Second & Howard District & New Montgomery/Second Street, Const. Date: 1906, Type of Impact: Cut-and-cover construction ~~nearby~~; need easement. • 163 Second Street/3721-048, NRHP Status: 1D, Contributing Element of Second & Howard District & New Montgomery/Second Street, Const. Date: 1907, Type of Impact: Cut-and-cover construction nearby. • 165-173 Second Street/3721-025, NRHP Status: 1D, Contributing Element of Second & Howard District & New Montgomery/Second Street, Const. Date: 1906, Type of Impact: Cut-and-cover construction; need easement. • 166-78 Townsend Street/3788-012, NRHP Status: 3D Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1910 [1], 1988 [2], Type of Impact: Cut-and-cover construction nearby. Need construction easement. • 640-Second Street/3788-002, NRHP Status: 252, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1926, Type of Impact: Tunnel under or near property. • 650 Second Street/3788-049 through 3788-073, NRHP Status: 252, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1922, Type of Impact: Tunnel under or near property. • 670-680 Second Street/3788-043, 3788-044, NRHP Status: 252 (670), 3D (680), Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1913, Type of Impact: Tunnel under or near property.	TJPA	During preliminary engineering, final design, and construction	TJPA	TJPA will contact owners of record of historic properties that will be affected (but that will not be acquired and demolished) by the Project. TJPA will provide and review this mitigation monitoring program with the owners via correspondence and/or public and face-to-face meetings. TJPA will coordinate these efforts with the CCSF Planning Department prior to commencement of any aspect of the project that could have any adverse effect on historic properties immediately adjoining the construction sites herein identified. TJPA will monitor the effectiveness of the protective measures and will supplement or modify these measures as and where necessary in order to ensure that they are effective.

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- 301-321 Brannan Street/3788-037, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1909, Type of Impact: Tunnel under or near property.
- 130 Townsend Street/3788-008, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1910 [1], 1895-6 [2], Type of Impact: Tunnel under or near property.
- 136 Townsend Street/3788-009, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1902 [1], 1913 [2], Type of Impact: Tunnel under or near property.
- 144-46 Townsend Street/3788-009A, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1922, Type of Impact: Tunnel under or near property.
- 148-54 Townsend Street/3788-010, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1922, Type of Impact: Tunnel under or near property.
- 162-164 Townsend Street/3788-081, NRHP Status: 3D, Contributing Element of Rincon Point/South Beach District & South End District, Const. Date: 1919, Type of Impact: Tunnel under or near property.

Notes: National Register Status Codes are as follows:

1 – Listed on the NRPH

251 – Determined eligible for listing by the Keeper of the Register

252 – Determined eligible for listing by the consensus of the SHPO and federal agency

1D – Listed on the National Register as a contributor to a district or multi-resource property

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CH 12 –TJPA will take the effect of the Project on the ~~three~~ historic properties listed below into account by recording these properties in accordance with the terms herein set forth. These buildings are: • 191 2nd Street, (APN: 3721-022), and • 580-586 Howard Street, (APN: 3721-092 through 3721-106), ~~and~~ ~~• 165-173 2nd Street, (APN: 3721-025).~~ Prior to taking any action that could adversely affect these properties, consult SHPO and SHPO will determine the type and level of recordation that is necessary for these properties. Upon a written determination by SHPO that all documentation prescribed hereunder is complete and satisfactory, submit a copy of this documentation to SHPO, with xerographic copies8 to the History Center at the San Francisco Public Library, San Francisco Architectural Heritage, and the Oakland History Room of the Oakland Public Library. Thereafter, proceed with that aspect of the Project that will adversely affect the historic properties documented hereunder. If SHPO does not respond within 45 days of receipt of each submittal of documentation prescribed herein, assume that SHPO has determined that said documentation is adequate and may proceed with that aspect of the Project that will adversely affect the historic properties documented hereunder.	TJPA	During preliminary engineering and final design	TJPA	TJPA will consult SHPO and SHPO will determine the type of recordation necessary for the properties. TJPA will submit a copy of this documentation to SHPO, upon a written determination by SHPO that all documentation prescribed hereunder is complete and satisfactory, with copies to the designated agencies. If no response from SHPO within 45 days of receipt of each submittal of documentation, then TJPA may proceed with the project.

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CH 13 – Repair, in accordance with the Secretary of the Interior's Standards for Rehabilitation, any damage to contributing elements of the Second and Howard Streets Historic District and the Rincon Point/South Beach Historic Warehouse Industrial District resulting from the Project.	TJPA	Prior to, during, and following construction	TJPA	TJPA will repair any damage to contributing elements.
Photograph the condition of the contributing elements prior to the start of the Project to establish the baseline condition for assessing damage. Consult with property owner(s) about the appropriate level of photographic documentation of building interiors and exteriors. Provide a copy of this photographic documentation to the property owner(s), and retain on file.				TJPA will photograph condition of contributing properties prior to the start of the Project to establish the baseline condition for assessing damage. TJPA will consult with property owner(s) about the appropriate level of photographic documentation of building interiors and exteriors, provide a copy of this photographic documentation to the property owner(s), and retain copy on file by TJPA.
Submit repair plans and specifications to SHPO for review and comment, if repair of inadvertent damage resulting from the Project is necessary, to ensure that the work conforms to the Secretary of the Interior's Standards for Rehabilitation. Consult with SHPO to establish a mutually satisfactory time frame for the SHPO's review. TJPA will carry out any repairs required hereunder in accordance with the comments of SHPO.				TJPA will submit repair plans and specifications to SHPO for review and comment, if repair of inadvertent damage is necessary, to ensure conformance to the Secretary of the Interior's Standards for Rehabilitation.

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CH 14 – Within 180 days after FTA determines that the Project has been completed, TJPA, in consultation with FTA and SHPO, will re-evaluate the Second and Howard Streets Historic District and determine whether the National Register nomination should be amended or whether the district no longer qualifies for listing and should be removed from the National Register. As appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination or petition for removal, to be processed according to the procedures set forth in 36 CFR Part 60 (60.14 and 60.15).	TJPA	Within 180 days after FTA determines that the Project has been completed	TJPA	As appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination or petition for removal, to be processed according to the procedures set forth in 36 CFR part 60 (60.14 and 60.15). TJPA will coordinate these efforts with the CCSF Planning Department.
CH 15 – Within 45 days following execution of MOA, consult with FTA, SHPO, JPB and CCSF to initiate the process of determining how archaeological properties that may be affected by the Project will be identified, whether and how the NRHP eligibility of such properties may be addressed, and whether and how the Project's effects, if any, on those archaeological properties that may be considered historic properties for purposes of this MOA, may be taken into account. FTA and TJPA to invite Caltrans to participate in this consultation. Determine the time frame for this consultation with the consulting parties through consensus. Consultation will at minimum be informed by, and take into account, the following documents: • Attachment 6, "Standard Treatment of Archaeological Sites: Data Recovery Plan," of the "Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Office, and the California Department of Transportation regarding compliance with Section 106 of the National Historic Preservation Act, as it pertains to the Administration of the Federal Aid Highway Program in California;" • "Archaeological Research Design and Treatment Plan for SF-480 Terminal Separation Rebuild" (Praetzellis and Praetzellis, 1993) and "The San Francisco-Oakland Bay Bridge, West Approach Replacement: Archaeological Research Design and Treatment Plan" (Ziesing, 2000); • "Revised Historical Archaeology Research Design for the Central Freeway Replacement Project" (Thad M. Van Bueren, Mary Praetzellis, Adrian Praetzellis, Frank Lortie, Brian Ramos, Meg Scantlebury and Judy D. Tordoff).	TJPA	During preliminary engineering phase	TJPA	SHPO, FTA, SHPO, TJPA, JPB, and CCSF will consult to determine how archaeological properties will be identified, whether and how the NRHP eligibility of such properties may be addressed, and whether and how the Project's effects, if any, on those archaeological properties that may be considered historic properties may be taken into account. Invite Caltrans to participate in this consultation. The consultation will take into account the designated documents.

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CH 16 – If the consulting parties agree that a treatment plan for archaeological properties should be prepared, prepare a Treatment Plan for archeological resources that provides for the identification, evaluation, and treatment of archaeological properties that may be affected by the Project and that conform to the requirements above of item CH13 1) and take into account the information contained in items CH13 2) and CH13 3) and conform to any other standards, documentation, or guidance that the consulting parties may specify.	TJPA	During preliminary engineering	TJPA	TJPA will assure completion of comprehensive treatment plan consistent with the content required in the MOA, if the consulting parties agree that a treatment plan for archaeological properties is to be prepared.
If the consulting parties agree that the Treatment Plan will address historic archaeological properties as well as prehistoric archaeological properties, ensure that appropriately qualified historians prepare a historic context(s) that will be used by an interdisciplinary team consisting at a minimum of historians and historic archaeologist.				TJPA shall transmit this plan to the signatories of the MOA.
The historic context will, at a minimum: • identify significant research themes and topics that relate to the historic period(s) addressed by the historic context(s) • determine what types of historic archaeological properties, if any, that may usefully and significantly contribute to research themes and topics deemed by the historic context(s) study to be important • identify the specific components and constituents (features, artifacts, etc., if any, of historic archaeological property types that can factually and directly, contribute data important to our understanding of significant historic research themes and topics • determine the amount (sample size, etc.) of archaeological excavation and related activity that is needed to provide the range and type of factual data that will contribute to our understanding of significant historic research themes and topics				TJPA will ensure that appropriately qualified historians prepare a historic context(s) that includes the specified information for use by an interdisciplinary team consisting at a minimum of historians and historic archaeologist, if the consulting parties agree that the Treatment Plan will address historic archaeological properties as well as prehistoric archaeological properties.
Submit the draft Treatment Plan to the other consulting for review and comment. The consulting parties have 45 days from receipt of the draft Treatment Plan to comment in writing to FTA and TJPA. Failure of the consulting parties to respond within this time frame shall not preclude FTA and TJPA from finalizing the draft Treatment Plan to their satisfaction. Before finalizing the draft Treatment Plan, FTA and TJPA to provide the consulting parties with written documentation indicating whether and how the draft Treatment Plan will be modified. Unless any consulting party objects to this documentation in writing to FTA and TJPA within 15 days following receipt, finalize the draft Treatment Plan as deemed appropriate by FTA and TJPA, and proceed to implement the final Treatment Plan.	TJPA	During preliminary engineering phase	TJPA and FTA	TJPA will submit the draft Treatment Plan to the consulting parties for review and comment. Before finalizing the draft Treatment Plan, FTA and TJPA will provide the consulting parties whether and how the draft Treatment Plan will be modified.

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If FTA and TJPA propose to modify the final Treatment Plan, they will notify the consulting parties concurrently in writing about the proposed modifications. The consulting parties will have 15 days from receipt of notification to comment in writing to FTA and TJPA. Failure of the consulting parties to respond within this time frame shall not preclude FTA and TJPA from modifying the final Treatment Plan to their satisfaction.				TJPA will ensure that the consulting parties have 15 days following receipt of notification of the modifications to comment in writing about the proposed modifications. Unless consulting party objects, FTA and TJPA will finalize the draft Treatment Plan as they deem appropriate, and TJPA and FTA will implement the final Treatment Plan.
Before modifying the final Treatment Plan, FTA and TJPA will provide the consulting parties with written documentation indicating whether and how the final Treatment Plan will be modified. Unless any consulting party objects to this documentation in writing to FTA and TJPA within 15 days following receipt, modify the final Treatment Plan as appropriate, and proceed to implement the modified final Treatment Plan.	TJPA	During preliminary engineering phase	TJPA and FTA	FTA and TJPA will provide the consulting parties whether and how the final Treatment Plan will be modified. TJPA will ensure that the consulting parties have 15 days following receipt of notification of the modifications to comment in writing about the proposed modifications. Unless consulting party objects, FTA and TJPA will modify the final Treatment Plan as they deem appropriate, and TJPA and FTA will proceed to implement the modified final Treatment Plan.

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CH 17 – Within two years after FTA, in consultation with TJPA, has determined that all fieldwork required by the Treatment Plan has been completed, prepare a draft technical report that documents the results of implementing the Treatment Plan and distributes this draft technical report to the other MOA signatories for review. The reviewing parties will be afforded 60 days following receipt of the draft technical report to submit any written comments to FTA and TJPA. Failure of the reviewing parties to respond within this time frame shall not preclude FTA from authorizing TJPA to revise the draft technical report as FTA and TJPA deem appropriate. FTA will provide the reviewing parties with a written documentation indicating modifications in accordance with any reviewing party comments. Unless the reviewing parties object to this documentation in writing to FTA and TJPA within 30 days following receipt, modify the draft technical report as FTA and TJPA deem appropriate. Thereafter, issue the technical report in final form and distribute this document in accordance with paragraph CH15 2). Distribute copies of the final technical report documenting the results of the Treatment Plan implementation to the other signatory parties, to any consulting Native American Tribe if prehistoric, protohistoric or ethnographic period archaeological properties were located and addressed under the Treatment Plan, and to the appropriate California Historical Resources Information Survey (CHRIS) Regional Information Center, subject to the terms of Stipulation IV. E (CH19).	TJPA	Within two years of completed fieldwork	TJPA and FTA	TJPA will prepare a draft technical report that documents the results of implementing the Treatment Plan and distribute this draft technical report to the other MOA signatories for review. FTA to authorize TJPA to revise draft as deemed appropriate by FTA and TJPA. FTA will provide the reviewing parties with a written documentation indicating modifications in accordance with any reviewing party comments. Unless any reviewing party objects, FTA and TJA to issue technical report in final form and distribute in accordance with paragraph CH15 2). TJPA will distribute copies of the final technical report documenting the results of Treatment Plan implementation to other signatory parties, to any consulting Native American Tribe, as applicable, and to the appropriate CHRIS Regional Information Center.

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Prepare a written draft document that communicates in lay terms the results of Treatment Plan implementation to members of the interested public. Distribute this written draft document for review and comment concurrently with and in the same manner as that prescribed for the draft written technical report prescribed by paragraph C.1. of this stipulation. If the draft document prescribed hereunder is a publication such as a report or brochure, then distribute such publication to the other signatory parties, to any consulting Native American Tribe as applicable, and to any other entity that the signatory parties and, as applicable, any consulting Native American Tribe, through consultation as appropriate, subject to the terms of Stipulation IV.E (CH 19).				TJPA will prepare a written draft document that communicates in lay terms the results of Treatment Plan implementation to members of interested public.
Prepare a written annual report describing the status of its efforts to comply with the terms of Stipulations II – IV, inclusive, of this MOA. Prepare the annual report following the end of each fiscal year (July 1 to June 30) that this MOA is in effect and distributed it to all MOA signatories by July 30 of each year until FTA and the SHPO through consultation determine that the requirements of stipulations II – IV, inclusive of this MOA have been satisfactorily completed.	TJPA	During preliminary engineering, final design, and construction	TJPA	TJPA will prepare an annual report describing its efforts to comply with the terms of stipulations II-IV.
CH 18 – If the consulting parties agree that a plan for treatment of archaeological properties will not be prepared, then address any archaeological properties discovered during implementation of any aspect of the Project pursuant to 36 CFR 800.13(b)(3).	TJPA	During construction phase	TJPA	If treatment plan not prepared, TJPA will address any archaeological properties discovered during implementation of any aspect of the Project pursuant to 36 CFR 800.13(b)(3).
CH 19 – The signatories to the MOA acknowledge that historic properties covered by this MOA are subject to the provisions of Section 304 of the National Historic Preservation Act of 1966, as amended, and Section 6254.10 of the California Government Code (Public Records Act), relating to the disclosure of archaeological site information and, having so acknowledged, will ensure that all actions and documentation prescribed by this Agreement are consistent with Section 304 of the National Historic Preservation Act of 1966, as amended, and Section 6254.10 of the California Government Code.	TJPA	During preliminary engineering phase	TJPA	TJPA will acknowledge that historic properties covered by the MOA are subject to the provisions specified in the MOA, relating to the disclosure of archaeological site information. TJPA will ensure that actions and documentation are consistent with same.

