

**MITIGATION MONITORING AND REPORTING
PROGRAM**

**PENINSULA CORRIDOR ELECTRIFICATION
PROJECT**

(SCH# 2013012079)

*San Francisco, San Mateo, and Santa Clara Counties,
California*

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Mitigation Monitoring and Reporting Program

1.0 Introduction

The California Environmental Quality Act (CEQA) requires that a Lead Agency establish a program to monitor and report on mitigation measures that it has adopted as part of the environmental review process, and that this program must be adopted at the time that the agency determines to carry out a project for which the environmental review process has been conducted (Public Resources Code Section 21081.6 (a) (1)). The Peninsula Corridor Joint Powers Board (JPB) has prepared this Mitigation Monitoring and Reporting Program (MMRP) to ensure that mitigation measures identified in the Peninsula Corridor Electrification Project (Project) Environmental Impact Report (EIR) are fully implemented during project implementation.

As the lead agency and proponent of this project, the JPB will implement the mitigation measures through its own actions, those of the Design-Build (D-B) Contractor, the Design-Bid-Build (D-B-B) Tunnel Contractor and actions taken in cooperation with other agencies and entities. The JPB is ultimately accountable for the overall administration of the mitigation and monitoring program and for assisting relevant individuals and parties in their oversight and reporting responsibilities. The responsibilities of mitigation implementation, monitoring, and reporting extend to several entities including the D-B Contractor and the D-B-B Tunnel Contractor as described below. However, the JPB will bear the primary responsibility for verifying that the mitigation measures are implemented.

2.0 Design-Build Contractor and Design-Bid-Build Tunnel Contractor Responsibilities

The JPB has defined the mitigation measures required for the Project, the Design-Build (D-B) Contractor's responsibilities and the Design-Bid-Build (D-B-B) Tunnel Contractor's responsibilities.

The D-B Contractor shall:

- Implement the mitigation measures for which it is responsible, as identified in Table 1, Summary of Mitigation Measures;
- Monitor its and its subcontractors' construction activities to ensure that the mitigation measures are being properly implemented;
- Accurately report its activities and results to the JPB;
- As one of the D-B Contractor's Key Personnel, provide a qualified Environmental Compliance Lead for the Project who is acceptable to the JPB; and
- Provide additional specific expertise to fulfill specific roles as indicated in Section 4.0 to assist in the implementation of the MMRP.

The D-B-B Tunnel Contractor shall:

- Implement the mitigation measures for which it is responsible, as identified in Table 1, Summary of Mitigation Measures;
- Monitor its and its subcontractors' construction activities to ensure that the mitigation measures are being properly implemented; and
- Accurately report its activities and results to the JPB.

3.0 JPB Responsibilities

The JPB will provide oversight of the D-B Contractor's activity and the D-B-B Tunnel Contractor's activity, reports, and effectiveness of mitigation activities consistent with the reporting and monitoring schedule described in the column Implementation and Reporting Schedule in Table 1. The JPB will also implement mitigation that Table 1 indicates will be implemented by the JPB.

4.0 Table 1 – Summary of Mitigation Measures

The MMRP for the Project is presented as a table that includes the mitigation measures identified in the Final EIR. The table is organized by environmental issue. The JPB may refine the means by which it will implement a mitigation measure as long as compliance is achieved during project implementation. Several supplementary tables from the Final EIR are included at the end of this document that are referenced in the mitigation measures for ease of reference including FEIR Table 3.3-3 (Special Status Plant Species), 3.4-17 (2020 Traffic Mitigation), and 4-17 (2040 Project Mitigation).

4.1 Description of Table Headers

The MMRP describes implementation and monitoring responsibilities, timing, implementation and reporting schedules, and implementation mechanisms or tools for each mitigation measure identified in the EIR, as described below. Please note that the EIR mitigation in some cases specific "Contractor" which has been changed in this MMRP to specify "D-B" Contractor or "D-B-B Tunnel" Contractor for the purposes of clarity. Reference to D-B Contractor or D-B-B Tunnel Contractor includes any and all subcontractors, as appropriate, working the direction and authority of the D-B Contractor or the D-B-B Tunnel Contractor, respectively.

Mitigation Measure: Provides the mitigation measure as identified the Final EIR.

Implementing, Monitoring, and Reporting Responsibilities: Identifies the entities that will be responsible for directly implementing the mitigation measures, reporting and monitoring. Implementation can be the responsibility of the JPB, the D-B Contractor, the D-B-B Tunnel Contractor or other specified individuals such as a Qualified Biologist. Reporting on implementation will generally be the responsibility of the D-B Contractor (and the D-B-B Tunnel Contractor for tunnel work), with monitoring oversight provided by the JPB during the design and construction process. Post construction mitigation (such as monitoring replanted trees) may transition from the

D-B Contractor to JPB or may remain with D-B Contractor. Long-term mitigation responsibilities separate from construction will be held by the JPB.

Mitigation Timing: Implementation of mitigation will not all occur at the same time. Depending on the mitigation requirements, it may be undertaken prior to construction, during construction, following construction, or during operation of the project. These columns identify the stage(s) of the project during which the mitigation will be implemented and when reporting is to occur, if it is required.

Implementation and Reporting Schedule: This column of the table describes when the mitigation will be implemented and when reporting is to occur, if it is required.

Implementation Mechanism or Tool: Identifies the actions required to implement the mitigation measure, including any required agency consultation, documentation, agreements and/or conditions.

4.2 Implementation Roles

Responsibilities for implementation of this MMRP are as follows:

- **D-B Contractor:** Designated contractor responsible for design and construction and for implementing or monitoring and reporting mitigation measures as specified in this MMRP.
- **D-B-B Tunnel Contractor:** Designated contractor responsible for design and construction related to the San Francisco tunnels and for implementing or monitoring and reporting mitigation measures as specified in this MMRP.
- **JPB:** Lead Agency and designated representative responsible for the implementation, monitoring and reporting regarding mitigation measures specified in this MMRP.
- **Qualified Biologist:** A Qualified Biologist will be retained by the JPB for permitting and responsible for regulatory permit preparation and support. A Qualified Biologist will also be retained by the D-B contractor for construction, and will be responsible for preparing and providing a Worker Environmental Awareness Training Program, as well as providing oversight to the D-B Contractor's implementation of the biological mitigation and monitoring. Minimum qualifications for this position include the following: An individual with a bachelor's degree in biology or a similar natural resource field of study and prior experience monitoring the implementation of mitigation activities, as well as long-term success monitoring of mitigation projects.
- **USFWS-Approved Biologist:** A USFWS-Approved Biologist will be retained by the JPB for permitting and responsible for regulatory permit preparation and support. A USFWS-Approved Biologist will be retained by the D-B Contractor and will be responsible for ensuring the appropriate treatment of the California red-legged frog and San Francisco garter snake species and habitat, as identified in the EIR. Minimum qualifications for this position include the following: An individual with a bachelor's degree in biology or a similar natural resource field of study, possessing USFWS approval or a Section 10(A)(1)(a) permit to identify, handle, and relocate California red-legged frog and San Francisco garter snake.

- **Qualified Botanist:** A Qualified Botanist will be retained by the JPB, and will be responsible for surveying areas of proposed construction disturbance containing undeveloped habitat suitable to support the special-status plants identified in the EIR to support permitting. A Qualified Botanist will also be retained by the D-B Contractor and be responsible for preparing a revegetation and monitoring plan, in the event that avoidance of special-status plants during construction is not possible. Minimum qualifications for this position include the following: An individual with a bachelor's degree in botany, biology, or similar a natural resource field of study, possessing experience conducting botanical surveys for special-status plant species and vegetation restoration in the greater San Francisco Bay Area.
- **Certified Arborist:** A Certified Arborist will be retained by the JPB for tree survey and development of the Tree Avoidance, Minimization, and Replacement Plan in cooperation with the D-B contractor and will also be responsible for consulting with cities, counties, and affected property owners along the project corridor during plan preparation. A Certified Arborist will also be retained by the D-B Contractor for Project construction and will be responsible for overseeing the D-B Contractor's tree mitigation in conformance with the EIR. The D-B Contractor in general shall avoid impacts to trees along the alignment through its final design and layout of the OCS pole configuration, where feasible. Minimum qualifications for this position include the following: (1) Minimum 3 years full-time experience in arboriculture or 2-year degree in arboriculture and 2 years practical experience for a 4-year degree in related field and one year of practical experience; and (2) a currently Certified Arborist per the ISA (International Society of Arboriculture).
- **Qualified Architectural Historian:** A Qualified Architectural Historian will be retained by the JPB to support design implementation of historic resource mitigation as implemented by the D-B Contractor and the D-B-B Tunnel Contractor, and for certifying that the D-B and D-B-B Contractors' final designs are compliant with the historic resource mitigation. The JPB in turn will provide the certification to SHPO and procure SHPO's approval. Historic facilities include but are not limited to certain stations and tunnels in the right-of-way. The D-B Contractor and the D-B-B Tunnel Contractor will each retain a Qualified Architectural Historian to verify that construction they supervise is in compliance with the historic resource mitigation. Minimum qualification for this position are a graduate degree in architectural history, art history, historic preservation, or closely related field, with coursework in American architectural history, or a bachelor's degree in architectural history, art history, historic preservation or closely related field plus one of the following: At least two years of full-time experience in research, writing, or teaching in American architectural history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history
- **Qualified Professional Archaeologist:** A Qualified Professional Archaeologist will be retained by the D-B Contractor and will meet the Secretary of the Interior (SOI) Standards of Archaeology. The Qualified Professional Archaeologist will be responsible for implementing mitigation and coordinating the status of the archaeological mitigation with the JPB and the D-B Contractor. The Qualified Professional Archaeologist will also be responsible for coordinating with the local Native American community. Minimum qualification for this

position are a graduate degree in archeology, anthropology, or closely related field plus: At least one year of full-time professional experience or equivalent specialized training in archeological research, administration or management; At least four months of supervised field and analytic experience in general North American archeology, and Demonstrated ability to carry research to completion.

- **Archaeological Monitor:** Archaeological monitors will be retained by the D-B Contractor and will be responsible for field monitoring of archaeological resources. The JPB will perform pre-construction investigation. Minimum qualification for this position are a Bachelor's degree in anthropology with an emphasis in archaeology or closely related field (such as history or geology) and subsequent course work in archaeology and twelve months professional archaeology experience in California.
- **Qualified Geologist:** A Qualified Geologist will be retained by the D-B Contractor, and will be responsible for preparing design-level geotechnical investigations for all Traction Power Facilities (TPFs). Minimum qualifications for this position are that the consultant be a Professional Geologist (P. G.), registered in California, with experience conducting geotechnical investigations.
- **Qualified Geotechnical Engineer:** A Qualified Geotechnical Engineer will be retained by the D-B Contractor, and will be responsible for conducting field observations and testing of onsite soils and formations to identify and define the limits of expansive materials. Minimum qualifications for this position are that the consultant be a Professional Geotechnical Engineer (P. G. E.), registered in California, with experience conducting assessment of soil conditions.
- **Qualified Environmental Consultant for additional hazardous material site assessment:** A Qualified Environmental Consultant will be retained by the JPB and will be responsible for preparation of a Phase II Environmental Site Assessment (ESA). The D-B Contractor shall retain a Qualified Environmental Consultant who can assess whether hazardous materials are encountered and oversee their removal, disposal and remediation in accordance with all applicable rules, regulations and laws. Minimum qualifications for this position are that the consultant be a Professional Engineer (P.E.) or Professional Geologist (P. G.), registered in California, with experience conducting Phase II ESAs.
- **Qualified Acoustical Consultant:** A Qualified Acoustical Consultant will be retained by the D-B Contractor, and will be responsible for conducting site-specific acoustical analysis of ancillary facilities. The D-B Contractor shall design, select equipment and install equipment such that acoustical levels during operations at all traction power facility sites comply with the EIR requirements. Minimum qualifications for this position include the following: 10+ years of experience as practicing acoustical consultant; and a licensed professional engineer or Board Certified by the Institute of Noise Control Engineering.

5.0 Design-Build Contractor Environmental Compliance Lead

The D-B Contractor's Environmental Compliance Lead shall have a minimum of 10 years of experience overseeing and implementing compliance with requirements of environmental impact reports and required mitigations on major construction projects in California. The individual shall have expertise in compliance, mitigation, and in CEQA and NEPA regulations.

6.0 Project Team Organization

Implementation of the MMRP will be a team effort consisting of both JPB and D-B Contractor personnel. The D-B Contractor's Environmental Compliance Lead shall be responsible for communications and coordination with the JPB's designated environmental lead regarding all MMRP activities throughout the duration of design and construction of the Project and following construction as determined by the JPB.

D-B Contractor team members with specialized expertise identified in Section 4.2 shall report to the D-B Contractor's Environmental Compliance Lead and shall work closely with JPB-designated experts in similar disciplines.

It is anticipated that, at a minimum, monthly meetings will be held between JPB and D-B Contractor environmental leads and staffs to review status and progress relative to MMRP activities. Additionally, the JPB and D-B Contractor environmental leads shall ensure that all pre-requisite MMRP activities to design and construction are completed in a timely manner.

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Table 1. Mitigation Monitoring and Reporting Program – Summary of Mitigation Measures

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>AES-2a: Minimize OCS construction activity on residential and park areas outside the Caltrain ROW.</p> <p>OCS construction activities outside the Caltrain ROW in residential and park areas along the Caltrain ROW shall be minimized in extent and duration to the maximum extent feasible. JPB shall include the following requirements for construction contractors:</p> <ul style="list-style-type: none"> Staging areas shall not be located in parks or on residential land. Access routes shall not be located in parks and shall avoid use of residential land wherever feasible OCS construction on residential lands shall only be during daylight hours, wherever feasible. OCS construction on park lands shall be during hours when parks are closed, wherever feasible. The duration of OCS construction on residential and park lands shall be minimized. Material and equipment shall be brought to such sites as close to the start time of construction as possible and shall be removed from such sites as soon after construction completion as possible. If multiple day construction is required on a residential or park parcel, construction materials and equipment shall be kept in good order and all trash and debris contained. Construction contractors shall coordinate with park facility operators and residential landowners and residents to inform them of planned construction activities well in advance of construction. 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: JPB will develop specific requirements to be included in contracts which will then be implemented by the D-B Contractor and the D-B-B Tunnel Contractor.</p> <p>Reporting: D-B Contractor and D-B-B tunnel Contractor shall present OCS proposed construction schedule to JPB for review and approval highlighting activity on/adjacent to residential areas and parks. Monthly during construction from D-B Contractor and D-B-B tunnel Contractor to JPB.</p>	<p>OCS Construction Schedule Review.</p> <p>The D-B Contractor and the D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p>
<p>AES-2b: Aesthetic treatments for OCS poles, TPFs in sensitive visual locations, and Overbridge Protection Barriers.</p> <p>New infrastructure (OCS poles, TPF-associated structures and equipment, fencing at TPFs, and overbridge protection barriers) associated with the Proposed Project will be designed in a manner that allows these features to blend with the surrounding built and natural environments as much as possible.</p> <p>Measures will include, but are not limited to, the following:</p> <ul style="list-style-type: none"> Aesthetic treatments to project features will be implemented to help soften their visual intrusion upon the landscape, especially in areas of high use. <p>OCS Pole Design</p> <ul style="list-style-type: none"> The JPB shall coordinate with local jurisdictions to obtain their input into OCS pole design relative to station aesthetics. Aesthetic considerations shall be considered when selecting pole design. Different pole designs, including round poles, square poles, and multi-face poles, have different characteristics. Some individuals find square poles to be aesthetically less desirable due to their angularity. In addition, the JPB shall consider options to reduce pole diameter by using thinner diameter poles that are constructed with thicker walls. Aesthetic considerations shall be balanced with other considerations including cost, 	<p>Implementing Party: D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Requirements will be specified in design-build contracts and incorporated into the final design by the D-B Contractor.</p> <p>Reporting: D-B Contractor shall provide JPB with recommended design solutions for review and approval prior to final design.</p>	<p>Design Review.</p> <p>The D-B Contractor will be contractually bound to implement these requirements during final design, and they will be verified following construction.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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<p>safety, maintenance, and durability.</p> <ul style="list-style-type: none"> The JPB shall also evaluate the potential to house OCS wire-tensioning weights inside larger diameter poles. The JPB will also place OCS wires on the track-side of the poles, where feasible. Features will be constructed with low sheen and non-reflective surface materials to reduce potential for glare. Unpainted metal surfaces will not be permitted. <p>Traction Power Facilities</p> <ul style="list-style-type: none"> The JPB shall coordinate with local jurisdictions regarding color selection and vegetative screening for aesthetic treatments at sensitive TPF sites for current uses (PS3, Option 1; PS5, Option 1, Option 1B and 2; PS6, Option 1 and 2; and PS7) or in the event of future adjacent residential or park/plaza uses (PS4, Options 1 and 2 and SWS Option 1) or in the event of future adjacent residential or park/plaza uses (PS4, Options 1 and 2 and SWS Option 1). Vegetative screening will be provided to visually buffer views of TPFs. Vegetative screening may be achieved in a variety of ways, depending on availability of space. Where feasible and necessary, the paralleling station standard design of 40' X 80' shall be modified to allow for more space for vegetative screening (such as 30' X 105' for example). Acceptable methods of vegetative screening that may be used include: <ul style="list-style-type: none"> Tree planting Fencing with creeping vines. Landscape buffer planting. Vegetative wall/fence. <p>The options above could be adjacent to the TPF perimeter and/or could be placed in other locations nearby where they would help to reduce the visual apparentness of the TPF and/or enhance the visual aesthetics near to the TPF location. For example, at PS5, Option 1B, tree planting on the east side of Alma Street in the sidewalk median, if allowed by the City of Palo Alto, could help to obscure the view of the facility from residences that back onto Alma Street.</p> <p>The JPB shall maintain all vegetative screening on an on-going basis on JPB properties. If screening vegetation is placed outside the JPB ROW, the JPB will coordinate with the local jurisdiction on maintenance responsibilities</p> <ul style="list-style-type: none"> Features will be colored or painted a shade that is two to three shades darker than the general surrounding area. Light or bright colors will be avoided. Colors will be chosen from the U.S. Department of the Interior Bureau of Land Management Standard Environmental Colors Chart CC-001: June 2008. Because color selection will vary by location, the facility designer shall employ the use of color panels evaluated from key observation points during common lighting conditions (front light versus backlighting) to aid in the appropriate color selection. Color selection will be made for the coloring of the most prevalent season. All paints used for the color panels and structures will be color matched directly from the physical color chart, rather than from any digital or color-reproduced versions of the color chart. Paints will be of a dull, flat, or satin finish to reduce potential for glare, and the use of glossy paints for surfaces will be avoided. Appropriate paint type will be 							