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CH 20 – The parties to the MOA agree that Native American burials and related items discovered during implementation of the terms of the MOA and of the Project will be treated in accordance with the requirements of Section 7050.5(b) of the California Health and Safety Code. If, pursuant to Section 7050.5(c) of the California Health and Safety Code, the county coroner/medical examiner determines that the human remains are, or may be of Native American origin, then the discovery shall be treated in accordance with the provisions of Section 5097.98(a)-(d) of the California Public Resources Code. TJPA will ensure that to the extent permitted by applicable law and regulation, the views of any consulting Native American Tribe and the Most Likely Descendant(s) are taken into consideration when decisions are made about the disposition of other Native American archaeological materials and records.	TJPA	Prior to, during, and following construction	TJPA	TJPA agree that Native American burials and related items discovered during implementation of the terms of the MOA and of the Project will be treated in accordance with the requirements specified. If, pursuant to Section 7050.5(c) of the California Health and Safety Code, the county coroner/medical examiner determines that the human remains are, or may be of Native American origin, then the discovery shall be treated in accordance with the provisions specified. TJPA will ensure that to the extent permitted by applicable law and regulation, the views of any consulting Native American Tribe and the Most Likely Descendant(s) are taken into consideration when decisions are made about the disposition of other Native American archaeological materials and records.
New-MM-C-CR-4.1 – *Minimize Potential Impacts to Paleontological Resources.* To minimize potential adverse impacts on previously unknown, potentially unique, scientifically important paleontological resources, the TJPA shall do the following: • Before the start of any earthmoving activities, the TJPA shall retain a qualified paleontologist to train all construction personnel involved with earthmoving activities, including the project superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and the proper notification procedures should be followed if fossils are encountered.	TJPA	Before and during construction	TJPA	Include provisions in contract documents requiring construction personnel to be trained prior to construction on procedures for notification if resources are detected. Implement measures during construction. Monitor construction activities to ensure compliance.

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• The construction crew shall immediately cease ground-disturbing work in the vicinity of the find and notify the TJPA. • The TJPA shall retain a qualified paleontologist to evaluate the resource and prepare a recovery plan, in accordance with Society of Vertebrate Paleontology guidelines (SVP 1996). The recovery plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Necessary and feasible recommendations in the recovery plan shall be implemented before construction activities are resumed at the site where the paleontological resource was discovered.				
Hazardous Materials/Waste – Operations				
HWO 1 – Construct and operate any Caltrain fueling facility in compliance with local, state and Federal regulations regarding handling and storage of hazardous materials. (Caltrain Joint Powers Board (JPB)/TJPA).	Caltrain Joint Powers Board (JPB)	During construction and operations	TJPA	Review design and contract documents to ensure compliance with all applicable regulations. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations. Inspect operations, and comply with all permitting and reporting requirements.
HWO 2 – Equip diesel fuel pumps with emergency shut-off valves and, in compliance with U.S. EPA requirements, fuel Underground Storage Tanks (USTs) would be equipped with leak detection and monitoring systems.	JPB	During operations	TJPA	Review design and contract documents to ensure compliance with all applicable regulations. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations. Inspect operations, and comply with all permitting and reporting requirements.
HWO 3 – Employ the use of secondary containment systems for any aboveground storage tanks.	JPB	During operations	TJPA	Secondary containment to be included in facility design and construction and maintained during operations.

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HWO 4 – Store cleaning solvents in 55-gallon drums, or other appropriate containers, within a bermed area to provide secondary containment.	JPB	During operations	TJPA	Inspect operations, and comply with all permitting and reporting requirements.
HWO 5 – Slope paved surfaces within the fueling facility and the solvent storage area to a sump where any spilled liquids could be recovered for proper disposal.	JPB	During construction and operations	TJPA	Sloped paved surfaces and sump to be included in facility design.
HWO 6 – Follow California OSHA and local standards for fire protection and prevention for the handling and storage of fuels and solvents.	JPB	During operations	TJPA	Review design and contract documents to ensure compliance with all applicable regulations. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations. Inspect operations, and comply with all permitting and reporting requirements.
HWO 7 – Prepare a Hazardous Materials Management/Business Plan and file with the CCSF Department of Public Health.	JPB	During final design	TJPA	JPB to prepare and TJPA to file Hazardous Materials Management/Business Plan with CCSF Department of Public Health (DPH).
Hazardous Materials/Waste – Construction				
HMC 1 – Follow California OSHA and local standards for fire protection and prevention. Handling and storage of fuels and other flammable materials during construction will conform to these requirements, which include appropriate storage of flammable liquids and prohibition of open flames within 50 feet of flammable storage areas.	TJPA	During construction	TJPA	Review design and contract documents to ensure compliance with all applicable regulations. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations.

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MITIGATION MEASURE	Responsibility for Implementation	Mitigation Schedule	Monitoring Responsibility	Monitoring Actions/Schedule
HMC 2 – Perform detailed investigations of the potential presence of contaminants in soil and groundwater prior to construction, using conventional drilling, sampling, and chemical testing methods. Based on the chemical test results, a mitigation plan will be developed to establish guidelines for the disposal of contaminated soil and discharge of contaminated dewatering effluent, and to generate data to address potential human health and safety issues that may arise as a result of contact with contaminated soil or groundwater during construction. The investigation and mitigation plan will follow the requirements of the City and County of San Francisco's Article 22A in the appropriate areas along the alignment. With construction projects of this nature and magnitude, there are typically two different management strategies that can be employed to address contaminated soil handling and disposal issues. Contaminated soil can be excavated and stockpiled at a centralized location and subsequently sampled and analyzed for disposal profiling purposes in accordance with the requirements of the candidate disposal landfill. Alternatively, soil profiling for disposal purposes can be done in-situ so when soil is excavated it is loaded directly on to trucks and hauled to the appropriate landfill facility for disposal based on the in-situ profiling results. A project of this nature could also combine both strategies.	TJPA	During construction	TJPA	Review design and contract documents to ensure compliance with all applicable regulations. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH and DPW.
HMC 3 – Cover with plastic sheeting soils removed during excavation and grading activities that remain at a centralized location for an extended period of time to prevent the generation of fugitive dust emissions that migrate offsite.	TJPA	During construction	TJPA	Review design and contract documents to ensure compliance. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations.
HMC 4 – Use a licensed waste hauler, applying appropriate manifests or bill of lading procedures, as required to haul soil for disposal at a landfill or recycling facility.	TJPA	During construction	TJPA	Review design and contract documents to ensure compliance. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations.

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HMC 5 – Use chemical test results for groundwater samples along the alignment to obtain a Batch Discharge Permit under Article 4.1 of the San Francisco Department of Public Works as well as to evaluate requirements for pretreatment prior to discharge to the sanitary sewer. Effluent produced during the dewatering of excavations will be collected in onsite storage tanks and periodically tested, as required under discharge permit requirements, for potential contamination to confirm the need for any treatment prior to discharge. If required, treatment may include: • Settling to allow particulate matter (total suspended solids) to settle out of the effluent in order to reduce the sediment load as well as reduce elevated metal and other contaminant concentrations that may be associated with suspended sediments; and/or • Construction of a small-scale batch waste water treatment system to remove dissolved contaminants (mainly organic constituents such as petroleum hydrocarbons [gas, diesel, and oils], BTEX, and VOCs) from the dewatering effluent prior to discharge to the sanitary sewer. A treatment system would also likely employ the use of filtration to remove suspended solids.	TJPA	During construction	TJPA	Review design and contract documents to ensure compliance. Obtain all applicable permits. Inspect construction to ensure compliance with contract documents and regulations. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH and DPW.
HMC 6 – Develop a detailed mitigation plan for the handling of potentially contaminated soil and groundwater prior to starting project construction.	TJPA	During final design	TJPA	Review detailed mitigation plan, include provisions in contract documents and inspect construction to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH and DPW. Obtain all applicable permits.
HMC 7 – Design dewatering systems to minimize downward migration of contaminants that can result from lowering the water table if necessary based on environmental conditions. As necessary, shallow soils with detected contamination would be dewatered first using wells screened only in those soils. Dewatering of deeper soils would then be performed using wells screened only in the zone to be dewatered. Dewatering wells would be installed using drilling methods that prohibit shallow contaminated soils from being carried deeper into the boreholes.	TJPA	During final design and construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH and DPW.

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HMC 8 – Require that workers performing activities on site that may involve contact with contaminated soil or groundwater have appropriate health and safety training in accordance with 29 CFR 1910.120. A Worker Health and Safety Plan (HSP) will be developed for the project and monitored for the implementation of the plan on a day-to-day basis by a Certified Industrial Hygienist (CIH). The HSP will include provisions for: • Conducting preliminary site investigations and analysis of potential job hazards; • Personnel protective equipment; • Safe work practices; • Site control; • Exposure monitoring; • Decontamination procedures; and • Emergency response actions. The HSP will specify mitigation of potential worker and public exposure to airborne contaminant migration by incorporating dust suppression techniques in construction procedures. The plan will also specify mitigation of worker and environmental exposure to contaminant migration via surface water runoff pathways by implementation of comprehensive measures to control drainage from excavations and saturated materials excavated during construction.	TJPA	During construction	TJPA	Provide health-and-safety training prior to start of and at timely intervals during construction. Include requirements in contract documents and monitor construction activities to ensure compliance.
HMC 9 – Review existing asbestos surveys, abatement reports, and supplemental asbestos surveys, as warranted. Perform an asbestos survey for buildings to be demolished, as required. Asbestos-containing building materials (ACM) will require abatement prior to building demolition. Removal and disposal of ACM will be performed in accordance with applicable local, state, and federal regulations.	TJPA	During preliminary engineering, final design and construction phases	TJPA	Determine extent of ACM throughout project site. Perform abatement work prior to demolition. Include all regulatory requirements in contract documents and inspect construction to ensure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH. Obtain all applicable permits.

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HMC 10 – Perform a lead-based paint survey for buildings to be demolished to determine areas where lead-based paint is present and the possible need for abatement prior to demolition.	TJPA	During preliminary engineering prior to building demolitions	TJPA	Determine extent of lead contamination throughout project site. Perform abatement work prior to demolition if necessary. Include all regulatory requirements in contract documents and inspect construction to insure compliance. Where applicable, coordinate with CCSF departments with jurisdiction over activities, such as DPH. Obtain all applicable permits.
Pedestrians				
Ped 1 – Use future construction or redevelopment as opportunities to increase building set-backs thereby increasing sidewalk widths. Particular areas where such widening is most needed include: • The southeast corner of Fremont and Mission streets, • The northeast corner of First and Mission streets, • The north side of Mission Street between First and Fremont, and • Sidewalks south of Howard Street along Folsom, First, Fremont and Beale that are less than 10 feet wide.	Agency and CCSF	During future project reviews in Transbay Terminal area	Agency and CCSF	TJPA will forward guidance to Agency, CCSF Planning Department and DPW.
Ped 2 – Eliminate or reduce sidewalk street furniture such as newspaper boxes and magazine racks in the immediate Transbay Terminal area on corners.	Agency and CCSF	Prior to opening of new Transbay Terminal	Agency and CCSF	TJPA will forward guidance to Agency, CCSF Planning Department and DPW.
Ped 3 – Retime traffic light signalization. This could improve pedestrian levels of service at each of the intersections studies that fall into LOS F.	CCSF	Prior to opening of new Transbay Terminal	CCSF	TJPA will forward guidance to CCSF DPT.
Ped 4 – Provide crosswalk signalization at intersections where they do not exist already, such as Folsom and Beale streets.	CCSF	Prior to opening of new Transbay Terminal	CCSF	TJPA will forward guidance to CCSF DPT.

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Ped 5 – Provide cross-walk count-down signals at intersections and cross-walks immediately surrounding the new Transbay Terminal.	CCSF	Prior to opening of new Transbay Terminal	CCSF	TJPA will forward guidance to CCSF DPT.
Ped 6 – Ensure that Transbay Terminal design increases corner and sidewalk widths at the four intersections immediately surrounding the Transbay Terminal.	TJPA and CCSF, DPW	During Transbay Terminal design phase	TJPA	TJPA and CCSF DPW, where applicable, to include sidewalk width expansion during preliminary and final design of new Transbay Terminal.
Ped 7 – Provide lights within crosswalks to warn when pedestrians are present in the crosswalk, such as at the cross-walk associated with the mid-block bus loading area.	TJPA	Prior to opening of new Transbay Terminal	TJPA	TJPA to work with CCSF DPT to install cross-walk warnings.
Pre-Construction Activities				
PC 1 – Complete a pre-construction building structural survey to determine the integrity of existing buildings adjacent to and over the proposed Caltrain Downtown Extension. Use this survey to finalize detailed construction techniques along the alignment and as the baseline for monitoring construction impacts during and following construction.	TJPA	Prior to preliminary engineering, final design and construction	TJPA	TJPA to perform building surveys during preliminary engineering. TJPA to include measures to protect existing buildings in final design and construction documents. TJPA to review design submittals, contract documents and construction activities to ensure implementation.

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PC 2 – Contact and interview individual businesses along the Caltrain Downtown Extension alignment to gather information and develop an understanding of how these businesses carry out their work. This survey will identify business usage, delivery/shipping patterns, and critical times of the day or year for business activities. Use this information to assist in: (a) the identification of possible techniques during construction to maintain critical business activities, (b) analyze alternative access routes for customers and deliveries to businesses, (c) develop traffic control and detour plans, and (d) finalize construction practices. (TJPA)	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to perform business activity survey during preliminary engineering. TJPA to include measures to maintain business activities and access in final design and construction documents. TJPA to review design submittals, contract documents and construction activities to ensure implementation.
PC 3 – Complete detailed geotechnical investigation, including additional sampling (drilling and core samples) and analyses of subsurface soil/rock conditions. Use this information to design the excavation and its support system to be used in the retained cut, cut-and-cover, and tunnel portions of the Caltrain Downtown Extension.	TJPA	During preliminary engineering and final design	TJPA	TJPA to obtain necessary permits from CCSF prior to performing drilling. TJPA to perform detailed geotechnical investigation during preliminary engineering. TJPA to review design submittals, contract documents and construction activities to ensure proper utilization of information obtained during investigation.
PC 4 – Establish community construction information/outreach program to provide on-going dialogue between the TJPA and the affected community regarding construction impacts and possible mitigation/solutions. Include dedicated personnel for an outreach office in the construction area to deal with construction coordination.	TJPA	During construction	TJPA	TJPA to establish program during final design prior to construction.