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<p>selected for the finished structures to ensure long-term durability of the painted surfaces. The appropriate operating agency or organization will maintain the paint color over time.</p> <ul style="list-style-type: none"> TPFs will be managed and maintained for a well-kept appearance and in a manner that vandalism and graffiti is abated semi-annually to maintain the effectiveness and attractiveness of the visual mitigation prescribed herein. <p>Overbridge Protection Barriers</p> <ul style="list-style-type: none"> JPB will coordinate with the appropriate city staff on design selection of overbridge protection barriers and fencing that would be viewed from highly used public spaces and historical train stations. Overbridge protection barriers shall be designed to recede into the visual landscape as much as possible and to match the aesthetic character on the existing overpass. While Caltrain will retain final approval, Caltrain will make effort to accommodate local input and preference when selecting overbridge protection materials. 							
<p>AES-4a: Minimize spillover light during nighttime construction.</p> <p>During nighttime construction adjacent to residential neighborhoods, the JPB will require the contractor to direct any artificial lighting onto the worksite and away from any adjacent residential areas at all times.</p> <p>The construction contractor will notify nearby residences of the construction schedule, prior to the start of construction, including the time periods for nighttime construction. A point of contact, including contact information, will be provided to residents to address concerns associated with construction and nighttime lighting.</p>	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>		X			<p>Implementation: Requirements will be specified in contracts, and will be implemented by the D-B Contractor and D-B-B Tunnel Contractor for the duration of construction.</p> <p>Reporting: Monthly</p>	The D-B Contractor and the D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.
<p>AES-4b: Minimize light spillover at TPFs.</p> <p>The JPB will ensure that all artificial outdoor lighting associated with traction power facilities will be limited to safety and security requirements and will be designed to minimize light spill over into adjacent areas. All lighting is to provide minimum impact on the surrounding environment and will use downcast, cut-off type fixtures that are shielded and that direct the light only towards objects requiring illumination. Lights will be installed at the lowest allowable height and cast low-angle illumination while minimizing incidental light spill onto adjacent properties and open spaces. The lowest allowable wattage will be used for all lighted areas and the amount of nighttime lights needed to light an area will be minimized to the highest degree possible. Light fixtures will have non-glare finishes that will not cause reflective daytime glare. Lighting will be designed for energy efficiency, use, and have daylight sensors or be timed with an on/off program. Lights will provide good color rendering with natural light qualities with the minimum intensity feasible for security, safety, and personnel access. Lighting, including light color rendering and fixture types, will be designed to aesthetically minimize the profile of the TPFs.</p>	<p>Implementing Party: D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Requirements will be specified in design-build contracts.</p> <p>Reporting: Prior to final design and following construction.</p>	The D-B Contractor will be contractually bound to implement these requirements during final design, and they will be verified following construction.
<p>AQ-2a: Implement BAAQMD basic and additional construction mitigation measures to reduce construction-related dust.</p> <p>JPB will require all construction contractors to implement the basic and additional construction mitigation measures recommended by BAAQMD to reduce fugitive dust emissions. Emission reduction measures will include, at a minimum, the following measures. Additional measures may be identified by BAAQMD or the contractor as appropriate.</p> <ul style="list-style-type: none"> All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Requirements will be specified in contracts, and will be implemented by the D-B Contractor and the D-B-B Tunnel Contractor for the duration of construction.</p> <p>Reporting: The D-B Contractor and the D-B-B Tunnel Contractor shall provide a dust mitigation plan to JPB for review and approval. The D-B Contractor and the D-B-B Tunnel</p>	Dust Mitigation Plan. The D-B Contractor and the D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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<p>unpaved access roads) will be watered two times per day.</p> <ul style="list-style-type: none"> All haul trucks transporting soil, sand, or other loose material off site will be covered. All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. All vehicle speeds on unpaved roads will be limited to 15 mph. All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used. A publicly visible sign will be posted with the telephone number and person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. BAAQMD's phone number will also be visible to ensure compliance with applicable regulations. All grading and demolition will be suspended when wind speeds exceed 20 mph. Wind breaks will be installed on the windward side(s) of actively disturbed areas of construction. Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent. 						Contractor shall require daily recording/ monthly reporting throughout construction.	
<p>AQ-2b: Implement BAAQMD basic and additional construction mitigation measures to control construction-related ROG and NOX emissions.</p> <p>JPB will implement the following BAAQMD-recommended basic and additional control measures to reduce ROG and NOX emissions from construction equipment.</p> <ul style="list-style-type: none"> All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and determined to be running in proper condition prior to operation. Minimize the idling time of diesel powered construction equipment to two minutes. Clear signage will be provided for construction workers at all access points. Require that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NOX and PM. Require all Contractors use equipment that meets the ARB's most recent certification standard for off-road heavy duty diesel engines. 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Requirements will be specified in contracts, and will be implemented by the D-B Contractor and D-B-B Tunnel Contractor for the duration of construction.</p> <p>Reporting: The D-B Contractor and the D-B-B Tunnel Contractor shall prepare an equipment emissions control plan for JPB review and approval prior to construction. The D-B Contractor and the D-B-B Tunnel Contractor shall require daily recording/ monthly reporting throughout construction to confirm implementation during construction. The JPB shall review compliance as part of annual construction reviews.</p>	<p>Equipment Emissions Control Plan</p> <p>The D-B Contractor and the D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p>
<p>AQ-2c: Utilize clean diesel-powered equipment during construction to control construction-related ROG and NOX emissions.</p> <p>JPB will ensure that all offroad diesel-powered equipment used during construction will be</p>	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-</p>	X	X			<p>Implementation: Requirements will be specified in contracts, and will be implemented by the D-B Contractor and D-B-B Tunnel</p>	<p>Equipment Emissions Control Plan</p> <p>The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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equipped with an EPA Tier 3 or cleaner engines, except for specialized construction equipment in which an EPA Tier 3 engine is not available. This mitigation measure assumes emission reductions compared with a fleet-wide average Tier 2 engine.	B-B Tunnel Contractor Monitoring Party: JPB					Contractor for the duration of construction. Reporting: The D-B Contractor and D-B-B Tunnel Contractor shall prepare an equipment emissions control plan for JPB review and approval prior to construction. The D-B Contractor and D-B-B Tunnel Contractor shall require daily recording/ monthly reporting throughout construction to confirm implementation during construction. The JPB shall review compliance as part of annual construction reviews	comply with these requirements.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>BIO-1a: Implement general biological impact avoidance measures.</p> <p>The following practices will be implemented when each applies as determined by the construction schedule and specific construction activities.</p> <ul style="list-style-type: none"> A Worker Environmental Awareness Training Program for construction personnel will be conducted by a qualified biologist retained by JPB. The program will provide workers with information on their responsibilities with regard to the special-status species, including central California steelhead, San Francisco garter snake, western pond turtle, California tiger salamander, California red-legged frog, Townsend’s big-eared bat, pallid bat, hoary bat, fringed myotis, Cooper’s hawk, great blue heron, western burrowing owl, northern harrier, white-tailed kite, American peregrine falcon, saltmarsh common yellow throat, and purple martin. The training will provide a physical description of the special-status species that have potential to occur and be affected by construction activities to each construction crew prior to the initiation of the crew’s construction activities. The worker awareness training will also detail each species’ habitat and legal protections, a photo of relevant species, and contact information for the primary biologist. Precautions to prevent pollution of streams, waterways, and other bodies of water during construction. Dust control through watering of appropriate surfaces. Clearing and grubbing procedures that specify that only trees and plants designated for removal will be removed. Excavation techniques to ensure the stability of subsurface materials as well as retention of excavated materials within the construction areas. Materials and fluids generated by construction activities will be placed at least 30 meters (100 feet) from wetland areas or drainages and covered until they are disposed of at a permitted site. All natural communities and wetland areas located outside the construction zone that could be affected by construction activities will be temporarily fenced off and designated Environmentally Sensitive Area(s) to prevent accidental intrusion by workers and equipment. Sensitive habitat and wetland (including other waters of the United States and waters of the state) areas will be identified during Project design and avoided during construction to the maximum extent feasible. 	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist/Botanist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Qualified Biologist will prepare and present the Worker Environmental Awareness Training Program to all construction personnel prior to the start of construction activities. Qualified Botanist will complete jurisdictional delineation of all potentially affected wetlands and will work with D-B Contractor on avoidance measures as part of design. Wetland avoidance technical memorandum presenting rationale why avoidance is not possible for any unavoidable impacts to wetland will be presented to JPB for review and approval. Wetland permits will be obtained from USACE and RWQCB as necessary for any temporary or permanent impacts to wetlands. D-B Contractor will comply with the measures for the duration of construction.</p> <p>Reporting: Daily recording/ monthly reporting throughout construction</p>	<p>Wetland Delineation prepared by a Qualified Botanist.</p> <p>Worker Environmental Awareness Training Program prepared by a Qualified Biologist.</p> <p>The D-B Contractor will be contractually bound to comply with these requirements.</p>
<p>BIO-1b: Implement special-status plant species avoidance and revegetation measures.</p> <p>During the design phase, prior to construction, JPB will retain a qualified botanist to survey any areas of proposed construction disturbance that contain undeveloped habitat suitable to support Franciscan onion, bent-flowered fiddleneck, round-leaved fillaree, bristly sedge, Congdon’s tarplant, Santa Clara Valley dudleya, marsh microseris, white seaside tarplant, San Francisco campion, or showy rancheria clover. The qualified botanist will survey appropriate areas of suitable habitat for these species during each species’ blooming period (Table 3.3-3[of the EIR]).</p> <p>If no special-status plants are identified during the design-period surveys, then no further action is necessary. If one or more special-status species is found within areas proposed for disturbance in the project corridor, then the occurrence will be avoided, if feasible. If avoidance is not possible, then a revegetation and monitoring plan would be developed and executed by a qualified botanist</p>	<p>Implementing Party: Qualified Botanist and D-B Contractor</p> <p>Reporting Party: Qualified Botanist</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: Qualified Botanist will conduct a plant survey during final design and prior to the start of construction. Qualified Botanist will prepare a Revegetation and Monitoring Plan in the event that avoidance of special-status plants is not possible; this plan will be implemented with yearly monitoring for success criteria as specified in the mitigation measure.</p> <p>Reporting: A report will be prepared following the completion of construction. In the event that</p>	<p>The D-B Contractor will be contractually bound to comply with avoidance of species habitat, where avoidance is possible.</p> <p>Preparation and implementation of a Revegetation and Monitoring Plan by the Qualified Botanist, in the event that avoidance of special-status plants is not possible.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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retained by JPB that would consist of collection of seed prior to disturbance, reseeding and revegetation after disturbance, and monitoring. Most of the project construction consists of installing OCS poles and wires which have a minimal footprint and, thus, revegetation will be possible in areas where special-status plants may be disturbed. The plan will include revegetation success criteria of 80% of the reseeded target area, in perpetuity conservation of restoration areas, weed management, limiting human access, monitoring for at least 5 years and until success is demonstrated for 3 consecutive years, and remediation measures if success is not achieved by year 5. Monitoring will continue until the success criteria are completely satisfied.						avoidance of special-status plants is not possible, monitoring reports will be prepared on a yearly basis until success criteria are completely satisfied,	
<p>BIO-1c: Implement California red-legged frog and San Francisco garter snake avoidance measures.</p> <ul style="list-style-type: none"> Implement the Worker Environmental Awareness Training Program described under Mitigation Measure BIO-1a: Implement general biological impact avoidance measures. All potential California red-legged frog and San Francisco garter snake habitat that can be avoided by construction activities will be flagged by a USFWS-approved biologist prior to grading or other construction activities. All California red-legged frog and San Francisco garter snake habitat will be protected by a 10-foot buffer with exclusionary fencing to make it easily avoided by construction crews. The construction site will be monitored by a qualified and federally permitted biologist during all phases of construction to remove any California red-legged frogs and San Francisco garter snakes found in the construction area. Individual frogs and snakes will be moved immediately to a site that is a minimum of 330 feet from the construction boundary. The relocation site will be determined prior to commencement of construction activities. Construction activities near drainages identified as potential migration corridors will take place between May 15 and October 31 when the California red-legged frog and San Francisco garter snake are least likely to be present in the project corridor. To discourage California red-legged frogs from entering the project impact areas via the freshwater ditches west of the impact areas, the ditches will be equipped with lightweight, one-way flow gates. These will be designed so that water can easily pass from the project site to the ditches, but small vertebrates such as the frog cannot move upstream from the ditches to the project site. 	<p>Implementing Party: USFWS-Approved Biologist and D-B Contractor</p> <p>Reporting Party: USFWS-Approved Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: USFWS-Approved Biologist will identify and demarcate species habitat prior to the initiation of construction activities, and will monitor all construction activities in sensitive areas for the duration of construction. Construction activities near drainages identified as migration corridors will be restricted between May 15 and October 30.</p> <p>Reporting: Daily recording and monthly reporting for the duration of construction</p>	<p>Worker Environmental Awareness Training Program prepared by a Qualified Biologist.</p> <p>The D-B Contractor will be contractually bound to comply with these requirements.</p>
<p>BIO-1d: Implement western pond turtle avoidance measures.</p> <p>Prior to the start of construction activities at sites that may support western pond turtle (defined as any undeveloped areas within 400 feet of creeks), JPB will retain a qualified biologist to conduct preconstruction surveys for pond turtles in all suitable habitats in the vicinity of the project corridor. Surveys will take place at each area of suitable habitat that will be disturbed no more than 7 days prior to the onset of site preparation and construction activities with the potential to disturb turtles or their habitat. If preconstruction surveys identify active nests, the biologist will establish no-disturbance buffer zones around each nest using temporary orange construction fencing. The demarcation should be permeable to allow young turtles to move away from the nest following hatching. The radius of the buffer zone and the duration of exclusion will be determined in consultation with the CDFW. The buffer zones and fencing will remain in place until the young have left the nest, as determined by the qualified biologist. If western pond turtles are found in the project corridor, a qualified biologist will remove and relocate them to suitable habitat outside of the project limits, consistent with CDFW protocols and permits. Relocation sites will be subject to agency approval.</p>	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: No more than 7 days prior to start of construction.</p> <p>Reporting: Following preconstruction survey; weekly recording and monthly reporting thereafter for the duration of construction.</p>	<p>Qualified Biologist will work with D-B Contractor to establish no disturbance buffers as needed.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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<p>BIO-1e: Implement Townsend’s big-eared bat, pallid bat, hoary bat, and fringed myotis avoidance measures.</p> <p>Prior to the start of construction activities at sites offering suitable bat roosting habitat, JPB will retain a qualified biologist to conduct preconstruction surveys for Townsend’s big-eared bat, pallid bat, hoary bat, and fringed myotis. Surveys will take place no more than 7 days prior to the onset of site preparation and construction activities with the potential to disturb bats or their habitat and will include close inspection of potential bat roosts, such as trees and any built features within the work footprint. If special-status bats are found in the project footprint and avoidance of roosting areas is not possible, a qualified wildlife biologist will consult with CDFW staff to identify the appropriate protection measures. The contractor will be responsible to ensure that CDFW requirements are implemented. Multiple survey visits and survey methods may be required at a single site to determine presence or absence of roosting bats, specifically Townsend’s big-eared bat, depending on season and roost type.</p>	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: No more than 7 days prior to start of construction.</p> <p>Reporting: Following preconstruction survey; weekly recording and monthly reporting thereafter for the duration of construction.</p>	Qualified Biologist will consult with CDFW and implement protection measures as needed.
<p>BIO-1f: Implement western burrowing owl avoidance measures.</p> <p>Prior to any construction activity planned to begin during the fall and winter non-nesting season (September 1 through January 31) during the survey or at any time during the construction process, JPB will retain a qualified wildlife biologist to conduct a preconstruction survey for burrowing owls. Surveys will be conducted at each area of suitable habitat that will be disturbed no more than 7 days prior to ground disturbing activities and will cover all suitable burrowing owl habitat subject to disturbance pursuant to the March 7, 2012 California Department of Fish and Game Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 2012). If any western burrowing owls are found within the disturbance area, the contractor will notify CDFW and will proceed under CDFW direction.</p> <p>If construction is planned to occur during the nesting season (February 1 through August 31), surveys for nesting owls will be conducted by a qualified wildlife biologist in the year prior to construction to determine if there is breeding pair within 150 meters (approximately 492 feet) of the construction footprint, unless the biologist determines that a smaller survey buffer around the construction footprint is called for based on preexisting background disturbance and conditions. This will provide the project team advance notice regarding nesting owls in the project area and allow ample time to discuss with CDFW regarding the appropriate course of action if nesting owls are found. In addition, same-year preconstruction surveys for nesting western burrowing owls will be conducted no more than 7 days prior to ground disturbance in all suitable burrowing owl habitat relative to the proposed date of disturbance. If the biologist identifies the presence of a burrowing owl nest in an area scheduled to be disturbed by construction, a 200-meter no-activity buffer will be established and maintained around the nest while it is active. Surveys and buffer establishment will be performed by qualified wildlife biologists, will be coordinated with CDFW, and will be subject to CDFW review and oversight.</p>	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: No more than 7 days prior to start of construction or in the year prior to construction if construction starts during nesting season.</p> <p>Reporting: Following preconstruction survey; weekly recording and monthly reporting thereafter for the duration of construction.</p>	Qualified Biologist will consult with CDFW and implement protection measures as needed.
<p>BIO-1g: Implement northern harrier, white-tailed kite, American peregrine falcon, saltmarsh common yellowthroat, purple martin, and other nesting bird avoidance measures.</p> <ul style="list-style-type: none"> Implement the Worker Environmental Awareness Training Program described under Mitigation Measure BIO-1a: Implement general biological impact avoidance measures. Preconstruction surveys for nesting migratory birds, including raptors if construction will occur between February 1 and August 31. If active nests are found during the survey, no-disturbance species-specific buffer zones will be established by a qualified biologist and marked with high-visibility fencing, flagging, or pin flags. Typical active 	<p>Implementing Party: USFWS-Approved Biologist and D-B Contractor</p> <p>Reporting Party: USFWS-approved Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Prior to construction and in each year when construction is proposed between February 1 and August 31.</p> <p>Reporting: Following preconstruction survey; weekly recording and monthly reporting thereafter for the duration of construction.</p>	USFWS-Approved Biologist will consult with USFWS and implement protection measures as needed.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
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<p>nest buffers for non-raptorial birds are 50 feet and 250 feet for raptors.</p> <ul style="list-style-type: none"> • Prior to construction activities, a USFWS-approved biologist will conduct a preconstruction survey of all potential nesting habitat for tree and ground-nesting raptors as well as purple martins and other swallow species that use cavities in human-made structures (i.e., overpasses) as nest sites or that construct nests that adhere to the aforementioned human-made structures to record the presence and location of nesting swallows. • If construction during the breeding season cannot be avoided, then USFWS-approved exclusionary devices such as netting, panels, or metal projectors will be installed over the entrances to the identified cavities and/or nest sites prior to the swallows' arrival in mid-March. No exclusionary devices will be installed after the breeding season begins (i.e., March 15 through August 15), nor will the cavities or external nests be blocked if birds are occupying them. All installation of exclusionary devices will be supervised by the USFWS-approved biologist. • Alternatively, no preconstruction surveys for nesting swallows would be conducted; however, all drainage holes or other cavities, or suitable nest substrates associated with human-made structures within the project corridor that may be used by nesting swallows would be fitted with the exclusionary devices described above prior to the birds' arrival in mid-March. • All exclusionary devices will be monitored and maintained throughout the breeding season to ensure that they are successful in preventing the birds from accessing the cavities or nest sites. Upon the project's completion, the exclusionary devices will be removed from the site unless otherwise authorized by USFWS. • All proposed new facility sites are recommended for nesting bird surveys in advance of construction activities if trees are to be removed during the breeding season. Although the majority of the proposed facility sites are located within previously disturbed areas, potential exists for birds to nest within suitable habitat present on or adjacent to these sites. 							
<p>BIO-1h: Conduct biological resource survey of future contractor-determined staging areas.</p> <p>JPB will retain a qualified biologist to conduct a survey of future contractor-determined staging areas prior to any project-related activities commencing in such locations. The biologist will identify any wetlands, other waters of the United States or state, sensitive habitat, and suitable habitat for special-status species. The biologist will work with the contractor, who will avoid such sensitive biological resources to the extent possible through the adjustment of the proposed staging area(s). For habitat where special-status species or other protected species could occur (e.g., occasional upland migration habitat) that could be affected by staging activities, other applicable mitigation measures (BIO-1a to BIO-1g, BIO-1i, BIO-2, BIO-3, BIO-5, BIO-6, and HYD-1) will be implemented for impacts that would occur at the contractor-proposed staging locations.</p>	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Qualified Biologist will conduct a survey prior to project-related activities.</p> <p>Reporting: Following establishment of construction staging areas.</p>	<p>The D-B Contractor will be contractually bound to comply with this requirement.</p> <p>Qualified Biologist will work with D-B contractor to adjust proposed staging area(s) as needed avoid sensitive biological resources to the extent possible.</p>
<p>BIO-1i: Minimize impacts on Monarch butterfly overwintering sites.</p> <p>Prior to and during construction, a qualified biologist will periodically monitor the project ROW to evaluate whether Monarch butterfly overwintering sites have been established within areas that would be disturbed by the Proposed Project construction. If no overwintering sites are identified, then no further action is necessary. If overwintering sites become established, then project construction will avoid disturbing the sites during the overwintering period. Outside of the overwintering period, Proposed Project construction may proceed without constraint at the</p>	<p>Implementing Party: Qualified Biologist and D-B Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Qualified Biologist will periodically monitor the project ROW for establishment of Monarch butterfly overwintering sites prior to and during construction throughout the overwintering period.</p> <p>Reporting: Monthly, if overwintering sites are</p>	<p>The D-B Contractor will be contractually bound to comply with this requirement.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
overwintering site.						identified for the duration of construction.	
<p>BIO-1j: Avoid nesting birds and bats during vegetation maintenance.</p> <ul style="list-style-type: none"> Implement the Worker Environmental Awareness Training Program described under Mitigation Measure BIO-1a: Implement general biological impact avoidance measures. Annual vegetation maintenance will be performed between September 1 and January 30, wherever feasible to avoid nesting and roosting seasons. If vegetation maintenance needs to occur between February 1 and August 31 in the ESZ, then JPB will retain a qualified biologist to conduct preclearance surveys for nesting migratory birds, including raptors, and roosting bats. If active nests or roosts are found during the survey, no-disturbance species-specific buffer zones will be established by a qualified biologist and marked with high-visibility fencing, flagging, or pin flags. If an active Townsend's big-eared bat roost is found, consultation with CDFW will be conducted to determine appropriate avoidance strategies. Vegetation clearance will then occur after the nesting or roosting activity has ended. If vegetation clearance is necessary due to an emergency, it may proceed as necessary. 	<p>Implementing Party: Qualified Biologist, JPB, and Rail Operations Contractor</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>		X		X	<p>Implementation: Preconstruction surveys will be conducted prior to construction and annually if maintenance activities are scheduled between February 1 and August 31.</p> <p>Reporting: Following each survey; in the event maintenance activities are scheduled between February 1 and August 31 for the duration of construction; and following maintenance activities during operation of the project if maintenance activities are scheduled between February 1 and August 31.</p>	<p>Worker Environmental Awareness Training Program.</p> <p>Annual Vegetation Maintenance Plan prepared and maintained by JPB.</p>
<p>BIO-2: Implement serpentine bunchgrass avoidance and revegetation measures.</p> <ul style="list-style-type: none"> The area of the alignment through Communications Hill in San Jose will be surveyed by a qualified botanist during the design phase. If serpentine bunchgrass grassland is identified, OCS pole placement will be designed to minimize permanent loss of this community. Where this community is temporarily disturbed by construction, the disturbed area will be revegetated with serpentine bunchgrass grassland. Where this community is permanently disturbed by permanent facilities, an area of equal size will be planted with serpentine bunchgrass grassland species and maintained and monitored until self-sufficient without intervention. Planting will occur at a location with suitable soils to support this community. The planting location will be as near as possible to the impact area within the Communications Hill area. 	<p>Implementing Party: Qualified Botanist and D-B Contractor</p> <p>Reporting Party: Qualified Botanist</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: Qualified Botanist will survey alignment for serpentine bunchgrass prior to final design and will prepare Revegetation Plan, as necessary.</p> <p>Reporting: Prior to final design and throughout the duration of construction, as needed. If revegetation done, then post-planting reporting until success determined.</p>	<p>The D-B Contractor will be contractually bound to comply with this requirement.</p> <p>Qualified Botanist will establish and monitor revegetated serpentine bunchgrass grassland as needed.</p>
<p>BIO-3: Avoid or compensate for impacts on wetlands and waters.</p> <ul style="list-style-type: none"> Wetlands and waters will be avoided as required by Mitigation Measure BIO-1a, where feasible. If wetlands and waters cannot be avoided, then JPB will compensate for any permanent losses on a minimum 1:1 ratio (or at a greater ratio if determined to be required in permitting by the USACE or San Francisco Regional Water Quality Control Board [SFRWQCB]). Compensation will be provided by either creation of wetlands or waters to replace those losses and/or enhancement of existing waters or wetlands and/or purchase of adequate credits from a mitigation bank approved by USACE and SFRWQCB. 	<p>Implementing Party: Qualified Biologist in coordination with USACE and/or SFRWQCB</p> <p>Reporting Party: Qualified Biologist</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: Following completion of final design, JPB will compensate for any permanent losses prior to construction.</p> <p>Reporting: Following final design.</p>	<p>Permit requirements established by USACE and/or SFRWQCB.</p> <p>Compensation and/or Restoration Plan.</p>
<p>BIO-5: Implement Tree Avoidance, Minimization, and Replacement Plan.</p> <p>A Tree Avoidance, Minimization, and Replacement Plan will be developed in consultation with a certified arborist and in consultation with cities, counties, and affected property owners along the project route. A complete field survey of the entire project area will be completed to support plan development by preparing a tree inventory for all affected areas.</p> <p>The plan will contain the following provisions.</p>	<p>Implementing Party: Certified Arborist, D-B Contractor, and JPB</p> <p>Reporting Party: Certified Arborist</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: Certified Arborist will develop a Tree Avoidance, Minimization, and Replacement Plan prior to construction.</p> <p>Reporting: Reporting prior to construction; monthly throughout construction. Reporting of annual monitoring or replanted trees.</p>	<p>Tree Avoidance, Minimization, and Replacement Plan prepared by a Certified Arborist.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<ul style="list-style-type: none"> • The definition of what is and is not a “tree” for the purposes of this mitigation shall be the same definition used in Appendix F, Tree Inventory and Canopy Assessment, which is based on the “tree” definition in each municipality. • During the design phase, JPB will assess the potential to modify OCS pole alignment and other facility design to avoid and/or minimize the amount of tree removal or pruning necessary consistent with maintenance, operational, and safety requirements. This may include changes in horizontal alignment of OCS poles, changes in pole design (such as use of center poles, two-track cantilevers, portals, or offset insulator poles and placement of energized elements on the trackside of OCS poles where consistent with construction maintenance, operational, and safety requirements). JPB will consult with each jurisdiction (including the jurisdictions’ arborist as appropriate) along the route during the design phase to identify where tree removals can and cannot be avoided with project design measures and methods to minimize pruning.¹ • Prior to construction, a professional arborist will assess the potential effects to non-removed individual tree roots, including root pruning due to trenching of underground utilities and soil compaction at TPFs, to determine if these activities may jeopardize the health of affected trees. If tree health for trees not planned for removal is compromised substantially such that the tree may die, mitigation would occur at the ratios specified in this measure. • During construction, trees not scheduled for removal will be protected using barrier fencing. • Tree pruning during construction will be done in accordance with arboricultural industry recommended practices. Pruning specifications will also follow American National Standards Institute (ANSI) A300 Standards and International Society of Arboriculture (ISA) Best Management Practices. Tree planning near walkways will be consistent with California Public Utilities Commission (CPUC) General Order 118. • Special care will be taken to minimize construction period effects on El Palo Alto including minimization of any pruning. Pruning of El Palo Alto, if necessary, will be coordinated with the City of Palo Alto arborist, in advance. • If pruning will result in the loss of 25 percent or more of an individual tree’s canopy, then JPB will consider the tree removed and it will be replaced consistent with the replacement requirements described below. <ul style="list-style-type: none"> ○ For trees removed outside of the Caltrain ROW: <ul style="list-style-type: none"> ▪ Where specific replacement ratios or specifications are provided in the local tree ordinance or guidance (in the Cities of South San Francisco, San Bruno, San Mateo, Belmont, San Carlos, Atherton, Menlo Park, Palo Alto , Sunnyvale and Santa Clara County), Caltrain will replace protected trees using the local requirements (as specifically described in Appendix F, Attachment 1). ▪ Where specific replacement ratios or specifications are not provided in local tree ordinances (in the Cities of San Francisco, Brisbane, Millbrae, Burlingame, Redwood City, Mountain View, Santa Clara, and 							