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PC 5 – Establish site and field offices located along the Caltrain Downtown Extension alignment. Field office staff, in conjunction with other staff, will: • Provide the community and businesses with a physical location where information pertaining to construction can be exchanged, • Enable TJPA and JPB to better understand community/business needs during the construction period, • Allow TJPA and JPB to participate in local events in an effort to promote public awareness of the project, • Manage construction-related matters pertaining to the public, • Notify property owners, residences, and businesses of major construction activities (e.g., utility relocation/disruption and milestones, re-routing of delivery trucks), • Provide literature to the public and press, • Promote and provide presentations on the project via a Speakers Bureau, • Respond to phone inquiries, • Coordinate business outreach programs, • Schedule promotional displays, and • Participate in community committees.	TJPA and JPB	During construction	TJPA	TJPA to establish program during final design and continue during construction.
PC 6 – Implement an information phone line to provide community members and businesses the opportunity to express their views regarding construction. Review calls received and, as appropriate, forward the message to the necessary party for action (e.g., utility company, fire department, the Resident Engineer in charge of construction operations). Information available from the telephone line will include current project schedule, dates for upcoming community meetings, notice of construction impacts, individual problem solving, construction complaints and general information. Phone service would be provided in English, Cantonese, and Spanish and would be operated on a 24-hour basis.	TJPA	During construction	TJPA	TJPA to establish informational "Hot Line" during final design and continue during construction.
PC 7 – Develop traffic management plans. Traffic management plans to maintain access to all businesses will be prepared for areas affected by surface or cut-and-cover construction. In addition, daily cleaning of work areas would be performed by contractors for the duration of the construction period. Provisions would be contained in construction contracts to require the maintenance of driveway access to businesses to the extent feasible.	TJPA	During preliminary engineering, final design and construction	TJPA	TJPA to forward traffic management plans to CCSF DPT for review and approval. Include all requirements in construction documents and inspect implementation during construction.

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New-MM-C-BR-1.1 – *Require Pre-Construction Bird Surveys.* Pre-construction bird surveys shall be required when trees or buildings and/or structures with potential nesting habitat would be disturbed as part of an individual project component. Pre-construction bird surveys shall be conducted on affected potential nesting habitat by a qualified biologist during the nesting season (February 1 through August 15) if construction activities are scheduled to take place during that period. Surveys shall be performed not more than 2 weeks prior to construction in an affected area. If special-status bird or migratory bird species are not found, work may proceed and no further mitigation action is required. If special-status bird or migratory bird species are found to be nesting in or near any work area (at a distance to be determined by a qualified biologist) or, for compliance with federal and state law concerning migratory birds, if birds protected under the federal MBTA or the California Fish and Game Code are found to be nesting in or near any work area, an appropriate no-work buffer zone (e.g., 100 feet for songbirds, 250 feet for raptors) shall be designated by the biologist. Depending on the species involved, the qualified biologist may require input from CDFW and/or the USFWS Division of Migratory Bird Management regarding the most appropriate ways to avoid disturbance to nesting birds. As recommended by the biologist, no activities shall be conducted within the no-work buffer zone that could harass birds or disrupt bird nesting. Outside of the nesting season (August 16 through January 31), or after young birds have fledged, as determined by the biologist, work activities may proceed. Birds that establish nests during the construction period are considered habituated to such activity, and no buffer shall be required, except as needed to avoid direct destruction of the nest, which shall be prohibited.	TJPA	Before construction	TJPA	Include provisions in contract documents to perform surveys and to comply with requirements for consultation and measures to protect nesting birds.
General Construction Measures				
GC 1 – Disseminate information to community in a timely manner regarding anticipated construction activities.	TJPA	During construction	TJPA	TJPA to initiate program during final design and continue during construction.
GC 2 – Provide signage. Work with establishments affected by construction activities to develop appropriate signage for display that directs both pedestrian and vehicular traffic to businesses via alternate routes.	TJPA	Prior to and during construction	TJPA	TJPA to initiate signage program during final design and monitor contractors' installation during construction.
GC 3 – Install level deck. Install decking at the cut-and-cover sections to be flush with the existing street or sidewalk levels.	TJPA	During construction	TJPA	TJPA to design flush decking during preliminary and final design, include in construction documents and ensure installation during construction.

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GC 4 – Provide for efficient sidewalk design and maintenance. Wherever feasible, maintain sidewalks at the existing width during construction. Where a sidewalk must be temporarily narrowed during construction (e.g., deck installation), restore it to its original width during the majority of construction period. (In some places, this may require placing the temporary sidewalk on the deck.) Each sidewalk design should be of good quality and approved by the Resident Engineer prior to construction. Handicapped access will be maintained during construction where feasible.	TJPA	During preliminary engineering and construction	TJPA	TJPA to work with CCSF DPW on design of sidewalk plans during preliminary and final design and ensure installation during construction.
GC 5 – Provide construction site fencing of good quality, capable of supporting the accidental application of the weight of an adult without collapse or major deformation. Where covered walkways or other solid surface fencing is installed, establish a program to allow for art work (e.g., by local students) on the surface(s).	TJPA	During design and construction	TJPA	TJPA to work with CCSF DPW, incorporate requirements in construction documents and inspect installation during construction.
Air Emissions – Construction				
AC 1 – Assure that, as part of the contract provisions, the project contractor is required to implement the measures below at all project construction sites.	TJPA	During development of contract documents	TJPA	Include requirement in contract documents.
AC 2 – Water all active construction areas at least twice daily. Ordinance 175-91, passed by the San Francisco Board of Supervisors on May 6, 1991, requires that non-potable water be used for dust control activities; therefore, the project contractor would be required to obtain reclaimed water from the City's Clean Water Program or other appropriate sources.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 3 – Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 4 – Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 5 – Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.

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AC 6 – Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 7 – Install sandbags or other erosion control measures to prevent silt runoff to public roadways.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 8 – Replant vegetation in disturbed areas as quickly as possible.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 9 – Minimize use of on-site diesel construction equipment, particularly unnecessary idling.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 10 – Shut off construction equipment to reduce idling when not in direct use.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 11 – Where feasible, replace diesel equipment with electrically powered machinery.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 12 – Locate diesel engines, motors, or equipment as far away as possible from existing residential areas.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 13 – Properly tune and maintain all diesel power equipment.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.

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AC 14 – Suspend grading operations during first and second stage smog alerts, and during high winds, i.e., greater than 25 miles per hour.	TJPA	During and following construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
AC 15 – Upon completion of the construction phase, buildings with visible signs of dirt and debris from the construction site shall be power washed and/or painted (given that permission is obtained from the property owner to gain access to and wash the property with no fee charged by the owner).	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
New-MM-C-AQ-5.1 – *Prepare and Implement an Emissions Plan.* The TJPA shall comply with the following measures to reduce construction emissions: A. *Construction Emissions Minimization Plan.* Prior to issuance of a construction permit, the TJPA shall prepare a Construction Emissions Minimization Plan (Emissions Plan) detailing project compliance with the following requirements: 1. All off-road equipment greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities shall meet the following requirements: a. Where alternative sources of power are available, portable diesel engines shall be prohibited. b. All off-road equipment shall have the following: i. engines that meet or exceed either EPA or CARB Tier 2 off-road emissions standards, and ii. engines that are retrofitted with a CARB Level 3 Verified Diesel Emissions Control Strategy (VDECS). c. Exceptions: i. Exceptions to A(1)(a) may be granted if the TJPA has evidence that an alternative source of power is limited or infeasible at the project site, and that the requirements of this exception provision apply. Under this circumstance, the TJPA shall prepare the documentation indicating compliance with A(1)(b) for on-site power generation. ii. Exceptions to A(1)(b)(ii) may be granted if the TJPA has evidence that a particular piece of off-road equipment with an CARB Level 3 VDECS is (1) technically not feasible, (2) would not produce desired emissions reductions due to expected operating modes, (3) installing the control device would create a safety hazard or impaired visibility for the operator, or (4) there is a compelling emergency need to use off-road equipment that are not retrofitted with a CARB Level 3 VDECS. iii. If an exception is made pursuant to (A)(1)(c)(ii), the TJPA shall provide the next	TJPA	Before and during construction	TJPA	Prepare Construction Emissions Minimization Plan. Prior to construction, include provisions in contract documents requiring preparation of emissions plan, reporting requirements, and certification that measures from the emissions plan have been incorporated. Monitor construction activities to ensure compliance and prepare monthly reports and final report within 6 months of completion of construction.

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cleanest piece of off-road equipment, as provided by the step-down schedule below).

Off-Road Equipment Compliance Step-Down Schedule		
Compliance Alternative	**Engine Emissions Standard**	**Emissions Control**
1	Tier 2	CARB Level 2 VDECS
2	Tier 2	CARB Level 1 VDECS
3	Tier 2	Alternative Fuel (Not a VDEC)

Notes:
CARB = California Air Resources Board; VDECS = Verified Diesel Emissions Control Strategy
Source: data compiled by AECOM in 2014

If the requirements of (A)(1)(b) cannot be met, then the TJPA shall meet Compliance Alternative 1. If the TJPA is not able to supply off-road equipment meeting Compliance Alternative 1, then Compliance Alternative 2 shall be met. If the TJPA is not able to supply off-road equipment meeting Compliance Alternative 2, then Compliance Alternative 3 shall be met.

2. The TJPA shall require idling times for off-road and on-road equipment to be limited to no more than 2 minutes, except as provided in exceptions to the applicable state regulations regarding idling for off-road and on-road equipment. Legible and visible signs shall be posted in multiple languages (English, Spanish, Chinese) in designated queuing areas and at the construction site to remind operators of the 2-minute idling limit.
3. The TJPA shall require that construction operators properly maintain and tune equipment in accordance with manufacturer specifications.
4. The Emissions Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for every construction phase. Off-road equipment descriptions and information shall include equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, expected fuel usage, and hours of operation. For VDECS-installed equipment, reporting shall indicate technology type, serial number, make, model, manufacturer, CARB verification number level, installation date, and hour meter reading on installation date. For off-road equipment using alternative fuels, reporting shall indicate the type of alternative fuel being used.

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5. The Emissions Plan shall be kept on-site and be available for review by any persons requesting it. A legible sign shall be posted at the perimeter of the construction site indicating to the public the basic requirements of the Emissions Plan and a way to request a copy of the plan. The TJPA shall provide copies of the Emissions Plan to members of the public as requested. B. *Reporting.* Monthly reports shall be prepared to indicate the construction phase and off-road equipment information used during each phase, including the information required in A(4). In addition, for off-road equipment using alternative fuels, reporting shall include the actual amount of alternative fuel used. 1. Within 6 months of completion of construction activities, the TJPA shall prepare a final report summarizing construction activities. The final report shall indicate the start and end dates and duration of each construction phase. For each phase, the report shall include detailed information required in A(4). In addition, for off-road equipment using alternative fuels, reporting shall include the actual amount of alternative fuel used. C. *Certification Statement and On-Site Requirements.* Prior to the commencement of construction activities, the TJPA shall certify (1) compliance with the Emissions Plan and (2) all that applicable requirements of the Emissions Plan have been incorporated into contract specifications.				
Air Emissions – Operations				
New-MM-AQ-3.1 – *Equip Diesel Generators with Applicable Tiered Emissions Standards.* All diesel generators shall have engines that meet Tier 4 Final or Tier 4 Interim emissions standards or meet Tier 2 emissions standards and are equipped with a CARB Level 3 Verified Diesel Emissions Control Strategy.	TJPA	During development of contract documents and during construction	TJPA	Prior to construction, include provisions in contract documents regarding diesel generator air emissions specifications. Monitor construction activities to ensure compliance.
New-MM-AQ-3.2 – *Require and Implement Ventilation Plans for Proposed Residential Land Development.* For residential development on the intercity bus facility or ventilation structure sites, the project sponsor shall comply with the following measures: A. *Air Filtration and Ventilation Requirements.* Prior to receipt of any residential building permit, the project sponsor shall submit a ventilation plan for the proposed building(s). The ventilation plan shall show that the building ventilation system removes at least 80 percent of the outdoor PM2.5 concentrations from habitable areas and be designed by an engineer certified by the ASHRAE. The engineer shall provide a written report documenting that the system meets the 80 percent performance standard identified in this measure and offers the best available technology to minimize outdoor-to-indoor transmission of air pollution.	TJPA	Prior to acquisition of building permits, prior to renting or selling buildings	TJPA	Prior to sale or lease of surplus property, include provisions in sale or lease documents that any future residential development will need to prepare and implement ventilation and filtration plans and systems.

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B. *Maintenance Plan.* Prior to receipt of any building permit, the project sponsor shall present a plan that ensures ongoing maintenance for the ventilation and filtration systems. C. *Disclosure to Buyers and Renters.* The project sponsor shall ensure disclosure to buyers and/or renters that the building is located in an area with existing sources of air pollution and that the building includes an air filtration and ventilation system designed to remove 80 percent of outdoor particulate matter. Occupants shall be informed of the proper use of the installed air filtration system.				
Visual/Aesthetics – Construction				
VA 1 – Assure that construction crews working at night direct any artificial lighting onto the work site in order to minimize "spill over" light or glare effects on adjacent areas.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
VA 2 – Assure that contractors make all efforts possible to minimize specific aesthetic and visual effects of construction identified by neighborhood businesses and residents.	TJPA	During construction	TJPA	Include requirements in contract documents and monitor construction activities to ensure compliance.
Transportation				
New-MM-TR-1.1 – *Modify Signal Operations at the 16th Street Intersection with Seventh Street/Mississippi Street, the Caltrain tracks, and Owens Street.* If Caltrain's service and operations plan requires the use of the turnback track during the AM/PM peak hours in the future, prior to Caltrain making any such changes, the TJPA, in conjunction with Caltrain, shall conduct further traffic and train operation analysis of the turnback and maintenance of way tracks to evaluate traffic operations along 16th Street at Seventh/Mississippi Street, the Caltrain turnback track, and Owens Street. Changes to the PCEP OCS and specialty trackwork, such as control points, switches, and train signals, will be undertaken by the TJPA to allow Caltrain to continue its operations at the level of service defined in the PCEP EIR. In addition, if the traffic/train operation analysis shows that the traffic delays attributable to the gate downtime during the AM/PM peak hours would increase at Seventh/Mississippi Street or at Owens Street (already operating at LOS E and F) such that the overall intersection v/c ratio would worsen by more than 10 percent (i.e., a v/c ratio increase of more than 0.10), then improvements shall be implemented so the resulting v/c ratio is no greater than 10 percent above the v/c ratio without use of the turnback track during the AM/PM peak hours. Actions or improvements that could achieve the performance standard, either individually or in combination, include but are not limited to:	TJPA and Caltrain	Proposal by Caltrain to change its service and operation plan to use the turnback track during the AM/PM peak hours	TJPA	TJPA and Caltrain to conduct traffic and train operations analysis to identify signal operations and feasible intersection design improvements, which shall be implemented if necessary to achieve the performance standard.