¹ The JPB will work with the City of San Carlos to determine whether to include the trees to be planted at the Transit Village in replacement requirements. If the trees are not planted by the time of the PCEP construction or do not fall within the ESZ, then there would be no reason to include them in the tree count as these trees would not be removed or trimmed.

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<p>San Jose, and in San Mateo County, as specifically described in Appendix F, Attachment 1), Caltrain will replace protected trees on a 2:1 basis using 15-gallon trees (i.e., two 15-gallon trees would be planted to each protected tree removed).</p> <ul style="list-style-type: none"> ▪ For non-protected trees in all locations outside the ROW, Caltrain will replace trees on a 1:1 basis using 15-gallon trees (i.e., one 15-gallon tree would be planted for each non-protected tree removed). ○ For trees within the Caltrain ROW, the following requirements will be followed: <ul style="list-style-type: none"> ▪ Protected trees will be replaced on a 1:1 basis using 15-gallon trees (i.e., one 15-gallon tree would be planted to every tree removed), where feasible. Non-protected trees will be replaced on the same basis. ○ Trees will be replaced, wherever possible, to provide visual screening of the ROW at locations where tree removal or pruning occurs due to the project. ○ On-site replanting will be the first priority, where feasible and consistent with railroad operations, maintenance, and safety. ○ Trees will be replaced with a tree of the same species wherever possible, unless that species is a non-native invasive species (see discussion below). Alternative species to the tree removed may be planted with concurrence of the landowner and local municipality. Within the Jules Francard Grove in Burlingame any replanting will consist of blue gum trees to be consistent with the historic plantings. Replacement eucalyptus species, with the exception of red river gum, can be utilized as part of this mitigation. ○ If on-site tree replacement cannot occur on the Caltrain ROW (where trees are removed from the ROW) or on adjacent property (where trees are removed outside of the ROW), then tree replacement will occur on other parts of the affected property (with concurrence of the land owner) or other parts of the local area (with concurrence of the local municipality). Alternatively, JPB will pay into a local urban forestry fund to support local tree planting programs, provided JPB and local municipalities can agree on the appropriate fund and amount. The replacement requirements described above will apply in determining the equivalent funding amount. <ul style="list-style-type: none"> • Consistent with Executive Order 13112 on invasive species, when JPB is replacing trees within its ROW, JPB will use native tree species insofar as it is practicable. Within the Caltrain ROW, JPB will not plant invasive tree species as defined by the Invasive Species Council of California (http://ice.ucdavis.edu/invasives/). For replacement of trees outside the Caltrain ROW, JPB will replant (or pay for others to replant) trees that are desired by the landowner or local municipality. Landowners may prefer that replacement trees be non-native trees to match non-native trees that were removed or to match surrounding vegetation. • The JPB will be responsible to provide maintenance and monitoring of all replanted trees to assure their survival and/or remedial replanting in case they do not survive. <ul style="list-style-type: none"> ○ All replanted trees will be maintained for a minimum 5-year period and monitored on an annual basis by a professional arborist. ○ If at the end of 5 years, the tree is considered successfully established, then no 							

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		Pre-Construction	Construction	Post-Construction	Operation		
<p>further maintenance is required by the JPB. A professional arborist shall make the determination as to planting success.</p> <ul style="list-style-type: none"> The JPB will be directly responsible for maintaining all trees within the JPB ROW. For trees outside the JPB ROW, the JPB will be responsible for maintenance costs for the first five years. If individual tree plantings are determined to be unsuccessful after five years, then the JPB will be required to either replace the tree (and provide an additional 5 years of maintenance) and/or extend the maintenance period on a year to year basis until the tree is successfully established. If the tree planting is successfully established, then all further maintenance will be responsibility of the landowner. 							
<p>BIO-6: Pay Santa Clara Valley Habitat Plan land cover fee (if necessary).</p> <p>If it is determined that the SCVHCP applies to the Proposed Project, JPB will pay any required compensation fees prior to construction. It is expected that fee payment will only be required in relation to TPS2, Option 1 (burrowing owl fee) and the area along the alignment disturbed for OCS installation south of PS7 (potential payment of land cover fee and serpentine fee).</p>	<p>Implementing Party: Qualified Biologist and JPB Reporting Party: JPB Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Biologist will determine if SCVHP applies to the Proposed Project prior to project construction. Reporting: No reporting required following fee assessment and payment (if applicable).</p>	<p>Compensation fees to SCVHP if applicable.</p>
<p>CUL-1a: Evaluate and minimize impacts on structural integrity of historic tunnels.</p> <p>A structural investigation shall be conducted prior to the removal of any historic fabric to evaluate probable effects on each tunnel’s structural integrity, followed by the development of a design approach and construction methods to avoid affecting structural integrity. While the notching would remove historic fabric, retained structural integrity will ensure that this historic method of construction will retain integrity.</p>	<p>Implementing Party: D-B-B Tunnel Contractor and Qualified Architectural Historian Reporting Party: Qualified Architectural Historian Monitoring Party: JPB</p>	X				<p>Implementation: D-B Tunnel Contractor will retain a qualified engineer to conduct a structural investigation and develop a design approach to avoid affecting structural integrity prior to any removal of historic fabric. Reporting: Prior to final design and following construction.</p>	<p>The D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p>
<p>CUL-1b: Minimize impacts on historic decorative tunnel material.</p> <p>Prior to any removal of decorative tunnel portal material during crown mining of historic Tunnels 1, 3, and 4, a structural investigation shall be conducted to evaluate the probable effects on the structural integrity of the tunnel portals. Also prior to the removal of the historic material, depending upon the extent of the material to be removed, the portal may be recorded to the Historic American Engineering Record (HAER) standards level III (refer to http://www.nps.gov/history/hdp/). Additionally, also depending upon the extent of the material to be removed, the Secretary of the Interior’s standards (SOIS) for the rehabilitation of historic properties may be followed in the design and implementation of the adaptation of the tunnels to accommodate the larger rolling stock (refer to http://www.nps.gov/tps/standards.htm).</p> <p>A structural investigation shall be conducted to identify construction disturbance to the decorative portals. If it is determined that more than 4 inches of material must be removed from the portals of any of the tunnels, a visual simulation depicting the removal shall be prepared to assess the visual impacts and to determine if the portal(s) will need to be recorded according to HAER standards and if the SOIS need to be applied. If the maximum amount of material to be removed is 4 inches or less, removal of the decorative tunnel material shall be “feathered” from the maximum removal at the keystone to the sides of the tunnels, maintaining the round arch.</p>	<p>Implementing Party: D-B-B Tunnel Contractor and Qualified Architectural Historian Reporting Party: Qualified Architectural Historian Monitoring Party: JPB</p>	X				<p>Implementation: D-B Tunnel Contractor will retain a qualified engineer to conduct a structural investigation prior to any removal of decorative tunnel portal material. Reporting: Prior to final design and following construction.</p>	<p>SOIS standards may be followed in the design and implementation of tunnel adaptation depending on the extent of material removed. The D-B Tunnel Contractor will be contractually bound to comply with these requirements.</p>
<p>CUL-1c: Install project facilities in a way that minimizes impacts on historic tunnel interiors.</p> <p>The OCS design for the tunnels shall minimize the removal of historic brick fabric as much as is</p>	<p>Implementing Party: D-B-B Tunnel Contractor and Qualified Architectural Historian</p>	X				<p>Implementation: D-B-B Tunnel Contractor Design will incorporate these requirements into the final design.</p>	<p>The D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>feasible. Power system supports for the Proposed Project inside Tunnels 1, 2, 3 and 4 shall be placed sufficiently far back to not be readily visible, and attached to the tunnels' interiors in shotcrete instead of historic brick.</p> <p>At Tunnels No. 1, 2, and 3, the OCS shall be attached to the interior roof surface of the tunnel by brackets inserted into shotcrete. In addition, pole sets shall be installed at the portals of each tunnel. For Tunnel Nos. 1-3, side poles at the portals shall be used with power systems over the individual tracks that the poles power. The brackets within the tunnel interiors shall be set inside the tunnel mouth sufficiently far back that they would not be readily visible to passers-by or to those standing on the passenger platforms.</p> <p>At Tunnel No. 4, the system shall also be attached to the interior roof surface of the tunnel by brackets inserted into shotcrete. In addition, pole sets shall be installed at the portals of each tunnel. The brackets within the tunnel interiors shall be set inside the tunnel mouth sufficiently far back that they will not be readily visible to passers-by or to those standing on the passenger platforms (particularly at Tunnel No. 4's southern portal, the Bayshore Station).</p>	<p>Reporting Party: Qualified Architectural Historian</p> <p>Monitoring Party: JPB</p>					<p>Reporting: Prior to final design and following construction.</p>	
<p>CUL-1d: Implement design commitments at historic railroad stations</p> <p>Millbrae Station</p> <p>Side poles shall not be placed in front of or within 40 feet of the historic station on the west side of the Caltrain ROW. In addition, to minimize the visual intrusion of the poles, one of the following arrangements will be used for areas along the alignment within 100 feet on either side of the historic station:</p> <ul style="list-style-type: none"> center pole/two-track cantilevers between MT1 and MT2 with side poles for the Millbrae siding, or a two-track cantilevers east of MT2 covering MT2 and MT1 with side poles for Millbrae siding. <p>Additionally, prior to the installation of the OCS, the station will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>Burlingame Station</p> <p>Side poles shall not be placed in front of or within 40 feet of historic station on the west side of the Caltrain ROW. In addition, to minimize the visual intrusion of the poles, one of the following arrangements will be used for areas along the alignment within 100 feet on either side of the historic station:</p> <ul style="list-style-type: none"> center pole/two-track cantilevers; or two-track cantilevers from the east side platform. <p>Additionally, prior to the installation of the OCS, the significant portions of the property (i.e., the baggage room, waiting room, and the station master living quarters which together make up the current station) will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>Atherton Station</p> <p>Side poles shall not be placed in front of or within 40 feet of historic station on the west side of the Caltrain ROW. In addition, to minimize the visual intrusion of the poles, within 100 feet on either side of the historic station, one of the following shall be used:</p>	<p>Implementing Party: D-B Contractor and Qualified Architectural Historian</p> <p>Reporting Party: Qualified Architectural Historian</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Architectural Historian will record stations to HABS level III standards and pole placement will be designed to minimize visual impact to historic stations prior to construction.</p> <p>Reporting: Prior to final design and following construction.</p>	<p>Design will be developed to comply with requirements regarding pole placement and visual intrusion on historic stations.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<ul style="list-style-type: none"> center pole/two-track cantilevers; or single cantilevers in the median between the two tracks. <p>Additionally, prior to the installation of the OCS, the station will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>Menlo Park Station</p> <p>Side poles shall not be placed in front of or within 40 feet of historic station on the west side of the Caltrain ROW. In addition, to minimize the visual intrusion of the poles, one of the following arrangements will be used for areas along the alignment within 100 feet on either side of the historic station:</p> <ul style="list-style-type: none"> center pole/two-track cantilevers; or two-track cantilevers from the east side platform. <p>Additionally, prior to the installation of the OCS, the station will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>Palo Alto Station</p> <p>Side poles shall not be placed in front of or within 40 feet of historic station on the west side of the Caltrain ROW. Given the separation between MT1 and MT2, single center poles are not feasible. Thus, to minimize visual impacts on the property, single pole/cantilevers will be placed in the median between MT1 and MT2.</p> <p>Additionally, prior to the installation of the OCS, the station will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>Santa Clara Station and the Station Tower</p> <p>Side poles shall not be placed in front of or within 40 feet of historic station or the other historic structures (control tower, etc.) on the west side of the Caltrain ROW. Poles in front of the historic station should be center pole single cantilevers for MT2 and MT3 where parallel to the historic station. Side poles can be used for MT1 and placed on the modern center platform.</p> <p>Side poles on the western side of the ROW shall be located near non-historic features, to the extent feasible as follows:</p> <ul style="list-style-type: none"> A pole at the northern end of the station can be located near the modern steel and glass passenger waiting shelter. A pole at the southern end of the station can be sited east of the old set of tracks nearest the historic station (retained as an example of the relationship of the station to the original line and no longer operative) set in the modern poured concrete passenger platform and located among the modern electroliers on this platform. Poles shall not be located near the speeder shed or the utility shed. Poles can be located to each side of the control tower, one between the tower and the stub of Benton Street, the other more than 50 feet to the north. <p>Additionally, prior to the installation of the OCS, the station will be recorded to HABS level III standards from the track side of the building, from the opposite platform.</p> <p>San Jose Diridon Station</p>							