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• Signal timing adjustments; • Signal phasing modifications; • Lane reconfiguration/re-striping in conjunction with phasing modification; • Left-turn pocket lengthening; • Pre-empt, pre-signal or queue cutters provision or modification as necessary to manage queues; and/or • Other improvements identified in the future due to technology advancement. The TJPA and Caltrain shall coordinate with the City and shall be responsible for reasonable costs of design, permitting, and construction of the necessary improvements at these crossings to attain the v/c performance standard. These changes to the crossing will also satisfy the performance standard for safe pedestrian and bicycle circulation identified in New-MM-TR-3.1.				
New-MM-TR-3.1 – *Modify 16th Street Intersection with the Caltrain and turnback track to provide a safe crossing for pedestrians and bicyclists.* At the time of the construction and operation of the proposed turnback track, the Caltrain electrification project (including mitigation measures adopted by Caltrain for this intersection), SFTMA's 22 Fillmore Transit Priority Project, and the Warriors Arena project may have been implemented. The combination of these projects will modify the intersection configuration and operation at the time of the proposed project. As a result, the TJPA is using a safety-based performance standard, explained below, to guide future improvements for pedestrian and bicyclist safety. At the time of final design, the TJPA shall determine the then-current overall time required by pedestrians and bicyclists traveling along 16th Street to cross the Seventh Street/Mississippi Street intersection, the Caltrain mainline tracks, and the turnback track, and the TJPA shall coordinate and consult with Caltrain, the California Public Utilities Commission, and the City to identify the changes to the intersection and grade crossing warning devices, including signal timing, that are needed to provide adequate time, as determined by the Institute of Transportation Engineers, Caltrans, and the City, for pedestrians and bicyclists to safely cross the widened intersection that results from the construction of the turnback track. The TJPA shall commit to implementing changes necessary to protect pedestrians and bicyclists from potential safety issues, prior to operation of the new turnback track. Specific changes are expected to be determined during final design, which will be after the location of the crossing gates for the turnback track along 16th Street has been determined and based on the then-current signal timing at that time and which is expected to account for other major development and transit projects in the vicinity. The changes to the intersection due to the turnback track will be included in the design specifications for the project. Possible improvements that may attain the above performance standard include:	TJPA	During final design	TJPA	TJPA to work with CCSF, Caltrain, and CPUC on signal operations and intersection design during final design and ensure installation during construction.

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• Adjust signal timing for the warning devices and adjacent traffic signals. The warning phase before the gates start to come down shall be extended to take into account the additional time needed for pedestrians and bicyclists to clear the track zone based on industry standards (such as the Caltrans California Manual on Uniform Traffic Control Devices or the Institute of Transportation Engineers' Design and Safety of Pedestrian Facilities) or City guidelines that define the walking speed of a pedestrian. • Provide sufficient refuge areas for pedestrians and bicyclists to wait while the crossing gates are down. The refuge, or waiting, area shall be sufficient to accommodate the projected pedestrians and bicyclists and be ADA compliant. • Install a smooth surface in the areas next to and between the rails to reduce tripping hazards and unintended forces on bicycle tires.				
Water Resources and Water Quality				
New-MM-WQ-4.1 – *Modify DTX Design Criteria to Avoid Flood Hazards.* The TJPA shall modify the DTX Design Criteria to protect project elements from flood hazards. Specifically, the TJPA shall design and construct Transbay Program Phase 2 within the area delineated as being within a 100-year floodplain to prevent inundation of the project rail alignment and associated infrastructure and to remain operational for the predicted flood level. Changes to the current DTX Design Criteria will include designing station entrances and other points of access to below-ground portions of the DTX system to maintain sufficient freeboard above the 100-year base flood elevation to protect the rail facilities and the public from 100-year storm water entering the stations and the tunnel. Changes to the design criteria will be completed prior to the next phase of design so that these standards can be incorporated into the 30 percent Preliminary Engineering design for DTX. In updating project designs to meet the modified DTX Design Criteria, the TJPA shall consider the cost-benefit of flood-proofing measures and designs which do not preclude other measures that may be more practicable and effective when the future flood risks become more evident. Because implementation of the proposed project would occur at a future date, the TJPA shall amend and update the DTX Design Criteria to incorporate new information related to San Francisco's FEMA FIRM or climate-informed science predictions and mapping of sea-level rise.	TJPA	During final design	TJPA	Modify DTX design criteria and ensure measures to avoid flood hazards are incorporated into construction documents.

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New-MM-CU-WQ-9.1 – *Prepare a Sea-Level Rise Adaptation Plan.* Based on the vulnerabilities identified from inundation maps of year 2100 sea-level rise, the TJPA will prepare a Sea-Level Rise Adaptation Plan identifying measures that will be taken to protect the new project facilities as well as the existing TJPA facilities from potential damage due to future flooding from sea-level rise. The TJPA will coordinate with other entities with facilities close to the San Francisco Bay with an equal or greater sea-level rise vulnerability, such as the City and County of San Francisco, San Francisco Bay Conservation and Development Commission, the Port of San Francisco, BART, the California Department of Transportation, and the San Francisco Municipal Transportation Agency. Specifically, the TJPA shall design its infrastructure system and buildings so that they remain resilient and adaptable over time. The strategies to implement such protection will evolve from the ongoing sessions with other local jurisdictions and agencies, and the performance standard to be achieved will protect the proposed project from the sea-level rise depths projected by the City for the year 2100. It is recognized that the projected flood depths may be refined over time and that new regional and citywide strategies to address sea-level rise will be identified. To the extent feasible, the TJPA shall amend and update its Adaptation Plan and the performance standard to incorporate this new information. The TJPA shall complete the first Sea-Level Rise Adaptation Plan as part of DTX final design. The Plan shall include the following: • Review of available scientific information on sea-level rise data and projections for the subsequent 50 years. Where data and projections indicate different rates of sea-level rise than previously applied, the TJPA will adjust the proposed project's vulnerability assessment and flood design criteria to reflect a median-point of then-current projections. • Improvements will meet the flood design criteria as feasible and unconstrained by surrounding development not owned by the TJPA. • The plan may also rely on flood improvements implemented separately by agencies other than the TJPA, but that will also provide flood risk protection benefits for Transbay Program Phase 2 facilities. • Opportunities for partnership with other local and regional parties for sea-level rise adaptation or where regional efforts will address flooding risks to TJPA facilities. • Consideration of the cost-benefit of flood-proofing measures and designs that do not preclude other measures that may be more practicable and effective when the future flood risks become more evident.	TJPA	During final design	TJPA	Prepare Sea-Level Rise Adaptation Plan, and discuss results and potential actions with other agencies that have facilities in the City that may be similarly affected.

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• Where the TJPA's adaptation options are constrained because of adjacent infrastructure (such as adjacent roadways and structures not owned by the TJPA), the TJPA will work with adjacent landowners and infrastructure managers to identify opportunities to improve rail system protection in cooperation with other local or regional parties.				
Electromagnetic Fields				
New-MM-EF-1.1 – *Evaluate EMI Effects on Nearby Medical Facilities during Final Design of the Additional Trackwork South of the Caltrain Railyard.* During final design, the TJPA shall conduct a site-specific electromagnetic interference (EMI) analysis, based on the OCS alignment, to determine the extent, if any, of disturbance to sensitive electric equipment from the addition of the turnback track, which would be aligned closer to medical and research facilities, such as the University of California San Francisco campus on the east side of the Caltrain right-of-way. If EMI levels result in disturbance to sensitive electric equipment, the TJPA will be responsible for costs related to evaluate, design, monitor, and remediate project-related EMI disruption. More specifically, the following steps will be followed as part of this mitigation measure: • During final design, the TJPA shall evaluate the specific EMI levels associated with the turnback track at the identified sensitive facilities and determine the appropriate controls necessary to avoid disruption of sensitive equipment prior to testing and commissioning of the proposed project. • During the testing and commissioning period for the proposed project, EMI levels shall be measured and the TJPA shall coordinate with the identified sensitive facilities to evaluate whether substantial EMI effects are occurring due to system operations. Where substantial EMI effects are detected that disrupt operations of the sensitive electric equipment, the TJPA shall remedy the disruption prior to commissioning of electrified operations through EMF controls and/or shall provide shielding of the sensitive equipment. • After commissioning of the proposed project, EMI levels shall be monitored during the first year of project operation and reporting of the results shall be shared with any identified sensitive facilities. Identified disruption of sensitive electric equipment during this period shall be immediately remedied through additional modifications to EMF-generating equipment along the turnback track and/or additional shielding of the sensitive electric equipment. EMI can be reduced at the project level through designs that minimize arcing and radiation of radiofrequency energy. Additional mitigation by shielding of sources is not always practical, but susceptibility to EMI can be reduced by choosing devices designed for a high degree of electromagnetic compatibility. The following strategies will be considered, as appropriate by the	TJPA	During final design, during the testing and commissioning period, after commissioning through first year of operation	TJPA	Conduct EMI analysis to determine appropriate design modifications if necessary. Measure EMI levels during testing and commissioning period and for the first year of project operation. Include provisions in contract documents to comply with requirements for consultation and measures to avoid electromagnetic effects.

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TJPA, in identifying feasible and effective mitigation for nearby medical electronic equipment: • passive engineering controls (e.g., shielding with metallic materials at the medical facility where excessive EMI levels are projected); • partial cancellation of magnetic field with a wire loop, in which an induced current creates a magnetic field of opposite direction; • active shielding, that requires a power supply and feedback loop to control the induced current and magnetic field direction and magnitude; and • design modifications to place EMF from the OCS further away or higher up.				
Environmental Commitments Included as Part of the Project (Avoidance Measures)				
1. Modify as necessary the overhead catenary system of the Electronic Trolley Bus and Caltrain at the 16th Street crossing.	TJPA	During final design	TJPA	In cooperation with the Peninsula Corridor Joint Powers Board and SFMTA, identify the necessary technical changes to the overhead catenary system and provide the appropriate funding to implement the necessary changes.
2. Mitigate construction-related effects to the Caltrain station at Fourth and King and on the existing Caltrain support facilities, including administration and storage buildings, bike storage, employee parking, and crew facilities.	TJPA	During final design	TJPA	Identify necessary mitigation actions with Caltrain and provide funding to implement identified actions.
3. Coordinate with SFMTA and enter into a Memorandum of Understanding (MOU), or similar agreement, to avoid impacts to the Muni T-Line (including the Central Subway project) during DTX construction. The MOU would identify construction phasing, sequencing, and timing that work for both agencies and minimize both delays to construction of the DTX, including the underground station at Fourth and Townsend, and disruption to T-Line operations.	TJPA	During final design	TJPA	Identify the phasing, sequencing, and timing for construction that works for both TJPA and SFMTA, and minimizes both delays to construction of the underground station and disruption to T-Line operations.

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4. Design the ventilation structures with City input and in accordance with context sensitive design guidelines, which seek to preserve and enhance, to the extent feasible, scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure.	TJPA	During final design	TJPA	Coordinate with the San Francisco Planning Department to design the appearance of the vent structures to be visually compatible with the surrounding built environment and, where appropriate, to follow accepted preservation guidelines for context-sensitive infill development in historic districts.
5. New-I-TR-1.1 Traffic Improvement and Adaptive Management Plan. A traffic improvement plan and adaptive management plan will be developed for the two at-grade intersections along the turn-back track length (7th Street/Mission Bay Drive and 16th Street/Mississippi Street/7th Street) which will outline all aspects of avoiding, minimizing, and compensating for all temporary and permanent impacts associated with the project. The traffic improvement plan will be reviewed and approved by the City and County of San Francisco prior to implementation. Final monitoring requirements for the area will be determined through coordination with regulatory agencies (including San Francisco, Caltrain and California High Speed Rail Authority (CHSRA)) and details will be included in the improvement plan approved by the City and County of San Francisco. A minimum of two monitoring events of the compensatory mitigation will take place after implementation for the first six years after implementation (or until CHSRA serves San Francisco whichever comes first), and one monitoring event for three additional years is required. Additional monitoring after this time period may be necessary based on impacts and any adaptive management applied. After each monitoring event, a report will be submitted to the City and County of San Francisco which will include, but not be limited to, a narrative of the site conditions, representative analysis including traffic counts, gate down time, and delays, and the performance metrics included in the City and County of San Francisco-approved mitigation plan.	TJPA	After construction	TJPA	The monitoring events and their timing are specified in the improvement measure. A report will be submitted to the city after each monitoring event, per the schedule identified in the improvement measure.

Attachment B

Summary of Comments and Responses to Comments on the

Transbay Transit Center Program

Final Supplemental Environmental Impact Statement/ Environmental Impact Report (Final SEIS/EIR)

Attachment B

Summary of Comments and Responses to Comments on the Transbay Transit Center Program Final Supplemental Environmental Impact Statement/ Environmental Impact Report (Final SEIS/EIR)

1.0 Introduction

The Notice of Availability for the Final Supplemental Environmental Impact Statement/ Environmental Impact Report (Final SEIS/EIR) for the Project was published in the Federal Register on December 7, 2018. The review period concluded on January 7, 2019. After release of the Final SEIS/EIR, the Federal Transit Administration (FTA) and the Transbay Joint Powers Authority (TJPA) received three letters prior to the December 13, 2018 TJPA Board Meeting via mail and three comments were received at the TJPA Board meeting as follows:

- University of California, San Francisco (UCSF), Lori Yamauchi, Associate Vice Chancellor (letter, dated December 12, 2018)
- Reuben, Junius & Rose, LLP (RJR), representing Birmingham Builders for 201 Second Street, 235 Second Street, and 589 Howard Street (letter, dated December 12, 2018)
- Friends of DTX (letter, dated December 13, 2018)
- Roland Lebrun (comments at TJPA Board Meeting, December 13, 2018)
- Jim Patrick (comments at TJPA Board Meeting, December 13, 2018)
- Bob Feinbaum (comments at TJPA Board Meeting, December 13, 2018)

The comments were in support of, or in opposition to, the Project or specific project elements. Most of these comments were similar to comments submitted on the Draft SEIS/EIR. The Final SEIS/EIR contains the responses to comments received on the Draft SEIS/EIR. FTA considered the comments received on the Draft and Final SEIS/EIR prior to the issuance of the Amended Record of Decision (ROD). Major themes of comments received on the Final SEIS/EIR concern:

- Traffic delays at 16th Street
- Pennsylvania Avenue extension
- Throat structure, track alignment, and turning radius
- Project alternatives
- Tunnel design and construction
- Availability of background documents
- DTX funding

A summary of comments and responses is provided below. The responses to comments provide clarification of consideration of alternatives, impact analysis, and mitigation measures in the Draft and Final SEIS/EIR. There were no changes to the Project that would result in significant environmental impacts that were not previously evaluated, and no new information or circumstances have been identified relevant to environmental concerns and bearing on the Project or its impacts that would result in significant environmental impacts not previously evaluated. Therefore, a supplemental environmental document or recirculation of the Final

SEIS/EIR pursuant to 23 CFR 771.130 and the Council on Environmental Quality (CEQ) guidance found in 40 CFR 1502.9 and 1506.3 was not warranted.

2.0 Agency and Institution Comments Received on the Final SEIS/EIR during the Review Period and Responses

One comment letter was received from an institution, the University of California, San Francisco (UCSF). UCSF acknowledged the responses to UCSF comments on the Draft SEIS/EIR in the Final SEIS/EIR and the analysis in the Final SEIS/EIR regarding traffic circulation. UCSF stated that it is looking forward to working cooperatively with the TJPA on 16th Street traffic issues and on the implementation of Mitigation Measure New-MM-EF-1.1 regarding electromagnetic interference with medical facilities. UCSF provided comments on potential traffic delays on 16th Street due to turnback track operations, and support for the Pennsylvania Avenue Extension, discussed below.

Potential Traffic Delays on 16th Street

UCSF requested additional information on traffic monitoring and implementation of Mitigation Measure MM-TR-1.1, which would require modification of signal operations at the 16th Street intersection with Seventh Street/Mississippi Street and Owens Street. As stated in Appendix D of the Final SEIS/EIR (i.e., the Mitigation Monitoring and Reporting Program), page 40, the TJPA and Caltrain will be responsible for implementation of Mitigation Measure MM-TR-1.1. The mitigation measure would be implemented if Caltrain proposes, in the future, to change its service and operation plan to use the turnback track during the AM/PM peak hours. In that case, the TJPA and Caltrain would conduct traffic and train operations analysis to identify signal operations and feasible intersection design improvements to achieve the performance standard.

In addition, traffic counts would be conducted to determine if the mitigation measure performance standard is being met. The performance standard is measured by the level of congestion at the intersections, which is based on the volume of traffic passing through the intersections compared to the capacity of the intersections (the "volume-to-capacity ratio"). Under future conditions with the turnback track in use during the AM/PM hours, the volume-to-capacity shall not be greater than 10 percent greater than the volume-to-capacity ratio under future conditions with the turnback track not in use during the AM/PM peak hours. If this 10 percent threshold is exceeded, the TJPA and Caltrain will be required to modify the signals at the intersections to lower the volume-to-capacity ratio to below the threshold. As explained above, this mitigation measure would only be implemented if Caltrain seeks to use the turnback track during the AM/PM peak hours; Caltrain's current plans and schedules do not call for use of the turnback track during these hours.

The Final SEIS/EIR also includes a traffic improvement measure, New-I-TR-1.1, to monitor transportation conditions at the two intersections crossed by the turnback track. Specifically, this improvement measure requires a Traffic Improvement and Adaptive Management Plan to be developed for the intersections at 7th Street/Mission Bay Drive and 16th Street/Mississippi Street/7th Street. The plan will cover all aspects of avoiding, minimizing, and compensating for all temporary and permanent traffic impacts associated with the project. The traffic improvement plan will be reviewed and approved by the City and County of San Francisco prior to

implementation. The improvement measure includes monitoring requirements, though final monitoring requirements for the area will be determined through coordination with regulatory agencies, including San Francisco. As stated in the Final SEIS/EIR Appendix D, Mitigation Monitoring and Reporting Program (also included as Attachment A to this Amended ROD), the TJPA will be responsible for implementation and monitoring related to this measure.

Support for the Pennsylvania Avenue Extension

Because of the concerns expressed above regarding traffic congestion along 16th Street, UCSF (and one member of the public at the TJPA Board hearing) also expressed support for a "Pennsylvania Avenue Extension" for Caltrain and future high-speed rail service to the Salesforce Transit Center. The Final SEIS/EIR on page 2-58 describes the City's planning study for the Caltrain railyards, the draft was titled the *Railyard Alternatives and I-280 Boulevard Feasibility Study* and study was re-titled *Rail Alignment and Benefits Study* (RAB Study) in 2018. The City Planning Department presented its findings to the San Francisco County Transportation Authority (SFCTA) in May 2018 identifying a Pennsylvania Avenue alignment as its preliminary preferred alternative for the rail component of the RAB study. As described in the RAB Study, "Each alignment in this (RAB) report would cover rail *beyond* the length of the DTX…" (emphasis added). As envisioned by the City, the Pennsylvania Avenue extension would be a possible future project that would connect at the terminus of the DTX and extend the tunnel for Caltrain and future high-speed rail service through San Francisco. The SFCTA accepted this recommendation in September 2018 to assist in planning future extensions beyond the DTX project.

The commenter's expression of the support for the Pennsylvania Avenue extension does not conflict with the Project, because they are separate projects, have different purpose and need, and have different termini. The Project was developed primarily to modernize the Transbay Terminal, alleviate blight in the surrounding area, and improve Caltrain service by providing direct access to downtown San Francisco from the Caltrain terminus station. The RAB Study and its rail component are intended to remove the at-grade crossings of the Caltrain mainline tracks with Mission Bay Drive and 16th Street to better connect the Mission Bay area with neighborhoods to the west of the Caltrain tracks and to the north of the Caltrain railyard, and, if possible, to redevelop the Caltrain railyard for housing, commercial, and open space. To achieve these objectives, the RAB Study proposes shifting Caltrain and future high-speed rail service from the existing at-grade tracks within the Caltrain right-of-way to a new underground alignment that would operate beneath Pennsylvania Avenue. The southern terminus of this extension would be around 22nd Street and the Caltrain mainline alignment. The northern terminus of the extension would be the Caltrain railyard, where it would enter the tunnel stub box included as part of the Project.

As defined, this proposed concept would not be an alternative to the Project, but would be a separate, independent project that may, in the future, connect to the DTX. The RAB Study describes the Pennsylvania Avenue extension as "[an] alignment [that] would allow a phased construction whereby the DTX would be completed and could start operations with a later connection to the Pennsylvania Avenue alignment section." The Final SEIS/EIR (page 2-58) explains that the RAB Study and its various components, including the rail component, remains at a conceptual planning phase. The results are not included in any adopted plan. Future project

development would be subject to environmental review. The City Planning Department has stated that the recommendations from the RAB study would not affect the construction schedules of the rail station at the Transit Center or the DTX. The DTX would not preclude a Pennsylvania Avenue extension. If the RAB Study advances with the Pennsylvania Avenue extension, the TJPA will participate at that time with local agencies, Caltrain, the California High-Speed Rail Authority to further evaluate plans.

In consideration of the RAB study recommendations as outlined in Table 2-7 in Final SEIS/EIR (page 2-97), two other alternative alignments were withdrawn from further consideration: (1) leaving the underground portion of the Project as is, but altering the at-grade segment south of the Caltrain railyard by lowering 16th Street and Mission Bay Drive to pass under the Caltrain tracks, and (2) departing from the current Caltrain mainline at 22nd Street, abandoning the Project alignment along Townsend Street, and instead proceeding northeastward through Mission Bay to Third Street, which the alignment would follow north to connect with the Project alignment at Third and Townsend Streets and then on to the Salesforce Transit Center. The alignment options are detailed in the Rail Alignment and Benefit Study – Draft Executive Summary Report, May 2018 (available online at: http://default.sfplanning.org/Citywide/railyard_blvd/RAB_ExecutiveSummary_052118-DRAFT.pdf).

3.0 Public Comments Received on the Final SEIS/EIR during the Review Period and Responses

Throat Structure, Track Alignment, and Turning Radius

As the DTX alignment transitions from the tunnel segment along Second Street to the train platforms in the lowest level of the Transit Center, the tracks curve through a "throat structure." The throat structure would be constructed using the cut-and-cover method. The 2004 FEIS/EIR identified properties that would be either fully or partially acquired to accommodate the construction of the throat structure. To comply with 2010 updated design specifications from the California High-Speed Rail Authority (affecting the turning radius for tracks and the length of the loading platforms), the Project included a widened throat structure. The widened throat structure, as described in the Final SEIS/EIR starting on page 2-52, would occupy about 14,059 square feet more than the throat structure adopted in 2004 as the Locally Preferred Alternative.

Several comments were received on the adequacy of the analysis of, and the need to consider alternatives to, the widened throat structure. Many of these comments were received during the public review period of the Draft SEIS/EIR, and the Final SEIS/EIR includes individual responses to the construction-related and operational impacts of the widened throat structure. Responses to the comments are provided below. In addition, a Master Response 4 was prepared (see Appendix A, starting at page 26) to provide a comprehensive overview to the cut-and-cover construction technique, the environmental consequences of this construction method, and the previously adopted and new mitigation measures to reduce the environmental effects. Master Response 4 is relevant to the comments on the throat structure, because this Project component would be constructed using the cut-and-cover technique.

Overview to Impact Analysis of the Throat Structure Crossing under Properties. One commenter stated that the Final SEIS/EIR failed to adequately identify and analyze significant

impacts of the Project, especially those due to the widened throat structure that would be constructed under properties along Second and Howard Streets. This comment reiterates points made in other comment letters on the Draft SEIS/EIR. Responses to those comment letters were provided in Final SEIS/EIR (see particularly Appendix A, pages 205-212 and 259-260). In addition, Master Response 4 in the Final SEIS/EIR (Appendix A, pages 26-46) contains a comprehensive discussion of the potential environmental effects of the proposed Phase 2 refinements and the measures to reduce the geological, historic, noise, vibration, and socioeconomic effects associated with the widened throat structure from the Draft SEIS/EIR. The Final SEIS/EIR concluded that these impacts would not be significant because previously approved 2004 mitigation measures for the Transbay Program and additional mitigation measures in the Final SEIS/EIR were adopted and incorporated into the Project. These impacts and the effectiveness of the mitigation measures are discussed further below following this overview to the impact analysis of the widened throat structure.

In addition to the mitigation measures that were adopted and incorporated into the Project, the DTX Design Criteria are the standards for the engineering, construction, and operations of the DTX and were used as the basis of design for the Project. They are typically incorporated into the plan and construction specifications and documents required to be implemented, and include guidelines and criteria intended, among other things, to avoid and minimize potential impacts to and from a variety of conditions, such as those related to soils and geotechnical hazards, noise, utilities, and adjacent buildings. Review of the plan and construction documents for compliance with the design criteria is required by the TJPA and the FTA. The DTX Design Criteria are summarized in the Final SEIS/EIR starting on page 2-43. Chapters of the DTX Design Criteria of particular relevance to avoiding potential impacts are highlighted below.

- **Chapter 5 – Civil Design** – provides the design criteria for general civil designs, including survey control, roadways, storm drainage, and requirements for maintenance and protection of traffic during project construction.
- **Chapter 6 – Utilities** – provides the criteria for the design of new utilities, utility relocations, replacements, and abandonment.
- **Chapter 9 – Geotechnical Requirements** – provides the design criteria for geotechnical exploration, testing, and analysis.
- **Chapter 10 – Protection of Existing Infrastructure** – provides design criteria and requirements for protection through temporary support and/or underpinning of existing facilities, including buildings, highway structures, utilities, and other infrastructure adjacent to or affected by construction.
- **Chapter 11 – Structures** – provides design criteria for temporary and permanent structures, including support of excavation, retaining walls, retained cut structures, and cut-and-cover structures. The design criteria include material properties and structure loading and durability requirements.
- **Chapter 12 – Tunnels** – provides design criteria for temporary and permanent structures for mined tunnels, including initial support, initial lining, and final lining. The design criteria include material properties and structure loading requirements.

- **Chapter 13 – Seismic Design** – sets forth the criteria for seismic design of permanent and temporary structures.
- **Chapter 22 – Fire-Life Safety** – provides design criteria for fire-life safety systems, including fire detection, alarm and suppression systems, emergency lighting and tunnel ventilation, and fire fighter air systems. Also includes requirements for emergency egress and exit signage.

In addition to the design criteria, the TJPA adopted mitigation measures to minimize and mitigate environmental impacts of the Project. The mitigation measures are contained in the Final SEIS/EIR, Appendix D, as well as in Attachment A to this Amended ROD.

Geological Impact Analysis and Mitigation Measures. One commenter questioned how mitigation measures would effectively reduce geotechnical impacts and potential damage from excavation, particularly for 235 Second Street and 589 Howard Street. This comment was similar to comments related to the potential for geology and soils impacts due to excavation received during the review of the Draft SEIS/EIR. These comments were responded to in the Final SEIS/EIR (see response in Appendix A, starting at page 208, and Appendix A Master Response 4, pages 33-35).

The mitigation measures adopted for the Project, (such as underpinning of existing structures where necessary, identification of tolerable limits for settlement (based on soil and groundwater conditions and the assessment of neighboring buildings), monitoring settlement, and excavation shoring systems) are common for large and small construction projects involving excavation and subsurface construction in urban environments. Because of the soft soil conditions, Bay muds, and shallow groundwater in the Project corridor, the TJPA has undertaken geotechnical studies and building surveys (discussed further below) and will continue to verify the results of these conditions to refine, if necessary, tolerable limits of settlement and other forms of ground movement that will ultimately be included in the construction design and specifications.

The previous geotechnical studies that provide the basis for further design of the Project were prepared as part of Preliminary Engineering for the DTX. The subsurface conditions described in these reports remain relevant and, as described above, will be verified and refined as final Project design progresses towards construction. The April 2010 Final Geotechnical Interpretative Report, Part I Soil and Rock Characterization for Mined Tunnel Design contains recommendations for soil properties to be used as a basis for the design of the mined tunnels. The May 2010 Final Geotechnical Interpretative Report, Part II Design Recommendations for the 30% Preliminary Engineering Design Phase of the Cut-and-Cover Segment of the DTX Alignment contains excavation dimensions, recommended shoring systems, and estimated deformation for the portions of the alignment to be constructed using the cut-and-cover method. These technical studies and others used in preparing the Draft SEIS/EIR are identified in the References chapter of the Draft SEIS/EIR, were again cited in the Final SEIS/EIR (see Master Response 4 on page 27), and are available for review upon request at the TJPA office at 201 Mission Street, Suite 2100 in San Francisco. Also, as part of the 30% preliminary engineering, the TJPA completed an Existing Buildings Protection report in March 2010, which presented ground settlement for cut-and-cover portions of the alignment, potential risks for buildings adjacent to and above tunneling portions of the alignment, protection and monitoring programs

for relevant buildings (such as strategies for reducing building deformation by modifying either the building superstructure, its foundation, or the ground conditions adjacent to or below the building), and further considerations for the next project phase.

During construction, adherence to the tolerable limits for settlement will be monitored to protect the adjacent buildings and mitigate impacts from excavation and other construction activities. As stated in the Final SEIS/EIR (Appendix A, Master Response 4), the DTX Design Criteria includes a section on "Instrumentation and Monitoring," which prescribes requirements for management of the movement of existing structures within and surrounding the area of influence of the proposed work. This monitoring program serves to ensure that construction and the adopted mitigation measures are performing as expected, and to determine whether corrective actions need to be implemented. The monitoring program will measure the response of buildings along the alignment to construction activities and to confirm the results of efforts to protect vulnerable buildings. The program includes typical measurement techniques, including using settlement markers, tape extensometers (devices used to measure small changes in the distance between two reference points), seismometers (devices used to measure ground movements), inclinometers (devices used to measure the tilt, elevation, or depression of an object), and vibration monitoring devices.