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At the San Jose Diridon Station the OCS design shall utilize a headspan. No poles shall be installed within the butterfly shelters between Tracks 2 and 3 and between Tracks 4 and 5.							
<p>CUL-1e: Implement specific tree mitigation considerations at two potentially historic properties and landscape recordation, as necessary.</p> <p>Access to properties at 45 and 51 Mount Vernon Lane in Atherton needs to be gained and historic resources evaluation completed prior to the removal of vegetation. If either of the residences proves to be CRHR-eligible, and the trees requiring removed for the project are character-defining features from the historic period of significance, or if the removal of the vegetation has the potential to visually impact the historic property, the preparation of specific tree avoidance, minimization, and/or compensation plans pursuant to Mitigation Measure BIO-5 shall take into account the historic character of the properties. If avoidance or minimization is not feasible, then replanting shall be conducted on the properties, if feasible. Regardless of the tree mitigation implemented, if the properties are determined to be CRHR-eligible, then the JPB shall have a qualified architectural historian record the landscape using Historic American Landscape Survey Standards level 3 prior to any project vegetation removal.</p>	<p>Implementing Party: D-B Contractor and Qualified Architectural Historian</p> <p>Reporting Party: Qualified Architectural Historian</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Qualified Architectural Historian will assess impacts to potential historic structures prior to construction.</p> <p>Reporting: Prior to final design and following construction.</p>	Design will be developed to comply with requirements.
<p>CUL-1f: Implement historic bridge and underpass design requirements.</p> <p>This mitigation measure addresses the approach to installing Proposed Project facilities at nine historic bridges/underpasses to ensure that the power system supports are not attached to the historic fabric of these bridges/underpasses and avoid adverse impacts on their historic integrity and visual appearance. All modifications will be completed following the Secretary of the Interior's standards for the treatment of historic properties.</p> <p>Airport Boulevard Underpass or South San Francisco Subway</p> <p>Rather than installing the power system directly onto the bridge, power cables shall be suspended parallel to and above it to ensure that the bridge will not be impacted.</p> <p>San Francisquito Bridge, Palo Alto</p> <p>The OCS cables shall be suspended from the upper portions of the San Francisquito Creek Bridge truss. The power cables shall use fasteners and brackets to support the power lines. The brackets shall be attached to the existing structure, but no part of the existing structure shall be removed as a part of the Proposed Project. Installation of the main support brackets shall require no permanent modification to the bridge structure and shall be completely removable. Installation of the static wire grounding brackets will require site drilling of eight 5/8 inch diameter clearance holes, with the brackets completely removable. No poles shall be set on the bridge itself.</p>	<p>Implementing Party: D-B Contractor and Qualified Architectural Historian</p> <p>Reporting Party: Qualified Architectural Historian</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Requirements will be specified in design-build contracts and incorporated into final design.</p> <p>Reporting: Prior to final design and following construction.</p>	The D-B Contractor will be contractually bound to comply with these requirements.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>University Avenue Underpass, Embarcadero Underpass, Palo Alto</p> <p>Power cables shall be suspended parallel to and above the University Avenue Underpass. The poles in this configuration shall be set at the side of the track they power. No poles shall be set on the bridges themselves.</p> <p>Alameda Underpass, San Jose</p> <p>Power cables shall be suspended parallel to and above the Alameda Underpass. No poles shall be set on the bridge itself.</p>							
<p>CUL-2a: Conduct an archaeological resource survey and/or monitoring of the removal of pavement or other obstructions to determine if historical resources under CEQA or unique archaeological resources under PRC 21083.2 are present.</p> <p>Prior to the start of construction or future construction activities, the JPB and/or the construction contractor shall retain qualified archaeologists to conduct a pedestrian archaeological survey to determine the prehistoric, ethnographic, and historic archaeological resources within areas proposed for disturbance within the Archaeological Study Area and within those areas outside of the Archaeological Study Area established for OCS pole placement and vegetation maintenance. In those areas covered with pavement or other obstructions, a qualified archaeologist shall monitor removal of the obstruction (and any underlying base, foundations, etc.) and inspect the ground for cultural materials.</p>	<p>Implementing Party: Qualified Professional Archaeologist and JPB or the D-B Contractor</p> <p>Reporting Party: Qualified Archaeologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Professional Archaeologist will conduct a pedestrian archaeological survey prior to construction. Monitoring of any removals.</p> <p>Reporting: Prior to construction.</p>	Pedestrian archaeological survey report.
<p>CUL-2b: Conduct exploratory trenching or coring of areas where subsurface project disturbance is planned in those areas with “high” or “very high” potential for buried site.</p> <p>In those areas with “high” or “very high” potential for buried sites, a qualified archaeologist shall conduct exploratory trenching or coring of areas where subsurface project disturbance is planned, prior to that disturbance. Any cultural resources discovered during exploratory trenching or coring shall be protected or evaluated. Evaluation shall follow the research design and recommendation presented in the <i>Data Recovery and Late Discoveries Treatment Plan for the Caltrain Electrification Program Alternative: San Francisco, San Mateo, and Santa Clara Counties, California</i> (Far Western Anthropological Research Group 2009).</p>	<p>Implementing Party: Qualified Professional Archaeologist and the JPB or the D-B Contractor</p> <p>Reporting Party: Qualified Archaeologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Professional Archaeologist will conduct exploratory trenching or coring of areas with “high” or “very high” potential for buried sites prior to construction.</p> <p>Reporting: Prior to construction.</p>	D-B Contractor will be required to protect or evaluate any cultural resources discovered.
<p>CUL-2c: Conduct limited subsurface testing before performing ground-disturbing work within 50 meters of a known archaeological site.</p> <p>When avoidance of impacts is not feasible, a qualified professional archaeologist shall conduct limited subsurface testing before any ground-disturbing project work is done within 50 meters of a known archaeological site. The objectives of the testing shall be to delineate the extent and depth of the site within the Archaeological Study Area and within those areas outside of the Archaeological Study Area established for OCS pole placement and vegetation maintenance; determine whether human remains are present within the Archaeological Study Area; and assess the nature and potential significance of the archaeological deposit within the Archaeological Study Area. The work shall be guided by the <i>Data Recovery and Late Discoveries Treatment Plan for the Caltrain Electrification Program Alternative: San Francisco, San Mateo, and Santa Clara Counties, California</i> (Far Western Anthropological Research Group 2009). All testing within a prehistoric or ethnographic site (including Mission-era sites) shall include consultation with the local Native American community.</p>	<p>Implementing Party: Qualified Professional Archaeologist in consultation from local Native American community and D-B Contractor</p> <p>Reporting Party: Qualified Archaeologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Professional Archaeologist, in consultation with the local Native American community, will conduct limited subsurface testing before any ground-disturbing project work is done within 50 meters of a known archaeological site.</p> <p>Reporting: Archeological sites will be identified and reported prior to construction.</p>	D-B Contractor will be required to protect or evaluate any cultural resources discovered from limited subsurface testing within 50 meters of a known archaeological site.
<p>CUL-2d: Conduct exploratory trenching or coring of areas within the three zones of special sensitivity where subsurface project disturbance is planned.</p> <p>If any ground-disturbing project work is planned within the three zones of special sensitivity (the</p>	<p>Implementing Party: Qualified Professional Archaeologist and D-B Contractor</p>	X				<p>Implementation: Qualified Professional Archaeologist will conduct exploratory trenching or coring of areas within zones of special sensitivity where subsurface project</p>	Archaeological investigations report.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
Hamilton shell mound zone, the vicinity of the Third Mission Santa Clara, and Tamien Station), a qualified archaeologist shall conduct exploratory trenching or coring of areas where subsurface project disturbance is planned, prior to that disturbance. Any cultural resources discovered during exploratory trenching or coring shall be protected or evaluated. Archaeological investigations in the vicinity of the archaeological preserve at the Third Mission (CA-SCL-30/H) should be guided by the recommendations presented by Allen et al. (2003) or by anticipated updates to that document. Archaeological investigations in the other two zones of special sensitivity shall be guided by the <i>Data Recovery and Late Discoveries Treatment Plan for the Caltrain Electrification Program Alternative: San Francisco, San Mateo, and Santa Clara Counties, California</i> (Far Western Anthropological Research Group 2009).	Reporting Party: Qualified Archaeologist Monitoring Party: JPB					disturbance is planned, prior to ground disturbance. Reporting: Report regarding findings of trenching and coring will be completed prior to ground-disturbance.	
CUL-2e: Stop work if cultural resources are encountered during ground-disturbing activities. The JPB shall ensure the construction specifications include a stop work order if prehistoric or historic-period cultural materials are unearthed during ground-disturbing activities. All work within 50 feet of the find shall be stopped until a qualified archaeologist and Native American representative can assess the significance of the find. Prehistoric materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or tool making debris; culturally darkened soil (“midden”) containing heat-affected rocks and artifacts; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered-stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If the find is determined to be potentially significant, the archaeologist, in consultation with the Native American representative, shall develop a treatment plan that could include site avoidance, capping, or data recovery.	Implementing Party: Qualified Professional Archaeologist, local Native American representative, and D-B Contractor Reporting Party: Qualified Archaeologist Monitoring Party: JPB	X	X			Implementation: Work will stop if prehistoric or historic-period cultural materials are unearthed during ground-disturbing activities until a Qualified Professional Archaeologist and local Native American representative can assess the significance of the find. Reporting: Monthly during ground disturbing activities.	Upon discovery of or historic-period cultural materials, a treatment plan that could include site avoidance, capping, or data recovery will be developed by the Qualified Professional Archeologist, in consultation with the local Native American representative.
CUL-2f: Conduct archaeological monitoring of ground-disturbing activities in areas as determined by JPB and SHPO. Even though data recovery would, in theory, collect all potentially significant materials and information from the impact zone, in practice it is not feasible to do archaeological excavation of the entire area. This is particularly true in highly urbanized areas such as this project corridor. Therefore, at the discretion of JPB and the SHPO, it may be necessary to monitor project operations within recorded site boundaries. Activities to be monitored would include, but are not necessarily limited to, brush clearing, grading for stations, pavement removal, placement of electrification poles and utilities, and any activity involving subsurface excavation. The monitor(s), in consultation with the construction supervisor, would have authority to halt construction activities temporarily in the immediate vicinity of an unanticipated find to assess the significance of the find. Whether or not a monitor is present, the construction supervisor and work crews should be alert to the possibility of additional cultural or human remains being unearthed. If this occurs, all work should stop temporarily within 50 feet of the find until a qualified professional archaeologist can be called in to assess the find and determine the proper course of action.	Implementing Party: D-B Contractor and Archaeological Monitor Reporting Party: Qualified Archaeologist Monitoring Party: JPB		X			Implementation: Archaeological Monitor will monitor construction activities, as determined necessary by JPB and SHPO, and temporarily halt construction activities if potentially significant materials and information are uncovered. Reporting: Monthly during ground disturbing activities.	The D-B Contractor will be contractually bound to comply with these requirements.
CUL-3: Comply with state and county procedures for the treatment of human remains discoveries. Any human remains and related items discovered during the implementation of the terms of the PA prepared for this project shall 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	Implementing Party: D-B Contractor and JPB Reporting Party: D-B Contractor Monitoring Party: JPB		X			Implementation: D-B Contractor will comply with requirements of Section 7050.5(b) of the California Health and Safety Code if any discovered human remains are discovered during construction. Reporting: Monthly during construction.	The D-B Contractor will be contractually bound to comply with these requirements.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
accordance with the provisions of Section 5097.98(a)-(d) of the California Public Resources Code. The JPB shall ensure that the remains are not damaged or disturbed further until all stipulations in Section 7050.5 and Section 5097.98 have been met.							
<p>EMF-2: Minimize EMI effects during final design, Monitor EMI effects during testing, commission and operations, and Remediate Substantial Disruption of Sensitive Electrical Equipment.</p> <p>The potential for EMI effects shall be minimized by ensuring that all electronic equipment is operated with a good electrical ground and that proper shielding is provided for electronic system cords, cables, and peripherals. Installing specialized components, such as filters, capacitors, and inductors, can also reduce EMI susceptibility of certain systems. The design of the system will consider and incorporate, where practicable, the latest standards relevant to minimizing the effects of EMI on other systems, including the Caltrain and BART signal systems.</p> <p>During final design, detailed analyses shall be undertaken to determine the specific levels of any voltages that could be induced onto paralleling longitudinal conductors and, if significant voltages were to be identified, mitigation measures shall be developed in accordance with the relevant industry accepted IEEE and/or MIL (Military) standards. The final design shall utilize proven technologies for catenary system components, and the technical specifications shall be written to assure that damage during construction to the conductors or hardware will be minimized to the greatest extent practicable.</p> <p>Proven design standards have been developed and shall be followed to mitigate any identified effects. For instance, the NEC installed 25 kV electrification system, counter poise ground wires were installed in some locations, and additional bonding between the aerial ground conductors was used as well. The specific design features shall be developed during final design, in accordance with the published standards.</p> <p>Union Pacific, SCVTA and BART operate sensitive electric equipment in or adjacent to the right-of-way. The following are required to ensure that significant EMI effects to the freight and passenger rail signal systems and operations are avoided:</p> <ul style="list-style-type: none"> The JPB shall work with Union Pacific, SCVTA, BART and other rail operators during project design to ensure that signal systems and other sensitive electric equipment for other freight or passenger rail facilities are not disrupted by EMI from the PCEP OCS. The JPB shall provide plans for controlling EMI levels near Union Pacific, SCVTA, and BART facilities for review and input. EMI levels shall be evaluated during testing and commissioning period for the Project and the JPB shall coordinate with Union Pacific SCVTA and BART to evaluate whether any interference effects occur to sensitive electric equipment. Where interference is detected that disrupt operations of this equipment, the JPB shall remedy the disruption prior to revenue operations. After commissioning, EMI impacts shall be monitored during the first year of project operation on at least a quarterly and reporting shares with Union Pacific, SCVTA, and BART. Any identified disruption of electric equipment shall be immediately remedied. If at any time, PCEP operation causes EMI interfering with signaling, automatic grade crossing warning devices, train control or other equipment necessary for safe and reliable operation of freight and passenger trains in the corridor, the JPB shall require shutdown and modification of the PCEP electrical system in the affected area and shall eliminate any disruption identified, 	<p>Implementing Party: D-B Contractor and JPB in coordination with local cities, BART, UCSF, France Telecom, Health Diagnostics, Valley Radiological, Palo Alto Medical Foundation, St. Jude Medical Center, Evans Analytical, Motorola and Intel</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: EMI effects will be minimized with incorporation of the latest standards relevant to minimizing the effects of EMI during the design phase.</p> <p>Reporting: Prior to final design, construction, and post-construction.</p>	<p>Latest standards relevant to minimizing the effects of EMI will be implemented to all electronic equipment.</p> <p>EMF monitoring post-construction.</p>

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		Pre-Construction	Construction	Post-Construction	Operation		
<ul style="list-style-type: none"> The JPB shall be responsible for all costs to evaluate, design, monitor, and remediate any project-related EMI disruption of sensitive electric equipment of other passenger or freight rail systems. <p>For non-rail systems, the following will be required:</p> <ul style="list-style-type: none"> The JPB will make a good faith effort to coordinate with local cities, BART, UCSF, France Telecom, Health Diagnostics, Valley Radiological, Palo Alto Medical Foundation, St. Jude Medical Center, Evans Analytical, Motorola and Intel (and any other facilities located adjacent to the ROW with sensitive equipment and requesting such consultation) to determine whether their facilities would be susceptible to EMI effects. During final design, the JPB shall evaluate the specific EMI levels associated with the PCEP system at the identified sensitive facilities and determine the appropriate controls necessary to avoid disruption of sensitive equipment prior to testing and commissioning of the system. EMI levels shall be evaluated during testing and commissioning period for the Project and the JPB shall coordinate with the identified sensitive facilities to evaluate whether any substantial interference effects are occurring due to system operation. Where substantial interference is detected that disrupt operations of sensitive electric equipment, the JPB shall remedy the disruption prior to commissioning of electrified operations through EMF controls and/or shall provide shielding of sensitive equipment. After commissioning, EMI impacts shall be monitored during the first year of project operation and reporting shared with any of the identified sensitive facilities. Any identified disruption of sensitive electric equipment shall be immediately remedied. If the PCEP operations causes substantial EMI interference with sensitive electric equipment during, the JPB shall identify and eliminate the substantial interference through additional EMF control measures and/or provide shielding for the sensitive equipment. <p>The JPB shall be responsible for all costs to evaluate, design, monitor, and remediate any project-related EMI disruption of sensitive electric equipment.</p>							
<p>GEO-1: Perform a site-specific geotechnical study for traction power facilities.</p> <p>Prior to final design, the JPB will ensure that a qualified geologist will prepare a design-level geotechnical investigation for all TPFs. The investigation will include subsurface soil sampling, laboratory analysis of samples collected to determine soil characteristics (including identifying and defining the limits of unstable, compressible, and collapsible soils), and an evaluation of the laboratory testing results by a geotechnical engineer. Recommendations based on the results will be used in the design specifications for the proposed TPF structures. The report will include recommendations typical to avoid potential risks associated with seismic groundshaking and liquefaction, in accordance with the specifications of California Geological Survey's Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California, and the requirements of the Seismic Hazards Mapping Act. This report will also identify thickness and distribution of compressible materials, anticipated amounts of total and differential settlement, and tolerance of the structure(s) for displacement of soils. Following identification and delineation of compressible and collapsible soils, the JPB and qualified geologists will identify recommendations for building on compressible soils, which may include the following measures.</p> <ul style="list-style-type: none"> Surcharging of compressible fine-grained soils prior to construction to reduce anticipated post-construction settlements to acceptable levels or use of deep 	<p>Implementing Party: D-B Contractor and Qualified Geologist</p> <p>Reporting Party: Qualified Geologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: The D-B Contractor and Qualified Geologist will prepare a design-level geotechnical investigation for all TPFs during the design phase and prior to construction.</p> <p>Reporting: Prior to final design.</p>	Geotechnical investigation prepared by Qualified Geologist.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>foundations to support improvements in non-compressible soil strata.</p> <ul style="list-style-type: none"> Removal and/or compaction of collapsible granular soils and non-compacted fills before placing fill to reduce anticipated post-construction settlements to acceptable levels. Deep-dynamic compaction, rapid impact compaction, vibro-compaction or stone columns. 							
<p>GEO-4a: Identification of expansive soils.</p> <p>Before submission of final grading plans, the JPB will retain a qualified geotechnical engineer and engineering geologist. The geologist/engineer will conduct field observations and testing of onsite soils and formations to identify and define the limits of expansive materials. A final report will be prepared and submitted to all appropriate agencies. This report will include identification of thickness and distribution of the expansive materials, anticipated depth of moisture variation, expansiveness of the earth materials, structure tolerance for displacement, and confirmation or modification of mitigation measures for expansive materials.</p>	<p>Implementing Party: Qualified Geotechnical Engineer and D-B Contractor</p> <p>Reporting Party: Qualified Geotechnical Engineer and Qualified Geologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Geotechnical Engineer will identify expansive soils prior to grading.</p> <p>Reporting: Prior to grading.</p>	Geotechnical Report on Expansive Soils.
<p>GEO-4b: Mitigation of expansive soils.</p> <p>Following identification and delineation of expansive materials, the geologist engineer will identify the most appropriate methods of mitigation. Mitigation measures can include the following measures.</p> <ul style="list-style-type: none"> Excavation and replacement with non-expansive fill materials. Design building foundations to limit foundation deflections from expansive soil movement. This could include heavy conventional mat or post-tensioned slab foundations, heavy reinforced grid footings, or pier and grade beam foundations. 	<p>Implementing Party: Qualified Geotechnical Engineer and D-B contractor</p> <p>Reporting Party: Qualified Geotechnical Engineer and Qualified Geologist</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Geotechnical Engineer will develop mitigation measures for expansive soils prior to grading.</p> <p>Reporting: Prior to foundation work and post-installation.</p>	Geotechnical Report on Expansive Soils.
<p>HAZ-2a: Conduct a Phase II Environmental Site Assessment prior to construction.</p> <p>Prior to construction, a Phase II Environmental Site Assessment (ESA) will be prepared for portions of the proposed Project located within areas with a high likelihood of contaminated media by a qualified environmental consultant. The Phase II ESA will include but not be limited to the following.</p> <ul style="list-style-type: none"> A scope of work consisting of Pre-Field Activities, such as preparation of a Health and Safety Plan (HASP), marking boring locations and obtaining utility clearance, and Field Activities, such as identifying appropriate sampling procedures, health and safety measures, chemical testing methods, and quality assurance/quality control (QA/QC) procedures in accordance with the ASTM Standard. <ul style="list-style-type: none"> The HASP will include, but is not limited to; <ul style="list-style-type: none"> Potential project hazards analysis Personal Protective Equipment (PPE) discussion Exposure monitoring Emergency response actions Hospital route directions Necessary permits for well installation and/or boring advancement. A Sampling and Analysis Plan (SAP) in accordance with the scope of work. 	<p>Implementing Party: Qualified Environmental Consultant and D-B Contractor</p> <p>Reporting Party: Qualified Environmental Consultant</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Environmental Consultant will conduct a Phase II ESA for portions of the Project located within areas with a high likelihood of contamination prior to ground disturbance.</p> <p>Reporting: Prior to ground disturbance.</p>	Phase II Environmental Site Assessment. Health and Safety Plan. Sampling and Analysis Plan. Risk Assessment (if necessary).

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<ul style="list-style-type: none"> Completion of a Risk Assessment if deemed necessary. Laboratory analyses conducted by a State-certified laboratory. Disposal process including transport by a State-certified hazardous material hauler to a State-certified disposal or recycling facility licensed to accept and treat hazardous waste. 							
<p>HAZ-2b: Implement engineering controls and best management practices during construction.</p> <p>During construction the contractor will employ use of engineering controls and BMPs to minimize human exposure to potential contaminants. Engineering controls and construction BMPs will include but not be limited to the following.</p> <ul style="list-style-type: none"> Contractor employees working on site will be certified in OSHA’s 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. Contractor will monitor area around construction site for fugitive vapor emissions with appropriate field screening instrumentation. Contractor will water/mist soil as its being excavated and loaded onto transportation trucks. Contractor will place any stockpiled soil in areas shielded from prevailing winds. Contractor will cover the bottom of excavated areas with sheeting when work is not being performed. 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: The D-B Contractor and D-B-B Tunnel Contractor will employ engineering controls and BMPs to minimize human exposure to potential contaminants during construction.</p> <p>Reporting: Inclusions of controls in construction planning. Monthly during construction.</p>	The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.
<p>HYD-1: Implement construction dewatering treatment, if necessary.</p> <p>If groundwater is encountered during excavation and trenching activities, then dewatering may be required. If dewatering activities require discharges to the storm drain system or other water bodies, the water shall be treated as necessary prior to discharge so that all applicable water quality objectives are met. As a performance standard, water treatment methods shall be selected to achieve the maximum removal of contaminants found in the groundwater and that represent the Best Available Technology (BAT) that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, the use of infiltration areas, filtration, or other means. The contractor shall perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained, conduct visual observations of the water (i.e., check for odors, discoloration, or an oily sheen on groundwater) and any other sampling and reporting activities prior to discharge. The final selection of water quality control measures shall be submitted to the Regional Water Board for approval prior to construction. If the groundwater is found to not meet water quality standards and the identified water treatment measures cannot ensure treatment to meet all receiving water quality standards, the water shall then be hauled offsite instead for treatment and disposal at an appropriate waste treatment facility permitted to receive such water.</p>	<p>Implementing Party: D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Requirements will be specified in design-build contracts, and will be implemented by the D-B Contractor for the duration of construction.</p> <p>Reporting: Monthly reporting for duration of construction.</p>	The D-B Contractor will be contractually bound to comply with these requirements. Best Available Technology (BAT) for dewatering.
<p>HYD-4: Minimize floodplain impacts by minimizing new impervious areas for TPFs or relocating these facilities.</p> <p>At PS3 (Option 1), PS6 (Option 1) and TPS2 (Option 3, at CEMOF), the design will minimize the amount of new impervious areas by using graveled or pervious pavement for all facility areas other than the foundations for new electric equipment and any other weight-bearing facilities. Currently unpaved areas not used to house new equipment shall remain unpaved or if paved shall</p>	<p>Implementing Party: D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Requirements will be specified in design-build contracts, and will be implemented by the D-B Contractor in the final design.</p> <p>Reporting: Prior to final design.</p>	Project design will minimize new impervious surface area.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>use pervious pavement. At other paralleling stations, TPS1, and the switching station, the same measure is recommended, but not required.</p> <p>The JPB could select PS3 Option 2 (to the northeast) which would remove this facility from the 100-year floodplain and PS6 could be placed at the Option 2, which is currently paved and then the requirements above would not apply. For TPS2, Caltrain could select one of the other options (Option 1 or Option 2), both of which are currently outside the 100-year floodplain.</p>							
<p>HYD-5: Provide for electrical safety at TPFs subject to periodic or potential flooding.</p> <p>For new TPFs within the current 100-year floodplain (PS3 Option 1, TPS-2 Option 3, and PS6 – both options), the preferred method of avoiding damage would be to place all new electrical equipment on elevated pads above expected flood depths and/or protect such equipment with flood barriers. If equipment cannot be designed so that flood waters cannot contact the equipment, then sealed or capped moisture-resistant components are required. Ground Fault Circuit Interrupters (GCFIs) shall be utilized for all electrical circuits below the base flood elevation for the 100-year flood.</p> <p>For all new traction power facilities subject to current flooding (for the current 100-year event), or with a potential for flooding due to levee or dam failure (PS3 [Option 1], PS5 [Option 2], PS6 [both options], TPS2 [all options] and possibly PS7 and PS7 Variant A and B, if selected), Caltrain shall develop emergency response procedures to provide electrical safety including system shutdown during projected flood events. Due to the potential for gaps in current FEMA mapping of areas subject to flooding due to levee failures, Caltrain shall also investigate potential flooding risks due to levee failures for all new TPFs and apply emergency shutdown requirements to all additional facilities identified as at risk of flooding due to potential levee failures.</p>	<p>Implementing Party: D-B Contractor Reporting Party: D-B Contractor Monitoring Party: JPB</p>	X			X	<p>Implementation: Requirements will be specified in design-build contracts, and will be implemented by the D-B Contractor in the final design. JPB shall develop and adopt emergency response procedures.</p> <p>Reporting: Prior to final design and prior to and during operation.</p>	<p>Electrical equipment will be designed such that flood waters cannot contact or damage the equipment. Emergency response procedures will be adopted and implemented to manage flooding event risks.</p>
<p>HYD-7: Implement sea level rise vulnerability assessment and adaptation plan.</p> <p>The JPB will use State of California Sea Level Rise guidance (CO-CAT 2013), the California Adaptation strategy, as well as guidance from other agencies [i.e., BCDC], for the development of the vulnerability assessment and adaptation plan. Under CEQA, this assessment and plan is only mandatory for the new facilities associated with the Proposed Project However, it is recommended that the JPB include analysis of all existing and new facilities subject to potential coastal flooding with predicted sea level rise.</p> <p><u>Sea Level Rise Vulnerability Assessment</u></p> <p>The analysis in the EIR considers potential vulnerability based on broad USGS mapping of potential inundation areas using specific SLR increments. This preliminary assessment shall be supplemented by a more detailed evaluation of future flood risks taking into account the following.</p> <ul style="list-style-type: none"> • The range of SLR predictions based on current state guidance. • The specific elevations of Caltrain facilities. • Hydraulic connection of Caltrain facilities to San Francisco Bay and tidal channels. • Protectiveness of other structures (levees, seawalls, other development) between Caltrain facilities and San Francisco Bay and tidal channels. <p>The vulnerability assessment shall describe the scenarios under which Caltrain facilities could become subject to flooding, the estimated duration of such flooding, and the potential damage that may result from such flooding scenarios.</p> <p>The JPB shall complete the vulnerability assessment within 5 years of project approval (nominally</p>	<p>Implementing Party: JPB in concert with other agencies (BART, VTA, etc.), jurisdictions (Millbrae, San Mateo, etc.), and landowners Reporting Party: JPB Monitoring Party: JPB</p>				X	<p>Implementation: JPB will develop a SLR Vulnerability Assessment within 2 years of project approval. JPB will develop a SLR Adaptation Plan within 2 years of project approval and update every 5 years thereafter starting in 2021.</p> <p>Reporting: Following completion of SLR Vulnerability Assessment and SLR Adaptation Plan, and upon every update of each plan.</p>	<p>SLR Vulnerability Assessment. SLR Adaptation Plan.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>early 2020, assuming project approval in early 2015). The JPB shall share the results of its vulnerability assessment with other local agencies potentially affected by sea level rise along the Caltrain corridor.</p> <p><u>Sea Level Rise Adaptation Plan</u></p> <p>Based on the vulnerabilities identified, the JPB shall prepare an SLR Adaptation Plan identifying measures that will be taken to protect the new project facilities as well as the existing Caltrain facilities from potential damage due to future flooding from SLR. The JPB will coordinate with other entities with facilities close to the San Francisco Bay with an equal or greater SLR vulnerability, such as cities along the northern portion of the route (San Francisco, Brisbane, South San Francisco, San Bruno, Millbrae, Burlingame, San Mateo, Belmont, San Carlos and Redwood City), the San Francisco International Airport, the California Department of Transportation (U.S. Highway 101 and Interstate 380), the Bay Area Rapid Transit District, VTA, SFMTA, and other agencies.</p> <p>The requirements for development and implementation of this plan and updating over time are as follows.</p> <ul style="list-style-type: none"> • 2016: The JPB shall complete the first SLR Adaptation Plan within 2 years of project approval (nominally end of 2016, assuming project approval in late 2014) including the following. <ul style="list-style-type: none"> ○ Review available scientific information on SLR data and projections for the subsequent 50 years. Where data and projections indicate different rates of SLR than previously applied, the JPB will adjust the vulnerability assessment and flood design criteria to reflect a median-point of then-current projections. ○ Review JPB system vulnerability for the subsequent 50 years in light of available data at that time and the adjusted flood design criteria. ○ Prepare a plan identifying improvements to meet the flood design criteria, as feasible and unconstrained by surrounding development not owned by JPB. The plan of improvements will be designed to meet the flood design criteria as predicted for the next 10 years and updated every 10 years thereafter. ○ The plan may include projects that the JPB implements on its own or in concert with other parties. The plan may also rely on flood improvements implemented separate from the JPB but that will also provide flooding benefits for Caltrain facilities provided such plans have a realistic funding and implementation schedule. ○ Where the JPB is a lead for improvements needed to address flooding risks expected within the next 10 years, the JPB shall complete all necessary environmental clearances and shall adopt such improvements as part of JPB's capital funding plans and identify funding sources for their implementation. ○ The goal for all improvements is to provide 100-year flood protection for Caltrain facilities from coastal flooding at all times, wherever feasible. Where that is not feasible, the JPB shall identify alternative means to provide for safe system operations in the event of flooding. ○ Identify opportunities for partnership with other local and regional parties for SLR adaptation or where regional efforts will address flooding risks to Caltrain facilities. 							

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		Pre-Construction	Construction	Post-Construction	Operation		
<ul style="list-style-type: none"> 2021 (and every 5 years thereafter): The JPB shall update the Adaptation Plan meeting the requirements described above. Ongoing: Where JPB's adaptation options are constrained because of adjacent infrastructure (such as adjacent roadways and structures not owned by JPB), JPB will work with adjacent landowners and infrastructure managers to identify opportunities to improve rail system protection in concert with other local or regional parties. 							
<p>NOI-1a: Implement Construction Noise Control Plan.</p> <p>A noise control plan that incorporates, at a minimum, the following best practices into the construction scope of work and specifications to reduce the impact of temporary construction-related noise on nearby noise sensitive receptors shall be prepared and implemented.</p> <ul style="list-style-type: none"> An active community liaison program shall be established. The community liaison program will keep residents informed about construction plans so residents may plan around noise or vibration impacts and will provide a conduit for residents to express any concerns or complaints. Construction contact information shall be provided to local residents and posted on construction sites adjacent to residential areas. Residents within 300 feet of upcoming construction shall be notified 10-days in advance of the start of construction in an area wherever possible. Contractor shall be required to use newer equipment fitted with the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational. Newer equipment will generally be quieter in operation than older equipment. All construction equipment shall be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding). Electric or "quiet" equipment shall be used for generators, compressors, and other construction equipment where feasible. Contractor shall employ construction methods or equipment that will provide the lowest level of noise and ground vibration impact near residences and consider alternative methods that are suitable for the soil condition. The contractor shall be required to select construction processes and techniques that create the lowest noise levels. Truck loading, unloading, and hauling operations shall be conducted so that noise and vibration are kept to a minimum by carefully selecting routes to avoid going through residential neighborhoods to the greatest possible extent. Deliveries of materials and equipment shall be prioritized for daytime hours whenever feasible. Ingress and egress to and from the staging area shall be on collector streets or higher street designations (preferred), and through routes for trucks will be designed to the extent feasible to minimize the frequency of backup alarm sound. Idling equipment shall be turned off whenever feasible. When practicable, temporary noise barriers will be used to protect sensitive receptors against excessive noise from construction activities. Partial enclosures around continuously operating equipment or temporary barriers along construction boundaries will be considered. Construction activities within residential areas will be minimized during evening, nighttime, weekend, and holiday periods to the extent feasible. Noise and vibration monitoring shall be conducted to verify compliance with the noise 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: The D-B Contractor and D-B-B Tunnel Contractor will develop a Construction Noise Control Plan prior to final design and implement during construction.</p> <p>Reporting: Prior to final design, weekly monitoring and reporting during construction.</p>	<p>The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p> <p>Construction Noise Control Plan.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
limits. Independent monitoring should be performed to check compliance in particularly sensitive areas. Contractor will be required to modify and/or reschedule their construction activities if monitoring determines that maximum limits are exceeded at residential land uses.							
<p>NOI-1b: Conduct site-specific acoustical analysis of ancillary facilities based on the final mechanical equipment and site design and implement noise control treatments where required.</p> <p>A qualified acoustical consultant shall review final mechanical equipment and site design and calculate expected exterior noise levels at adjacent noise sensitive receptors to limit the substation noise at the TPS1, Option 3 site if selected for a substation site and at the PS5, Option 2 site if selected as a paralleling station site. If TPS1, Option 1 or TPS1, Option 2, or TPS1, Option 4 sites are selected instead, then this mitigation will not be required for TPS1, Option 3. If PS5, Option 1 or 1B were selected instead, then this mitigation will not be required for PS5, Option 2.</p> <p>A moderate noise impact has been identified at TPS1 Option 3 based on the FTA methodology and reference data. If the projected noise contribution from the substation is reduced by at least 2.8 dBA the impact will be eliminated. A performance criterion which limits the substation noise to a maximum noise level of 60 dBA at 50 feet, or no more than 63 dBA Ldn at the closest nearby noise sensitive receptor (111 Mitchel Avenue) would be sufficient to eliminate the moderate noise impact.</p> <p>A severe noise impact has been identified at PS5, Option 2 before mitigation and using FTA methodology and reference data. If the projected transformer noise level at the fenceline of the adjacent mixed use project could be reduced to 58 dBA (or 64.4 L_{dn}) the impact would be less than the FTA moderate impact level and the noise impact at this location would be less than significant.</p> <p>TPS1, Option 3, and PS5, Option 2 noise levels shall comply with IEEE national standards and guidelines for electrical power facilities. Station layouts and specific noise control measures will be developed during the design phase to minimize noise impacts resulting from the TPFs. Such noise control measures may include the following:</p> <ul style="list-style-type: none"> • Locate electrical noise-generating equipment farther away from the property lines of noise sensitive sites, if at all possible. • Consider the use of special enclosures for all transformers to mitigate the associated low frequency noise impacts. • Reduce potential noise impacts from the ventilation system for switchgear by using acoustical louvers, line duct silencers, and hoods on the vent openings, and/or by locating vents at the side of the building that is not facing residences. • At PS5, Option 2, compliance with the performance criteria may require relocation of the facility southward to place the transformer at least 25 feet (for an oil-filled transformer type) to 55 feet (for a dry-type transformer) from the mixed use location. The areas to the south of the mixed use project are commercial buildings set back farther from the JPB ROW than the mixed use project and would be considered non-sensitive receptors. As shown in Figure 3.11-8, there are two potentially feasible locations south of PS5, Option 2 (referred to as PS5, Option 2B and PS5, Option 2C) that would be more than the required distances from the mixed use development and would avoid a significant noise impact. 	<p>Implementing Party: Qualified Acoustical Consultant and D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: Qualified Acoustical Consultant will work with the D-B Contractor to implement appropriate noise control treatments during final design.</p> <p>Reporting: Prior to final design, and following completion of construction.</p>	The D-B Contractor will be contractually bound to comply with these requirements.
<p>NOI-2a: Implement Construction Vibration Control Plan.</p> <p>A Construction Vibration Control Plan that includes, at a minimum, the following procedures to</p>	Implementing Party: D-B Contractor and D-B-B Tunnel Contractor	X	X			Implementation: The D-B Contractor and D-B-B Tunnel Contractor will develop a Construction	The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>minimize the potential for building damage from construction vibration shall be prepared:</p> <ul style="list-style-type: none"> Where feasible, avoid placing OCS poles within 25 feet of structures or use alternative construction methods for pile driving (such as augurs) to minimize potential vibration damage. Where vibratory compacting/rolling is proposed within 15 feet of structures, utilize alternative equipment (such as non-vibratory rollers) to minimize potential vibration damage. Where pile driving is proposed within 50 feet of structures or vibratory compacting/rolling within 25 feet, preconstruction surveys shall be conducted to document the existing condition of buildings in case damage is reported during or after construction. Damaged buildings due to project construction shall be repaired or compensation paid. <p>The Construction Vibration Control Plan shall also include, at a minimum, the following procedures to minimize the potential for annoyance from construction vibration:</p> <ul style="list-style-type: none"> When possible, limit the use of construction equipment that creates high vibration levels near residential structures. Require vibration monitoring during vibration-intensive activities. Where feasible, plan the hours of vibration-intensive equipment, such as vibratory pile drivers or vibratory rollers, so that impacts on residents are minimal (e.g., weekdays during daytime hours only, when as many residents as possible are away from home). <p>The JPB and/or the Design-Build contractor will coordinate with Caltrans during development of the construction vibration plan concerning construction vibration that may occur near Caltrans facilities.</p>	<p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor Monitoring Party: JPB</p>					<p>Vibration Control Plan prior to final design and implement during construction. Reporting: Prior to final design, monthly during construction.</p>	<p>comply with these requirements. Construction Vibration Control Plan.</p>
<p>PSU-8a: Provide continuous coordination with all utility providers.</p> <p>The JPB will initiate coordination with all utility providers and local jurisdictions during engineering design and will continue coordination with these entities through final design and construction to ensure that all potential utility location conflicts are identified. To prevent damage to utility systems and minimize disruption or degradation of utility service to local customers, utilities will be avoided while constructing OCS pole foundations, TPFs, and overhead facilities where possible. Coordination efforts will focus on identifying potential conflicts, planning utility reroutes, and formulating and implementing strategies to address any problems that arise.</p>	<p>Implementing Party: D-B Contractor and JPB in coordination with utility providers Reporting Party: D-B Contractor Monitoring Party: JPB</p>	X	X			<p>Implementation: D-B Contractor will coordinate with all utility providers and local jurisdictions to prevent damage to utility systems and minimize disruption or degradation of utility service to local customers. Reporting: Prior to final design and monthly during construction.</p>	<p>Potential conflicts will be identified through coordination with utility providers and local jurisdictions.</p>
<p>PSU-8b: Adjust OCS pole foundation locations.</p> <p>If underground utilities are discovered at proposed OCS pole foundation locations prior to construction, the JPB will assess the location of the underground utility and will adjust the location of the OCS pole foundations to avoid the utility wherever feasible. If the OCS pole foundation cannot be relocated to avoid the utility (which is unlikely), then the JPB will coordinate with the owner of the utility to identify feasible relocation options.</p>	<p>Implementing Party: D-B Contractor and JPB in coordination with utility providers Reporting Party: D-B Contractor Monitoring Party: JPB</p>	X				<p>Implementation: D-B Contractor will develop plan for OCS pole locations that avoids utilities where feasible. Reporting: Prior to final design.</p>	<p>Final design will identify OCS pole locations.</p>
<p>PSU-8c: Schedule and notify users about potential service interruptions.</p> <p>The JPB will coordinate with all utility providers to schedule any short-term, limited service interruptions at least 30 days in advance and will notify all appropriate users accordingly.</p>	<p>Implementing Party: D- B Contractor and JPB in coordination with utility providers Reporting Party: D-B Contractor</p>	X	X			<p>Implementation: Users will be notified of service interruptions. Reporting: Users will be notified of service interruptions at least 30 days in advance.</p>	<p>Service interruption notices distributed by utility providers.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
	Monitoring Party: JPB						
<p>PSU-9: Require application of relevant construction mitigation measures to utility relocation and transmission line construction by others.</p> <p>The JPB will require that all relevant construction mitigation measures identified in this EIR be applied to utility relocation and transmission line efforts. Within the Caltrain ROW or Caltrain-owned property, the JPB can mandate the implementation of such measures. Outside the Caltrain ROW, the JPB will recommend their use by utility owners and/or inclusion in any encroachment permits required by local jurisdictions.</p>	<p>Implementing Party: JPB and D-B Contractor</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Requirements will be specified in design-build contracts, and will be implemented by the D-B Contractor for the duration of construction.</p> <p>Reporting: Monthly throughout duration of construction.</p>	The D-B Contractor will be contractually bound to comply with these requirements. JPB will work with utilities concerning their project.
<p>TRA-1a: Implement Construction Road Traffic Control Plan.</p> <p>The JPB would coordinate with the traffic departments of local jurisdictions and with all corridor emergency service providers to develop a Traffic Control Plan consistent with the Caltrans <i>Manual on Uniform Traffic Control Devices</i> to mitigate construction impacts on transit service, roadway operations, emergency responses, pedestrian and bicycle facilities, and public safety. Measures that will be implemented throughout the course of project construction, will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> Maintain acceptable response times and performance objectives for emergency response services. Limit number of simultaneous street closures and consequent detours of transit and vehicular traffic within each immediate vicinity, with closure time frame limited as much as feasible for each closure, unless alternative traffic routings are available. Implement traffic control measures to minimize traffic conflicts and delays to the traveling public for local roadways where lane closures and restricted travel speeds will be required for longer periods. Provide advance notice of all construction-related street closures, durations, and detours to local jurisdictions, emergency service providers, and motorists. Provide safety measures for vehicles, bicyclists and pedestrians to transit through construction zones safely. Limit sidewalk, bicycle, and pedestrian walkway closures to one location within each vicinity at a time, with a closure time frame limited as much as feasible for each closure unless alternative routings for pedestrian and bicycle transit are available. Provide designate areas for construction worker parking wherever feasible to minimize use of parking in residential or business areas. Coordinate any construction effects to parking at the San Jose Diridon Station and at other areas used for SAP Center Parking with the City of San Jose and SAP Center representatives to minimize disruption of event parking. If necessary, a Maintenance of Traffic Plan and/or a Traffic Management Plan would be established in accordance with Caltrans' <i>Manual on Uniform Traffic Control Devices</i>. 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor and JPB in coordination with local jurisdictions and emergency service providers</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: D-B Contractor and D-B-B Tunnel Contractor will develop the Traffic Control Plan prior to construction; the D-B Contractor and D-B-B Tunnel Contractor will implement the Traffic Control Plan for the duration of construction.</p> <p>Reporting: Weekly monitoring, monthly reporting.</p>	The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to comply with these requirements. Traffic Control Plan.
<p>TRA-1c: Implement signal optimization and roadway geometry improvements at impacted intersections for the 2020 Project Condition.</p> <p>Table 3.14-17 summarizes the intersection impacts and the associated mitigation measures proposed to minimize localized traffic impacts. Detailed description for improvements at each impacted intersections are included in the transportation analysis report in Appendix D,</p>	<p>Implementing Party: JPB</p> <p>Reporting Party: JPB</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: JPB will be responsible for implementing signal optimization and roadway geometry improvements at identified intersections following construction.</p> <p>Reporting: Following completion of signal</p>	Signal optimization and roadway changes.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>Transportation Analysis. Possible mitigation measures include signal optimization and roadway geometry improvements, as discussed below:</p> <ul style="list-style-type: none"> Signal optimization: Signal timing optimization would be performed to reduce delay at signalized intersections. This can include optimizing the cycle time, splits, and phasing. In addition, for closely spaced intersections, optimizing the offset and better signal coordination will also reduce delay. Roadway geometry changes: Changing the roadway geometry could help reduce intersection delay. This would include changing the roadway width by widening the street or changing the existing geometry configuration through restriping. Intersection #64 (El Camino Real and Alma Street and Sand Hill Road) is an example of where roadway geometry could be altered as a mitigation measure to reduce intersection delay. A review of the significantly affected intersections identified one location (7th/16th Street in San Francisco) where, with the proposed mitigation, there is a possibility of queues backing up to the grade crossing. Thus, this measure also includes pre-emption, pre-signals or queue cutters at this location to prevent an increase in potential queue back to the grade crossing. JPB will coordinate with the CPUC during the final design phase of the project concerning adjustment of traffic signals and road geometry adjacent to at-grade crossings through the GO 88-B process. <p>JPB will coordinate with local jurisdictions during the design phase of roadway mitigation measures that affect roadways under local jurisdiction.</p>						optimization and/or roadway geometry improvements.	
<p>TRA-2a: Implement construction railway disruption control plan.</p> <p>The JPB will make the efforts to contain disruption to Caltrain, tenant passenger, and freight services during construction. Measures that will be implemented throughout the course of project construction, will include, but are not limited to, the following:</p> <ul style="list-style-type: none"> The overall goal of this plan should be to minimize the overall duration of disruption of Caltrain, tenant passenger, and freight operations and maintain reasonable levels of service, while allowing for an expeditious completion of construction. Limit number of simultaneous track closures within each immediate vicinity, with closure time frame limited as much as feasible for each closure, unless bypass tracks are available. Provide safety measures for rail services to transit through construction zones safely. Require contractors to coordinate with rail dispatch to minimize disruption of rail service in the corridor. Where feasible, limit closure of any tracks for construction activities to off-peak periods and weekends, when service is less frequent or late night, when no passenger service is scheduled. Where feasible, maintain acceptable service access for passenger and freight service. Where one open track cannot be maintained for passenger or freight use, limit multi-track closures to one location at a time, as much as feasible Where multi-track closures result in temporary elimination of transit rail service, work with local and regional transit providers to provide alternative transit service around 	<p>Implementing Party: D-B Contractor and D-B-B Tunnel Contractor and JPB in coordination with rail dispatch</p> <p>Reporting Party: D-B Contractor and D-B-B Tunnel Contractor</p> <p>Monitoring Party: JPB</p>	X	X			<p>Implementation: Requirements will be specified in contracts, and will be implemented by the D-B Contractor and D-B-B Tunnel Contractor for the duration of construction.</p> <p>Reporting: Weekly during construction.</p>	<p>The D-B Contractor and D-B-B Tunnel Contractor will be contractually bound to comply with these requirements.</p> <p>Construction railway disruption control plan prepared by D-B Contractor and D-B-B Tunnel Contractor.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>the closure area including increased bus and shuttle service.</p> <ul style="list-style-type: none"> Where multi-track closures result in temporary elimination of freight rail service, work with Union Pacific and freight users to schedule alternative freight service timing to minimize disruption to freight customers. Provide advance notice of all construction-related track closures to all affected parties. Provide advance notice to transit riders of any temporary disruption in transit service. Where temporary cessation of freight rail service is necessary due to multi-track closures and would result in substantial diversion to truck modes, Caltrain or its construction contractor shall coordinate with local jurisdictions and freight operations to determine preferred truck routes to minimize the effect on local traffic conditions. Construction in and adjacent to BART facilities will be coordinated in advance and during construction with BART including any necessary BART safety monitors. If construction would result in any potential service disruption, Caltrain or its construction contractor shall coordinate with BART to avoid the disruption and/or minimize the extent and duration of disruption and provide information to commuters on alternative transit options during the disruption. Caltrain and/or its construction contractor shall coordinate with Union Pacific in advance and during any potential disruption to freight operations and/or Union Pacific facilities. Union Pacific's emergency access will be maintained throughout construction. 							
<p>TRA-3b: In cooperation with the City and County of San Francisco, implement surface pedestrian facility improvements to address the Proposed Project's additional pedestrian movements at and immediately adjacent to the San Francisco 4th and King Station.</p> <p>The JPB, in cooperation with the City and County of San Francisco, will improve surface pedestrian facilities at the San Francisco 4th and King Station where needed to accommodate the Proposed Project's increase in pedestrian volumes. This mitigation applies to increased pedestrian traffic under Proposed Project conditions that would occur within the impact window beginning in 2020 and ending when DTX/TTC is fully operational.</p> <p>Both the JPB and the City and County of San Francisco will implement a pedestrian access study to identify the surface improvements necessary to accommodate the Proposed Project's increased pedestrian demand during the impact window identified above. The JPB's responsibility will be to implement mutually agreed upon improvements necessary to accommodate pedestrian demand within the Caltrain station and JPB-owned right-of-way. The City and County of San Francisco will be responsible for implementing improvements on City streets and the public right-of-way surrounding the 4th and King Station. Because there are multiple contributors to pedestrians to the station, including Caltrain, MUNI Metro J and T Lines, MUNI bus lines, the future Central Subway, and other transit line and local land use development, cost shall be shared on a fair-share basis as determined mutually by the JPB and the City and County of San Francisco.</p> <p>The performance standard guiding specific measures selection is as follows:</p> <ul style="list-style-type: none"> Pedestrian delay and illegal crossing activity shall be equivalent to or better than No Project conditions, and peak hour pedestrian sidewalk densities on primary access routes to the Fourth and King Station shall be less than or equal to projected No Project densities. <p>The following surface improvements to pedestrian facilities will address increased pedestrian demand caused by the Proposed Project. These improvements will be studied in detail in the</p>	<p>Implementing Party: JPB in coordination with City and County of San Francisco</p> <p>Reporting Party: JPB</p> <p>Monitoring Party: JPB</p>	X	X	X		<p>Implementation: JPB will conduct surface pedestrian facility improvements.</p> <p>Reporting: JPB and the City and County of San Francisco will conduct a pedestrian access study during the PCEP design process.</p> <p>Reporting of pedestrian facility conditions will occur periodically throughout duration of project operations.</p>	San Francisco 4 th and King Station Pedestrian Access Study.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>pedestrian access study.</p> <ul style="list-style-type: none"> Widened curb waiting areas and added pedestrian bulbouts where high levels of demand cannot be accommodated by existing facilities. A pedestrian “scramble” at the intersection of 4th and Townsend Streets. A pedestrian scramble is an intersection that is striped and designed to allow pedestrians to cross diagonally in all directions during an all-way red signal at which all motor vehicles are stopped. Signalization improvements for both 4th and Townsend and 4th and King intersections. While a pedestrian scramble is not likely to be feasible at the intersection of 4th Street and King Street due intersection size, traffic volumes, and SMFTA at-grade transit operations, all-way pedestrian signals at existing crosswalks are potentially feasible. Widened crosswalks to increase pedestrian volumes and improve pedestrian sidewalk widths on the immediate approaches to the intersections of 4th and Townsend and 4th and King Streets, as appropriate and feasible. Pedestrian safety countermeasures, such as pedestrian barriers and improved signage, as necessary to address safety issues that are directly related to increased pedestrian volumes at station access points. <p>The improvements identified in the access study shall be completed in a manner that does not interfere with SMTA bus operations, SFMTA Metro or bicycle facilities in and around the station area.</p> <p>The JPB will also coordinate with the CPUC during the final design phase of the Project concerning signal adjustments at 4th Street / King Street to ensure light rail vehicle operational safety through this intersection.</p> <p>This measure does not include any above- or below-ground pedestrian facilities, because the Proposed Project’s impact can be address through feasible surface treatments described above.</p>							
<p>TRA-4b: Continue to improve bicycle facilities at Caltrain stations and partner with bike share programs where available following guidance in Caltrain’s Bicycle Access and Parking Plan.</p> <p>Caltrain will improve bicycle facilities at Caltrain stations where needed to accommodate increased demand over time for such facilities including bike parking and bike lockers necessary to safely and securely park bikes that are not taken on the train. Caltrain will work local and regional bike share programs to provide opportunities for Caltrain riders to utilize bike share facilities located at Caltrain stations (where feasible) or nearby (where not).</p>	<p>Implementing Party: JPB Reporting Party: JPB Monitoring Party: JPB</p>				X	<p>Implementation: Following completion of construction, JPB will work with local and regional bike share programs to improve bicycle facilities at Caltrain stations.</p> <p>Reporting: Bike facility and safety will be monitored and reported periodically following completion of construction.</p>	<p>Bicycle Access and Parking Plan. Bikeshare programs in partnership with local and regional providers.</p>
<p>NOI-CUMUL-1: Implement a phased program to reduce cumulative train noise along the Caltrain corridor as necessary to address future cumulative noise increases over FTA thresholds</p> <p>The JPB, in cooperation with other rail operators, local jurisdictions, transportation funding agencies, and state and federal agencies, will support incremental noise reduction measures at the locations of cumulative noise impacts over time as funding becomes available for the locations where the PCEP would contribute to cumulative noise impacts. Where the PCEP does not contribute to cumulative noise impacts or where it would lower existing noise levels, then the PCEP is not responsible to participate in mitigation, even if the cumulative noise impacts due to other rail service increase is significant. Caltrain will work with local, state, and federal partners to establish priorities for noise reduction measure to be implemented as funding becomes available.</p>	<p>Implementing Party: JPB in cooperation with other rail operators, local jurisdictions, transportation funding agencies, and state and federal agencies Reporting Party: JPB Monitoring Party: JPB</p>				X	<p>Implementation: Implementing parties will prioritize, develop and implement phased programs to reduce cumulative noise impacts prior to future major increases in rail operations (such as HSR, Capitol Corridor, ACE and freight expansion).</p> <p>Reporting: Following implementation of phased programs.</p>	<p>Technical studies evaluating the need for and effectiveness of phased programs to reduce cumulative noise impacts.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>Caltrain will also work with other rail operators to seek funding participation from multiple parties on a fair-share basis in proportion to their cumulative noise contributions.</p> <p>The costs for implementing the phased program shall be borne by all rail operators in proportion to their contributions to cumulative train noise increases over existing conditions. Given that there are multiple contributors to cumulative rail noise, the JPB is only responsible to fund its fair share for necessary noise mitigation with other rail services responsible to fund their fair share as well. Fair share shall be determined by the noise contribution of each rail service increase over existing conditions (2013) to cumulative noise levels as determined using acceptable FTA noise modeling protocols.</p> <p>As noted above, the Proposed Project would result in increased noise at four of the 49 study locations in the 2020 cumulative scenario (but only three locations would have cumulatively significant noise increases in 2020), but if Caltrain implements full electrification (e.g. 100 percent EMU service from San Jose to San Francisco), then the combined effect of the Proposed Project and full electrification would not result in noise increases at any of the 49 study locations and no fair-share contribution would be necessary from Caltrain.</p> <p>This program is expected to be implemented over a period of decades. Improvements will be phased as needed to address changes in cumulative rail service over time and cumulative rail noise.</p> <ul style="list-style-type: none"> • The first cumulative milestone is 2020. The PCEP would contribute to significant cumulative impacts at three locations with PCEP contributions ranging from 8 to 13 percent: San Mateo near the 9th Avenue grade crossing (Receptor #19); Redwood City near the Whipple Avenue grade crossing (Receptor #25); and Palo Alto near the W. Charleston Road grade crossing (Receptor #36). At these locations, the cumulative noise increases identified in the EIR are the combination of the PCEP, assumed freight increases, and potential Coast Daylight service. Caltrain will monitor freight levels as well Coast Daylight planning in the time leading up to 2020. Caltrain will work with UPRR and Amtrak, as necessary, to coordinate fair-share contributions to cumulative mitigation and plan for implementation of feasible improvements by 2020 or by such period that cumulative noise at the three locations above is expected to exceed the FTA moderate threshold criteria. Since the PCEP increases are only a small portion of the cumulative impact in 2020, the fair-share contributions of other parties will need to be secured to implement potential mitigation. If the other parties are not willing to contribute their fair-share, then mitigation may not be feasible. • The second cumulative milestone is 2026 or after when HSR blended service first commences along the Caltrain corridor. If Caltrain replaces all remnant diesel equipment by that time, then the PCEP would make no contribution to cumulative noise increases and would have no further mitigation responsibilities (operating up to 79 mph). If Caltrain is still operating a similar amount of diesel locomotives in 2026 or after as in 2020, then it would contribute approximately 3 percent to the increases at these four locations: Burlingame near the Broadway grade crossing (Receptor #14); San Mateo near the 9th Avenue grade crossing (Receptor #19); Redwood City near the Whipple Ave. grade crossing (Receptor #25); and Palo Alto near the W. Charleston Road grade crossing (Receptor #36). These four locations would all be affected by the PCEP, HSR, freight, and the Coast Daylight and the Palo Alto location could also be affected by Dumbarton Rail Corridor service. The subsequent project-level analysis of blended HSR service may refine the noise increases due to HSR and blended service when project level design details are taken into account. Caltrain's fair share responsibility for blended service with Caltrain EMUs operating up to 110 mph may exceed the PCEP's noise 							