The widened throat structure would pass under two new buildings as identified in the Final SEIS/EIR. During construction of the widened throat structure, portions of the buildings at 235 Second Street and 589 Howard Street would need to be supported through underpinning. The parking lot at 201 Second Street would be adjacent to the excavation but would not require underpinning. Construction at all three sites would be monitored for ground movement, as described above. Feasibility studies and recommendations for underpinning the buildings at 235 Second Street and 589 Howard Street were performed in 2010 and refined in 2018. These studies are available to review upon request to TJPA:

- Parsons Transportation Group, Draft Preliminary Structural Assessment of 589 -591 Howard Street and 235 Second Street for the Caltrain Downtown Extension Project, May 2010
- Parsons Transportation Group, Updated Preliminary Report and Plans, March 2018

Underpinning is a proven and common technique to support overlying buildings and other structures while underground construction for building expansions, renovations, and utilities and infrastructure installation or repairs is underway. Examples related to transit and tunnel construction include the Union Square Parking Garage, underpinned as part of the SFMTA Central Subway Project; the landmark Los Angeles Times Building, underpinned as part of LA Metro's Regional Connector Project; and the historic Corbin Building in New York, underpinned as part of the MTA-NYCT Fulton Street Transit Center Project. Other successfully completed local examples of underpinning for renovation and expansion include 555 Mission Avenue, 300 Grant Avenue, and the historic Curran Theater on Geary Boulevard in San Francisco; 1100 Broadway in Oakland; and the historic Naval Architecture Building at UC Berkeley.

In addition to the above mitigation measures, Section 1.6 of the DTX Design Criteria requires construction specifications to be based on the current prevailing codes and standards, including those of the City and County of San Francisco, California Department of Transportation, U.S.

Army Corps of Engineers, and the American Railway Engineering and Maintenance-of-Way Association. As explained in the Final SEIS/EIR (Appendix A, Master Response 4, page 34), these best practices and codes are appropriate, adequate, state-of-the-art, and effective.

One commenter stated that there is a need to evaluate all the conditions that could contribute to geotechnical hazards such as settlement. The Final SEIS/EIR starting on page 2-302 and Appendix A (Master Response 4, starting on page 33) explains that ground stability is a function of several factors including, but not limited to, the heterogeneity of composition and depth of fill, local groundwater depth and permeability, presence of underlying Young Bay Mud, and ground-shaking characteristics of the fill deposits. Pages 2-305 through 2-313 assess ground movement due to:

- liquefaction – when soils lose their strength and cohesion due to water saturation in response to an earthquake
- settlement and lateral spreading – when the compaction, rearrangement, and consolidation of subsurface materials results in the vertical (settlement) and/or lateral (spreading) deformation of these materials
- expansive soils – when soils swell and expand when wet and shrink and contract when dry
- excavation – when soils are excavated and there is shallow groundwater, poorly consolidated remaining soils can settle adjacent to the excavation.

Geotechnical and soil impacts were also examined in the 2004 FEIS/EIR and resulted in seven mitigation measures (see Final SEIS/EIR Appendix D, Mitigation Monitoring and Reporting Program, which is also reproduced as Attachment A to this Amended ROD). These mitigation measures were adopted as part of the 2004 FEIS/EIR and incorporated into the Project. The measures apply throughout the Project corridor and will be implemented regardless of the track curvature and whether building underpinning is necessary. These measures are summarized below.

- **SG 1** – Monitor adjacent buildings for movement and, if movement is detected, take immediate action to control the movement.
- **SG 2** – Apply geotechnical and structural engineering principles and conventional construction techniques similar to the design and construction of high-rise buildings and tunnels throughout the downtown area; apply design measures and utilize pile-supported foundations to mitigate potential movement of the stations.
- **SG 3** – Design and construct structural components of the Project to resist strong ground motions approximating the maximum anticipated earthquake (0.5g); cut-and-cover portions will require pile supports to minimize non-seismic settlement in soft compressible sediments (Bay Mud); the underground Caltrain station at Fourth and Townsend will require pile-supported foundations due to the presence of underlying soft sediments.
- **SG 4** – Underpin existing building, where deemed necessary, to protect existing structures from potential damage that could result from excessive ground movements during construction; design the tunneling and excavation procedures (and construction sequence)

and the temporary support system to control ground deformations within small enough levels to avoid damage to adjacent structures. Where the risk of damage to adjacent structures is too great, special measures will be implemented such as: (1) underpinning, (2) ground improvement, and/or (3) strengthening of existing structures to mitigate the risks.

Underpinning, if it is deemed necessary, is one of the options for mitigating adverse effects of tunneling on the existing buildings. Alternatives, in lieu of underpinning, involve strengthening the ground between the building and the crown of the tunnel. Grouting in combination with inclined pin piles can be used not only to strengthen the ground but make the ground over the tunnel act as a rigid beam, allowing construction of tunnels with no adverse effects on the buildings supported on shallow foundations over the tunnel.

The methodology that is proposed for the Caltrain Downtown Extension, i.e., to design the support system to control ground deformations within tolerances and selectivity strengthen structures that may be too weak to resist even small deformations, was successfully used for the Muni Metro Turnback project, and are deemed to be effective for the Caltrain Downtown Extension Project as well.

- **SG 5** – Assure proper design and construction of pile-supported foundations for structures to control potential settlement of the surface.
- **PC 1** – Complete a pre-construction building structural survey to determine the integrity of existing buildings adjacent to and over the proposed Caltrain Downtown Extension. Use this survey to finalize detailed construction techniques along the alignment and as the baseline for monitoring construction impacts during and following construction.
- **PC 3** – TJPA shall complete detailed geotechnical investigation, including additional sampling (drilling and core samples) and analyses of subsurface soil/rock conditions. Use this information to design the excavation and its support system to be used in the retained cut, cut-and-cover, and tunnel portions of the Caltrain Downtown Extension.

The commenter singled out New Mitigation Measure C-GE-4.1 that was included in the Final SEIS/EIR, suggesting that the ground movement analysis was inadequate because this mitigation measure addresses groundwater control only and no other factors that could affect ground stability. The previously adopted mitigation measures (summarized above) plus this new mitigation measure included in the Final SEIS/EIR adequately address the causes of ground stability impacts in the Project corridor.

Historic Resources Impact Analysis and Mitigation Measures. One commenter questioned whether underpinning and other measures identified in the Amended Memorandum of Agreement (MOA) for protection of historic properties would protect the historic integrity of 589 Howard Street during construction. It was also commented that the MOA was not available for review and thus the public had not had an opportunity to comment on its protective measures.

The MOA is a confirmation of the responsibilities of the signatories and evidence of a federal agency's compliance with Section 106 of the National Historic Preservation Act. The measures to protect historic resources in the MOA (see Appendix A of the MOA) are the mitigation measures from the 2004 FEIS/EIR as adopted by the TJPA and the FTA. The MOA does not introduce new mitigation measures or substitute measures that were in the 2004 FEIS/EIR.

The adopted mitigation measures identified in the 2004 FEIS/EIR and incorporated into the Project are also included in the Project's Mitigation Monitoring and Reporting Program and in the 2005 ROD, which the TJPA and FTA are obligated to implement in accordance with 40 CFR Section 1505.3 and California Public Resources Code Section 21081.6. The MOA memorializes those measures and commits the signatories to fulfill and implement the measures in accordance with Section 106. As a result, these measures have been in place since the 2004 FEIS/EIR, they were available for public review as part of the 2004 FEIS/EIR and the companion Mitigation Monitoring and Reporting Program, they were available for public review again as part of the Final SEIS/EIR, and their implementation to protect the historic integrity of 589 Howard Street during construction is a requirement.

Underpinning buildings is a standard means of protecting buildings in place during construction; the approach to and steps for underpinning are well established, and this construction technique has a demonstrated track record of protecting the overlying building. Underpinning the property at 589 Howard would require removal of a portion of the building's basement, which is not recognized as a feature that contributes to the Second and Howard Streets Historic District, and would avoid removal of any above-ground portion of the building that is recognized as a contributor to a historic district.

The underpinning would result in removal of a small portion of the northwest corner of the basement (approximately 750 square feet), which projects beyond the building façade into the public right of way, but would not involve any removal of the rest of the building and the features that contribute to the Second and Howard Streets Historic District. Basement demolition was performed as part of the SFMTA Central Subway project, to accommodate the construction of the Chinatown Station. Protection of the building's historic significance and control of potential vibration effects are addressed by the previously approved mitigation measures from the 2004 FEIS/EIR (see Mitigation Measure CH11) and by the MOA to protect historic resources. The MOA was executed in June 2004, and includes the 2004 FEIS/EIR mitigation measures that avoid and minimize construction vibration impacts and inadvertent damage during construction.

The MOA is available on the TJPA website at: https://tjpa.org/uploads/2009/12/ROD-B.pdf. Pursuant to Section 106 of the National Historic Preservation Act, the State Historic Preservation Officer concurred with the finding that there would be no adverse effects to the 589 Howard Street property with implementation of Stipulation IV of the MOA (see Final SEIS/EIR, Appendix B.3). The MOA has been amended twice, but neither of the amendments altered the mitigation measures or introduced new ones. The first amendment in 2010 added the TJPA and the FRA as signatories; the second amendment added an annual reporting requirement, requires immediate notification for discovery of Native American resources, and extends the termination date for the MOA. In addition to the link cited above, the MOA and its amendments can also be viewed at the project website at: https://www.tjpa.org/tjpa/documents.

MOA Stipulation III.A states that the "TJPA, in consultation with the owners of the historic properties immediately adjoining the construction sites, will develop and implement measures to protect the contributing elements of the Second and Howard Streets Historic District and the Rincon Point/South Beach Historic Warehouse Industrial District from damage by any aspect of the Undertaking. Such measures will include, but are not necessarily limited to, those identified

in Appendix A [Protective Measures] to this MOA. The protective measures herein stipulated will be developed and implemented by TJPA prior the commencement of any aspect of the Undertaking that could have an adverse effect on historic properties … In addition, TJPA will monitor the effectiveness of the protective measures … and will supplement or modify these measures as and where necessary …" As indicated above, each of the protective measures in Appendix A of the MOA is in the 2004 FEIS/EIR and incorporated into the Project. Protective measures were identified for preconstruction activities, general construction measures, soils/geology, air emissions, and vibration, and these same measures are also found in Attachment A (Mitigation Monitoring and Reporting Program) to this Amended ROD under the same topics. As explained in the Final SEIS/EIR on page 2-260, a mitigation measure in the Draft SEIS/EIR (New-MM-NO 4.1 to protect the building at 589 Howard Street from construction vibration) was deleted in the Final SEIS/EIR, because it was redundant with the 2004 FEIS/EIR mitigation measures and MOA.

Socioeconomic Impact Analysis and Mitigation Measures. One commenter questioned the Final SEIS/EIR statement that only 52 employees would be relocated during construction, since 1,000 employees occupy the building at 235 Second Street, the headquarters for CBS Interactive, an online content network for information and entertainment. Further, the commenter questions whether there would be sufficient replacement space given current market conditions.

The Final SEIS/EIR (Table 3.4-15 on page 2-196) explains that the widened throat structure would pass under the northwestern portion of the building at 235 Second Street, requiring a temporary construction easement for the installation of the throat structure and a permanent underground easement following construction. During construction, the building would be underpinned and supported while the throat structure is installed. As a result, the Project would not require full acquisition of the property nor is it expected that all employees in the building would need to be displaced during construction. The Final SEIS/EIR (Table 3.4-16 on page 2-197) indicates the estimated land area under the building that would be required for the widened throat structure, based on plan drawings; the overlying building square footage assuming six stories; and the temporary displacement of 52 employees using 250 square feet/ employee. The west-facing facade of the building is its main entrance and is occupied by a large lobby space. As a result, the estimate of displaced employees in the Final SEIS/EIR is conservative, because it assumes all portions above the throat structure would be occupied with employee work spaces but includes the largely unoccupied lobby and a multi-story atrium, resulting in fewer employees working in this portion of the building. Regardless of the precise number of affected employees, the TJPA is committed to providing relocation assistance as described below.

The 2004 FEIS/EIR identified mitigation for permanent and temporary displacement of residents and employees. Specifically, in fulfillment of Mitigation Measure Prop 1, the TJPA must comply with the federal Uniform Relocation Act (Public Law 91-646) and California Relocation Act (Chapter 16, Section 7260 et seq. of the Government Code). This mitigation measure was adopted and incorporated into the Transbay Program, including the Project (see Final SEIS/EIR, Appendix D, Mitigation Monitoring and Reporting Program, which is also reproduced as Attachment A in this Amended ROD). Because relocation assistance is part of the Project, no additional mitigation is needed, and the impact would not be adverse.

The TJPA prepared a *Final Relocation Impact Study II* in January 2010, based on the designs and property effects available at the time. The report was prepared to comply with the federal Uniform Relocation Act and the California Relocation Act. The report identified the businesses that would be displaced (no residential uses were affected), described available replacement sites (also referred to as "relocation resources"), and summarized the types of relocation advisory assistance services. Eligible businesses may request reimbursement of actual, reasonable, and necessary moving costs, and related expenses. This 2010 study is available on the TJPA website at: https://tjpa.org/uploads/2010/02/Item7_FRIS-2_final_Jan2010.pdf.

It may be possible to relocate the employees within the building at 235 Second Street, but this is uncertain. Assuming the employees would be relocated off-site, the Final SEIS/EIR starting on page 2-200 provides general information about current market conditions in the vicinity. The market overview suggests that planned office space in the vicinity should be adequate to accommodate the displacement of employees from 235 Second Street. The TJPA will update the Relocation Impact Study, after the designs for the Project advance beyond 35 percent, to reflect any change in displaced businesses and employees, as well as the relocation resources.

Construction Vibration Impact Analysis and Mitigation Measures. The commenter states that ground-borne construction-related vibration should be a significant impact and that proposed mitigation measures do not lessen the impact from construction vibration because they reduce damage from vibration and not the vibration itself. The Final SEIS/EIR on page 2-321 explains that the *FTA Transit Noise and Vibration Impact Assessment Manual* recommends that vibration impacts associated with construction activities be evaluated using its building damage criteria (see Table 3.12-6 on page 2-324 of the Final SEIS/EIR). The analysis of construction vibration impacts is presented in Impact C-NO-4 starting on page 2-332 of the Final SEIS/EIR. The analysis concluded that construction vibration impacts would not be significant, because the mitigation measures previously adopted and incorporated into the Transbay Program will apply to the Project.

These previously adopted mitigation measures (see Attachment A to this Amended ROD) would reduce vibration, as well as avoid and minimize potential damage from vibration. Mitigation Measures VibC 1 through 6 would reduce the amount of construction vibration by limiting or prohibiting the use of construction techniques that create high vibration levels and restricting procedures that contractors can use in vibration sensitive areas; a summary of all construction vibration mitigation measures is presented below.