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>contribution since the PCEP is limited to 79 mph. Projected freight and other passenger rail increases may or may not occur. Caltrain will monitor freight levels changes and will work with CHSRA, UPRR, and Amtrak (and DRC sponsors if DRC is advanced) as necessary, to coordinate fair-share contributions to cumulative mitigation and plan for implementation of feasible improvements by 2026 or by such period that cumulative noise at the four locations above will exceed the FTA moderate threshold criteria. Since the PCEP increases are only a small portion of the cumulative impact, the fair-share contributions of other parties will need to be secured to implement potential mitigation. If the other parties are not willing or able to contribute their fair-share, then mitigation may not be feasible, although it is assumed that CHSRA will be able to secure sufficient funding to support mitigation to address HSR noise fair-share impacts.</p> <p>Residential building sound insulation</p> <p>The JPB, in cooperation with the other parties noted above, shall evaluate the potential to reduce cumulative noise impacts through the installation of building sound insulation improvements at residences projected to have a sound increase greater than the FTA moderate impact criteria. Building sound insulation methods may include extra wall insulation, window glazing and sealing of exterior surfaces.</p> <p>If this option is selected, a technical study shall be completed to evaluate the effectiveness of reducing cumulative impacts to less than the FTA moderate impact threshold through these methods. If the study shows that it is feasible to reduce the impact to less than the threshold at a cumulatively affected sensitive noise receptor, then no additional mitigation at that location will be required. Building sound insulation measures shall only be installed to the extent necessary to meet the impact threshold at the receptor location and shall only be installed if building owners are willing to accept such measures.</p> <p>Quiet Zones</p> <p>The lead agency for a quiet zone designation is the local jurisdiction (typically the City or County) that is responsible for traffic control and law enforcement on the roads at the at-grade crossings.</p> <p>The JPB, in cooperation with the other parties noted above, and the affected local jurisdictions shall implement a phased program considering the potential establishment of quiet zones along the Caltrain corridor at all locations where cumulative train noise is predicted to exceed FTA moderate impact thresholds. The JPB and other cooperating railroad operators will work closely with local jurisdictions to prepare the engineering studies and coordination agreements to design, construct, and enforce potential quiet zones.</p> <p>Options for establishing quiet zones could include implementation of the following FRA pre-approved supplemental safety measures (SSM):</p> <ul style="list-style-type: none"> ● Four-quadrant gate system. This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing. ● Gates with medians or channelization devices. This measure keeps traffic in the proper travel lanes as it approaches the crossing, thus denying the driver the option of circumventing the gates by travelling in the opposite lane. ● One-way street with gates. This measure consists of one-way streets with gates installed so that all approaching travel lanes are completely blocked. This option may not be feasible or acceptable to local jurisdictions at all locations. ● Road closure. This measure consists of closing the road to through travel at the at-grade crossing. This option may not be feasible or acceptable to local jurisdictions at all 							

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>locations.</p> <p>In addition to these pre-approved SSMs, the FRA also identifies a range of other measures that may be used to establish a quiet zone. These could be modified SSMs or non-engineering measures which might involve law enforcement or public awareness programs. Such alternative safety measures must be approved by the FRA based on the prerequisite that they provide an equivalent level of safety as the sounding of horns.</p> <p>Wayside horns can also be utilized as part of a quiet zone. While not avoiding the sounding of a horn, wayside horns affect a smaller area than train-mounted horn. Wayside horns can be used when the other measures above are not adequate to avoid the use of a horn.</p> <p>The lead agency for a quiet zone designation is the local public authority which is the only authority that can implement a quiet zone. Caltrain or the other rail operators cannot on their own designate the quiet zone. However, only with the implementation of the quiet zone can Caltrain, other tenant railroads and freight operators be relieved of the requirement to sound their horns when crossing at-grade crossings. One key aspect of local jurisdiction acceptance of a quiet zone is acceptance of potential liability in the event of accidents related to not sounding a horn at an at-grade crossing after the installation of any required SSMs. Thus, if a local city does not accept the quiet zone, then even if the required SSMs are present, Caltrain, freight and other rail operators would continue to use train horns as a safety device in compliance with FRA requirements.</p> <p>Grade Separations</p> <p>Caltrain, in cooperation with other rail operators, local jurisdictions, transportation funding agencies, and state and federal agencies, will support incremental grade separations at locations of cumulative noise impacts over time as funding becomes available. Caltrain will work with local, state, and federal partners to establish priorities for grade separations to be implemented as funding becomes available. Caltrain will also work with other rail providers to seek funding participation from multiple parties on a fair-share basis in proportion to noise contributions.</p> <p>Costs</p> <p>The specific costs are not known for this mitigation. As noted in the EIR, grade separations can cost \$50 million to \$100 million or more per location (42 locations could cost \$2.1 to 4.2 billion) and quiet zone treatments can cost \$1 million to \$2 million per location (42 locations could cost \$42 to \$84 million). Building insulation costs have not been estimated.</p>							
<p>NOI-CUMUL-2: Conduct project-level vibration analysis for Blended System operations and implement vibration reduction measures as necessary and appropriate for the Caltrain corridor</p> <p>As noted above, the vibration analysis in this document uses worst-case assumptions. A project-level vibration analysis will be completed by CHSRA for both the San Jose to Merced segment and the Blended Service segment north of San Jose. If subsequent environmental evaluation by CHSRA shows that significant cumulative increases in vibration would not occur along the Caltrain ROW when considering the specific track improvements and HSR and Caltrain EMU design, then this mitigation would not be required or may only be required in certain locations.</p> <p>A significant cumulative impact would only occur when the number of vibration events approaches a doubling of existing conditions. These measures are only necessary to be in place by the time Blended Service operates on the Caltrain corridor north of Santa Clara or when HSR operates on dedicated track south of Santa Clara (to 2 miles south of Tamien Station).</p> <p>Based on the 2014 Business Plan, the earliest date for HSR blended service operations on the</p>	<p>Implementing Party: CHSRA and JPB in coordination with other rail operators</p> <p>Reporting Party: CHSRA/JPB</p> <p>Monitoring Party: JPB</p>				X	<p>Implementation: Implementing parties will conduct project-level vibration analysis for the San Jose to Merced segment of the California High-Speed Train System and the Blended Service segment north of San Jose and implement vibration reduction measures as necessary.</p> <p>Reporting: Following completion of project-level vibration analysis by CHSRA.</p>	Project-level vibration analysis conducted by CHSRA.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>Caltrain corridor north of Santa Clara and south of Santa Clara on dedicated track would be 2026. Caltrain will coordinate with CHSRA during the subsequent environmental process for blended service to examine the actual potential for significant cumulative vibration impacts to actually occur and the need for mitigation.</p> <p>If the subsequent environmental evaluation shows significant cumulative vibration impacts taking into account the specific blended service track improvements, the JPB, in cooperation with CHSRA and other rail operators will support incremental train vibration reduction measures along the Caltrain ROW. Caltrain will work with CHSRA and other rail operators to establish priorities for vibration reduction measure to be implemented as funding becomes available. The timing for any necessary improvements should be combined with blended service track improvements and should occur prior to a doubling of vibration events. Based on the 2014 Business Plan, HSR operations would commence in 2026 which would double the vibration events and thus mitigation should be in place at that time.</p> <p>Potential vibration reduction measures could include, but are not limited to, special track support systems, vehicle suspension (HSR vehicles only), building modifications, trenches (if feasible), and buffer zones.</p> <p>The costs for implementing the phased program should be borne by all rail operators in proportion to their contributions to increased vibration events and/or levels. Given that there are multiple contributors to cumulative rail vibration events, the JPB is only responsible to fund its fair share for necessary vibration reduction measures with other rail services responsible to fund their fair share as well. However, if there is no governmental approval that triggers an obligation to share such costs, it may be impossible to require other railroads to pay their fair-share. Fair-share shall be determined by the vibration train event increases over existing conditions (2013).</p>							
<p>TRA-CUMUL-1: Implement a phased program to provide traffic improvements to reduce traffic delays near at-grade crossings and Caltrain stations</p> <p>The proposed signalization and minor roadway mitigations in Table 4-18 will be fully funded by Caltrain as they are directly related to the Proposed Project impact compared to 2040 No Project conditions. The performance standard for the project impacts compared to the No Project conditions are the significance criteria used in this EIR.</p> <p>Other long-term mitigation, such as grade separations, cannot be committed to by Caltrain at this time due to funding limitations, but Caltrain will work with local jurisdictions and funding partners to support such improvements as funding becomes available. JPB will coordinate with local jurisdictions during the design phase of roadway mitigation measures that affect roadways under local jurisdiction.</p> <p>Caltrain, in cooperation with local agencies and other parties, will support a phased program seeking to improve local roadway conditions along the Caltrain corridor near at-grade crossings and Caltrain stations where cumulative impacts have been identified and where the Proposed Project makes an adverse contribution to traffic delays. Separate from the specific Table 4-18 mitigation, given that there are multiple contributors to cumulative traffic conditions, Caltrain is only responsible to fund its fair share for other necessary improvements with local jurisdictions, future land use development as well as other rail services responsible to fund their fair share as well. Fair share shall be determined by cumulative contributions to future traffic levels or delays at identified significant cumulatively affected intersections and roadways determined using traffic modelling.</p> <p>In the long run, where adequate funding is available, there are a variety of technically feasible The following traffic improvements that would help to reduce cumulative traffic delays at</p>	<p>Implementing Party: JPB in cooperation with local agencies and other parties</p> <p>Reporting Party: JPB</p> <p>Monitoring Party: JPB</p>				X	<p>Implementation: Implementing parties will evaluate phased programs to improve local roadway conditions along the project corridor as necessary to anticipate cumulative traffic increases.</p> <p>Reporting: Minimum evaluation of need for mitigation every five years starting in 2020.</p>	Traffic Improvement Program.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>intersections near at-grade crossings and Caltrain stations including, but not limited to the following options:</p> <ul style="list-style-type: none"> ● Traffic signal optimization: Signal timing optimization can include optimizing the cycle time, splits, and phasing. In addition, for closely spaced intersections, optimizing the offset and better signal coordination can also reduce delay. Signal optimization is proposed as a mitigation measure at a number of study intersections as shown in Table 4-18. Caltrain will fund and implement the signalization in Table 4-18 as these impacts are directly related to Proposed Project impacts as they are identified relative to 2040 No Project conditions. ● Roadway Geometry Changes: Changing the roadway geometry can also help reduce intersection delay. This can include changing the roadway width by widening the street or changing the existing geometry configuration through restriping. Intersection #43 (Main Street and Middlefield Road) and Intersection #64 (El Camino Real and Alma Street and Sand Hill Road) are examples of where roadway geometry could be altered as a mitigation measure to reduce intersection delay. Roadway changes are proposed in Table 4-18. Caltrain will fund and implement the roadway improvements in Table 4-18 as these impacts are directly related to Proposed Project impacts as they are identified relative to 2040 No Project conditions. ● Grade Separations: Given the costs and disruption of major roadway widenings and grade separations², Caltrain cannot commit at this time to a comprehensive program of improvements that would address all cumulative impacts in the future, because it does not have the identified funding and does not expect to receive sufficient funding in the foreseeable future. However, Caltrain, in cooperation with local jurisdictions, transportation funding agencies, and state and federal agencies, will support incremental grade separations at locations of cumulative traffic impacts over time as funding becomes available. Caltrain will work with local, state, and federal partners to establish priorities for roadway improvements grade separations to be implemented as funding becomes available. Caltrain will also work with other rail parties to seek funding participation from multiple parties on a fair-share basis in proportion to traffic contributions or project contributions to traffic delays. ● Road Closures: One option for managing local traffic is to close roadways at grade crossings and reroute traffic via alternative roadways. This option may not be feasible or acceptable to local jurisdictions at many, if not all locations. <p>This mitigation is funding limited as it relates to major road widenings and grade separations and will likely take many decades to implement. As noted above, the JPB is committed to implementing the improvements shown in Table 4-18 in a phased program as needed to address the Proposed Project's effects on local traffic.</p>							
<p>TRA-CUMUL-2: Implement technical solution to allow electric trolley bus transit across 16th Street without OCS conflicts in cooperation with SFMTA.</p> <p>The JPB, in cooperation with SFMTA, will implement a technical solution to allow operation of the ETB at the 16th street crossing as well as the Caltrain electrification.</p>	<p>Implementing Party: JPB/D-B Contractor in coordination with SFMTA</p> <p>Reporting Party: D-B Contractor</p> <p>Monitoring Party: JPB</p>	X				<p>Implementation: JPB/D-B Contractor and SFMTA will implement a technical solution to allow operation of the ETB at the 16th Street crossing as well as the Caltrain electrification prior to the final design.</p>	<p>Technical solution to OCS conflicts prepared by JPB/D-B Contractor in cooperation with SFMTA.</p>

² While grade separations are a technically feasible way to reduce cumulative traffic impacts at the at-grade locations, it is a highly expensive mitigation strategy. As discussed above, Caltrain supports future efforts at grade separation where acceptable to local communities and where local, state, and federal funding can be obtained to fund these improvements. However, using an average assumed cost of \$50 to \$100 million per crossing (grade separations can cost much more sometimes), grade separating all existing 42 at-grade crossings would cost \$2.1 to \$4.2 billion. Grade separating only 17 locations that are nearest the 17 significant unavoidably impacted intersections noted above could cost \$850 million to \$1.7 billion. The budget for the Proposed Project is \$1.225 billion by comparison. Thus, Caltrain cannot commit to a comprehensive program of grade separations at this time.

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>Two feasible options for the SFMTA at-grade trolley crossing at 16th Street underneath the I-280 viaduct have been identified, both of which would involve a short phase break of the Caltrain OCS. Both options would include a short gap in the Caltrain OCS to allow the ETB OCS to be installed through the intersection. The short section of the ETB OCS would not be energized to avoid any potential for contact between energized parts of the Caltrain OCS and the ETB OCS. The options for equipment to facilitate Caltrain operations through the Caltrain OCS gap are as follows:</p> <ul style="list-style-type: none"> ● Option #1: Installation of a track-mounted transponder that automatically communicates with special on-board equipment to open the main circuit breaker and preclude current from reaching the car. <ul style="list-style-type: none"> ○ As a Caltrain consist approaches the 16th street crossing, the engineer would reduce the power draw and the track-mounted transponder would instruct the individual car to open its main breaker. Power drawn from pantographs outside the “zero-power zone” will allow the train to move through the crossing without slowing down. After clearing the crossing, the main breaker will close, and the power draw can be ramped up again. ○ Electric Trolley Buses will operate normally at the crossing, as the collector poles glide along the contact wires up to 6” above the 25kV Caltrain OCS wires. Buses will encounter a roughly 6-foot-long (the width of the Caltrain pantograph) non-energized portion of contact wire at the crossing of each track, but can coast through that gap on a continuous wire structure. This type of movement is a part of normal operations in San Francisco. ○ This type of OCS wire structure has been used previously in Seattle and in Europe. ● Option #2: Installation of a vacuum circuit breaker (VCB), which removes the requirement for special on-board equipment. <ul style="list-style-type: none"> ○ The VCB solution has only been available for about 15 years and has not been implemented on a large scale yet. This solution has been utilized in newer installations in China. <p>Caltrain will need to obtain regulatory clearance from the CPUC for either of these solutions. The CPUC has not yet released regulations for 25kV traction power systems. The rulemaking process is ongoing. Caltrain, in cooperation with SFMTA will work with the CPUC to obtain approval of a technical solution for the 16th Street crossing.</p> <p>The placement of the ETB overhead wires needs to be identified by SFMTA in coordination with Caltrain as the ETB needs to cross in the lane with the overhead wires in order to avoid any power interruption for the bus while crossing the rail line.</p> <p>The following issues will be resolved during design of the improvement: wire height for the 22-Fillmore OCS, reliability of the Caltrain on-board (transponders), or off-board equipment, (vacuum circuit breakers), and emergency operating procedures in case of failure.</p> <p>In addition, Caltrain will work with SFMTA to identify any design, maintenance, or emergency contingency considerations important to the design of the crossing system to minimize additional maintenance effort or materials for SFMTA during operations and to identify emergency response actions in the event of any wire entanglement at the crossing.</p>					<p>Reporting: Prior to final design.</p>		

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>Mitigation Measure TRA-CUMUL-3: As warranted, Caltrain and freight operators will partner to provide Plate H clearance as feasible between San Jose and Bayshore .</p> <p>Caltrain and freight operators share responsibility for the potential constraints that may occur due to the combination of a change in freight operating equipment and the installation of the OCS.</p> <p>Bayshore to Butterhouse Spur (MP 41.4)</p> <p>If freight operators identify a plan to operate freight railcars along the Caltrain corridor between Bayshore and the Butterhouse Spur (MP 41.4) that would be hindered by the OCS installation compared with existing conditions, then Caltrain and freight operators shall evaluate the feasibility to provide Plate H effective vertical height clearances where needed along this segment of the Caltrain corridor.</p> <p>The evaluation shall first include a feasibility assessment of a “neutral section”, or unelectrified segment, for the San Francisquito Bridge. If the use of a “neutral section” is feasible without compromising project service improvement objectives or safety, then a combination of track lowering and “neutral sections” (if feasible) shall be used to provide Plate H clearance between Bayshore and the Butterhouse Spur (MP 41.4).</p> <p>Based on current analysis (see Table 4-23) apart from San Francisquito Bridge, additional vertical clearance height would be required at the following locations to support Plate H equipment: Oyster Point Parkway (MP 8.60, +0.1’), Signal Bridge (MP 9.10, +0.7’), San Antonio Avenue (MP 34.0, +0.63’), Highway 85 (MP 36.5, +0.15’), Pedestrian Overpass (MP 39.40, +0.44’) and Lawrence Expressway (MP 40.75, +.16’).</p> <p>If a “neutral section” is not feasible at the San Francisquito Bridge and thus the entire segment would be constrained by the low point at the San Francisquito Bridge, then no further improvements are required between Bayshore and the Butterhouse Spur.</p> <p>Butterhouse Spur (MP 41.4) to MP 52.0</p> <p>If freight operators identify a plan to operate freight railcars along the Caltrain corridor between MP 52.0 and the Butterhouse Spur (MP 41.4) that would be hindered by the OCS installation compared with existing conditions, then Caltrain and freight operators shall implement site improvements to restore effective vertical height clearances where needed along the Caltrain corridor.</p> <p>Based on current analysis, the only proposed improvement in addition to the Proposed Project tunnel notching/track lowering at the four San Francisco tunnels and the track lowering at Hedding Avenue (MP 46.15), San Carlos Avenue (MP 47.89), Curtner Avenue (MP 50.59), a private overpass (MP 51.08), would be track lowering at the Lafayette Pedestrian Overpass (MP 43.65).</p> <p>Both Segments</p> <p>Track lowering is a possible solution to rectify the reduction in clearance at constrained bridge overcrossings, but further study will be required to determine the condition of track subgrade in each specific area and to locate existing utilities that may impact the track lowering. If it is determined existing utilities are in the way of potential track lowering, the existing utilities will have to be relocated in order to achieve the desired clearance.</p> <p>Caltrain and the freight operators shall apportion any cost pursuant to the existing agreement between the parties.</p> <p>Presuming that any identified improvements will be implemented by an entity that is subject to</p>	<p>Implementing Party: JPB and freight operators</p> <p>Reporting Party: JPB</p> <p>Monitoring Party: JPB</p>				X	<p>Implementation: Timing/need for action to be determined in consultation between UPRR and JPB. Freight operations to identify their future freight needs. JPB and UPRR to study needs for improvement and resolve cost sharing. Improvements to be completed within 3 years of mutual agreement on improvements and cost arrangements.</p> <p>Reporting: As needed.</p>	<p>Periodic consultation between UPRR and JPB per the Trackage Rights Agreement.</p>

Mitigation Measure	Implementing, Reporting and Monitoring Responsibilities	Mitigation Timing				Implementation and Reporting Schedule	Implementation Mechanism or Tool
		Pre-Construction	Construction	Post-Construction	Operation		
<p>CEQA, those improvements would need to be analyzed for their environmental impacts, as warranted, to determine if any additional significant impacts beyond those disclosed in this EIR for clearance improvements (e.g., those described in Chapter 2, <i>Project Description</i>).</p> <p>Environmental clearance shall be obtained, if necessary and required, prior to construction of any additional site improvements.</p> <p>All relevant mitigation included in this EIR would apply to any additional construction necessary to implement this mitigation measure.</p>							

REFERENCED TABLES

Table 3.3-3. Special-Status Plants Known to Occur or that May Occur in the Project Corridor

Species	Status ^a		California Distribution	Habitats	Blooming Period	Potential Occurrence in Project Corridor ^b
	Federal/State/ CRPR					
<i>Acanthomintha duttonii</i> San Mateo thornmint	E/E/1B.1		Central Coast, San Francisco Bay Area: two occurrences in San Mateo County.	Annual grassland and open areas in chaparral and coastal scrub, on serpentine vertisol clay soil, below 900 feet above mean sea level (MSL).	Apr–Jun	None—there is no suitable habitat present within project corridor.
<i>Allium peninsulare</i> var. <i>franciscanum</i> Franciscan onion	–/–/1B.2		Central Coast, San Francisco Bay region: Santa Clara, San Mateo, and Sonoma Counties.	Clay and often serpentine soils in cismontane woodland, valley and foothill grassland, below 1,000 feet above MSL.	May–Jun	Low—nine CNDDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Amsinckia lunaris</i> Bent-flowered fiddleneck	–/–/1B.2		Inner North Coast Ranges, San Francisco Bay Area, west-southern Sacramento Valley, and west-northern San Joaquin Valley.	Coastal bluff scrub, valley and foothill grasslands, cismontane woodlands, 101,645 feet above MSL.	Mar–Jun	Low—three CNDDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Arctostaphylos franciscana</i> Franciscan manzanita	P/–/1B.1		Historical occurrence in San Francisco; believed extinct in the wild.	Coastal scrub on serpentine soils, below 990 feet above MSL.	Feb–Apr	None—no suitable habitat within the project corridor.
<i>Arctostaphylos imbricata</i> San Bruno Mountain manzanita	–/E/1B.1		Western San Francisco Bay: San Bruno Mountain, San Mateo County.	Chaparral and coastal scrub on rocky outcrops.	Feb–May	None—no suitable habitat within the project corridor.
<i>Arctostaphylos montana</i> ssp. <i>ravenii</i> Presidio manzanita	E/E/1B.1		Presidio of San Francisco.	Chaparral, coastal prairie, coastal scrub, serpentine soils.	Feb–Mar	None—no suitable habitat within the project corridor.
<i>Arctostaphylos montaraensis</i> Montara manzanita	–/–/1B.2		Endemic to San Mateo County, San Bruno Mountain, Montara Mountains.	Maritime chaparral, coastal scrub, 650–1,640 feet above MSL.	Jan–Mar	None—no suitable habitat within the project corridor.
<i>Arctostaphylos regismontana</i> Kings Mountain manzanita	–/–/1B.2		Western San Francisco Bay region, northern Santa Cruz Mountains: Santa Cruz and San Mateo Counties.	Broadleaved upland forest, chaparral, North Coast coniferous forest, on granitic or sandstone soils.	Jan–Apr	None—no suitable habitat within the project corridor.
<i>Arenaria paludicola</i> Marsh sandwort	E/E/1B.1		Known only from three occurrence near Black Lake on Nipomo Mesa, San Luis Obispo County. Historically more wide ranging through Central and South Coast.	Boggy meadows, freshwater marshes, and swamps, below 1,000 feet above MSL.	May–Aug	None—no suitable habitat within the project corridor.
<i>Astragalus tener</i> var. <i>tener</i> Alkali milk-vetch	–/–/1B.2		Southern Sacramento Valley, northern San Joaquin Valley, east San Francisco Bay Area.	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkaline soils, annual grassland on alkaline soil, seasonal wetlands; below 197 feet above MSL.	Mar–Jun	None—no suitable habitat within the project corridor.
<i>Balsamorhiza macrolepis</i> Big-scale balsamroot	–/–/1B.2		Scattered occurrences in the Coast Ranges and Sierra Nevada foothills.	Rocky annual grassland and fields, foothill woodland hillsides, sometimes serpentinite soils, below 4,600 feet above MSL.	Mar–Jun	None—no suitable habitat within the project corridor.
<i>California macrophylla</i> Round-leaved filaree	–/–/1B.1		Scattered occurrences in the Sacramento and San Joaquin Valleys, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges.	Grasslands, on friable clay soils.	Mar–May	Low—one CNDDDB occurrence within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Carex comosa</i> Bristly sedge	–/–/2.1		Scattered occurrences throughout California, Oregon, and Washington.	Wet places and lake margins.	May–Sep	Low—one CNDDDB occurrence within 5 miles of project corridor; low-quality suitable habitat present within project corridor.

Species	Status ^a	California Distribution	Habitats	Blooming Period	Potential Occurrence in Project Corridor ^b
	Federal/State/ CRPR				
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	-/-/1B.1	Eastern San Francisco Bay Area, Salinas Valley, and Los Osos Valley.	Alkaline soils in annual grassland, on lower slopes, flats, and swales, sometimes on saline soils, below 755 feet above MSL.	May–Oct (Nov)	Low—five CNDDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Centromadia parryi</i> ssp. <i>parryi</i> Pappose tarplant	-/-/1B.2	Butte, Colusa, Glenn, Lake, Napa, San Luis Obispo, San Mateo, Solano, and Sonoma Counties.	Often alkaline soils, chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic).	May–Nov	None—no suitable habitat within the project corridor.
<i>Chloropyron maritimum</i> ssp. <i>palustre</i> (<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>) Point Reyes bird's-beak	-/-/1B.2	Coastal northern California from Humboldt to Santa Clara County.	Coastal salt marsh; below 33 feet above MSL.	Jun–Oct	None—no suitable habitat within the project corridor.
<i>Chorizanthe robusta</i> var. <i>robusta</i> Robust spineflower	E/-/1B.1	Coastal central California from San Mateo to Monterey County.	Coastal bluff scrub, coastal dunes openings in cismontane woodland, on sandy soil.	May–Sep	None—no suitable habitat within the project corridor.
<i>Cirsium andrewsii</i> Franciscan thistle	-/-/1B.2	Coastal California from Sonoma County to San Mateo County.	Moist areas in coastal prairie, coastal scrub, and mixed evergreen forest, sometimes on serpentine soils, 0–440 feet above MSL.	Mar–Jul	None—no suitable habitat within the project corridor.
<i>Cirsium fontinale</i> var. <i>campylon</i> Mt. Hamilton fountain thistle	-/-/1B.2	Mt. Hamilton Range, eastern San Francisco Bay Area: Alameda, Santa Clara, and Stanislaus Counties.	Freshwater seeps and streams on serpentine outcrops, chaparral, cismontane woodland, valley and foothill grassland, 1,000–2,500 feet above MSL.	Apr–Oct	None—no suitable habitat within the project corridor.
<i>Cirsium fontinale</i> var. <i>fontinale</i> Fountain thistle	E/E/1B.1	Endemic to San Mateo County.	Seeps in chaparral and grassland, on serpentine soils.	Jun–Oct	None—no suitable habitat within the project corridor.
<i>Cirsium occidentale</i> var. <i>compactum</i> Compact cobwebby thistle	-/-/1B.2	San Francisco and San Luis Obispo Counties.	Chaparral, coastal dunes, coastal prairie, coastal scrub.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Clarkia franciscana</i> Presidio clarkia	E/E/1B.1	San Francisco Bay, Presidio, Oakland hills: Alameda and San Francisco Counties.	Serpentine grassland, coastal scrub.	May–Jul	None—no suitable habitat within the project corridor.
<i>Collinsia corymbosa</i> Round-headed Chinese-houses	-/-/1B.2	North Coast and northern Central Coast from Del Norte County to Marin County.	Coastal dunes, below 65 feet above MSL.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Collinsia multicolor</i> San Francisco collinsia	-/-/1B.2	Coastal California from San Francisco to Monterey County.	Closed-cone coniferous forest, coastal scrub.	Mar–May	None—no suitable habitat within the project corridor.
<i>Dirca occidentalis</i> Western leatherwood	-/-/1B.2	San Francisco Bay region: Alameda, Contra Costa, Marin, Santa Clara, San Mateo, and Sonoma Counties.	Moist areas in broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, riparian woodland, 82–1394 feet above MSL.	Jan–Apr	None—no suitable habitat within the project corridor.
<i>Dudleya abramsii</i> ssp. <i>setchellii</i> Santa Clara Valley dudleya	E/-/1B.1	Endemic to Santa Clara County.	Cismontane woodland, valley and foothill grassland, on rocky serpentine sites.	May–Jun	Low—nine CNDDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Eriophyllum latilobum</i> San Mateo woolly sunflower	E/E/1B.1	One known occurrence in San Mateo County.	Open areas in coast live oak woodland, often on roadsides, sometimes on serpentine soils, 150–500 feet above MSL.	May–Jun	None—no suitable habitat within the project corridor.

Species	Status ^a		California Distribution	Habitats	Blooming Period	Potential Occurrence in Project Corridor ^b
	Federal/State/ CRPR					
<i>Eryngium aristulatum</i> var. <i>hooveri</i> Hoover's button-celery	-/-/1B.1		South San Francisco Bay Area, South Coast Ranges in Alameda, San Benito, Santa Clara, and San Luis Obispo Counties.	Vernal pool, 10–148 feet above MSL.	July	None—no suitable habitat within the project corridor.
<i>Fritillaria biflora</i> var. <i>ineziana</i> Hillsborough chocolate lily	-/-/1B.1		Endemic to Hillsborough area in San Mateo County.	Serpentine grassland.	Mar–Apr	None—no suitable habitat within the project corridor.
<i>Fritillaria liliacea</i> Fragrant fritillary	-/-/1B.2		Coast Ranges from Marin County to San Benito County.	Adobe soils of interior foothills, coastal prairie, coastal scrub, annual grassland, often on serpentine soils, below 1,350 feet.	Feb–Apr	None—no suitable habitat within the project corridor
<i>Gilia capitata</i> ssp. <i>chamissonis</i> Blue coast gilia	-/-/1B.1		Marin, San Francisco, and Sonoma Counties.	Coastal dunes and coastal scrub.	Apr–Jul	None—no suitable habitat within the project corridor.
<i>Gilia millefoliata</i> Dark-eyed gilia	-/-/1B.2		Coastal California from Del Norte to San Francisco County.	Coastal dunes; 10–65 feet above MSL.	Apr–Jul	None—no suitable habitat within the project corridor.
<i>Helianthella castanea</i> Diablo helianthella	-/-/1B.2		San Francisco Bay Area: Alameda, Contra Costa, Marin ^c , San Francisco ^c , and San Mateo Counties.	At chaparral/oak woodland ecotone, often in partial shade, on rocky soils, 80–3,800 feet above MSL.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Hemizonia congesta</i> ssp. <i>congesta</i> White seaside tarplant	-/-/1B.2		Mendocino, Marin, San Francisco, San Mateo, and Sonoma Counties.	Valley and foothill grassland, sometimes roadsides.	Apr–Nov	Low—two CNDDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Hesperavax sparsiflora</i> var. <i>brevifolia</i> Short-leaved evax	-/-/1B.2		Humboldt, Mendocino, Marin, Santa Cruz, San Francisco, and Sonoma Counties.	Coastal dunes, sandy soils in coastal bluff scrub, below 700 feet above MSL.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Hesperolinon congestum</i> Marin dwarf-flax (=western flax)	T/T/1B.1		Marin, San Francisco, and San Mateo Counties.	Chaparral, serpentine grassland.	Apr–Jul	None—no suitable habitat within the project corridor
<i>Horkelia cuneata</i> var. <i>sericea</i> Kellogg's horkelia	-/-/1B.1		Coastal California from Marin County to Santa Barbara County.	Openings in closed-cone coniferous forest, coastal scrub, maritime chaparral, on sandy or gravelly soils.	Apr–Sep	None—no suitable habitat within the project corridor.
<i>Horkelia marinensis</i> Point Reyes horkelia	-/-/1B.2		Scattered occurrences in North Coast and northern Central Coast: Mendocino, Marin, Santa Cruz, and San Mateo Counties.	Coastal dunes, coastal scrub, perennial grassland on sandy soils, 15–1,150 feet above MSL.	May–Sep	None—no suitable habitat within the project corridor.
<i>Lasthenia conjugens</i> Contra Costa goldfields	E/-/1B.1		Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley: Alameda, Contra Costa, Mendocino, Monterey, Napa, Santa Barbara ^c , Santa Clara ^c , and Solano Counties.	Alkaline or saline vernal pools and swales, below 700 feet above MSL.	Mar–Jun	None—no suitable habitat within the project corridor
<i>Layia carnosa</i> Beach layia	E/E/1B.1		Scattered occurrences along coastal California from Humboldt County to Santa Barbara County.	Coastal dunes, coastal scrub on sandy soil.	Mar–Jul	None—no suitable habitat within the project corridor.
<i>Leptosiphon rosaceus</i> Rose leptosiphon	-/-/1B.1		Marin, San Francisco ^c , San Mateo, and Sonoma* Counties.	Coastal bluff scrub.	Apr–Jul	None—no suitable habitat within the project corridor.
<i>Lessingia arachnoidea</i> Crystal Springs lessingia	-/-/1B.2		San Mateo County, one location reported in Sonoma County.	Serpentine grassland and open grassy areas in serpentine chaparral, cismontane woodland.	Apr–Jul	None—no suitable habitat within the project corridor.

Species	Status ^a	California Distribution	Habitats	Blooming Period	Potential Occurrence in Project Corridor ^b
	Federal/State/ CRPR				
<i>Lessingia germanorum</i> San Francisco lessingia	E/E/1B.1	San Francisco and San Mateo Counties.	Coastal scrub, on remnant dunes.	Jun–Nov	None—no suitable habitat within the project corridor.
<i>Malacothamnus aboriginum</i> Indian Valley bush mallow	–/–/1B.2	Inner South Coast Ranges: San Benito, Fresno, and Monterey Counties.	Rocky areas in chaparral and oak woodland, often in burned areas, 492–5,577 feet above MSL.	Apr–Oct	None—no suitable habitat within the project corridor.
<i>Malacothamnus arcuatus</i> Arcuate bush-mallow	–/–/1B.2	Santa Clara, Santa Cruz, and San Mateo Counties.	Chaparral, 49–1,165 feet above MSL.	Apr–Sep	None—no suitable habitat within the project corridor.
<i>Malacothamnus davidsonii</i> Davidson’s bush-mallow	–/–/1B.2	Los Angeles, Monterey, and San Luis Obispo Counties.	Coastal scrub, chaparral, and riparian woodland in sandy washes, 900–2,800 feet above MSL.	Jun–Sep	None—no suitable habitat within the project corridor.
<i>Malacothamnus hallii</i> Hall’s bush-mallow	–/–/1B.2	Alameda, Contra Costa, Merced, Santa Clara, and Stanislaus Counties.	Chaparral and coastal scrub, 30–2,500 feet above MSL.	May–Sep	None—no suitable habitat within the project corridor.
<i>Microseris paludosa</i> Marsh microseris	–/–/1B.2	Coastal California from Mendocino County to San Luis Obispo County.	Grassland, coastal scrub, closed-cone-coniferous forest, cismontane woodland.	Apr–Jul	Low—one CNDDDB occurrence within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Monolopia gracilens</i> Woodland woollythreads	–/–/1B.2	Contra Costa, Alameda (reported), Santa Clara, San Mateo, Santa Cruz, Monterey, San Luis Obispo Counties.	Cismontane woodland, openings in broadleaved forest, openings in north coast coniferous forest, openings in chaparral, and serpentine valley and foothill grassland, 328–3,937 feet above MSL.	Mar–Jun (Feb)	None—no suitable habitat within the project corridor.
<i>Pentachaeta bellidiflora</i> White-rayed pentachaeta	E/E/1B.1	One occurrence in San Mateo County, historically known also from Marin and Santa Cruz Counties.	Annual grassland, often on serpentine soils.	Mar–May	None—no suitable habitat within the project corridor
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i> Choris’ popcornflower	–/–/1B.2	Southwest San Francisco Bay Area, northern Central Coast: Santa Cruz, San Francisco and San Mateo Counties.	Chaparral, coastal prairie, coastal scrub, in mesic areas.	Mar–Jun	None—no suitable habitat within the project corridor.
<i>Plagiobothrys diffusus</i> San Francisco popcornflower	–/E/1B.1	Alameda and Santa Cruz County.	Coastal prairie, valley and foothill grassland.	Mar–Jun	None—not known to occur in the counties in which the project is located.
<i>Polemonium carneum</i> Oregon polemonium	–/–/2.2	Alameda, Del Norte, Humboldt, Marin, San Francisco, Siskiyou, San Mateo, and Sonoma Counties.	Coastal prairie, coastal scrub, and lower montane coniferous forest.	Apr–Sep	None—no suitable habitat within the project corridor.
<i>Potentilla hickmanii</i> Hickman’s cinquefoil	E/E/1B.1	Monterey, San Mateo, and Sonoma ^c Counties.	Freshwater marshes, seeps, and small streams in open areas in coastal scrub or coniferous forest.	Apr–Aug	None—no suitable habitat within the project corridor.
<i>Sanicula maritima</i> Adobe sanicle	–/R/1B.1	Coastal Monterey and San Luis Obispo Counties. Historically known from the San Francisco Bay area: Alameda ^c and San Francisco ^c Counties.	Moist clay or ultramafic soils, in meadows and grassland.	Feb–May	None—no suitable habitat within the project corridor.
<i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	–/–/1B.2	Northern Central Coast, San Francisco Bay Area: San Francisco, and San Mateo, Santa Cruz Counties; also Sutter County.	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland, in sandy areas, 100–2,100 feet above MSL.	Mar–Aug	Low—six CNDDDB occurrences within 5 miles of the project and limited suitable habitat is present within the project corridor.
<i>Streptanthus albidus</i> ssp. <i>albidus</i> Metcalf Canyon jewel-flower	E/–/1B.1	Endemic to Santa Clara County.	Valley and foothill grassland, on serpentine soils.	Apr–Jul	None—no suitable habitat within the project corridor.

Species	Status ^a		California Distribution	Habitats	Blooming Period	Potential Occurrence in Project Corridor ^b
	Federal/State/ CRPR					
<i>Streptanthus albidus</i> ssp. <i>peramoenus</i> Most beautiful jewel-flower	-/-/1B.2		Eastern San Francisco Bay area, Central south coastal outer ranges: Alameda, Contra Costa, Monterey, and Santa Clara Counties.	Chaparral, annual grassland, on ridges and slopes on serpentine outcrops, 450–3,200 feet above MSL.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Stuckenia filiformis</i> (<i>Potamogeton filiformis</i>) Slender-leaved pondweed	-/-/2.2		Scattered locations in Contra Costa, El Dorado, Lassen, Merced, Mono, Modoc, Mariposa, Placer, and Sierra Counties; presumed extirpated in Santa Clara County.	Freshwater marsh, shallow emergent wetlands and freshwater lakes, drainage channels; 984–7,054 feet above MSL.	May–July	None—no suitable habitat within the project corridor.
<i>Sueda californica</i> California seablite	E/-/1B.1		Morro Bay, San Luis Obispo County, historically found in south San Francisco Bay.	Margins of tidal salt marsh, below 49 feet above MSL.	Jul–Oct	None—no suitable habitat within the project corridor.
<i>Trifolium amoenum</i> Showy rancheria clover	E/-/1B.1		Coast Range foothills, San Francisco Bay region from Mendocino County to Santa Clara County.	Low elevation grasslands, including swales and disturbed areas, sometimes on serpentine soils.	Apr–Jun	Low—two CNDDB occurrences within 5 miles of project corridor; low-quality suitable habitat present within project corridor.
<i>Trifolium hydrophilum</i> Saline clover	-/-/1B.2		Sacramento Valley, central western California.	Salt marsh, mesic alkaline areas in grasslands, vernal pools.	Apr–Jun	None—no suitable habitat within the project corridor.
<i>Triquetrella californica</i> Coastal triquetrella	-/-/1B.2		Scattered localities in Coastal California: Contra Costa, Mendocino, San Diego, and San Francisco Counties.	On soil in coastal bluff scrub and coastal scrub, 33–328 feet above MSL.	N/A	None—no suitable habitat within the project corridor.

^a Status explanations:

Federal

- E = listed as endangered under the Endangered Species Act (ESA)
- P = proposed for listing under the ESA
- = no listing

State

- E = listed as endangered under the California Endangered Species Act
- = no listing

California Rare Plant Rank (CRPR)

- 1B = List 1B species: rare, threatened, or endangered in California and elsewhere
- 2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere

CRPR Code Extensions:

- 0.1 = seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
- 0.2 = fairly endangered in California (20–80% of occurrences threatened)

^b Definitions of levels of potential occurrence:

- Moderate: Plant known to occur in the region from the CNDDDB or other documents regarding the vicinity of the Proposed Project, or habitat conditions are of suitable quality.
- Low: Plant not known to occur in the region from the CNDDDB or other documents regarding the vicinity of the Proposed Project; or habitat conditions are of poor quality.
- None: Plant not known to occur in the region from the CNDDDB or other documents regarding the vicinity of the Proposed Project; or suitable habitat is not present in any condition.

^c Species has not been observed here, but is expected to also occur at this location.

CNDDDB = California Natural Diversity Database

Table 3.14-17. Summary of Intersection Impacts and Mitigation Measures

Int. ID	City	Intersection	Impacted Peak Hour	Mitigation Strategies	Impact Significance after Mitigation
Signalized Intersections					
1	<u>San Francisco</u>	4th Street and King Street	PM	Revise signal timing and phasing to better coordinate with 4th Street and Townsend Street	Less than significant
2	<u>San Francisco</u>	4th Street and Townsend Street	PM	Revise signal timing and phasing to better coordinate with 4th Street and King Street	Less than significant
5	<u>San Francisco</u>	7th Street and 16th Street	AM	Widen northbound approach to lengthen left turn pocket Remove parking lane to create a third lane for the eastbound approach Revise signal timing and phasing to better coordinate with 16th Street and Owens Street Pre-emption, pre-signals or queue cutters as necessary to manage queues relative to the rail crossing.	Less than significant
16	<u>San Francisco</u>	El Camino Real and Millbrae Avenue	AM and PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
17	<u>Millbrae</u>	Millbrae Avenue and Rollins Road	PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
18	<u>Burlingame</u>	California Drive and Broadway	AM and PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
36	<u>San Mateo</u>	E Hillsdale Boulevard and El Camino Real	AM	Adjust signal timings to better serve traffic after project implementation	Less than significant
55	<u>Menlo Park</u>	El Camino Real and Glenwood Avenue	AM and PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
56	<u>Menlo Park</u>	El Camino Real and Oak Grove Avenue	AM	Adjust signal timings to better serve traffic after project implementation	Less than significant
63	<u>Palo Alto</u>	Meadow Drive and Alma Street	AM and PM	No feasible mitigations exist ^{ba}	Significant and unavoidable
64	<u>Palo Alto</u>	El Camino Real and Alma Street and Sand Hill Road	AM	Widen west leg of Sand Hill Road by adding one lane to allow southbound right turns on red Adjust signal timings to better serve traffic after project implementation Evaluate potential signal pre-emption with Caltrans and City of Palo Alto to manage traffic movements.	Less than significant
66	<u>Palo Alto</u>	Alma Street and Churchill Avenue	AM and PM	No feasible mitigations exist ^{ba}	Significant and unavoidable
68	<u>Palo Alto</u>	Alma Street and Charleston Road	AM and PM	No feasible mitigations exist ^{ba}	Significant and unavoidable
70	<u>Mt. View</u>	Central Expressway and N Rengstorff Avenue	PM	No feasible mitigations exist ^{ba}	Significant and unavoidable
71	<u>Mt. View</u>	Central Expressway and Moffett Boulevard and Castro Street	AM and PM	No feasible mitigations exist ^{ba}	Significant and unavoidable
75	<u>Sunnyvale</u>	W Evelyn and S Mary Avenue	PM	No feasible mitigations exist ^{eb}	Significant and unavoidable
80	<u>San Jose</u>	W Santa Clara Street and Cahill Street	PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
81	<u>San Jose</u>	South Montgomery Street and W San Fernando Street	PM	Adjust signal timings to better serve traffic after project implementation	Less than significant
Stop-Controlled Intersections					
21	<u>Burlingame</u>	Carolan Avenue and Oak Grove Avenue	AM and PM	Signalize intersection	Significant and unavoidable ^{dc}
51	<u>Atherton</u>	El Camino Real and Watkins Avenue	AM and PM	Signalize intersection	Less than significant
54	<u>Atherton</u>	Glenwood Avenue and Middlefield Road	AM and PM	Signalize intersection	Less than significant

Source: Appendix D, *Transportation Analysis*

^a Addition of through lanes along Central Expressway and Alma Street may reduce the impact at this location, but the addition of through lanes is subject to ROW constraints and is, therefore, infeasible.

^b Implementation of a grade-separated crossing may reduce the impact but is subject to fiscal constraints. Therefore, this mitigation is considered infeasible for purposes of this document.

^c Intersection impacts would be less than significant after mitigation, but a secondary impact would be produced at Intersection #20 (California Drive and Oak Grove Avenue) with the signalization of Carolan Avenue/Oak Grove Avenue. After mitigation, average vehicle delay would increase by more than 4 seconds at Intersection #20.

Table 4-18. Summary of 2040 Cumulative Intersection Impacts and Mitigation Measures

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
Signalized Intersections				
1	4th Street and King Street	AM	Adjust signal timings to better serve traffic after project implementation	Significant and unavoidable (SU)
5	7th Street and 16th Street	AM and PM	Widen northbound approach to lengthen left turn pocket Revise signal timing and phasing to better coordinate with 16th Street and Owens Street, Pre-emption, pre-signals or queue cutters to prevent an increase in potential queue back to the grade crossing.	Less-than-significant after mitigation (LTS)
6	16th Street and Owens Street	PM	Revise signal timing and phasing to better coordinate with 7th Street and 16th Street	Less-than-significant after mitigation (LTS)
10	Linden Avenue and Dollar Avenue	AM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
12	S Linden Avenue and San Mateo Avenue	AM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
16	El Camino Real and Millbrae Avenue	AM and PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS) in AM Significant and unavoidable (SU) in PM
17	Millbrae Avenue and Rollins Road	AM and PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
19	Carolan Avenue and Broadway	AM and PM	<u>Include northbound right-turn overlap.</u> Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
20	California Drive and Oak Grove Avenue	PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
28	S B Street and 1 st Avenue	PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
30	S B Street and 9 th Avenue	AM and PM	Extend southbound left-turn pocket Remove parking to add eastbound left-turn pocket Adjust signal timing to better serve traffic after project implementation <u>Pre-emption, pre-signals or queue cutters to prevent an increase in potential queue back to the grade crossing.</u>	Less-than-significant after mitigation (LTS) in AM Significant and unavoidable ^a (SU) in PM
35	31 st Avenue and El Camino Real	PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
36	E Hillsdale Boulevard and El Camino Real	PM	Reconfigure westbound to two through lanes and one shared through/right-turn lane Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
37	E Hillsdale Boulevard and Curtiss Street	PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
39	El Camino Real and Ralston Avenue	AM	Restripe westbound shared through/left-turn lane into a through lane Revise signal timing and phasing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
45	El Camino Real and Whipple Avenue	AM	Adjust signal timing to better serve traffic after project implementation	Significant and unavoidable (SU)
50	El Camino Real and Fair Oaks Lane	AM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
55	El Camino Real and Glenwood Avenue	AM	Widen westbound approach to provide right-turn pocket Adjust signal timing to better serve traffic after project implementation	Significant and unavoidable (SU)
56	El Camino Real and Oak Grove Avenue	AM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
57	El Camino Real and Santa Cruz Avenue	PM	Adjust signal timing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
63	Meadow Drive and Alma Street	AM and PM	No feasible mitigations exist ^b	Significant and unavoidable (SU)
64	El Camino Real and Alma Street and Sand Hill Road	AM and PM	Widen west leg of Sand Hill Road by adding one lane to allow southbound right turns on red Adjust signal timings to better serve traffic after project implementation	Significant and unavoidable (SU) in AM Less-than-significant after mitigation (LTS) in PM
66	Alma Street and Churchill Avenue	AM	No feasible mitigations exist ^b	Significant and unavoidable (SU)
68	Alma Street and Charleston Road	AM	No feasible mitigations exist ^b	Significant and unavoidable (SU)
70	Central Expressway and N Rengstorff Avenue	AM	No feasible mitigations exist ^b	Significant and unavoidable (SU)
71	Central Expressway and Moffett Boulevard and Castro Street	AM and PM	No feasible mitigations exist ^b	Significant and unavoidable (SU)
73	Rengstorff Avenue and California Street	AM and PM	Revise signal timing and phasing to better serve traffic after project implementation	Significant and unavoidable (SU)
74	Castro Street and Villa Street	AM and PM	Remove five on-street parking spaces on the eastbound approach to add a left turn pocket Revise signal timing and phasing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
75	W Evelyn Avenue and S Mary Avenue	AM and PM	No feasible mitigations exist ^c	Significant and unavoidable (SU)

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
76	W Evelyn Avenue and Frances Street	AM and PM	Stripe westbound as one through lane and one shared through/right-turn lane Revise signal timing and phasing to better serve traffic after project implementation	Significant and unavoidable (SU)
77	Kifer Road and Lawrence Expressway	AM	No feasible mitigations exist ^d	Significant and unavoidable (SU)
78	Reed Avenue and Lawrence Expressway	AM	No feasible mitigations exist ^d	Significant and unavoidable (SU)
79	El Camino Real and Railroad Avenue	AM	Revise signal timing and phasing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
82	Lick Avenue and W Alma Avenue	AM	Revise signal timing and phasing to better serve traffic after project implementation	Less-than-significant after mitigation (LTS)
Unsignalized Intersections				
9	Tunnel Avenue and Blanken Avenue	AM and PM	Signalize intersection	Less-than-significant after mitigation (LTS)
21	Carolan Avenue and Oak Grove Avenue	AM and PM	Signalize intersection with the addition of northbound and westbound left-turn pockets	Significant and unavoidable ^e (SU) in AM Less-than-significant after mitigation (LTS) in PM
52	Fair Oaks Lane and Middlefield Road	AM	Signalize intersection	Less-than-significant after mitigation (LTS)
53	Watkins Avenue and Middlefield Road	AM and PM	Signalize intersection	Less-than-significant after mitigation (LTS)
58	Merrill Street and Santa Cruz Avenue	PM	Signalize intersection	Less-than-significant after mitigation (LTS)
Source: Appendix D, <i>Transportation Analysis</i>				
<p>^a Less-than-significant after mitigation but a secondary impact is produced at Intersection #29 (9th Avenue and S Railroad Avenue). After mitigation, the delay increases by more than four seconds at Intersection #29.</p> <p>^b Addition of through lanes along Central Expressway and Alma Street may reduce the impact, but the addition of through lanes is subject to right-of-way constraints and is therefore infeasible.</p> <p>^c Implementation of a grade separated crossing may reduce the impact but is subject to fiscal and temporal constraints. Therefore this mitigation is considered infeasible for purposes of this document.</p> <p>^d Grade separated interchanges are under study but have yet to be approved or funded.</p> <p>^e Less-than-significant after mitigation but a secondary impact is produced at Intersection #20 (California Drive and Oak Grove Avenue). After mitigation, the delay increases by more than four seconds at Intersection #20.</p>				