- **VibC 1** – limit or prohibit use of construction techniques that create high vibration levels.
- **VibC 2** – restrict procedures that contractors can use in vibration-sensitive areas.
- **VibC 3** – require vibration monitoring during vibration-intensive activities.
- **VibC 4** – restrict the hours of vibration-intensive activities to weekdays during daytime hours.
- **VibC 5** – investigate alternative construction methods and practices to reduce impacts.
- **VibC 6** – include specific limits, practices, and monitoring and reporting procedures for the use of controlled detonation.

As explained above under "Historic Resources Impact Analysis and Mitigation Measures," these construction vibration mitigation measures constitute commitments by the TJPA and FTA to reduce Project impacts and must be implemented in accordance with 40 CFR Section 1505.3 and California Public Resources Code Section 21081.6. The MOA described in the Final SEIS/EIR incorporates and memorializes these mitigation measures in order to reduce Project effects to historic resources, in this instance to 589 Howard Street which is a contributor to the Second and Howard Streets Historic District. Because of its historic status, the adopted mitigation measures for historic resources also apply and are incorporated and memorialized in the MOA:

- **CH 1** – comply with the provisions of the MOA.
- **CH 11** – in consultation with property owners, develop and implement measures to protect contributing elements of historic properties.
- **CH 13** – repair any project-related damage (in accordance with the Secretary of the Interior's standards) to contributing elements of the Second and Howard Streets Historic District and the Rincon Point/South Beach Historic Warehouse Industrial District.
- **CH 14** – reevaluate the Second and Howard Streets Historic District within 180 days of FTA's determination of project completion.

Mitigation Measure CH 1 includes implementing the protective measures in MOA Stipulation III.A, which defines protective measures during construction (including CH 11 and CH13 from the 2004 FEIS/EIR) that could affect contributing elements to the Second and Howard Streets Historic District.

Construction of the widened throat structure in compliance with the adopted construction vibration mitigation measures and cultural resources mitigation measures would reduce construction-related vibration impacts; therefore, changing the conclusion in the Final SEIS/EIR from less than significant under the California Environmental Quality Act (CEQA) and no adverse impact under National Environmental Policy Act (NEPA) to significant and adverse impact would not be appropriate.

Noise Impact Analysis and Mitigation Measures. One commenter requested additional evidence that underground facilities and operations would not result in impacts above ground. The following proposed project components would be subterranean and would not generate street-level noise and the potential to affect noise-sensitive land uses:

- Widened throat structure
- Extended train box
- Realigned Fourth and Townsend Street Station
- Tunnel stub box
- Rock dowels
- Bicycle/controlled vehicle ramp and below-grade bicycle facilities
- Beale Street underground pedestrian connector

The absence of noise impacts from underground project components is a result of how noise is propagated and travels between the noise source and the noise receiver. When the path between the noise source and receiver is obstructed such that there is no direct "line of sight," noise levels

at the receiver are shielded and not detectable by the human ear. In the case of the proposed project, train movements and operation and maintenance activities within the train box, and pedestrian movements and operation and maintenance activities within the pedestrian connector, would be enclosed within the structures for the project components and then covered by fill and reconstructed streets and sidewalks. These structures and the overlying fill and pavement would absorb the sound energy from the noise sources. There would be no direct line-of-sight, and annoyance or disturbance from these underground components would not affect street level sensitive receptors. For further details, the commenter is referred to the 2018 *FTA Transit Noise and Vibration Impact Assessment Manu*al (page 15), regarding the effects of shielding on noise.

Project Alternatives

One comment letter commented on the design of the Project and suggested that some of its components were committed to prior to completion of environmental review. In particular, reference is made to the granting of a variance for the proposed curvature of the throat structure prior to its evaluation pursuant to CEQA. This letter acknowledged that similar comments were made during the comment period on the Draft SEIS/EIR, which responded on pages 205-207 and further responded on pages 210-211 of the Final SEIS/EIR.

The Locally Preferred Alternative was adopted in 2004 by the City and County of San Francisco, the San Francisco Redevelopment Agency, the TJPA, and the Peninsula Corridor Joint Powers Board. The selection of this plan came after extensive analyses and evaluation of alternative DTX alignments, intermodal transit center sites and designs, redevelopment plans for the land uses around the Transit Center, and construction methods dating back to the 1990s. The investigations and assessment of environmental and socioeconomic effects were documented in the 2004 Final EIS/EIR. The FTA subsequently issued its Record of Decision in 2005, providing its rationale and findings for selecting the Locally Preferred Alternative. Planning for the Locally Preferred Alternative conformed to then-current design standards and specifications, and rail and bus service plans.

The Project includes and refines portions of the 2004 Locally Preferred Project that have not been constructed; construction to date involves Phase 1 of the Transbay Program, including the Salesforce Transit Center, the below-grade train box for Caltrain and high-speed rail service, and redevelopment of blighted areas around the transit terminal. The widened throat structure which is of concern to the commenter has not been constructed; rather it has been evaluated in the Final SEIS/EIR. This project component has been designed to comply with the CHSRA design specification for track curvature and turning radii for tracks that will be shared with commuter rail trains and where operating speeds will be less than 25 miles per hour. The design specification is issued by the CHSRA as a basis for the design of the system. The environmental consequences of the Project designed to comply with this specification are analyzed throughout the Final SEIS/EIR. As described in the Final SEIS/EIR, alternative turn radii were withdrawn from further consideration because they were determined to be infeasible, because they either conflicted with CHSRA design specifications or resulted in greater impacts than the turn radius and throat structure proposed as part of the Project (see Final SEIS/EIR Table 2-7 on page 2-95).

There have been discussions regarding the CHSRA turning radius in southern California. The TJPA contacted the CHSRA to determine whether refinements to this design specification might

be applicable for the throat structure, track alignment, and turn radius at the Salesforce Transit Center. The CHSRA responded on April 4, 2018 stating that CHSRA track standard for high-speed trains operating at speeds below 25 miles per hour (as would be the case for trains entering and leaving the Salesforce Transit Center) and sharing tracks with commuter trains (which would be the case with Caltrain) is a minimum curve radius of 650 feet. As a result of this correspondence, the design specification used for the widened throat structure has not been modified.

Tunnel Design and Construction

Several commenters submitted opinions and ideas about the Project's design. The comments concerned the ventilation structures, the tunnel construction, the construction methods, and future service extensions to the East Bay.

Ventilation Structures. One commenter stated that the Project did not require as many ventilation structures. The design and spacing of the ventilation structures for the Project was based on the applicable standards of the National Fire Protection Association. Because these design standards for ventilation and emergency exit structures changed after the adoption of the Locally Preferred Alternative in 2004 and proposals for systems operations and safety had been suggested, the purpose and need for the Project included responding to system safety needs, particularly for fire protection and life safety (see Final SEIS/EIR, page 2-36). The Project, as designed, is in accordance with the National Fire Protection Association Standard 130, the California Mechanical Code, the 2009 DTX Design Criteria, and the TJPA assessments of risk and vulnerability from various threats and cannot eliminate the identified ventilation structures.

This commenter submitted a similar comment during the public review period for the Draft SEIS/EIR in December 2015. That comment recommended a ventilation system designed to eliminate ventilation / evacuation structures north of Townsend Street and was based on modifying the Locally Preferred Alternative tunnel design. As explained in the Final SEIS/EIR on page 228, this alternative tunnel configuration and ventilation system would result in greater impacts, would be technically and financially difficult to construct, and would not comply with the National Fire Protection Association Standard 130 requirement for coordination of signaling, traction power, and ventilation systems.

Tunnel Construction. One commenter suggested that the Project's tunnel construction approach would result in structural integrity problems. Specifically, the commenter stated that construction of two outside bores with tunnel boring machines, followed by a third bore in the middle, for the three-track configuration of the Project, would cause structural issues for the outside bores. The commenter did not offer any further explanation or evidence for this comment.

The TJPA prepared a feasibility level study, the *Tunnel Options Study* in 2017 and subsequently amended it in 2018. The study examined the use of twin tunnel boring machines (TBM) with mining between the TBMs utilizing the Sequential Excavation Method (SEM). This approach would remove several segments of TBM liner and replace the segments with vertical interior support walls. The central SEM portion of the tunnel is excavated and supported prior to removal of the bored tunnel segments. The excavation and support sequence for the tunnel would maintain the stability of the tunnel structure at all times. Based on the study, the TJPA's

designers believe that the TBM with SEM approach is feasible. The study was peer reviewed by tunneling consultants on behalf of the SFCTA who agreed with the feasibility of the approach.

Furthermore, the TJPA has designed the proposed approach for the tunnel segment in accordance with its 2009 DTX Design Criteria using New Austrian Tunneling Method(NATM)/SEM procedures. The standards, codes, and guidelines which will be used in the tunnel designs are from the *American Concrete Institute Manual of Concrete Practice*, the *Cal/OSHA Tunnel Safety Orders*, the *Caltrans Bridge Design Specifications*, the *Caltrans Amendments to the AASHTO LRFD Bridge Design Specifications*, and the *U.S. Army Corps of Engineers Tunnels and Shafts in Rock, Engineering Design Manual*.

Construction Methods. One commenter stated that the TJPA has not chosen a preferred alternative but has introduced other possible construction methods in the Final SEIS/EIR. The commenter further remarks that it is not clear why the alternative construction methods are considered feasible for certain portions of the DTX alignment and not others or why there are conflicting statements about the extent and intensity of impacts, particularly for mining construction methods.

The analysis in the Final SEIS/EIR evaluates the proposed construction method, which is a combination of cut-and-cover and the sequential excavation method. The extent of cut-and-cover identified and evaluated in the Final SEIS/EIR is the reasonable, worst-case (most impactful) and proposed construction scenario. The determination of which portions of the alignment are appropriate for cut-and-cover and which are appropriate for mining was based on evaluation of the subsurface geotechnical conditions completed during the conceptual design phase of the Project in the early 2000s. More detailed information on the subsurface conditions was developed as part of the 30% preliminary engineering phases.

The *Tunnel Options Study* is the next step in an ongoing design process that verifies and refines as necessary earlier recommendations regarding the design and construction methods of the Project. This advancement of design does not fundamentally change the project definition; rather, it serves to update, focus, and refine aspects of the Project. The "other construction methods" identified by the commenter were considered by the TJPA and included in the Final SEIS/EIR in response to a number of comments received on the Draft SEIS/EIR concerning impacts of cut-and-cover construction techniques. This study is available upon request at the TJPA office at 201 Mission Street, Suite 2100, San Francisco, CA.

As explained in the Final SEIS/EIR in Section 2.4, Updated Section 2.2, Description of the Project Alternatives, page 2-86, other construction methods were identified in the *Tunnel Options Study*. None of the options studied in this report was reasonable or feasible for the full length of the alignment because of subsurface soil and groundwater conditions, utility conflicts, rail profile, and design specifications. The locally preferred alternative includes the cut-and-cover construction method and the SEM method as illustrated in Figure 2-2 of the Final SEIS/EIR on page 2-42.

The difference from the project as described in the 2004 FEIS/EIR is that the NATM/SEM replaced the stacked drift method. As explained in the Final SEIS/EIR on page 2-85, the stacked drift method, while common when the 2004 FEIS/EIR was approved, is rarely used today

because it is more costly and requires a longer construction period. The TJPA estimated that the stacked drift method would be approximately 30 percent more costly and require 2 more years of construction than NATM/SEM. Additionally, the NATM/SEM would reduce ground movement, risk of tunnel collapse, use of blasting, and fewer truck trips to remove spoils compared to the stack drift method. Those segments of the project that would not be mined would be constructed using the cut-and-cover technique. This method is commonly used, practical, and cost effective when the tunnel depth is relatively shallow as occurs along stretches of Second Street and Townsend Street, where this construction method is proposed. Furthermore, potential adverse effects of cut-and-cover construction would be reduced with implementation of the mitigation measures from the 2004 FEIS/EIR as well as measures from the Final SEIS/EIR. If the construction methods are refined, they would be subject to environmental review under 23 CFR 771.129 and 130.

The text in the Final SEIS/EIR is consistent in describing the settlement impacts of the various construction methods. The conclusions cited by the commenter (Final SEIS/EIR pages 2-94, 2-98, and 2-312) vary because they refer to different construction methods and different segments of the corridor. Each of the different construction methods – whether cut-and-cover or mining – has the potential to result in ground settlement due to the subsurface materials and shallow groundwater at the throat structure. The alternative construction methods would excavate and remove soils in the vicinity of the throat structure at Howard Street differently and thus the potential effects for settlement would vary. However, the adopted mitigation measures from the 2004 FEIS/EIR and the Final SEIS/EIR, in conjunction with the instrumentation and monitoring program required by the DTX Design Criteria, would reduce these impacts to not adverse regardless of the construction method.

Other construction methods identified for the throat structure but withdrawn from consideration are summarized below from the *Tunnel Options Study* and the Final SEIS/EIR (in Section 2.4, Updated Section 2.2, Description of the Project Alternatives, page 2-86).

Alternative Construction Methods at the Throat Structure	**Technically Feasible (Yes/No), Reason for Rejection**
Mining the entire throat structure using a combination of micro tunnel boring machine (TBM) pilot tunnels with mining or a pipe roof with mining.	No, this alternative extends the construction schedule by a minimum of approximately one year, is very costly, and carries significant design and construction risks due to the complex geometry of the tunnel and the number of construction processes in this segment. The pilot tunnels using micro-TBMs with subsequent mining is complex and introduces considerable construction challenges. There is also potential for significant surface settlements that can be readily mitigated with cut-and-cover construction.

Alternative Construction Methods at the Throat Structure	Technically Feasible (Yes/No), Reason for Rejection
Mining under Howard Street only using jacked box pilot tunnels with mining.	Yes, this alternative is technically feasible. However, this alternative has not satisfied other factors that need to be considered to amend the Project; e.g., FTA's risk assessment criteria and consideration of the tradeoffs in cost and schedule. If the TJPA determines in the future this construction method should be considered for implementation instead of those identified for the Project, it would be subject to review under 23 CFR 771.129 and 130.
Mining under a portion of Second Street including the throat structure using a pipe roof.	No, this alternative would be costly and would not reduce the cut-and-cover construction impacts for Second Street, because the segment between Tehama and Clementina Streets would remain in cut-and-cover. There would be minimal benefits of mining this segment, because surface disruption would still result, but at a greater cost and with schedule delays. The pipe roof with mining also has a risk of potentially excessive settlements.
Mining under only Howard Street using jacked box pilot tunnels with a pipe canopy.	Yes, this alternative is feasible, incorporates the alternative above of using jack box pilot tunnels, and offers further benefits of additional support for the mined drifts. However, this alternative has not satisfied other factors that need to be considered to amend the Project; e.g., FTA's risk assessment criteria and consideration of the tradeoffs in cost and schedule. If the TJPA determines in the future this construction method should be considered for implementation instead of those identified for the Project, it would be subject to review under 23 CFR 771.129 and 130.
Pipe arch without pre-support walls.	No, this alternative would result in large vertical and lateral forces concentrated at the side walls of the tunnel, which in turn could lead to lateral spreading of the side walls, vertical settlement of the tunnel walls, and surface settlements.
Stacked drift pre-support side walls without vertical pier supports.	No, this alternative can concentrate vertical loads that would result in excessive vertical settlement of the stacked drifts and pose greater risk of ground movement than pressurized face micro-tunneling.
Precast roof beam method.	No, this alternative was considered infeasible due the equipment requirements and logistics.
Continue tunneling with TBM as proposed for the segment south of the throat structure.	No, this alternative was rejected because there are existing subsurface features that prevent the TBM from advancing north of Tehama Street to the throat structure. Additionally, as the throat structure widens, there would be insufficient support to the overlying ground, leading to the potential of unacceptably high ground settlements.
Source: *Final Tunnel Options Study for the Downtown Rail Extension Project, Task 7.1*, November 18, 2017	

East Bay Extension. One commenter stated that the Project does not include an engineering solution for an eventual East Bay extension. The current extended train box included as part of the Project extends the train box of the Locally Preferred Alternative one block to the east, from Beale Street to Main Street. The extension was necessitated by CHSRA design specifications regarding the length of high-speed rail platforms. As explained in the Final SEIS/EIR (see Appendix A, page 227), the Project, like the 2004 Locally Preferred Alternative, would not preclude future opportunities to extend services to the East Bay.

Because of the growing interest in another East Bay connection and burgeoning demand on BART's cross-bay service, the TJPA in 2014 examined the potential for a future East Bay connection from the Project's extended train box. It was determined that an East Bay connection was technically feasible with the train box extension in five different configurations: with an extension from the east side of the train box down Steuart Street and along the Embarcadero to the Bay, with a spur off from Second Street to Townsend Street/Embarcadero to the Bay, from Townsend Street through Townsend Street/Embarcadero to the Bay, or from Townsend Street past King Street to the Bay. As a result, the train box extension would not preclude an eventual East Bay extension as alleged by the commenter.

Availability of Background Documents referenced in the Final SEIS/EIR

One commenter said that background documents referenced in the Final SEIS/EIR were not made available to the public. The Final SEIS/EIR referenced the following documents that concerned either tunnel design and construction or mitigation measures:

- *2017 Final Tunnel Options Study for the Downtown Rail Extension Project, Task 7.1* (November 18, 2017) – As described earlier, this was a review by the TJPA of different construction methods. It was prepared in 2017-2018, between the release of the Draft SEIS/EIR and the completion of the Final SEIS/EIR. The Tunnel Option Study is summarized in the Final SEIS/EIR starting on page 2-86 and later on page 2-93.
- *2018 Peer Review Panel Report on Findings: Review of Three Operations Studies for the Design of the Caltrain Downtown Extension (DTX)* (April 2, 2018)– This study was a peer review led by the SFCTA, the purpose of which was to evaluate the proposed rail operations and the feasibility of replacing the proposed three track configuration with two tracks as it approaches the Transit Center. It was prepared in 2018, between the release of the Draft SEIS/EIR and the completion of the Final SEIS/EIR. The study examined and reported on "Train Operations Analysis of Two Versus Three Mainline Tracks for the San Francisco Downtown Rail Extension," prepared by Parsons (October 31, 2017). The peer review study is summarized in the Final SEIS/EIR starting on page 2-95. It is available at: https://archive.sfcta.org/sites/default/files/content/Executive/Meetings/board/2018/04-Apr-10/ENC%20-%20Peer%20Review%20Final%20Report.pdf
- *2009 Transbay Transit Center Program DTX Design Criteria* (May 2009) – This document provides the engineering design criteria for the Project. Its preparation is a standard product for a transit capital project and establishes the criteria for the design, construction, and operation of the Project. It was completed by the TJPA's design

consultants in 2009. The DTX Design Criteria are summarized in the Final SEIS/EIR starting on page 2-43.

- *Memorandum of Agreement (MOA) between the Federal Transit Administration, and the California State Historic Preservation Officer regarding the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project in San Francisco County, California* (executed on June 23, 2004) – This document addresses the protection of historic properties and mitigation for adverse effects to those properties. The MOA was executed in June 2004, and the signatory parties were the FTA, the State Historic Preservation Officer, the TJPA, the City and County of San Francisco, the Peninsula Corridor Joint Powers Board, and the state Department of Transportation. The MOA is described in the Final SEIS/EIR starting on page 2-221 and in greater detail later starting on page 2-251. The MOA has been amended twice: the first amendment in 2010 added the TJPA and the FRA as signatories; the second amendment added an annual reporting requirement, requires immediate notification for discovery of Native American re/sources, and extends the termination date for the MOA. In addition to the link cited above. The MOA and its amendments can be viewed at the project website at: https://www.tjpa.org/tjpa/documents.

The above reports, as well as others cited in the Final SEIS/EIR, are available for review upon request at the TJPA's office at 201 Mission Street, Suite 2100, San Francisco, CA. The above documents have also been placed on the TJPA's website at: https://www.tjpa.org/tjpa/documents.

DTX Funding

Several commenters who spoke at the TJPA Board hearing commented on the funding for ongoing planning and engineering work and others made suggestions about future funding sources. While these comments are not relevant to the analysis or the accuracy of the Final SEIS/EIR nor result in changes or revisions to the Project, these comments are summarized and addressed below.

Proposition K Funds. Proposition K was adopted by City and County of San Francisco voters in 2003. The proposition imposed a local sales tax, the revenues of which were to be used for transportation improvements. The SFCTA is responsible for disbursing these funds. In October 2018, the SFCTA voted to suspend funds to the TJPA that would have been applied to a variety of planning and engineering tasks related to progressing design of the Project towards 30 percent completion. Without the Proposition K funds, the TJPA does not have the resources to continue the planning and engineering tasks for DTX.

One commenter stated that there is a need to restore funding or find alternatives so that further delays to the DTX would not occur. Project elements considered for further work using the Proposition K funds included the updating of the 2009 DTX Criteria to reflect more current design standards and references; performing a risk and vulnerability assessment; and refining the engineering for the realigned Fourth and Townsend Street Station, vent structures, tunnel stub box, tunnel designs, and underpinning of structures. These elements have been defined sufficiently for the analysis of environmental effects pursuant to NEPA and CEQA. Any refinements would occur within the identified footprint of the prior designs, serve to progress the preliminary cost estimates, further develop the construction methods, and update the utility

relocation plans along the corridor. When funding for further design of the Project becomes available, the above efforts to advance the Project design would be undertaken. If the design does change, then it would be subject to environmental review under 23 CFR 771.129 and 130.

DTX Funding Strategies. One commenter suggested that the TJPA seriously consider private-public partnerships as a funding mechanism to implement the DTX. The TJPA has been exploring all financial avenues to complete designs and to construct the DTX, including private partnerships. The Draft SEIS/EIR in Chapter 4, Financial Considerations/Evaluation of Alternatives summarized various project delivery options under consideration. These funding efforts will be ongoing as the Project advances.

Attachment C

National Historic Preservation Act - Section 106 Correspondence for the

Transbay Transit Center Program

Final Supplemental Environmental Impact Statement/
Environmental Impact Report
(Final SEIS/EIR)

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December 8, 2015

In Reply Refer To: FTA011108A

Leslie T. Rogers
Regional Administrator, Region IX
U.S. Dept. of Transportation
Federal Transit Administration
201 Mission Street, Suite 1650
San Francisco, CA 94105-1839

Re: Section 106 Consultation for the Area of Potential Effect (APE) Amendment and Supplemental Section 106 Report for the Transbay Terminal/Caltrain Downtown Extension/ Redevelopment Project.

Dear Leslie T. Rogers:

Thank you for your letter dated September 11, 2015, requesting my review and comment with regard to a revised Area of Potential Affects (APE) and supplemental Section 106 report identifying historic resources within the revised APE for the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project in the City of San Francisco, California. The Federal Transportation Administration (FTA) is consulting with me Pursuant to 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act and the Memorandum of Agreement (MOA) executed on June 23, 2004.

The FTA is notifying my office of refinements made to the Transbay Program to enhance the use of alternative modes of transportation and to improve connectivity and access to transit services. Specific locations and features of the design have been defined or updated since the APE was defined in 2003. These revisions include widening the throat structure, extending the train box, additional track work south of the Caltrain railyard, changes to vent structures in several locations, and changes to the tunnel stub box, bike/controlled vehicle ramp, underground pedestrian connector, rock dowels, intercity bus facility, taxi staging area, and AC Transit bus storage parking area. Therefore, the APE has been refined to accommodate these changes of the proposed undertaking. The FTA has defined the Archaeological APE for the undertaking as all areas that may experience ground disturbance as a result of the construction of the proposed project components. This includes the footprint of the proposed project components noted above that would involve intensive ground disturbance during construction. The exception to this is the proposed installation of rock dowels, because the work would occur only within bedrock and there is no potential to disturb an archaeological resource within bedrock. The FTA has defined the Architectural APE as any historic-period buildings, structures, or objects that may be directly or indirectly affected by the implementation of the undertaking. This includes the extent of proposed construction for most project components (i.e. the project "footprint") and the area surrounding each component up to one parcel. An exception to the one parcel surrounding a proposed component was made for the installation of rock dowels because they would be inserted along the mined tunnel segment at a depth of 60-100 feet below the ground surface and

there would be no potential for direct effects to the built environment. Additionally, the proposed additional trackwork south of the Caltrain railyard would result in minor reconfiguring of existing track that was determined not eligible for listing on the NRHP with SHPO consensus in 2001 and 2008. The taxi staging area and AC Transit bus parking would not include any new construction or demolition and has been omitted from the architectural APE. The underground pedestrian connector is limited to the Beale Street right-of-way and has no potential for direct or indirect effects to buildings/structures on Beale Street and has been omitted from the Architectural APE. In addition to their letter, the FTA included the following document:

- *National Historic Preservation Act-Section 106 Supplemental Consultation: Definition of the Undertaking, Area of Potential Effect, and Identification of Historic Properties Transbay Transit Center* (AECOM 2015)

The submitted report indicates that a records search performed in September, 2013 identified two archaeological sites within or near the Archaeological APE including CA-SFR-151/H and CA-SFR-152H. The report states that these sites have not been formally evaluated for eligibility to the NRHP, and that neither site boundary as recorded falls within the footprint of proposed project components for the revised APE. It is, however, anticipated that the revised APE is sensitive for prehistoric or historic archaeological deposits of similar composition. As a result of the previous architectural surveys conducted for this undertaking, five historic properties (historic districts) were identified within the revised APE. These include the Second and Howard Streets NRHP Historic District, the *Rincon Point/South Beach Historic Warehouse-Industrial District and South End Historic District, the South End Historic District, the Bluxome and Townsend Warehouse District, and the Auxiliary Water Supply System Historic District*. All properties Identified within the APE will be addressed according to the MOA.

The FTA is requesting my concurrence with the revised APE and Supplemental Section 106 report identifying historic resources within the revised APE. After reviewing the information provided, **I have no objections to the revised APE as defined and the identification efforts appear to have been sufficient to identify and historic properties within the revised APE.**

Thank you for seeking my comments; I look forward to continuing consultation on future phases of the Transbay Redevelopment Project. If you require further information, please contact Jessica Tudor at (916) 445-7016 or by e-mail at Jesscia.Tudor@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

STATE OF CALIFORNIA – THE RESOURCES AGENCY
EDMUND G. BROWN, JR., *Governor*

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March 1, 2017

In Reply Refer To: FTA011108A

Leslie T. Rogers, Regional Administrator
Federal Transit Administration
90 Seventh Street
Suite 15-300
San Francisco, CA 94103-6701

Re: Finding of Effect Transbay Terminal/Caltrain Downtown Extension Redevelopment Project (Transbay Transit Center), San Francisco, CA

Dear Mr. Rogers:

Thank you for the letter received on February 21, 2017, continuing consultation on the above-referenced undertaking. The Federal Transportation Administration (FTA) is consulting pursuant to Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations found at 36 CFR § 800. FTA has requested an expedited review per 36 CFR § 800.3(g). Included with the letter were enclosures detailing the revised Area of Potential Effect (APE), proposed project refinements, and the consultation history for the undertaking. As stated in the consultation package, subsequent to the 2004 execution of the *Memorandum of Agreement Between the Federal Transit Administration and the California State Historic Preservation Officer Regarding the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project in San Francisco County, California* (MOA), the design for Phase 2 of the undertaking has been refined.

Phase 2 of the undertaking includes the extension of the existing Caltrain rail line to the new Transit Center (also known as the DTX), completion of the Transit Center below-grade levels for rail operations and construction of a new underground station along the DTX alignment at Fourth and Townsend Streets. Other improvements include a bus storage facility and a pedestrian tunnel between the Transit Center and the Embarcadero BART/Muni Metro station. Recent refinements to the design include the following:

- Modification of the throat structure
- Extension of the underground levels of the Transit Center train box from Beale Street eastward to Main Street
- Realignment of the underground Fourth and Townsend Street Station
- Construction of a vent structure at Third and Townsend Streets
- Construction of a tunnel stub box at the Fourth and King Streets Caltrain railyard at the western end of the proposed project limits

- Installation of rock dowels in conjunction with construction of the mined tunnel segment
- Additional track work south of the Caltrain railyard

The APE was previously revised to include the parcels located at 699 Third Street and 180 Townsend Street, but did not include the extent of ground disturbance. FTA has defined the vertical APE in the current consultation to extend to 70 feet below grade at the vertical shaft location.

Due to the design refinements, the buildings located at 165-173 Second Street will not be demolished. The building at 589 Howard Street will also remain, and both properties will be underpinned and protected per Stipulation IV of the MOA. However, the building located at 180 Townsend Street will be demolished to accommodate the vent structure. This building is a contributor to the previously identified Rincon Point/South Beach Historic District. It is not individually eligible for listing in the National Register of Historic Places (NRHP), and FTA has determined that its demolition will not result in an adverse effect to the Rincon Point/South Beach Historic District. Previous identification efforts have determined that the archaeological sensitivity of the APE is moderate to high, particularly near the location of the widened throat and vent structures.

Due to modifications in the Transbay Transit Center Program, FTA has requested comments on the revised APE, and concurrence that the refinements described above will not result in additional adverse effects to historic properties. After reviewing the information provided, I have the following comments:

- I concur that APE is sufficient for the proposed undertaking, per 36 CFR § 800.4(a)(1).
- I concur that the undertaking will not result in additional adverse effects to built environment properties only.
- However, as the APE is an urban environment and archaeological testing and identification cannot be completed prior to construction, FTA has proposed the preparation of an *Archaeological Research Design and Treatment Plan* (ARDTP) per Stipulation IV of the MOA. FTA will continue consultation with the identified consulting parties to determine the most appropriate course of action for archaeological testing and identification efforts in coordination with the proposed demolition and excavation for construction purposes.

I look forward to continuing consultation on these modifications to the Transbay Transit Center Program. If you require further information, please contact Kathleen Forrest at (916) 445-7022 or Kathleen.Forrest@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer