APPENDIX C: MITIGATION MONITORING AND ENFORCEMENT PLAN (MMEP)

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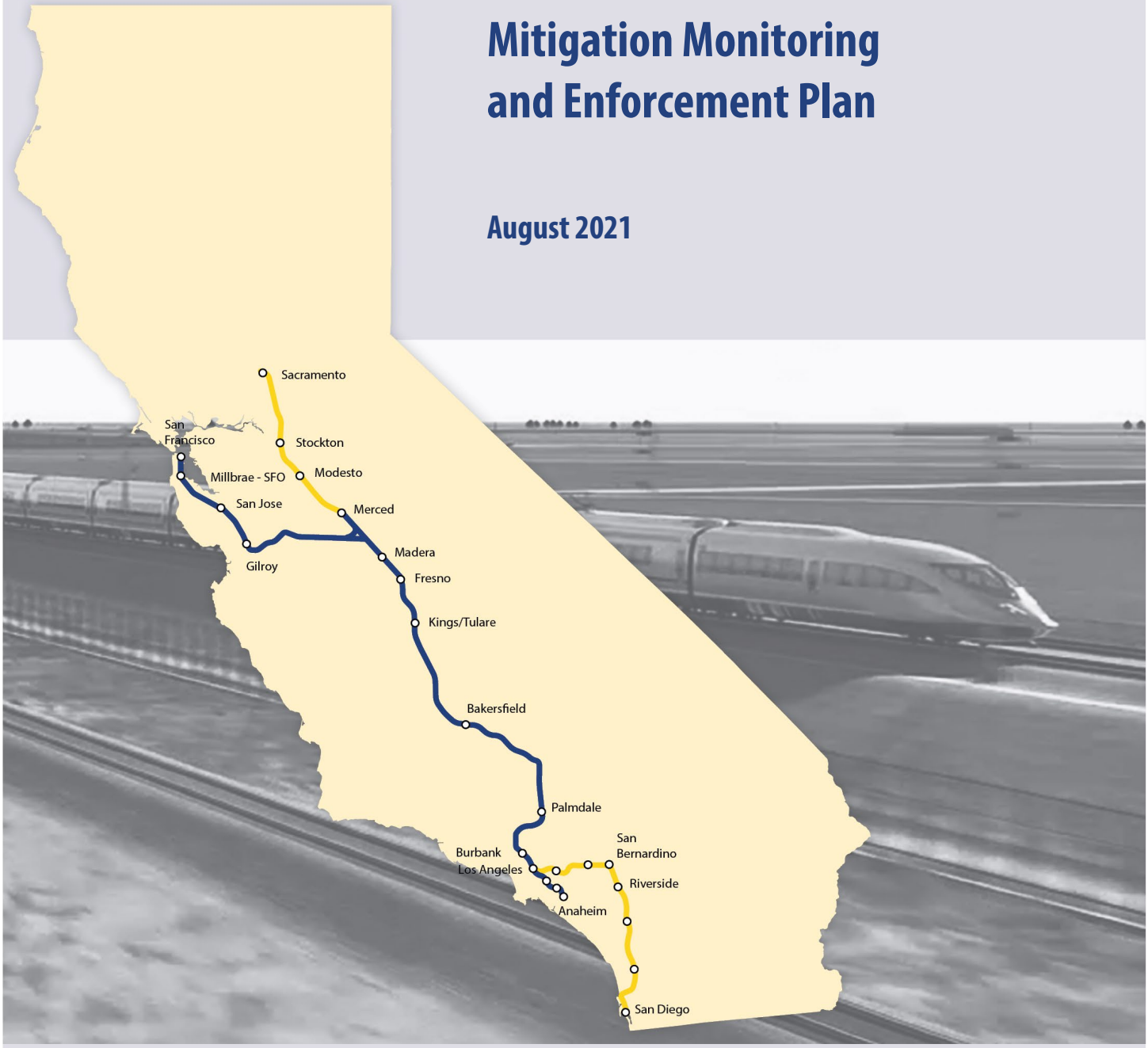
California High-Speed Rail Authority

Bakersfield to Palmdale Project Section

Mitigation Monitoring and Enforcement Plan

August 2021



CALIFORNIA High-Speed Rail Authority

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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California High-Speed Rail Project

Bakersfield to Palmdale Project Section

MITIGATION MONITORING AND ENFORCEMENT PLAN

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1 INTRODUCTION

On June 25, 2021, the California High-Speed Rail Authority (Authority), as the state lead agency and as the federal lead agency pursuant to the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (July 23, 2019), issued a Final Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) (Final EIR/EIS) for the Bakersfield to Palmdale Project Section of the California High-Speed Rail (HSR) Project (the Project). The Final EIR/EIS satisfies the requirements of the California Environmental Quality Act (CEQA) and NEPA and is the basis for the Authority's decision. In its decision, the Authority selected the Preferred Alternative (Alternative 2 with the Refined César E. Chávez National Monument [CCNM] Design Option, the Avenue M Maintenance Site and Maintenance of Way Facility, and the Palmdale Station).

This Mitigation Monitoring and Enforcement Plan (MMEP)[1] has been prepared for the Preferred Alternative. As described in Section 3.1 of the Final EIR/EIS, some mitigation measures from the *Fresno to Bakersfield Section Final Supplemental Environmental Impact Report* (Authority 2018) and *Fresno to Bakersfield Section Final Supplemental Environmental Impact Statement* (Authority 2019) have been incorporated into the Final EIR/EIS to mitigate impacts for the portion of the alignment from immediately south of the F Street Station in Bakersfield, at the intersection of 34th Street and L Street, to Oswell Street. Those mitigation measures are identified with an abbreviation for the Fresno to Bakersfield Locally Generated Alternative, "F-B LGA."

Table 1 of the MMEP describes mitigation measures from the F-B LGA that apply to and would mitigate the adverse environmental impacts of the portion of the alignment from the intersection of 34th Street and L Street to Oswell Street only. Table 2 of the MMEP describes mitigation measures from the Bakersfield to Palmdale Project Section that would mitigate adverse environmental impacts of the entire Preferred Alternative from 34th and L Streets in Bakersfield to Spruce Court in Palmdale. These measures were developed by the Authority in consultation with appropriate agencies, as well as input from the public, to meet the requirements of CEQA and NEPA. The mitigation measures in Table 1 and Table 2 are conditions of approval that the Authority is required to comply with as it implements the Preferred Alternative.

The Preferred Alternative incorporates impact avoidance and minimization features (IAMFs) including Best Management Practices (BMP) identified in the Final EIR/EIS and described in detail in the technical reports that support the environmental document. As a result of incorporating these IAMFs, the Preferred Alternative will avoid potential adverse environmental impacts related to geology, soils, seismicity, and paleontological resources. In addition, the regulatory requirements, including permitting and coordination with regulatory agencies, for many project-related activities provide additional assurance that potential adverse environmental impacts will not occur. Three cooperating agencies are part of the NEPA review process: the U.S. Army Corps of Engineers (USACE), the Bureau of Land Management (BLM), and the Surface Transportation Board (STB). As part of the CEQA process, the responsible agencies include the California Department of Fish and Wildlife (CDFW), California Department of Transportation (Caltrans), California Public Utilities Commission, California State Lands Commission, Lahontan Regional Water Quality Control Board, San Joaquin Valley Air Pollution Control District, Eastern Kern Air Pollution Control District, and Antelope Valley Air Quality Management District. Like the mitigation measures listed in Table 1 and Table 2, the project IAMFs and compliance with regulatory requirements are a condition of project approval and must be implemented by the Authority during design, construction, and operation of the Preferred Alternative.

The IAMFs that are part of the Preferred Alternative are listed in Table 3, and they are described in Appendix 2-E, Impact Avoidance and Minimization Features of the Final EIR/EIS. Table 4 includes the applicable impact avoidance and mitigation measures (IAMM) from the Fresno to Bakersfield Supplemental EIR and Fresno to Bakersfield Supplemental EIS that apply only to the portion of the Preferred Alternative from 34th and L Streets to Oswell Street in Bakersfield. The

[1] The MMEP is consistent with CEQA requirements for mitigation monitoring as set forth in Sections 15091(d) and 15097 of the CEQA Guidelines (Title 14 California Code of Regulations, Division 6, Chapter 3).

laws and orders the Project is subject to are described for the following resource areas in more detail in the corresponding chapters of the Final EIR/EIS.

- Transportation – Section 3.2.2
- Air Quality and Global Climate Change – Section 3.3.2
- Noise and Vibration – Section 3.4.2
- Electromagnetic Fields and Electromagnetic Interference – Section 3.5.2
- Public Utilities and Energy – Section 3.6.2
- Biological and Aquatic Resources– Section 3.7.2
- Hydrology and Water Resources – Section 3.8.2
- Geology, Soils, Seismicity, and Paleontological Resources – Section 3.9.2
- Hazardous Materials and Wastes – Section 3.10.2
- Safety and Security – Section 3.11.2
- Socioeconomics and Communities – Section 3.12.2
- Station Planning, Land Use, and Development – Section 3.13.2
- Agricultural Farmland and Forest Land – Section 3.14.2
- Parks, Recreation, and Open Space – Section 3.15.2
- Aesthetics and Visual Quality – Section 3.16.2
- Cultural Resources – Section 3.17.2
- Regional Growth – Section 3.18.2
- Cumulative Impacts – Section 3.19.2

The MMEP adheres to the Council on Environmental Quality's (CEQ) regulations (40 Code of Federal Regulations Section 1505)[2] and Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register 28545, May 26, 1999) and was prepared based on the CEQ finalized guidance entitled *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact* (CEQ January 14, 2011). The CEQ guidance assists NEPA lead agencies to develop mitigation programs that provide effective documentation, implementation, and monitoring of mitigation commitments.

[2] The Council on Environmental Quality (CEQ) issued new regulations, effective September 14, 2020, updating the NEPA implementing procedures at 40 CFR 1500-1508. However, because this project initiated the NEPA process before September 14, 2020, it is not subject to the new regulations. The Authority is relying on the regulations as they existed prior to September 14, 2020. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations, pursuant to 40 CFR 1506.13 (2020) and the preamble at 85 Fed Reg. 43340.

2 MITIGATION MONITORING AND ENFORCEMENT PLAN

The environmental effects of the Preferred Alternative will result in impacts considered significant under CEQA and in impacts under NEPA. Mitigation measures that will reduce or eliminate potential adverse environmental impacts are described in Chapter 3 of Volume 1 of the Final EIR/EIS. The specific provisions contained in this MMEP are presented as tables and include mitigation measures identified in the Final EIR/EIS, organized by environmental issue and topical areas addressed in the Final EIR/EIS. In collaboration with the appropriate agencies, the Authority may refine the means by which it will implement a mitigation measure, as long as the alternative means would be equally or more effective. This MMEP describes implementation and monitoring procedural guidance, responsibilities, and timing for each mitigation measure identified in the Final EIR/EIS. Components include:

- **Impact Number and Impact Text:** Provides the impact number and description of the impact requiring mitigation as identified in the Final EIR/EIS.
- **Mitigation Measures:** Provides the number, title, and text of the mitigation measures as identified in the Final EIR/EIS.
- **Phase:** Provides the phase during which the mitigation measure will be implemented (pre-construction, during construction, post-construction, or during operation).
- **Implementation Action/Text/Mechanism:** Identifies the actions required to implement the measures, including any required agreements and/or conditions.
- **Reporting Schedule:** Identifies the stage of the project and the frequency that reporting is to occur, if reporting is required.
- **Implementing Party/Reporting Party:** Identifies the entity that will be responsible for directly implementing the mitigation measures, monitoring, and reporting. Implementation can be the responsibility of the Authority or its Design Build Contractor (Contractor). Monitoring will generally be the responsibility of the Contractor, with oversight provided by the Authority during construction. Long-term mitigation monitoring responsibilities will be the responsibility of the Authority.

The use of brackets (i.e.: [ ]) indicate text with minor corrections compared to the mitigation measures and IAMFs as presented in the Final EIR/EIS or to direct the reader where to find the figure or table that was referenced.

2.1 Roles and Responsibilities

As the lead agency and proponent of this Project, the Authority will implement the mitigation measures through its own actions, those of its Contractors, and actions taken in cooperation with other agencies and entities. The Authority is ultimately accountable for the overall administration of the MMEP and for assisting relevant individuals and parties in their oversight and reporting responsibilities. The responsibilities of mitigation implementation, monitoring, and reporting extended to several entities as discussed above; however, the Authority will bear the primary responsibility for verifying that the mitigation measures are implemented. The Authority defines the mitigation measures required for the Project. When project work is undertaken by the Authority's contractor, the Contractor shall implement the mitigation measures that are pertinent to its scope of work. The Contractor shall monitor construction activities to ensure that the mitigation measures are being properly implemented and accurately report their activity and results to the Authority. The Authority will periodically check the Contractor's activity, reports, and effectiveness of mitigation activities.

- **Authority:** While the Authority retains responsibility for the implementation and reporting on mitigation measures and IAMFs as specified in this MMEP, activities may be carried out by an Authority representative or an Authority-approved contractor. Authority responsibilities may also include certain measures outside of the scope of the Design-Build Contractor such as future studies or operations-phase implementation. In addition,

oversight of implementation and reporting may be provided by Authority contractor or representatives as lead agency representatives to facilitate regulatory oversight agency coordination and compliance during implementation and reporting.

- **Contractor:** The Design-Build Contractor (or the environmental team provided by the Design-Build Contractor) will be responsible for implementing or monitoring mitigation measures and IAMFs as specified in this MMEP.
- **Mitigation Manager:** The Design-Build Contractor's representative responsible for overseeing their environmental team's implementation and reporting of environmental commitments will be responsible for reporting the status of each mitigation measure to the Authority in accordance with this MMEP.
- **Biological Monitor(s):** The Design-Build Contractor-provided Biological Monitor(s) will be approved by and report directly to the Contractor's Biologist. The Biological Monitor(s) will be present onsite within a reasonable monitoring distance during all ground-disturbing activities that have the potential to affect biological resources as directed by the Project Biologist and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance.
- **Cultural Resources Compliance Manager/Principal Investigator:** This position must be an Archaeologist who meets relevant Secretary of the Interior qualifications for an archaeologist. The Cultural Resources Compliance Manager/Principal Investigator is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP and treatment plans, and coordinating the status of archaeological mitigation with the Authority in accordance with this MMEP, the Authority's Programmatic Agreement with the California SHPO, and the Bakersfield to Palmdale Memorandum of Agreement.
- **Cultural Resources Monitor(s):** The Design-Build Contractor-provided Cultural Resources Monitor(s) will be approved by and report directly to the Cultural Resources Compliance Manager/Principal Investigator. This/these Monitor(s) will be present onsite within a reasonable monitoring distance during ground disturbing activities in areas indicated as culturally sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Cultural Resources Compliance Manager/Principal Investigator.
- **Paleontological Resources Specialist:** The Design-Build Contractor-provided Paleontological Resources Specialist is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP including preparation of the Paleontological Resources Management Plan and approval and direction of the Paleontological Resource Monitor(s).
- **Paleontological Resources Monitor(s):** The Design Build Contractor provided Paleontological Resources Monitor(s) will be approved by and report directly to the Paleontological Resources Specialist. The Paleontological Resources Monitor(s) will be present onsite within a reasonable monitoring distance during ground disturbing activities in areas indicated as resource sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Paleontological Resources Specialist.

3 ENVIRONMENTAL MITIGATION MANAGEMENT APPLICATION (EMMA) SYSTEM

The Authority will implement an Environmental Mitigation Management Application (EMMA) system consisting of strategic planning, policies, and procedures, organizational structure, staffing and responsibilities, milestones, schedule, and resources devoted to achieving the Authority's environmental commitments. The EMMA will also include a component that tracks the implementation of mitigation measures (as well as environmental commitments, BMPs, and IAMFs) and can produce reports on compliance. The Authority will receive periodic reports on compliance and may request additional reports as necessary to ensure that the MMEP is fully implemented. This system will rely on data provided by the design-build contractor, regional consultants, and others to produce status reports regarding construction status, permitting activities, monitoring, inspections, and other compliance activities.

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Table 1 Fresno to Bakersfield Locally Generated Alternative Project Section Mitigation Monitoring and Enforcement Plan: Mitigation Measures that Apply to the Bakersfield to Palmdale Project Section from Immediately south of the F Street Station to Oswell Street in the City of Bakersfield Only

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Noise and Vibration										
F-B LGA N&V-MM#1	Construction Noise Mitigation Measures	During construction, the contractor will monitor construction noise to verify compliance with the noise limits shown in Table 3.4-1 of the (Fresno to Bakersfield Section) Final EIR/EIS. The contractor would be given the flexibility to meet the FRA construction noise limits in the most efficient and cost-effective manner. This would be done by either prohibiting certain noise-generating activities during nighttime hours or providing additional noise control measures to meet the noise limits. A noise-monitoring program will be developed to meet required noise limits, and the following noise control mitigation measures will be implemented as necessary, for nighttime and daytime: • Install a temporary construction site sound barrier near a noise source. • Avoid nighttime construction in residential neighborhoods. • Locate stationary construction equipment as far as possible from noise-sensitive sites. • During nighttime work, use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with spotters. • Use low-noise emission equipment. • Implement noise-deadening measures for truck loading and operations. • Monitor and maintain equipment to meet noise limits. • Line or cover storage bins, conveyors, and chutes with sound-deadening material. • Use acoustic enclosures, shields, or shrouds for equipment and facilities. • Use high-grade engine exhaust silencers and engine-casing sound insulation. • Prohibit aboveground jackhammering and impact pile driving during nighttime hours. • Minimize the use of generators to power equipment. • Limit use of public address systems. • Grade surface irregularities on construction sites. • Use moveable sound barriers at the source of the construction activity. • Limit or avoid certain noisy activities during nighttime hours. • To mitigate noise related to pile driving, the use of an augur to install the piles instead of a pile driver would reduce noise levels substantially. If pile driving is necessary, limit the time of day that the activity can occur.	Pre-construction/ construction	Monitoring/ reporting	Weekly	Authority/ Contractor	Contractor	Weekly monitoring construction noise/ developing and implementing noise monitoring program	Contract requirements and specifications	F-B LGA Impact N&V #1: Construction Noise F-B LGA Impact LU #1: Potential for Construction to Alter Land Use Patterns

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA N&V-MM#2	Construction Vibration Mitigation Measures	Building damage from construction vibration is only anticipated from impact pile driving at very close distances to buildings. If pile driving occurs more than 77 feet from fragile or historic buildings, 55 feet from residential structures, or if alternative methods such as push piling, auger piling, or cast-in-drill-hole (CIDH) can be used, damage from construction vibration is not expected to occur. Other sources of construction vibration do not generate high enough vibration levels for damage to occur. When a construction scenario has been established, preconstruction surveys are conducted at locations within 50 feet of pile driving to document the existing condition of buildings in case damage is reported during or after construction. The Authority will arrange for the repair of damaged buildings or will pay compensation to the property owner. Although vibration impacts would occur during construction activities, the construction activities are considered temporary, as they would cease after completion.	Pre-construction/ construction/ post-construction	Reporting/ funding	Weekly	Authority/ Contractor	Authority/ Contractor	Pre-construction surveys to establish baseline/ ongoing weekly monitoring during construction/ post-construction assessments and repairs building damage as needed	Contract requirements and specifications	F-B LGA Impact N&V #2: Construction Vibration F-B LGA Impact LU #1: Potential for Construction to Alter Land Use Patterns F-B LGA Impact PK #1: Construction Impacts on Parks, Recreation, Open Space and School District Recreation Facilities
F-B LGA N&V-MM#3	Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines	To determine the appropriate mitigation measure for properties experiencing severe noise impacts, noise mitigation guidelines would be applied as follows: • Prior to operation of the HSR, the Authority will install sound barriers where they can achieve between 5 and 15 dBA of noise reduction, depending on their height and location relative to the tracks. The primary requirements for an effective sound barrier are that the barrier must (1) be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) be of an impervious material with a minimum surface density of 4 pounds per square foot, and (3) not have any gaps or holes between the panels or at the bottom. Because many materials meet these requirements, aesthetics, durability, cost, and maintenance considerations usually determine the selection of materials for sound barriers (examples are shown in Figure 3.4-14 of the Final EIR/EIS). Depending on the situation, sound barriers can become visually intrusive. Typically, the sound barrier style is selected with input from the local jurisdiction to reduce the visual effect of barriers on adjacent lands uses. For example, sound barriers could be solid or transparent, and made of various colors, materials, and surface treatments. • The minimum number of affected sites should be at least 10, and the length of a sound barrier should be at least 800 feet. The maximum sound barrier height would be 14 feet for at-grade sections; however, all sound barriers would be designed to be as low as possible to achieve a substantial noise reduction. Berm and berm/wall combinations are the preferred types of sound barriers where space and other environmental constraints permit. On aerial structures, the maximum sound barrier height would also be 14 feet, but barrier material would be limited by engineering weight restrictions for barriers on the structure. Sound barriers on the aerial structure will still be designed to be as low as possible to achieve a substantial noise reduction. Sound barriers on both aerial structures and at-grade structures could consist of solid, semitransparent or transparent materials. • The Authority will work with the communities to identify how the use and height of sound barriers would be determined using jointly developed performance criteria. Other solutions may result in higher numbers of residual impacts than reported herein. Options may be to reduce the height of sound barriers and combine barriers with sound insulation or to accept higher noise thresholds than the FRA's current noise thresholds.	Pre-construction/ construction/ post-construction	Design	Weekly	Authority/ Contractor	Authority/ Contractor	Implement sound barriers as needed or acquire easements on properties severely affected by noise	Contract requirements and specifications/ California High-Speed Rail Project Noise Mitigation Guidelines	F-B LGA Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers F-B LGA Impact N&V #6: Traffic Noise F-B LGA Impact PK #4: Project Changes to Park Character F-B LGA Impact BIO #6: Project Effects on Special Status Wildlife Species Direct Effects

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• If sound walls are not proposed or do not reduce sound levels to below a severe impact level, building sound insulation can be installed. Sound insulation of residences and institutional buildings to improve the outdoor-to-indoor noise reduction is a mitigation measure that can be provided when the use of sound barriers is not feasible in providing a reasonable level (5 to 7 dBA) of noise reduction. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where sound barriers are not feasible or desirable and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to windows, by sealing holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air conditioning so that windows do not need to be opened. Performance criteria would be established to balance existing noise events and ambient roadway noise conditions as factors for determining mitigation measures. • If sound barriers or sound insulation is not effective, the Authority can acquire easements on properties severely affected by noise. Another option for mitigating noise impacts is for the Authority to acquire easements on residences likely to be impacted by HSR operations in which the homeowners would accept the future noise conditions. This approach is usually taken only in isolated cases where other mitigation options are infeasible, impractical, or too costly.								
F-B LGA N&V-MM#4	Vehicle Noise Specification	In the procurement of an HSR vehicle technology, the Authority will require bidders to meet the federal regulations (40 CFR Part 201.12/13) at the time of procurement for locomotives (currently a 90-dBA-level standard), for cars operating at speeds of greater than 45 mph. Depending on the available technology, this could significantly reduce the number of impacts throughout the corridor.	Post-construction	HSR vehicle purchasing	Prior to HSR operation	Authority	Authority	HSR vehicle noise specification	Contract requirements and specifications	F-B LGA Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers
F-B LGA N&V-MM#5	Special Track Work	Because the impacts of HSR wheels over rail gaps at turnouts increases HSR noise by approximately 6 dBA over typical operations, turnouts can be a major source of noise impacts. If the turnouts cannot be moved from sensitive areas, the project can use special types of trackwork that eliminate the gap. Table 3.4-29 [of the Fresno to Bakersfield Section Final Supplemental EIR/EIS] provides additional mitigation measures that would reduce operational vibration levels when the train, railway, and railway structures are already in good condition. As shown in Table 3.4-29, mitigation would take place at the source, sensitive receptor, or along the propagation path from the source to the sensitive receptor. If mitigation measures provided in Table 3.4-29 are not feasible, the Authority would attempt to negotiate a vibration easement with property owners or the Authority would negotiate to relocate the property owner outside of the area subject to significant vibration impacts.	Pre-construction	Design	Prior to final design	Authority/ Contractor	Authority/ Contractor	Special track work as per Table 3.4-29 [of the Fresno to Bakersfield Section Final Supplemental EIR/EIS]	Contract requirements and specifications	F-B LGA Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers F-B LGA Impact N&V #5: Impacts from Project Vibration

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA N&V-MM#6	Additional Noise and Vibration Analysis Following Final Design	If final design or final vehicle specifications result in changes to the assumptions underlying the noise and vibration analysis (including analysis regarding resident and business displacements), reassess noise and vibration impacts and recommendations for mitigation and provide supplemental environmental documentation, as required by law. Several single-family homes will be subject to traffic peak-hour noise levels in excess of 66 dBA Leq. These noise levels would exceed the Caltrans Noise Abatement Criteria and potentially require the preparation of Noise Study Reports and noise abatement measures. In determining the reasonableness of abatement, FHWA highway traffic noise regulation requires, among other factors, the feasibility of the noise mitigation measure as well as the consideration of the viewpoints of the affected residents and property owners. Feasibility generally deals with considering whether it is possible to build an abatement measure, given site constraints; and whether the abatement measure provides a minimum reduction in noise levels. Feasibility also requires that all of the homes potentially affected face the roadway from which the noise emanates. As a result, noise mitigation measures would be infeasible for any home with a driveway for which access must be maintained. The sound barrier would not be continuous, and subsequently would not provide the minimum 5 dBA of noise reduction. A noise abatement measure is not feasible unless the measure achieves a noise reduction of at least 5 dBA for front-row receivers. Highway sound barriers are designed to protect areas of "frequent human use," which generally do not include the front yards of homes. Caltrans does not generally put sound barriers across the front yards of homes because they are acoustically infeasible and because most homeowners wish to maintain the views from the fronts of their homes.	Pre-construction	Design	Prior to construction/ prior to final vehicle specification	Authority (vehicle)/ Contractor	Authority (vehicle)/ Contractor	Reassessment of noise and vibration impacts and recommended mitigation following final design	Submit assessment and supplemental environmental documentation	F-B LGA Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers F-B LGA Impact N&V #6: Traffic Noise
F-B LGA N&V-MM#7	Station, Maintenance of Infrastructure Facility, and Traction Power Supply Station	In order to reduce the noise from the facilities, the following noise mitigation measures are recommended: • Enclose as many of the activities within the facility as possible. • Eliminate windows in the building that would face toward noise-sensitive land uses adjacent to the facility. If windows are required to be located on the side of the facility facing noise-sensitive land uses, they should be the fixed type of windows with a sound transmission class (STC) rating of at least 35. If the windows must be operable, they should be closed during nighttime activities. • Close facility doors where the rails enter the facility during nighttime activities. • Tracks that cannot be located within the facility should be located on the far side of the facility from adjacent noise-sensitive receivers. • For tracks that cannot be installed away from noise-sensitive receivers, install sound barriers along the maintenance tracks in order to protect the adjacent noise-sensitive receivers. • All mechanical equipment (compressors, pumps, generators, etc.) should be located within the facility structure. • Any mechanical equipment located exterior to the facility (compressors, pumps, generators, etc.) should be located on the far side of the facility from adjacent noise-sensitive receivers. If this is not possible, this equipment should be located within noise enclosures to mitigate the noise during operation. • All ventilation ducting for the facility should be pointed away from the adjacent noise-sensitive receivers.	Pre-construction/ operation	Design/ facility operation	Prior to final design/ during facility operation	Authority/ Contractor	Authority/ Contractor	Reduce noise from the facilities	Contract requirements and specification	F-B Impact LGA N&V #7: Noise Impacts from HSR Stationary Facilities F-B LGA Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers F-B LGA Impact N&V #6: Traffic Noise

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Biological and Aquatic Resources										
F-B LGA BIO-MM#1	Designate Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s), and Project Biological Monitor(s)	A Project Biologist shall be designated by the Environmental Compliance Manager to oversee regulatory compliance requirements and monitor the restoration activities associated with ground-disturbing activities in accordance with the adopted mitigation measures and applicable laws. The Project Biologist, Regulatory Specialist, and Project Botanist are responsible for the timely implementation of the biological mitigation measures as outlined in the MMEP, construction documents, and pertinent resource agency permits. Resumes for the Designated Project Biologist(s), Regulatory Specialists (Waters), and Project Botanists, and Project Biological Monitors(s) must be submitted to the USFWS during final design. Additional duties of the Project Biologist Regulatory Specialist (Waters) and Project Botanist include reviewing design documents and construction schedules, determining project biological monitoring needs, and guiding and directing the work of the Project Biological Monitors. The duties of the Project Biological Monitor include monitoring construction crew activities, as needed, to document applicable mitigation measures and permit conditions. The Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s) and the Project Biological Monitor(s) report to the Mitigation Manager. The Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s) and/or the Project Biological Monitor(s) may require special approval from the USFWS and CDFW to implement certain mitigation measures. In these circumstances, they are referred to as agency-approved biologist(s).	Pre-construction	Surveying/ monitoring/ reporting	Prior to construction initiation	Authority/ Contractor/ Project Biologist, Regulatory Specialist, and Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Biologist, Regulatory Specialist, and Project Botanist/ Mitigation Manager	Designate Project Biologist(s), Regulatory Specialist(s) (Waters), Project Botanist(s), and Project Biological Monitor(s) and provide resumes to regulatory agencies as required	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#2	Regulatory Agency Access	If requested, before, during, or on completion of ground-disturbing activities, the Contractor will allow access by USFWS, USACE, SWRCB, and CDFW staff to the construction site. Because of safety concerns, all visitors will be required to check in with the Contractor before accessing the construction site. If agency personnel access the construction site, the Project Biologist will prepare a memorandum within 1 day of the visit to document agency access and the issues raised during the field meeting. This memorandum will be submitted to the Mitigation Manager. Any non-compliance issues will be reported to the Contractor and Authority.	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	1 day following agency site visit	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Submit memorandum within 1 day of regulatory agency site visit to document field meeting	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#3	Prepare and Implement a Worker Environmental Awareness Program	Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters) and Project Botanist will prepare and implement a WEAP for construction crews. WEAP training materials will include the following: discussion of the federal Endangered Species Act (federal ESA), the California Endangered Species Act (CESA), the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), and the Clean Water Act (CWA); the consequences and penalties for violation or noncompliance with these laws and regulations and project permits; identification of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of mitigation measures. In the WEAP, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. A factsheet conveying this information will be prepared by the Project Biologist, Regulatory Specialist (Waters) and Project Botanist for distribution to the construction crews and to others who enter the construction footprint. On completion of the WEAP training, construction crews will sign a form stating that they attended the training, understood the information presented, and will comply with the WEAP requirements. The Project Biologist, Regulatory Specialist (Waters) and Project Botanist will submit the signed WEAP training forms to the Mitigation Manager on a monthly basis. Construction crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Project Biologist, Regulatory Specialist (Waters) and Project Botanist travel within the marked project site will be restricted to established roadbeds. Established roadbeds include all pre-existing and project-constructed unimproved and improved roads.	Pre-construction/ construction	Surveying/ monitoring/ reporting.	Monthly	Authority/ Contractor/ Project Biologist/ Regulatory Specialist (Waters)/ Project Botanist/ Mitigation Manager	Contractor/ Project Biologist/ Regulatory Specialist (Waters)/ Project Botanist/ Mitigation Manager	Prepare and implement a WEAP for construction crews prior to start of construction; submit signed WEAP training forms to the Mitigation Manager on monthly basis	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#4	Prepare and Implement a Weed Control Plan and Annual Vegetation Management Plan	A construction-phase Weed Control Plan and an operation phase Annual Vegetation Control Plan will be developed and implemented. Before the start of ground-disturbing activities, the Project Botanist will prepare and oversee the implementation a Weed Control Plan to minimize or avoid the spread of weeds during ground-disturbing activities. The Weed Control Plan will address the following: Schedule for noxious weed surveys to be conducted in coordination with the Biological Resources Management Plan (BRMP) (BIO-MM#5). The success criteria for noxious and invasive weed control, as established by a qualified biologist. The success criteria will be linked to the Biological Resources Management Plan [BRMP] (BIO-MM#5) standards for onsite work during construction. In particular, the criteria will limit the introduction and spread of highly invasive species, as defined by the California Invasive Plant Council (CalIPC), to less than or equal to the pre-disturbance conditions in areas temporarily impacted by construction activities. If invasive species cover is found to exceed by 10% the pre-disturbance conditions during monitoring—or is 10% more compared with a similar, nearby reference site with similar vegetation communities and management—a control effort will be implemented. If the target, or other success criteria identified in the Comprehensive Mitigation and Monitoring Plan (CMMP), has not been met by the end of the BRMP monitoring and implementation period, the Authority or its designee will continue the monitoring and control efforts, and remedial actions would be identified and implemented until the success criteria are met. Depending on monitoring results, additional or revised measures may be	Pre-construction/ construction/ post-construction/ operation	Design/ surveying/ monitoring/ reporting	Prior to construction initiation/ monthly reporting	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Prepare and implement Weed Control Plan and Annual Vegetation Management Plan; monthly reporting to document implementation	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		needed to ensure that the introduction and spread of noxious weeds are not promoted by the construction and operation of the project. Provisions to ensure that the development of the Weed Control Plan will be coordinated with development of the Restoration and Revegetation Plan (RRP) (BIO-MM#6) so that the RRP incorporates measures to reduce the spread and establishment of noxious weeds, and incorporates percent cover of noxious weeds into revegetation performance standards. Identification of weed control treatments, including the use of permitted herbicides, and manual and mechanical removal methods. Herbicide application will be restricted from use in Environmentally Sensitive Areas and on compensatory mitigation sites, which are defined in BIO-MM#7, Delineate Environmentally Sensitive Area and Environmental Restricted Area (on plans and in field). Determination of timing of the weed control treatment for each plant species. Identification of fire prevention measures. During operation, the Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property [Caltrans 2014]. Vegetation would be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. A separate plan, the Annual Vegetation Control Plan, would also be developed each winter for implementation no later than April 1 of each year. That plan would consist of site-specific vegetation control methods, as outlined below: Chemical vegetation control noting planned usage. Mowing program. Other non-chemical vegetation control plans (manual, biological, cultural, thermal (includes the use of propane heat or steam and is not specific to controlled burning) and structural). List of sensitive areas. Other chemical pest control plans (e.g., insects, snail, rodent). Only Caltrans-approved herbicides will be used in the vegetation control program. Pesticide application will be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide control of noxious/invasive weeds if established by local agencies. Farmers/landowners who request weed control on state right-of-way that is not identified in the annual vegetation control plan will be encouraged to submit a permit request application for weed control that identifies the target weeds and control method desired. The Contractor will implement the Weed Control Plan during the construction period. The Authority will require that HSR maintenance crews follow the guidelines in the Weed Control Plan and Annual Vegetation Control Plan during project operation. The Authority or its designee will appoint the responsible party during the operations period to ensure the Annual Vegetation Control Plan is being carried out appropriately and effectively. A monthly memorandum will be prepared by the Project Botanist to document the progress of the plan and its implementation.								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#5	Prepare and Implement a Biological Resource Management Plan	During final design, the Mitigation Manager, or its designee (Project Biologist, Regulatory Specialist or Project Botanist) will prepare the Biological Resources Management Plan (BRMP) and assemble the biological resources mitigation measures. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP will also include habitat replacement and revegetation, protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. The parameters for the BRMP will be formed with the mitigation measures from this project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB, and CDFW permits. The goal of the BRMP is to provide an organized reporting tool to ensure that the mitigation measures and terms and conditions are implemented in a timely manner and are reported on. These measures, terms, and conditions include all avoidance, minimization, repair, mitigation, and compensatory actions stated in the mitigation measures or terms and conditions from the permits referenced above. These measures, terms, and conditions are tracked through final design, implementation, and post-construction phases. The BRMP will help the long-term perpetuation of biological resources within the temporarily disturbed areas and protect adjacent targeted habitats. The BRMP will be submitted to the Contractor and will contain, but not be limited to, the following information: a. A master schedule that shows that construction of the project, Pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources. b. Specific measures for the protection of special-status species. c. Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored. d. Procedures for vegetation analyses of temporarily affected habitats to approximate their relative composition and procedures for site preparation, irrigation, planting, and maintenance. This information may be used to determine the requirements of the revegetation areas for both onsite temporary impacts and offsite compensatory sites. e. Sources of plant materials and methods of propagation. f. Identification of specific parameters consistent with mitigation ratios and permit conditions for determining the amount of replacement habitat for temporary disturbance areas. g. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas. h. Specification of performance standards for the re-established plant communities within the construction limits. i. Specification of the remedial measures to be taken if performance standards are not met (e.g., a form of adaptive management). j. Methods and requirements for monitoring restoration/replacement efforts, which will be a combination of qualitative and quantitative data consistent with mitigation measures and permit conditions. k. Measures to preserve topsoil and control erosion.	Pre-construction/ construction/ post-construction	Design/ surveying/ monitoring/ reporting	Monthly or in accordance with reporting schedule established by agency agencies	Authority/ Contractor/ Mitigation Manager, Project Biologist, Regulatory Specialist or Project Botanist/ Mitigation Manager	Authority/ Contractor/ Mitigation Manager, Project Biologist, Regulatory Specialist or Project Botanist/ Mitigation Manager	Prepare and implement BRMP; monthly reporting to document implementation	Condition of the design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		l. Design of protective fencing around Environmentally Sensitive Areas (ESA), environmentally restricted areas (ERA), and the construction staging areas. m. Specification of the locations and quantities of gallinaceous guzzlers (catch basin/artificial watering structures) and the monitoring of water levels in them. n. Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees. o. Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas. p. Specific construction monitoring programs for habitats of concern and special-status species, as needed. q. Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements. r. Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring procedures will (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s),and (4) identify the reporting requirements.								
F-B LGA BIO-MM#6	Prepare and Implement a Restoration and Revegetation Plan	During final design, the Project Botanist will prepare a Restoration and Revegetation Plan (RRP) for temporarily disturbed upland communities. (Site restoration will also be conducted to restore temporary impacts on valley foothill riparian areas [BIO-MM#47] and jurisdictional waters [BIO-MM#48].) In the RRP, impacts on habitat subject to temporary ground disturbances that will require decompaction or regrading will be addressed, if appropriate. The Project Biologist will approve the seed mix. The standards for onsite work during construction will limit highly invasive species, as defined by the California Invasive Plant Council, to less than 10% greater than the pre-disturbance condition or as determined through a comparison with an appropriate reference site with similar natural communities and management. During ground-disturbing activities, the Contractor will implement the RRP in temporarily disturbed areas. The Project Biologist will prepare and submit compliance reports to the Mitigation Manager to document implementation and performance of the RRP.	Pre-construction/ construction/ post-construction	Design/ surveying/ monitoring/ reporting	Prior to construction/ monthly reporting	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Prepare and implement RRP/ monthly reporting to document implementation	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#7	Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field)	Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist will verify that ESAs and ERAs are delineated on final construction plans (including grading and landscape plans) and in the field and will update as necessary. ESAs are areas within the construction zone, or on compensatory mitigation sites, containing suitable habitat for special-status species and habitats of concern that may allow construction activities but have restrictions based on the presence of special-status species or habitats of concern at the time of construction. ERAs are sensitive areas that are typically outside the construction footprint that must be protected in place during all construction activities. Before and during the implementation of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist, will mark ESAs and ERAs with high-visibility temporary fencing, flagging, or other agency-approved barriers to prevent encroachment of construction personnel and equipment. Sub-meter accurate Global Positioning System (GPS) equipment will be used to delineate all ESAs and ERAs. The Contractor will remove ESA and ERA fencing when construction is complete or when the resource has been cleared according to agency permit conditions in the MMRP and construction drawings and specifications. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist will submit a memorandum regarding the field delineation and installation of all ESAs/ERAs to the Mitigation Manager.	Pre-construction/ construction	Design/ surveying/ monitoring/ reporting	Prior to construction/ reporting upon delineation and installation	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), and Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), and Project Botanist/ Mitigation Manager	Identify and establish ESAs and ERAs/ reporting to document delineation and installation	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#8	Wildlife Exclusion	The Contractor, under the supervision of the Project Biologist, will install wildlife-specific exclusion barriers at the edge of the construction footprint. Exclusion barriers will be made of durable material, regularly maintained, and installed below-grade by the Contractor under the supervision of the Project Biologist. Wildlife exclusion fencing will be installed along the outer perimeter of ESAs and ERAs and below-grade (e.g., 6 to 10 inches below-grade). The design specifications of the exclusion fencing will be determined through consultation with USFWS and/or CDFW. The wildlife exclusion barrier will be monitored, maintained at regular intervals throughout construction, and removed after the completion of major construction activities. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Design/ surveying/ monitoring/ reporting	Monthly or as established by agency permit requirements	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Install wildlife-specific exclusion barriers/ reporting to document compliance	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#9	Equipment Staging Areas	Before the start of ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), and Project Botanist will confirm that staging areas for construction equipment are outside areas of sensitive biological resources, including habitat for special-status species, habitats of concern, and wildlife movement corridors, to the extent feasible. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist will submit a memorandum to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by agency permit requirements	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), and Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), and Project Botanist/ Mitigation Manager	Confirm construction equipment staging areas for are outside sensitive biological resources areas/ reporting to document compliance	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

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F-B LGA BIO-MM#10	Mono-Filament Netting	Before and during the implementation of ground-disturbing activities, the Project Biologist will verify that the Contractor is not using plastic mono-filament netting (erosion-control matting) or similar material in erosion control materials; acceptable substitutes include coconut coir matting, tackified hydroseeding compounds, rice straw wattles (e.g., Earthsaver wattles: biodegradable, photodegradable, burlap), and other reusable erosion, sediment, and wildlife control systems that may be approved by the regulatory agencies (e.g., ERTEC Environmental Systems products). The Project Biologist will submit memoranda to the Mitigation Manager to document compliance with this measure; the memoranda will be submitted monthly or as appropriate throughout project construction.	Pre-construction/ construction	Design/ surveying/ monitoring/ reporting	Prior to construction/ monthly reporting	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Verify Contractor is not using plastic mono-filament netting or similar in erosion control materials/ monthly reporting to document compliance	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#11	Vehicle Traffic	During ground-disturbing activities, the contractor will restrict project vehicle traffic within the construction area to established roads, construction areas, and other designated areas. The contractor will establish vehicle traffic in locations disturbed by previous activities to prevent further adverse effects, require observance of a 15 mile per hour (mph) speed limit for construction areas with potential special-status species habitat, clearly flag and mark access routes, and prohibit off-road traffic. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure; memoranda will be submitted on a weekly basis or as appropriate throughout project construction.	Construction	Surveying/ monitoring/ reporting	Weekly reporting	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Contractor/ Project Biologist/ Mitigation Manager	Restrict project vehicle traffic/ weekly reporting to document compliance	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#12	Entrapment Prevention	To prevent inadvertent entrapment of protected species, the Contractor, under the guidance of the Project Biologist, will cover all excavated, steep-sided holes or trenches more than 8 inches deep at the close of each work day with plywood or similar materials or provide a minimum of one escape ramp per 10 feet of trenching (with slopes no greater than a 3:1) constructed of earth fill or wooden planks. The Project Biologist will thoroughly inspect holes and trenches for trapped animals before leaving the construction site each day. The Contractor will either screen, cover, or store more than 1 foot off the ground all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored at the construction site for one or more overnight periods and these pipes, culverts, and similar structures will be inspected by the Project Biologist for wildlife before the material is moved, buried, or capped. The Project Biologist will clear stored material reserved for common and special-status wildlife species before the pipe is subsequently buried, moved, or capped (covered). The Project Biologist will submit memoranda to the Mitigation Manager to document compliance with this measure; the memoranda will be submitted on a weekly basis or as appropriate throughout project construction.	Construction	Surveying/ monitoring/ reporting	Weekly reporting	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Prevent entrapment of protected species by covering holes; provide escape ramps; inspect holes for trapped animals; cover pipe, culverts, and similar structures; check stored material for animals prior to use/ weekly reporting to document compliance	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#13	Work Stoppage	During ground-disturbing activities, the Project Biologist, Regulatory Specialist (Waters), Project Botanist or Biological Monitor will halt work in the event that a special-status wildlife species gains access to the construction footprint. This work stoppage will be coordinated with the resident engineer and/or the Authority or its designee. The Contractor will suspend ground-disturbing activities in the immediate construction area where the potential construction activity could result in "take" of special-status wildlife species or until non-listed species, including mammals, are relocated; work may continue in other areas. Written permission will be obtained from CDFW to relocate any non-listed mammals before their being relocated. The Contractor will continue the suspension until the individual leaves voluntarily, or is relocated to a release area using USFWS- and/or CDFW-approved handling techniques and relocation methods, or as required by USFWS or CDFW. The Project Biologist, Regulatory Specialist (Waters), and Project Botanist will submit a memorandum to the Mitigation Manager to document compliance within 1 day of the work stoppage and subsequent action.	Construction	Surveying/ monitoring/ reporting	1 day following work stoppage	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), Project Botanist or Biological Monitor/ Mitigation Manager	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Waters), Project Botanist or Biological Monitor/ Mitigation Manager	Stop work if special-status wildlife species enters construction area/ relocate animal (if possible)/ report 1 day following work stoppage	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#14	"Take" Notification and Reporting	The Project Biologist, Regulatory Specialist (Water), or Project Botanist will immediately notify the Mitigation Manager in the event of an accidental death or injury to a federal- or state-listed species during project activities. The Project Biologist will then notify USFWS and/or CDFW within 24 hours in the event of an accidental death or injury to a federal- or state-listed species during project activities. The Project Biologist will submit a memorandum to the Mitigation Manager to document compliance with this measure. The memorandum will also identify suggested revisions to the construction activities or additional measures that will be implemented to minimize or prevent future impacts.	Construction	Surveying/ monitoring/ reporting	Immediately notify Mitigation Manager/ notify USFWS and/or CDFW within 24 hours	Authority/ Contractor/ Project Biologist, Regulatory Specialist (Water), or Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Immediately notify Mitigation Manager of death or injury to a federal- or state-listed species/ notify USFWS and/or CDFW within 24 hours/ document compliance	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#15	Post-Construction Compliance Reports	After each construction package, construction phase, permitting phase, or other portion of the HSR section as defined by Authority is completed, the Mitigation Manager, or their designee, will submit post-construction compliance reports consistent with the requirements of the protocols of each appropriate agency (e.g., UFSWS, CDFW), including compliance with regulatory agency permits. The Mitigation Manager will submit a memorandum to the regulatory agencies to document compliance with this measure. The frequency of the memorandum compilation and submission will be consistent with the requirements in the regulatory agency permits.	Post-construction	Reporting	In accordance with reporting schedule established by agency permit requirements	Authority/ Contractor/ Mitigation Manager	Authority/ Contractor/ Mitigation Manager	Submit memorandum to regulatory agencies documenting compliance	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#16	Conduct Protocol-Level Pre-Construction Surveys for Special-Status Plant Species and Special Status Plan Communities	The Project Botanist will conduct protocol-level, Pre-construction botanical surveys for special-status plant species and special-status plant communities in all potentially suitable habitats where permission to enter was not granted during the spring and summer 2010 field surveys or 2011 supplemental surveys. The surveys will be conducted during the appropriate blooming period(s) for the species before the start of ground-disturbing activities for salvage and relocation activities. The Project Botanist will mark the locations of all special-status plant species and special-status plant communities observed for the Contractor to avoid. Before the start of ground-disturbing activities, all populations of special-status plant species and special-status plant communities identified during Pre-construction surveys within 100 feet of the construction footprint will be protected and delineated by the Contractor (directed by the Project Botanist) as ERAs. As appropriate, the Project Botanist will update the mapping of special-status species or habitats of concern within the construction limits based on resource agency permits. Portions of the construction footprint that support special-status plant species that will be temporarily disturbed will be restored onsite to Pre-construction conditions. Before disturbance, Pre-construction conditions, including species composition, species richness, and percent cover of key species will be documented, and photo points will be established. If special-status plant species cannot be avoided, mitigation for impacts on these species will be documented (density, percent cover, key habitat characteristics, including soil type, associated species, hydrology, topography, and photo documentation of Pre-construction conditions) and incorporated into are location/compensation program, as defined in BIO-MM#17. The Project Botanist will provide verification of survey results and report findings through a memorandum to the Mitigation Manager to document compliance with this measure.	Pre-construction	Surveying/ monitoring/ reporting	Report findings at least 30 days prior to ground disturbance	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Conduct protocol-level surveys for special-status plant species and communities in areas not surveyed in 2010-2011/ report findings/ restore temporary disturbed areas	Condition of design-build contract following requirements established by regulatory compliance permits	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#17	Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special Status Plant Species	The Project Botanist will prepare a plan before the start of ground-disturbing activities to address monitoring, salvage, relocation, and propagation of special-status plant species. The relocation or propagation of plants and seeds will be performed at a suitable mitigation site approved by the appropriate regulatory agencies, and as appropriate per species. Documentation will include provisions that address the techniques, locations, and procedures required for the successful establishment of the plant populations. The plan will include provisions for performance that address survivability requirements, maintenance, monitoring, implementation, and the annual reporting requirements. Permit conditions issued by the appropriate resource agencies (e.g., USFWS, CDFW) will guide the development of the plan and performance standards. The Project Botanist will submit a memorandum to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	In accordance with agency permit requirements	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Prepare and implement monitoring, salvage, relocation, and propagation of special-status plant species/ report findings	Condition of design-build contract	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#22	Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species	Before the start of ground-disturbing activities, the Project Biologist will conduct Pre-construction surveys in suitable habitats to determine the presence or absence of special-status reptiles and amphibian species within the construction footprint. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities and will be phased with project build-out. The results of the Pre-construction survey will be used to guide the placement of the environmentally sensitive areas, ERAs, and wildlife exclusion fencing. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Presence-absence surveys of special-status reptiles and amphibian species within the construction footprint conducted pre-construction and during construction/ report findings	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#23	Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation	During ground-disturbing activities, the Project Biological Monitor will observe all construction activities in habitat that supports special-status reptiles and amphibians. If suitable habitat is present and environmentally sensitive areas are deemed necessary, the Project Biological Monitor will conduct a clearance survey within the area for special-status reptiles and amphibians after wildlife exclusion fencing is installed. If a special-status reptile or amphibian is present during construction, the Contractor will avoid the special-status reptile or amphibian specie. Otherwise, the Project Biological Monitor will relocate special-status reptiles or amphibians (other than California tiger salamander) found in the Environmentally Sensitive Area or construction footprint to an area outside the construction area as determined through consultation with USFWS and/or CDFW. If necessary, clearance surveys will be conducted daily. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biological Monitor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biological Monitor/ Project Biologist/ Mitigation Manager	Clearance surveys as needed for special-status reptiles and amphibians/ avoidance or relocation of such species/ report findings	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#29	Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds	Before the start of ground-disturbing activities, the Project Biologist will conduct visual Pre-construction surveys where suitable habitats are present for nesting birds protected by the MBTA if construction and habitat removal activities are scheduled to occur during the bird breeding season (February 1 to August 15). In the event active bird nests are encountered during the Pre-construction survey, the Project Biologist in conjunction with the Contractor will establish nest avoidance buffer zones as appropriate. The buffer distances will be consistent with the intent of the MBTA. The Project Biologist will delineate nest avoidance buffers established for ground-nesting birds in a manner that does not create predatory bird perch points in close proximity (150 feet) to the active nest site. The Project Biologist or Biological Monitor will periodically monitor active bird nests. The Project Biologist will maintain the nest avoidance buffer zone until nestlings have fledged and are no longer reliant on the nest or parental care for survival or the nest is abandoned (as determined by the Project Biologist). The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Biological Monitor/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Biological Monitor/ Mitigation Manager	Visual pre-construction surveys in suitable habitats for nesting birds/ establish nest avoidance buffer zones/ monitor active bird nests/ report findings	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#30	Conduct Preconstruction Surveys and Monitoring for Raptors	No more than 14 days before the start of ground-disturbing activities, the Project Biologist will conduct visual Pre-construction surveys where suitable habitats are present for nesting raptors if construction and habitat removal activities are scheduled to occur during the bird-breeding season (February 1 to August 15). Surveys will be conducted in areas within the construction footprint and, where permissible, within 500 feet of the construction footprint for raptor species (not Fully Protected species) and 0.5 mile of the construction footprint for Fully Protected raptor species. The required survey dates will be modified based on local conditions. If breeding raptors with active nests are found, the Project Biologist in conjunction with the Contractor will establish a 500-foot buffer around the nest to be maintained until the young have fledged from the nest and are no longer reliant on the nest or parental care for survival or the nest fails (as determined by the Project Biologist).If fully protected raptors (e.g., white tailed-kite) with active nests are found, the Project Biologist in conjunction with Contractor will establish a 0.5-mile buffer around the nest to be maintained until the young have fledged from the nest or the nest fails (as determined by the Project Biologist). Adjustments to the buffer(s) will require prior approval by USFWS and/or CDFW. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Visual pre-construction surveys in suitable habitats for nesting raptors/ establish nest avoidance buffer zones/ monitor active raptor nests/ report findings	Condition of design-build contract	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#31	Bird Protection	During Final Design, the Project Biologist will verify that the catenary system, masts, and other structures such as fencing are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006) and Reducing Avian Collisions with Power Lines: State of the Art in 2012 (APLIC 2012). The Project Biologist will check the final design drawings and submit a memorandum to the Mitigation Manager to document compliance with this measure.	Pre-construction	Final design	After final design check	Authority/ Project Biologist/ Mitigation Manager	Authority/ Project Biologist/ Mitigation Manager	Verify structures are bird- and raptor-safe in accordance with APLIC guidance/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#32	Conduct Protocol and Preconstruction Surveys for Swainson's Hawks	The Project Biologist will conduct Pre-construction surveys for Swainson's hawks as described in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee [SHTAC] 2000). Surveys will be performed during the nesting season (March 1 through August 1) in the year before ground-disturbing activities within the construction footprint and within a 0.5-mile buffer, where access is permitted. The Pre-construction nest surveys following the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee 2000) will be phased with project build-out. The Pre-construction surveys will determine the status (i.e., active, inactive) of observed nests. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Pre-construction surveys for nesting Swainson's hawks/ monitor active nests/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#33	Swainson's Hawk Nest Avoidance and Monitoring	If active Swainson's hawk nests (defined as a nest used one or more times in the last 5 years) are found within 0.5-mile of the construction footprint during the nesting season (March 1 to August 1), the active nests within the 0.50-mile buffer of the construction footprint will be monitored daily by the Project Biological Monitor to assess whether the nest is occupied. If the nest is occupied, the health and status of the nest will be monitored until the young fledge or for the length of construction, whichever occurs first. The Project Biologist in conjunction with the Contractor, will implement buffers restricting construction activities, following CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California (CDFG 1994). Adjustments to the buffer(s) may be made in consultation with CDFW. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Project Biological Monitor/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Monitor active Swainson's hawk nests/ establish nest avoidance buffer zones/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#34	Monitor Removal of Nest Trees for Swainson's Hawk	Before the start of ground-disturbing activities, the Project Biological Monitor will monitor nest trees for Swainson's hawks in the construction footprint following the guidelines and methods presented in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (SHTAC 2000). If an occupied Swainson's hawk nest must be removed, the Authority will obtain take authorization through a Section 2081 Incidental Take Permit (including compensatory mitigation to offset the loss of the nest tree) from CDFW. If ground-disturbing activities or other project activities may cause nest abandonment by a Swainson's hawk or forced fledging within the specified buffer area, monitoring of the nest site by the Project Biological Monitor will be conducted to determine if the nest is abandoned. Removal of nesting trees outside of the nesting season (generally between October 1 and February 1) does not require authorization under the Section 2081 Incidental Take Permit. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Project Biological Monitor/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Project Biological Monitor/ Mitigation Manager	Monitor Swainson's hawk nest trees/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#35	Conduct Protocol Surveys for Burrowing Owls	Before the start of ground-disturbing activities a qualified, agency-approved biologist, designated by the Project Biologist, will conduct protocol-level surveys in accordance with CDFW's Staff Report on [Burrowing Owl] Mitigation [CDFW 2012]. The Project Biologist or designee will conduct these surveys at appropriate timeframes within suitable habitat located in the construction footprint. Results of the surveys will be used to inform BIO-MM#36. These surveys will be conducted within suitable habitat of the construction footprint and within a 150-meter (approximately 500-foot) buffer. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Protocol-level surveys for burrowing owls/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#36	Burrowing Owl Avoidance and Minimization	The Project Biologist will implement burrowing owl avoidance and minimization measures following CDFW's Staff Report on Burrowing Owl Mitigation [CDFW 2012]. During the nesting season (February 1 through August 31) occupied burrowing owl burrows will not be disturbed unless it is verified that either the birds have not begun egg-laying and incubation or the juveniles from the occupied burrows are foraging independently and are capable of independent survival (as determined by the Project Biologist). Unless otherwise authorized by CDFW, the Project Biologist in conjunction with the Contractor, will establish buffers (as an ESA) between the construction work area and occupied burrowing owl nesting sites as described in Table 3.7-19 [of the Final EIR/EIS]. Adjustments to the buffer(s) will require prior approval by CDFW. Eviction of burrowing owls outside the nesting season may be permitted pending evaluation of eviction plans and receipt of formal written approval from the CDFW authorizing the eviction. If burrowing owls must be moved from the project area, the Project Biologist will undertake passive relocation measures, including monitoring, in accordance with CDFW's (CDFW 2012) guidelines. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure. California Department of Fish and Wildlife recommended restricted activity dates and setback distances by level of disturbance for burrowing owls is noted below: • Location Time of Year Level of Disturbance • Low Medium High • Nesting Sites April 1–Aug 15 200 meters 500 meters 500 meters • Nesting Sites Aug 16–Oct 15 200 meters 200 m 500 meters • Nesting Sites Oct 16–March 31 50 meters 100 meters 500 meters	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Establish buffers between work area and occupied burrowing owl nesting sites/ passive relocation as needed/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#37	Conduct Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	Before the start of construction, the Project Biologist will conduct a habitat assessment in potentially suitable habitat within the project footprint to determine presence of special-status small mammal species burrows or their signs. The habitat assessment surveys will be conducted within 2 years, and no more than 14 days before the start of construction or ground-disturbing activities and may be phased with project build-out. If no burrows or signs of special-status small mammal species are detected, no further measures will be required. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct habitat assessment surveys for special-status small mammal species/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#38	Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	If during the habitat assessment, burrows or signs of special-status small mammal species are detected, the Project Biologist will establish non-disturbance exclusion zones (i.e., wildlife exclusion fencing [e.g., a silt fence or similar material]) in areas where special-status small mammal species are believed to be present. Non-disturbance exclusion zones will be established at least 14 days before the start of ground-disturbing activities. The non-disturbance exclusion fence with one-way exit/escape points will be placed to exclude the special-status small mammals from the construction area. The wildlife exclusion fence will be established around burrows in a manner that allows state-listed species to leave the construction footprint. Additional measures such as one or both of the following will be implemented after the exclusion fencing is installed. • The Contractor will trim and clear vegetation to the ground by hand or using hand-operated equipment to discourage the presence of special-status small mammal species in the construction footprint. The cleared vegetation will remain undisturbed by project construction equipment for 14 days to allow species to passively relocate through the one-way exit/escape points along the wildlife exclusion fencing. • A qualified, agency-approved biologist, designated by the Project Biologist, will conduct small-mammal trapping and relocation in general accordance with the survey protocols in the California Valley Solar Ranch Project: Plan for Relocation of Giant Kangaroo Rats (*Dipodomys ingens*) (H.T. Harvey & Associates 2011) or as determined in consultation with CDFW and USFWS.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Establish non-disturbance exclusion zones if burrows or signs of special-status small mammal species are detected/ relocation as needed/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#40	Conduct Preconstruction Surveys for Special-Status Bat Species	Before the start of ground-disturbing activities, a qualified, agency-approved biologist, designated by the Project Biologist, will conduct a visual and acoustic Pre-construction survey for roosting bats. A minimum of one day and one evening will be included in the visual Pre-construction survey. The Project Biologist, in coordination with the Mitigation Manager and Authority, will contact CDFW if any hibernation roosts or active nurseries are identified within or immediately adjacent to the construction footprint, as appropriate. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct visual and acoustic pre-construction survey for roosting bats/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#41	Bat Avoidance and Relocation	During ground-disturbing activities, if active or hibernation roosts are found, the Contractor will avoid them, if feasible, for the period of activity. If avoidance of the hibernation roost is not feasible, the Project Biologist, will prepare a relocation plan and coordinate the construction of an alternative bat roost with CDFW. The Contractor, under the direction of the Project Biologist will implement the Bat Roost Relocation Plan before the commencement of construction activities. The Contractor, under the supervision of the Biological Monitors, will remove roosts with approval from CDFW before hibernation begins (October 31), or after young are flying (July 31), using exclusion and deterrence techniques described in BIO-MM#42, below. The timeline to remove vacated roosts is between August 1 and October 31. All efforts to avoid disturbance to maternity roosts will be made during construction activities. The Project Biologist will submit a memorandum to the Mitigation Manager, on a weekly basis or at other appropriate intervals, to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Biological Monitors/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Avoid active or hibernation roosts, if feasible/ if necessary, prepare and implement relocation plan for bat roosts/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#42	Bat Exclusion and Deterrence	During ground-disturbing activities, if non-breeding or non-hibernating individuals or groups of bats are found within the construction footprint, the Project Biologist will direct the Contractor to safely exclude the bats by either opening the roosting area to change the lighting and air-flow conditions or installing one-way doors or other appropriate methods specified by CDFW. The Contractor will leave the roost undisturbed by project activities for a minimum of 1 week after implementing exclusion and/or eviction activities. The Contractor will not implement exclusion measures to evict bats from established maternity roosts or occupied hibernation roosts. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Safely evict bats from roosts except for established maternity roosts and occupied hibernation roosts/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#43	Conduct Preconstruction Surveys for American Badger and Ringtail	Before the start of ground-disturbing activities, the Project Biologist will conduct Pre-construction surveys for den sites within suitable habitats in the construction footprint. These surveys will be conducted no more than 30 days before the start of ground-disturbing activities and phased with project build-out. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct pre-construction surveys for American badger and ringtail den sites in suitable habitats/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#44	American Badger and Ringtail Avoidance	The Contractor, under the direction of the Project Biologist, will establish a 50-foot buffer around occupied dens. The Contractor and Project Biologist will establish a 100-foot buffer around maternity dens through the pup-rearing season (American badger: February 15 through July 1; Ringtail: May 1 through June 15). Adjustments to the buffer(s) will require prior approval by CDFW as coordinated by the Project Biologist, under the supervision of the Mitigation Manager. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Establish buffer around occupied American badger and ringtail dens/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#45	Conduct Preconstruction Surveys for San Joaquin Kit Fox	Before the start of ground-disturbing activities, the Project Biologist will conduct Preconstruction surveys in accordance with USFWS' San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999b). Preconstruction surveys for the kitfox will be conducted between May 1 and September 30 within the study area in suitable habitat areas (alkali desert scrub, annual grassland, pasture, barren, and compatible-use agricultural lands) to identify known or potential San Joaquin kit fox dens. Pre-construction surveys will be conducted by a USFWS-approved project biologist within 30 days before the start of construction or ground-disturbing activities and will be phased with project build-out. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct pre-construction surveys for San Joaquin kit fox dens/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#46	Minimize Impacts on San Joaquin Kit Fox	The Contractor, under direction of the Project Biologist, will implement USFWS' Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance [USFWS 2011] to minimize ground disturbance-related impacts on this species. The Project Biologist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Implement USFWS's Standardized Recommenda-tions for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS 2011)/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#48	Restore Temporary Impacts on Jurisdictional Waters	During or after the completion of construction, the Contractor, under direction of the Regulatory Specialist (Waters) and Project Botanist, will restore disturbed jurisdictional waters to original topography using stockpiled and segregated soils. In areas where gravel or geotextile fabrics have been placed to protect substrate and minimize impacts on jurisdictional waters, these materials will be removed and affected features will be restored. The Contractor, under supervision of the Project Botanist, will conduct revegetation using appropriate plants and seed mixes. The Authority will conduct maintenance monitoring consistent with the provisions in the RRP (BIO-MM#6). The Project Botanist will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Construction/ post-construction	Restoration/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Regulatory Specialist (Waters)/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Restore disturbed jurisdictional waters/ conduct revegetation/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#49	Monitor Construction Activities within Jurisdictional Waters	During ground-disturbing activities, the Regulatory Specialist (Waters) and Project Biological Monitor will conduct monitoring within and adjacent to jurisdictional waters, including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities. The Project Biological Monitor will conduct biological monitoring to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures, including, but not limited to, the provisions outlined in BIO-MM#5, BIO-MM#7, BIO-MM#8, BIO-MM#10, BIO-MM#12 through BIO-MM#15, BIO-MM#47, and BIO-MM#48. The monitor will also document adherence to all relevant conservation measures as listed in the USFWS, CDFW, SWRCB, and USACE permits. The Regulatory Specialist (Waters) will submit a memorandum, on a weekly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Construction/ post-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Regulatory Specialist (Waters)/ Project Biological Monitor/ Mitigation Manager	Authority/ Contractor/ Regulatory Specialist (Waters)/ Mitigation Manager	Conduct monitoring of construction activities in and adjacent to jurisdictional waters/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#51	Install Flashing or Slats within Security Fencing	During construction, the Contractor, under the direction of the Project Biologist, will install permanent security fencing consistent with the final design along portions of the project that are adjacent to wildlife movement corridors and natural habitats (e.g., alkali desert scrub, annual grassland). The security fencing will be enhanced with flashing or slats for 6 inches below ground surface to 12 inches above to prevent special-status reptiles and mammals from moving into the right-of-way. The fencing flashing or slats will be maintained during operation of the HSR project. The Project Biologist will verify that the installation is consistent with the designated terms and conditions in the applicable permits. The design of the reptile and mammal-proof fencing and the exact locations where reptile and mammal-proof fencing will be installed will be determined in consultation with USFWS and CDFW. The Project Biologist will submit a memorandum, on a yearly basis or at other appropriate intervals, to the Mitigation Manager to document compliance with this measure.	Pre-construction/ construction	Final design/ surveying/ monitoring/ reporting	Yearly or at other appropriate intervals	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Install permanent security fencing adjacent to wildlife movement corridors and natural habitats/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#53	Compensate for Impacts on Special-Status Plant Species	Before final design, the Authority will mitigate the impacts on special-status plants in accordance with the USFWS Biological Opinion (USFWS 2013) by implementing the following measures: • Compensation for federally listed plant species that are observed within the project footprint and that cannot be avoided will be compensated at a 1:1 ratio based on actual acres of direct effects by the following: – Identification of suitable sites to receive the listed plants. ▪ Pixley National Wildlife Refuge, Allensworth Ecological Reserve/State Historic Park, Kern National Wildlife Refuge, Atwell Island, Alkali Sink Ecological Reserve, Semitropic Ecological Reserve, and Kern Water Bank. ▪ Authority-proposed permittee-responsible mitigation sites. ▪ Other locations approved by USFWS. – Collection of seeds, plant materials, and top soil from the project footprint before construction impacts. The Authority or its designee will submit a memorandum to the USFWS and or CDFW to document compliance with this measure.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Compensate impacts on special-status plants at a 1:1 ratio based on actual acres of direct effects/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#58	Compensate for Loss of Swainson's Hawk Nesting Trees	To compensate for the loss of occupied Swainson's hawk nesting trees or mortality to offspring, the Authority will provide project specific compensatory mitigation that replaces nesting trees and provides natural lands for foraging. Compensatory mitigation for Swainson's hawk will be based on the number of trees with "active" nests that are removed by construction activities, or where construction activities create a significant habitat modification that leads to a reduction in reproductive success, or nest abandonment. If project construction occurs within 0.5 mile of a documented or observed active nest, the Authority will acquire and preserve 150 acres of natural habitat, per active nest tree removed by construction activities, or where construction activities create a significant habitat modification that leads to reduce reproductive success or nest abandonment. At a minimum, the habitat preserved will contain trees suitable to support nesting and natural foraging habitat for Swainson's hawk. The Authority will submit a memorandum to the CDFW to document compliance with this measure.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Compensatory mitigation that replaces Swainson's hawk nesting trees and provides natural lands for foraging/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#59	Compensate for Loss of Burrowing Owl Active Burrows and Habitat	To compensate for permanent impacts on nesting, occupied, and satellite burrows and/or burrowing owl habitat, the Authority will provide compensatory mitigation based on CDFW's (CDFG 2012) Staff Report on Burrowing Owl Mitigation. The Authority will submit a memorandum to the CDFW to document compliance with this measure.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Compensate for permanent impacts burrowing owls/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#60	Compensate for Destruction of San Joaquin Kit Fox Habitat	The Authority will mitigate the destruction of San Joaquin kit fox habitat by the purchase of suitable, approved habitat (USFWS and CDFW). Habitat will be replaced at a minimum ratio of 1:1 for natural lands and a ratio of 0.1:1 for suitable urban or agricultural lands to provide additional protection and habitat in a location that is consistent with the recovery of the species. The Authority will mitigate the impacts on San Joaquin kit fox in accordance with the USFWS Biological Opinion (USFWS 2013) and/or CDFW 2081(b). The Authority will submit a memorandum to the USFWS and CDFW to document compliance with this measure.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Mitigate for impacts to San Joaquin kit fox habitat/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species
F-B LGA BIO-MM#62	Prepare and Implement a Site-Specific Comprehensive Mitigation and Monitoring Plan	As part of the USFWS, USACE, SWRCB, and CDFW permit applications and before the start of ground-disturbing activities, the Authority will prepare a CMMP to mitigate for temporary and permanent impacts on biological resources (i.e., special-status wildlife, jurisdictional waters, and riparian areas). In the CMMP, performance standards, including percent cover of native species, survivability, tree height requirements, wildlife utilization, the acreage basis, restoration ratios, and the combination of onsite and/or offsite mitigation will be detailed; preference will be given to conducting the mitigation within the same HUC-8 or HUC-6 watershed where the impact occurs. The Project Biologist will work with the USACE, SWRCB, and CDFW to develop appropriate avoidance, minimization, mitigation, and monitoring measures to be incorporated into the CMMP. The CMMP will outline the intent to mitigate for the lost conditions, functions, and values of impacts on jurisdictional waters and state streambeds consistent with resource agency requirements and conditions presented in Sections 404 and 401 of the CWA and Section 1600 of the CFGC. The CMMP will incorporate the following standard requirements consistent with USACE, SWRCB, and CDFW guidelines: • Description of the project impact/site. • Goal(s) (i.e., functions and values or conditions) of the compensatory mitigation project. • Description of the proposed compensatory mitigation site. • Implementation plan for the proposed compensatory mitigation site. • Maintenance activities during the monitoring period. • Monitoring plan for the compensatory mitigation site. • Completion of compensatory mitigation. • Financial assurances. • Contingency measures. Also, the following will be included at a minimum for the implementation plan: • Site analysis for appropriate soils and hydrology. • Site preparation specifications based on site analysis, including but not limited to grading and weeding. • Soil and plant material salvage from impact areas, as appropriate to the timing of impact and restoration as well as the location of restoration sites.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Prepare and implement CMMP for temporary and permanent impacts on biological resources/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• Specifications for plant and seed material appropriate to the locality of the mitigation site. • Specifications for site maintenance to establish the habitats, including but not limited to weeding and temporary irrigation. Habitat preservation, enhancement, and/or establishment or restoration activities will be conducted on some of the compensatory (i.e., selected permittee-responsible) mitigation sites to achieve the mitigation goals. A detailed design of the mitigation habitats will be created in coordination with the permitting agencies and be described in the CMMP. It is recognized that several CMMPs will be developed consistent with the selected mitigation sites and the resources mitigated at each. The primary engineering and construction Contractor will ensure, through coordination with the Project Biologist, that construction is implemented in a manner that minimizes disturbance of such areas. Temporary fencing will be used during construction to avoid sensitive biological resources that are located adjacent to construction areas and can be avoided. Performance standards are targets for determining the effectiveness of the mitigation and assessing the need for adaptive management (e.g., mitigation design or maintenance revisions). The performance standards are developed so that progress towards meeting final success criteria can be assessed on an annual basis; the standard for each year is progressively closer to the final criteria (e.g., vegetation cover standards may increase annually until reaching the success criteria objective in the final year of monitoring). Success criteria are formal criteria that must be met after a specific timeframe to meet regulatory requirements of the permitting agencies. Where applicable, replacement planting/seeding will be implemented if monitoring demonstrates that performance standards or success criteria are not met during a particular monitoring interval. The performance standards will be used to determine whether the habitat improvement is trending toward sustainability (i.e., reduced human intervention) and to assess the need for adaptive management. These standards must be met for the habitat improvement to be declared successful, both during a particular monitoring year and at the end of the establishment period. These performance standards will be developed in consultation with the permitting agencies and described in the CMMP. The final success criteria will be developed in coordination with the regulatory agencies and presented in the CMMP. Examples of success criteria, which could be included in the CMMP, and would be assessed at the end of the monitoring period (assumed to be 5 years or as directed by agencies), include: • Percent survival of planted trees (65–85%, depending on species and habitat). • Percent absolute cover of highly invasive species, as defined by the California Invasive Plant Council (<5%). • Percent total absolute cover of plant species (50-80%, depending on habitat type). • Designed wetlands will meet U.S. Army Corps of Engineers criteria for hydrophytic vegetation, hydric soils, and hydrology as defined in the “Corps of Engineers wetland delineation manual” (Environmental Laboratory 1987). • Designed vernal pools and seasonal wetlands will meet inundation and seasonal drying requirements as specified in the design and indicated by agencies.								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• Species composition and community diversity, relative to reference sites, and/or as described in the guidelines issued by permitting agencies (e.g., USFWS conservation guidelines for valley elderberry longhorn beetle). Performance standards and success criteria will be provided for each of the years of monitoring and will be specific to habitat types at each permittee-responsible mitigation site. The monitoring schedule will be detailed in the site-specific CMMPs. To be deemed successful, the site will be required to meet the performance standards established for the year in which monitoring is being conducted (e.g., monitoring conducted at intervals with increasing performance requirements). However, if performance standards are not met in specific years, remedial measures, such as regrading, adjustment to modify the hydrological regime, and/or replacement planting or seeding, must be implemented and that year's monitoring must be repeated the following year until the performance standards are met. The success criteria specified must be reached without human intervention (e.g., irrigation, replacement plantings) aside from maintenance practices described in the site-specific CMMPs for maintenance during the establishment period. The Project Biologist will oversee the implementation of all CMMP elements and monitor consistent with the prescribed maintenance and performance monitoring requirements. The Authority, or its designee, will prepare annual monitoring reports for 5 years (or less if success criteria are met as described earlier) and/or other documentation prescribed in the resource agency permits. The Authority will submit a memorandum to the regulatory agencies to document compliance with this measure.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#63	Compensate for Permanent and Temporary Impacts on Jurisdictional Waters	The Authority will mitigate permanent and temporary wetland impacts through compensation determined in consultation with the USACE, SWRCB, USFWS, and CDFW, in order to be consistent with the CMMP (BIO-MM#62). Regulatory compliance for jurisdictional waters includes relevant terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and CDFW 1600 Streambed Alteration Agreement. Compensation shall include aquatic resources restoration, establishment, enhancement, or preservation through one or more of the following methods: • Purchase of credits from an agency-approved mitigation bank. • Fee-title-acquisition of natural resource regulatory agency-approved property. • Permittee-responsible mitigation through the establishment, re-establishment, restoration, enhancement, or preservation of aquatic resources and the establishment of a conservation easement or other permanent site protection method, along with financial assurance for long-term management of the property-specific conservation values. In lieu fee contribution determined through negotiation and consultation with the various natural resource regulatory agencies. The following ratios are proposed as a minimum for compensation for permanent impacts; final ratios will be determined in consultation with the appropriate agencies: • Vernal pools: 2:1. • Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type and function and values lost; 1:1 offsite for permanent impacts; 1:1 onsite and 0.1:1 to 0.5:1 offsite for temporary impacts. The Authority will mitigate impacts on jurisdictional waters by replacing, creating, restoring, enhancing or preserving aquatic resource at the ratios presented above or other ratios, as determined in consultation with the appropriate agencies, which compensates for functions and values lost. The Authority will consider modifying the vernal pool mitigation ratios in the final permits based on site-specific conditions and the specific life history requirements of vernal pool branchiopods, California tiger salamander, and western spadefoot toad. Where an HSR alternative affects an existing conservation area (e.g., Allensworth ER), the Authority will modify the mitigation ratio to meet the vernal pool mitigation requirement. Either the affected portion of the conservation area will be relocated or compensation will be provided to the holder of Allensworth ER in accordance with the Uniform Relocation and Real Property Policy Act of 1970, as amended. • Through the CMMP reporting program and the applicable terms and conditions from the USACE 404 Permit, SWRCB 401 Permit, and the CDFW 1600 Streambed Alteration Agreement, the Authority, or its designee, will document compliance and submit it to the regulatory agencies.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Mitigate permanent and temporary wetland impacts through compensation/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA BIO-MM#64	Compensate for Impacts on Protected Trees	The Authority will compensate for impacts, including removal or trimming of naturally occurring native protected trees and landscape or ornamental protected trees, in accordance with the local regulatory body (city or county government). The local regulations and laws allow for a number of potential mitigation opportunities. The Authority will provide mitigation commensurate with the regulations and laws in that jurisdiction such that the resulting impact on protected trees is less than significant and may include, but is not limited to, the following, depending on the local jurisdiction: • Transplant directly affected protected trees that are judged by an arborist to be in good condition to a suitable site outside the zone of impact. • Replace directly affected protected trees at an onsite or offsite location, based on the number of protected trees removed, at a ratio not to exceed 3:1 for native trees or 1:1 for landscape or ornamental trees. • Contribute to a tree-planting fund. The Authority will submit a memorandum to the local regulatory body to document compliance with this measure.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Compensate for impacts on protected trees/ report findings	Condition of design-build contract/ local regulation requirement	F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact BIO #7: Project Effects on Habitats of Concern
F-B LGA BIO-MM#65	Offsite Habitat Restoration, Enhancement, and Preservation	Before site preparation at a mitigation site, the Authority will consider the offsite habitat restoration, enhancement, and preservation program and identify short-term temporary and/or long-term permanent effects on the natural landscape. A determination will be made on any effects from the physical alteration of the site to onsite biological resources, including plant communities, land cover types, and the distribution of special-status plant and wildlife. Appropriate seasonal restrictions (e.g., breeding season) on activities that result in physical alteration of the site may be applicable if suitable habitats for special-status species and sensitive habitats exist onsite. Activities resulting in the physical alteration of the site include grading/modifications to onsite topography, stockpiling, storage of equipment, installation of temporary irrigation, removal of invasive species, and alterations to drainage features. In general, the long-term improvements to habitat functions and values will offset temporary effects during restoration, enhancement, and preservation activities. The offsite habitat restoration, enhancement, and preservation program will be designed, implemented, and monitored in ways that are consistent with the terms and conditions of the USACE Section 404 Permit, CDFW 1600 Streambed Alteration Agreement, and CESA and federal ESA as they apply to their jurisdiction and resources onsite. Potential effects on site-specific hydrology and the downstream resources will be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and a Storm Water Pollution Prevention Plan (SWPPP) will be implemented as appropriate. The Authority will report on compliance with the permitting requirements. The Authority, or its designee, will be responsible for the monitoring and tracking of the program, will prepare a memorandum of compliance, and will submit it to the appropriate regulatory agency.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct offsite habitat restoration, enhancement, and preservation program/ report findings	Condition of design-build contract/ condition of regulatory permits	F-B LGA Impact BIO #1: Effects on Special-Status Plant Species F-B LGA Impact BIO #2: Effects on Special-Status Wildlife F-B LGA Impact BIO #3: Effects on Special-Status Plant Communities F-B LGA Impact #5: Project Effects on Special-Status Plant Species F-B LGA Impact BIO #6: Project Effects on Special-Status Wildlife Species F-B LGA Impact BIO #7: Project Effects on Habitats of Concern

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Geology, Soils, Seismicity, and Paleontological Resources										
F-B LGA CUL-MM #16	Engage a Paleontological Resources Specialist to Direct Monitoring during Construction	A paleontological resources specialist (PRS) will be designated for the project who will be responsible for determining where and when paleontological resources monitoring should be conducted. Paleontological resource monitors will be selected by the PRS based on their qualifications, and the scope and nature of their monitoring will be determined and directed based on the Paleontological Resource Monitoring and Mitigation Plan (PRMMP). The PRS will be responsible for developing Worker Environmental Awareness Program training. All management and supervisory personnel and construction workers involved with ground-disturbing activities will be required to take this training before beginning work on the project and will be provided with the necessary resources for responding in case paleontological resources are found during construction. The PRS will document any discoveries, as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in CEQA Guidelines Section 15064.5.	Pre-construction/ construction	Reporting	Daily logs (during active monitoring)	Contractor	Contractor	Identify PRS at least 120 days prior to construction The PRS will document any discoveries, as needed, evaluate the potential resource, and assess the significance of the find	Paleontological Resource Monitoring and Mitigation Plan (PRMMP)	F-B LGA Impact GSSP #12: Sensitive Paleontological Resources
F-B LGA CUL-MM #17	Prepare and Implement a Paleontological Monitoring and Mitigation Plan	Paleontological monitoring and mitigation measures are restricted to those construction-related activities that will result in the disturbance of paleontologically sensitive sediments. The PRMMP will include a description of when and where construction monitoring will be required; emergency discovery procedures; sampling and data recovery procedures; procedures for the preparation, identification, analysis, and curation of fossil specimens and data recovered; and procedures for reporting the results of the monitoring and mitigation program. The monitoring program will be designed to accommodate site-specific construction of the selected option. The PRMMP will be consistent with Society of Vertebrate Paleontology (SVP 2010) guidelines for the mitigation of construction impacts on paleontological resources. The PRMMP will also be consistent with the SVP (1996) conditions for receivership of paleontological collections and any specific requirements of the designated repository for any fossils collected.	Construction	Reporting	Monthly	Contractor	Contractor	Construction/ monthly reporting	PRMMP/ Worker Environmental Awareness Program (WEAP) training	F-B LGA Impact GSSP #12: Sensitive Paleontological Resources
F-B LGA CUL-MM #18	Halt Construction When Paleontological Resources Are Found	If fossil or fossil-bearing deposits are discovered during construction, regardless of the individual making a paleontological discovery, construction activity in the immediate vicinity of the discovery will cease. This requirement will be spelled out in both the PRMMP and the WEAP. Construction activity may continue elsewhere provided that it continues to be monitored as appropriate. If the discovery is made by someone other than a Paleontological Resource Monitor or the PRS, a Paleontological Resource Monitor or the PRS would immediately be notified.	Construction	Reporting	Daily logs during active monitoring	Contractor	Contractor	Construction/ weekly reporting (if resource is identified during construction)	PRMMP/ WEAP	F-B LGA Impact GSSP #12: Sensitive Paleontological Resources
Hazardous Materials and Wastes										
F-B LGA HMW-MM#1	Limit Use of Extremely Hazardous Materials near Schools during Construction	The Contractor shall not handle or store an extremely hazardous substance (as defined in California Public Resources Code Section 21151.4) or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified pursuant to subdivision (j) of Section 25532 of the Health and Safety Code within 0.25 mile of a school. Prior to construction activities, signage will be installed to delimit all work areas within 0.25 mile of a school, informing the Contractor not to bring extremely hazardous substances into the area. The Contractor would be required to monitor all use of extremely hazardous substances. The above construction mitigation measure for hazardous materials and wastes is consistent with California Public Resources Code Section 21151.4.	Pre-construction/ construction	Reporting/ monitoring	Weekly	Contractor/ Hazardous Materials Monitor	Contractor	Construction/ weekly reporting	Reporting contract requirements/ specifications	F-B LGA Impact HMW#4: Temporary Hazardous Material and Waste Activities in the Proximity of Schools

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Safety and Security										
F-B LGA S&S-MM#4	Halliburton-Specific Safety and Security	The following site-specific mitigation shall be implemented in all subsequent property transactions for the Golden Empire Gleaners Facility: • Upgrade of the fire alarm and suppression system to current fire code regulations, per Office of State Fire Marshall requirements and approval. • Prohibition of regulated amounts of hazardous materials in the structure. • Annual inspection by the Office of the State Fire Marshal. • Public ownership and control of the entire facility. This could be Authority ownership, or City of Bakersfield ownership with restrictions on use and access of the facility to enforce the above mitigations. Note: State-owned property requires additional conditions by the Office of the State Fire Marshal that must be incorporated. • Restrict access to the facility by uncontrolled or uninspected trucks or step vans. • Allow audits of security protocols and processes to ensure security measures continue the level of protection warranted. • Allows HSR security personnel access, with notice, to ensure security measures are being followed. • Allow only trucks that can be visually verified to be empty may be parked under the F-B LGA viaduct. These trucks include flatbeds and trucks with equipment that would not allow hidden materials. • Only passenger cars and small trucks and vans can be parked in the employee parking under the structure. • Any change of use would require reassessment and approval.	Construction/ post-construction/ operation	Property acquisition and easement negotiation	Weekly	Authority/ Contractor	Authority/ Contractor	Property purchase and easement negotiation	Easement negotiation with outlined stipulations	F-B LGA Impact S&S#7: Risk of Fire and Explosions at Specific Parcels
Socioeconomics and Communities										
F-B LGA SO-MM#1	Implement Measures to Reduce Impacts Associated with the Division of Existing Communities in the Unincorporated Areas East of Hanford, Northeast of Corcoran, and South of Shafter	The Authority will minimize impacts associated with the F-B LGA in the rural residential areas around the community of Oildale as well as in urban residential areas in Shafter and Bakersfield by conducting special outreach to affected homeowners and residents to fully understand their special relocation needs. The Authority will make every effort to locate suitable replacement properties that are comparable to those currently occupied by these residents, including constructing suitable replacement facilities if necessary. In cases where residents wish to remain in the immediate vicinity, the Authority will take measures to purchase vacant land or buildings in the area, and consult with local authorities over matters such as zoning, permits, moving of homes, and replacement of services and utilities, as appropriate. Before land acquisition, the Authority will conduct community workshops to obtain input from those homeowners whose property would not be acquired, but whose community would be substantially altered by construction of HSR facilities, including the loss of many neighbors, to identify measures that could be taken to mitigate impacts on those who remain (including placement of sound walls and landscaping, and potential uses for remnant parcels that could benefit the community in the long term).	Pre-construction/ construction/ post-construction	Reporting	Monthly	Authority	Authority	Monthly reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts	F-B LGA Impact SO #6: Disruption to Community Cohesion or Division of Existing Communities from Project Operation F-B LGA Impact SO #7: Effects to the Regional Agricultural Community

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA SO-MM#3	Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	The Authority will minimize impacts resulting from the disruption to key community facilities including the Mercado Latino Tianguis, Golden Empire Gleaners (a food bank), Bakersfield Homeless Center, Kern County Veterans Service Department, Iglesia de Dios Pentecostes La Hermosa (a religious facility). The Authority will consult with the appropriate respective parties before land acquisition to assess potential opportunities to reconfigure land use and buildings and/or relocate affected facilities, as necessary, to minimize the disruption of facility activities and services, and also to ensure relocation that allows the community currently served to continue to access these services. Because many of these community facilities are located in Hispanic communities, the Authority will continue to implement a comprehensive Spanish-language outreach program for these communities as land acquisition begins. This program will facilitate the identification of approaches that would maintain continuity of operation and allow space and access for the types of services currently provided and planned for these facilities. Also, to avoid disruption to these community amenities, the Authority will ensure that all reconfiguring of land uses or buildings, or relocating of community facilities is completed before the demolition of any existing structures.	Pre-construction/ construction/ post-construction	Reporting	Monthly	Authority	Authority	Monthly reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts	F-B LGA Impact SO #6: Disruption to Community Cohesion or Division of Existing Communities from Project Operation F-B LGA Impact SO #18: Potential for Physical Deterioration F-B LGA Impact SO #1: Disruption to Community Cohesion or Division of Existing Communities from Project Construction
F-B LGA SO-MM#5	Develop Measures to Minimize the Potential for Physical Deterioration.	The Authority will work with the communities on the design of project features consistent with Technical Memorandum 200.6, *Aesthetic Guidelines for Non-Station Structures* [Authority 2011a]. The guidelines for station and non-station structures allow for contextual design responses to site-specific or unique conditions, or "context sensitive solutions". Context sensitive solutions mean structural aesthetics must respond to local settings with concern for the human scale, building scale, and the vantage points from which the structures will be viewed. Included in the Authority's design principles is the requirement that the structures enhance local environments and community context. Landscaping will be used to visually integrate project structures into the local context with plantings that recreate the natural setting into which they are placed. The aesthetic design of project structures, in combination with landscape and urban design that serve the local community, can create a positive contribution to the surrounding visual context and minimize the potential for physical deterioration.	Pre-construction/ construction	Reporting/ monitoring	Monthly	Authority	Authority	Monthly reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts The Authority will hold workshops and create reports based on workshop and design findings	F-B LGA Impact SO #6 – Disruption to Community Cohesion or Division of Existing Communities from Project Operation F-B LGA Impact SO #18: Potential for Physical Deterioration F-B LGA Impact SO #7: Effects to the Regional Agricultural Community
Parks, Recreation, and Open Space										
F-B LGA PP-MM#1	Temporary Closures of Park Property During Construction	Prior to temporary closures of linear park facilities, the Authority will ensure that connections to the unaffected park portions or nearby roadways are maintained. If a proposed linear park closure restricts connectivity, the Authority will provide alternative pedestrian and bicycle access via existing roadways or other public rights-of-way. The Authority will provide detour signage and lighting and will ensure that the alternative routes meet all public safety requirements.	Pre-construction/ construction	Maintenance of access to parks	Monthly	Authority	Authority	Monthly reporting	Authority will ensure access as outlined in mitigation text	F-B LGA Impact PK #1: Construction Impacts on Parks, Recreation, Open Space and School District Recreation Facilities
F-B LGA PP-MM#3	Collect Additional Maintenance Funds	The Authority will consult with affected jurisdictions to identify its share of funding to provide additional maintenance, labor, and repairs for the existing park areas to remedy any potential degradation of existing facilities that may result from increased facility use. Prior to project construction, the Authority will enter into an agreement with the affected jurisdictions (City of Bakersfield and Kern County) that establishes the funding share and describes the relative roles of the Authority and the affected jurisdictions in providing continuous maintenance of existing play areas, or compensation for play areas acquired in order to accommodate the project.	Pre-construction/ construction/ post-construction/ operations	Compensation	Monthly	Authority	Authority	Authority to coordinate with local jurisdictions	The Authority will coordinate with the affected jurisdictions to identify appropriate funding amounts	F-B LGA Impact PK #2: Project Acquisition of Parks, Recreation, and Open Space Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Aesthetics and Visual Resources										
F-B LGA AVR-MM#1a	Minimize Visual Disruption from Construction Activities	The project will adhere to local jurisdiction construction requirements (if applicable) regarding construction-related visual/aesthetic disruption. In order to minimize visual disruption, construction will employ the following activities: • Minimize pre-construction clearing to that necessary for construction. • Limit the removal of buildings to those that would obstruct project components. • When possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views. • After construction, regrade areas disturbed by construction, staging, and storage to original contours and revegetate with plant material similar in replacement numbers and types to that which was removed based upon local jurisdictional requirements. If there are no local jurisdictional requirements, replace removed vegetation at a 1:1 replacement ratio for shrubs and small trees, and 2:1 replacement ratio for mature trees. For example, if 10 mature trees in an area are removed, replant 20 younger trees that after 5 to 15 years (depending upon the growth rates of the trees) would provide coverage similar to the coverage provided by the trees that were removed for construction. • To the extent feasible, do not locate construction staging sites within the immediate foreground distance (0 to 500 feet) of existing residential, recreational, or other high-sensitivity receptors. Where such siting is unavoidable, staging sites will be screened from sensitive receptors using appropriate solid screening materials such as temporary fencing and walls. Any graffiti or visual defacement of temporary fencing and walls will be painted over or removed within 5 business days.	Pre-construction/ construction/ post-construction	Reporting	Weekly	Contractor	Contractor	Construction/ weekly reporting	Contract requirements/ specifications	F-B LGA Impact AVR #2: Construction Impacts on Existing Visual Quality F-B LGA Impact PK #1: Construction Impacts on Parks, Recreation, Open Space and School District Recreation Facilities
F-B LGA AVR-MM#1b	Minimize Light Disturbance during Construction	Where construction lighting will be required during nighttime construction, the Contractor will be required to shield such lighting and direct it downward in such a manner that the light source is not visible offsite, and so that the light does not fall outside the boundaries of the project site to avoid light spill offsite.	Pre-construction/ construction/ post-construction	Reporting	Weekly	Contractor	Contractor	Construction/ weekly reporting	Contract requirements/ specifications	F-B LGA Impact AVR #3: Construction Impact from Light and Glare F-B LGA Impact PK #1: Construction Impacts on Parks, Recreation, Open Space and School District Recreation Facilities
F-B LGA AVR-MM#2a	Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context	During final design of the elevated guideways and the Fresno, Kings/Tulare Regional, and Bakersfield stations, the contractor partnering with the Authority will coordinate with local jurisdictions on the design of these facilities so that they are designed appropriately to fit in with the visual context of the areas near them. This will include the following activities: • For stations: During the station design process, establish a local consultation process with the Cities of Fresno and Bakersfield, and the cities and communities surrounding the Kings/Tulare Regional Station, as necessary, to identify and integrate local design features into the station design through a collaborative, context-sensitive solutions approach. The process will include activities to solicit community input in their respective station areas. This effort will be coordinated with the station area planning process that will be undertaken by those cities under their station area planning grants. • For elevated guideways in cities or unincorporated communities: During the elevated guideway design process, establish a process with the city or county with jurisdiction over the land along the elevated guideway to advance the final design through a collaborative, context-sensitive solutions approach. Participants in the consultation process will meet on	Pre-construction/ design	Reporting	During final design/ prior to construction/ monthly reporting	Contractor/ Authority	Contractor/ Authority	Final design and construction/ monthly reporting	Established local consultation process with communities along the alignment	F-B LGA Impact AVR #4: Lower Visual Quality in the East Bakersfield Landscape Unit F-B LGA Impact AVR#5: Visual Quality Effects to Schools F-B LGA Impact PK#4: Project Changes to Park Character

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		a regular basis to develop a consensus on the urban design elements that are to be incorporated into the final guideway designs. The process will include activities to solicit community input in the affected neighborhoods. • Actions taken to help achieve integration with the local design context during the context-sensitive solutions process will include the following: • Design HSR stations and associated structures such as elevators, escalators, and walkways to be attractive architectural elements or features that add visual interest to the streetscapes near them. • Design HSR station parking structures and adjacent areas to integrate visually into the areas where they would be located. Where the city has adopted applicable downtown design guidelines, the parking structures and adjacent areas will be designed to be compatible with the policies and principles of those guidelines. • For the elevated guideways and columns, incorporate architectural elements, such as graceful curved or tapered sculptural forms and decorative surfaces, to provide visual interest. Include decorative texture treatments on large-scale concrete surfaces such as parapets and other portions of elevated guideways. Include a variety of texture, shadow lines, and other surface articulation to add visual and thematic interest. Closely coordinate the design of guideway columns and parapets with station and platform architecture to promote unity and coherence where guideways lie adjacent to stations. • Integrate trees and landscaping into the station streetscape and plaza plans where possible to soften and buffer the appearance of guideways, columns, and elevated stations. This will be consistent with the principles of crime prevention through environmental design. • For the stations, structures, and related open spaces: incorporate design features that provide interest and reflect the local design context. These features could include landscaping, lighting, and public art. • The designs in cities and unincorporated communities will reflect the results of the context-sensitive solutions design process. During the context-sensitive solutions design process, the HSR project's obligations and constraints related to planning, mitigation, engineering, performance, funding, and operational requirements will be taken into consideration.							
F-B LGA AVR-MM#2b	Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs	During development of the final design, the Authority will work with the affected cities and counties to develop a project site and landscape design plan for the areas disturbed by the project. As a result of following these plans, the design features identified in [F-B LGA] AVR-MM#2a and the park mitigation measure [F-B LGA] PP-MM#3 will be implemented.	Pre-construction/ design	Reporting	Monthly	Contractor	Contractor and Authority	Construction/ monthly reporting	Contract requirements/ specifications Authority will meet with local jurisdictions during development of final design	F-B LGA Impact AVR #4: Lower Visual Quality in the East Bakersfield Landscape Unit F-B LGA Impact AVR#5: Visual Quality Effects to Schools

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA AVR-MM#2e	Provide Offsite Landscape Screening Where Appropriate	Where onsite landscape screening measures as described under [F-B LGA] AVR-MM#2d cannot provide effective screening to significantly affected high-sensitivity receptors such as nearby rural residential areas, provide offsite screening, as appropriate, if desired by affected residential owners.	Pre-construction/ operation	Reporting	Monthly	Authority	Contractor/ Environmental Compliance Manager/ Mitigation Manager/ Authority	Post - construction/ monthly reporting	Contract requirements/ specifications and landscaping and maintenance will be provided by the Contractor for its scope of work until substantial completion of the work at which time the Authority shall assume responsibility for landscaping or assign the responsibility to other third parties.	F-B LGA Impact AVR #4: Lower Visual Quality in the East Bakersfield Landscape Unit F-B LGA Impact AVR#5: Visual Quality Effects to Schools
F-B LGA AVR-MM#2f	Landscape Treatments along the HSR Project Overcrossings and Retained Fill Elements of the HSR	Upon the completion of construction, the contractor will plant the surface of the ground supporting the overpasses (slope-fill overpasses) and retained fill elements with vegetation consistent with the surrounding landscape in terms of vegetative type, color, texture, and form. During final design, the Authority will consult with the affected cities and counties regarding the landscaping program for planting the slopes of the overcrossings and retained fill. Plant species will be selected on the basis of their mature size and shape, growth rate, and drought tolerance. No species that is listed on the Invasive Species Council of California's list of invasive species will be planted. The landscaping will be continuously maintained and appropriate irrigation systems will be installed if needed. Where wall structures supporting the overpasses or retained fill are proposed, the structure will employ architectural details and low-maintenance trees and other vegetation to screen the structure, minimize graffiti, and reduce the effects of large walls. Surface coatings will be applied on wood and concrete to facilitate cleaning and the removal of graffiti. Any graffiti or visual defacement or damage of fencing and walls will be painted over or repaired within a reasonable time after notification.	Pre-construction/ operation	Reporting	Monthly	Authority	Contractor/ Environmental Compliance Manager/ Mitigation Manager/ Authority	Post - construction/ monthly reporting	Contract requirements/ specifications and landscaping and maintenance will be provided by the Contractor for its scope of work until substantial completion of the work at which time the Authority shall assume responsibility for landscaping or assign the responsibility to other third parties.	F-B LGA Impact AVR #4: Lower Visual Quality in the East Bakersfield Landscape Unit F-B LGA Impact AVR#5: Visual Quality Effects to Schools Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA AVR-MM#2g	Provide Sound Barrier Treatments	The contractor will design a range of sound barrier treatments for visually sensitive areas, such as those where residential views of open landscaped areas would change or in urban areas where sound barriers would adversely affect the existing character and setting (see the description of sound barriers in Table 3.16-2 [of the Fresno to Bakersfield Section Final EIR/EIS]). The Authority will develop the treatments during final design and integrate them into the final project design. The treatments will include, but are not limited to, the following: • Sound barriers along elevated guideways may incorporate transparent materials where sensitive views would be adversely affected by solid sound barriers. • Sound barriers will use non-reflective materials and will be of a neutral color. • Surface design enhancements and vegetation appropriate to the visual context of the area will be installed with the sound barriers. Surface enhancements will be consistent with the design features developed under AVR-MM#2a, and will include architectural elements (i.e., stamped pattern, surface articulation, and decorative texture treatment as determined acceptable to the local jurisdiction. Surface coatings will be used on wood and concrete sound barriers to facilitate cleaning and the removal of graffiti.	Pre-construction/ construction	Reporting	Monthly	Contractor	Contractor	Construction/ monthly reporting	Contract requirements/ specifications	F-B LGA Impact AVR #4: Lower Visual Quality in the East Bakersfield Landscape Unit F-B LGA Impact AVR#5: Visual Quality Effects to Schools
Cultural Resources										
F-B LGA CUL-MM #12	Prepare and Submit Additional Recordation and Documentation	A BETP will identify specific historical resources that would be physically altered, damaged, relocated, or destroyed by the project that will be documented in detailed recordation that includes photography. This documentation may consist of preparation of updated recordation forms (DPR 523), or may be consistent with the Historic American Building Survey, the Historic American Engineering Record (HAER), or the Historic American Landscape Survey (HALS) programs; a Historic Structure Report; or other recordation methods stipulated in the MOA and described in the BETP. The recordation undertaken by this treatment would focus on the aspect of integrity that would be affected by the project for each historic property subject to this treatment. For example, historic properties in an urban setting that would experience an adverse visual effect would be photographed to capture exterior and contextual views; interior spaces would not be subject to recordation if they would not be affected. Consultation with the SHPO and the consulting parties will be conducted for the historic architectural resources to be documented. Recordation documents will follow the appropriate guidance for the recordation format and program selected. In addition to any copies required by a selected recordation program, additional copies of the documentation will be provided to the consulting parties and offered to the appropriate local governments, historical societies and agencies, or other public repositories, such as libraries. The documentation will also be offered in printed and electronic form to any repository or organization to which the SHPO, the Authority, and the local agency with jurisdiction over the property, through consultation, may agree. The electronic copy of the documentation may also be placed on an agency or organization's website.	Pre-construction/ construction	Reporting	Monthly	Contractor, Authority to coordinate with SHPO	Contractor	Prior to construction/ monthly reporting	BETP/ Photographs and nomination document, HABS/ HAER/ HALS/ MOA	F-B LGA Impact CUL-2: Potential Adverse Effects on Historic Architectural [Built] Resources Due to Construction Activities: Introduction of Visual Elements

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
F-B LGA CUL-MM #13	Prepare Interpretive or Educational Materials	Based on the finalization of design and the completed inventory, the BETP will identify historic properties and historical resources that will be subject to historic interpretation or preparation of educational materials. Interpretive and educational materials will provide information regarding specific historic properties or historical resources and will address the aspect of the significance of the properties that would be affected by the project. Interpretive or educational materials could include, but are not limited to: brochures, videos, websites, study guides, teaching guides, articles or reports for general publication, commemorative plaques, or exhibits. Historic properties and historical resources subject to demolition by the project will be the subject of informative permanent metal plaques that will be installed at the site of the demolished historic property or at nearby public locations. Each plaque will provide a brief history of the subject property, its engineering/architectural features and characteristics, and the reasons for and the date of its demolition. The interpretive or educational materials will utilize images, narrative history, drawings, or other material produced for the mitigation described above, including the additional recordation prepared, or other archival sources. The interpretive or educational materials should be advertised, and made available to, and/or disseminated to the public. The interpretive materials may be made available in physical or digital formats at local libraries, historical societies, or public buildings.	Post-construction	Reporting	Annual	Authority	Authority, in consultation with SHPO and appropriate consulting parties	Post-construction/ annual reporting	BETP/ photographic documentation/ plan for repairs to historic properties	F-B LGA Impact CUL-2: Potential Adverse Effects on Historic Architectural [Built] Resources Due to Construction Activities: Introduction of Visual Elements
Cumulative Impacts										
F-B LGA CUM-N&V-MM#1	Consult with Agencies Regarding Construction Activities	To minimize the potential overlapping noise-generating construction activities within the same area, the Authority would consult with local city and county planning departments and other agencies as determined necessary. Consultation would entail notifying the departments/agencies regarding the anticipated HSR construction schedule and would allow for adjustment of construction schedules for adjacent projects or projects in close proximity to the HSR alignment, to the extent feasible.	Pre-Construction/ Construction	Notify and consult with departments/ agencies	Monthly	Contractor/ Authority	Contractor	Monthly, record keeping, and reporting	Meetings with departments/ agencies	F-B LGA Impact CUM-N&V: Cumulative noise and vibration impacts of the HSR alternatives and other past, present, and reasonably foreseeable projects during construction

AQMD = Air Quality Management District
ATP = Archaeological Treatment Plan
Authority = California High-Speed Rail Authority
BETP = built environment treatment plan
BMP = best management practice
BRMP = biological resources management plan
CARB = California Air Resources Board
CFR. = Code of Federal Regulations
CDFG = California Department of Fish and Game (former name of CDFW)
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CESA = California Endangered Species Act
CMP = Compensatory Mitigation Plan and also Bay Area AQMD's Carl Moyer Memorial Air Quality Standards Attainment Program
CWA = Clean Water Act
dBA = A-weighted decibels
EIR/EIS = environmental impact report/environmental impact statement
EMI = electromagnetic interference
ESA = environmentally sensitive area
F-B = Fresno to Bakersfield Project Section
FRA = Federal Railroad Administration
HAER = Historic American Engineering Record
HABS = Historic American Building Survey
HALS =Historic American Landscape Survey
HSR = high-speed rail
LGA = locally generated alternative
MOA = memorandum of agreement
mph = miles per hour
NEPA = National Environmental Policy Act
O_x = nitrogen oxides
PM = particulate matter
RRP = Restoration and Revegetation Plan
SHTAC = Swainson's Hawk Technical Advisory Committee
SHPO = State Historic Preservation Officer
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
SWPPP = Stormwater Pollution Prevention Plan
SWRCB = State Water Resources Control Board
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency
USFWS = U.S. Fish and Wildlife Service
VERA = Voluntary Emission Reduction Agreement
VOC = volatile organic compounds
WEAP = worker environmental awareness program

Table 2 Bakersfield to Palmdale Project Section Mitigation Monitoring and Enforcement Plan (Measures That Apply to Entire Alignment)

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Transportation										
TRAN-MM#2	Earthwork Haul Routes	Prior to commencement of construction, the Authority will ensure that the Contractor reviews and refines earthwork haul routes and identifies the specific locations where flaggers and temporary traffic control personnel are required. Haul routes outside of project right-of-way will be identified. At a minimum, flaggers will be required at the following intersections: • SR 184/Weedpatch Highway • East Brundage Lane • South Edison Road • Comanche Drive • East Tehachapi Boulevard • Highline Road • Tehachapi Willow Springs Road (all crossings) • Rosamond Boulevard • 60th Street West • Avenue A • SR 138 • West Avenue F • West Avenue G • West Avenue K • Columbia Way/East Avenue M • West Avenue N • West Avenue O At a minimum, temporary traffic control personnel will be provided to control the major intersections along SR 138 between 25th Street West and 15th Street. These requirements will be incorporated into the Construction Transportation Plan (TR-IAMF#2).	Pre-construction	Design	Prior to commencement of construction	Contractor	Contractor	Identify haul routes, flagger locations, and traffic control personnel prior to commencement of construction	Pre-construction haul routes, flagger locations, and traffic control personnel locations submitted to Authority	Impact TR #2: Circulation and Emergency Access During Construction
TRAN-MM#3	Intersection and Roadway Segment Improvements	The following improvements are available for consideration to address traffic delay impacts under NEPA for the project. No mitigation is required under CEQA. • SR 14 Southbound on-ramp at Rancho Vista Boulevard – Provide a traffic signal with westbound continuous green phase • 20th Street E at Avenue Q – Widen intersection and add an eastbound through lane • 50th Street E/47th Street E at Palmdale Boulevard – Reconfigure southbound approach to include an additional lane on each approach (shared through/right and left lane) – Reconfigure westbound approach to include an additional lane on each approach (shared through/left and right lane) • Fort Tejon Road/Pearblossom Highway at Pearblossom Highway/Avenue T – Provide eastbound right-turn overlap phasing – Provide westbound right-turn overlap phasing	Pre-construction	Design	Prior to final design	Authority/ Contractor	Authority/ Contractor	Intersection and roadway segment improvements to address traffic delay impacts	MOU with City of Palmdale, as necessary/ contract with contractor	Impact TR #6: Roadway Levels-of-Service

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– Optimize cycle length – Optimize splits • U.S. Route 395 at Palmdale Road – Modify signal timing: optimize cycle length and splits • 3rd Street at Avenue Q – Provide traffic signal • 10th Street E Between Avenue R and Avenue S – Widen roadway from 2 to 4 lanes • Avenue Q Between 10th Street E and 20th Street E – Widen roadway from 2 to 4 lanes								
Air Quality and Global Climate Change										
AQ-MM#1	Offset Project Construction Emissions through Off-Site Emission Reduction Programs	The Authority shall enter into a contractual agreement with the San Joaquin Valley Air Pollution Control District (SJVAPCD) through a Memorandum of Understanding and a Voluntary Emission Reduction Agreement (VERA). The VERA mitigates (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of volatile organic compound (VOC), NO_X, particulate matter (PM_{10}), and $PM_{2.5}$. The agreement will provide funds for the SJVAPCD's Emission Reduction Incentive Program (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly affected communities, thus offsetting project-related impacts on air quality. To lower overall cost, funding for the VERA program to cover estimated construction emissions for any funded construction phase will be provided at the beginning of the construction phase. At a minimum, mitigation/offsets will occur in the year of impact, or as otherwise permitted by 40 Code of Federal Regulations (C.F.R.) Part 93 Section 93.163. The Authority shall also enter into an agreement with the Antelope Valley Air Quality Management District (AVAQMD) and Eastern Kern Air Pollution Control District (EKAPCD) to mitigate (by offsetting) to net zero (to the extent that offsets are available) the project's actual emissions from construction equipment and vehicle exhaust emissions of VOC, NO_X, PM_{10} and $PM_{2.5}$. In the AVAQMD, the Authority shall participate in the Air Quality Investment Program, which funds stationary- and mobile-source emission reduction strategies. In the EKAPCD, the Authority shall provide an application for the Emission Banking Certificate Program.	Construction	Reporting/ funding	Yearly	Authority/ Contractor	Authority/ Contractor	Offset project construction criteria air pollutant emissions through funding	Authority to coordinate purchase of offsets with SJVAPCD and other AQMDs per contractor reports	Impact AQ #1: Regional Air Quality Impacts during Construction Impact AQ #2: Compliance with Air Quality Plans during Construction Impact AQ #8: Cumulative Impacts during Construction Impact PK #2: Temporary Access, Air Quality, Noise, and Visual Impacts

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Noise and Vibration										
N&V-MM#1	Construction Noise Mitigation Measures	During construction, the contractor will monitor construction noise to verify compliance with the noise limits shown in Table 3.4-7 [of the Final EIR/EIS]. Prior to construction (any ground disturbing activities), the contractor shall prepare a noise-monitoring program for Authority approval. The noise-monitoring program shall describe how, during construction, the contractor will monitor construction noise to verify compliance with the noise limits (an 8-hour Leq dBA of 80 during the day and 70 at night for residential land use, 85 for both day and night for commercial land use, and 90 for both day and night for industrial land use) where a noise-sensitive receptor is present. The contractor would be given the flexibility to meet the FRA construction noise limits in the most efficient and cost-effective manner. This can be done by either prohibiting certain noise-generating activities during nighttime hours or providing additional noise control measures to meet the noise limits. In addition, the noise-monitoring program will describe the actions required of the contractor to meet required noise limits. These actions will include the following nighttime and daytime noise control mitigation measures, as necessary: • Install a temporary construction site sound barrier near a noise source. • Avoid nighttime construction in residential neighborhoods. • Locate stationary construction equipment as far as possible from noise-sensitive sites. • Re-route construction truck traffic along roadways that will cause the least disturbance to residents. • During nighttime work, use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with spotters. • Use low-noise emission equipment. • Implement noise-deadening measures for truck loading and operations. • Monitor and maintain equipment to meet noise limits. • Line or cover storage bins, conveyors, and chutes with sound-deadening material. • Use acoustic enclosures, shields, or shrouds for equipment and facilities. • Use high-grade engine exhaust silencers and engine-casing sound insulation. • Prohibit aboveground jackhammering and impact pile driving during nighttime hours. • Minimize the use of generators to power equipment. • Limit use of public address systems. • Grade surface irregularities on construction sites. • Use moveable sound barriers at the source of the construction activity. • Limit or avoid certain noisy activities during nighttime hours. • To mitigate noise related to pile driving, the use of an auger to install the piles instead of a pile driver would reduce noise levels substantially. If pile driving is necessary, limit the time of day that the activity can occur.	Pre-construction/ construction	Design/ reporting	Prior to construction/ weekly monitoring	Authority/ Contractor	Contractor	Placement of sound barriers and construction equipment to mitigate construction noise and weekly monitoring construction noise	Contract requirements and specifications	Impact N&V #1: Construction Noise Impact PK #2: Temporary Access, Air Quality, Noise, and Visual Impacts F-B LGA Impact PK #1: Construction Impacts on Parks, Recreation, Open Space and School District Recreation Facilities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• The Authority will establish and maintain in operation until completion of construction a toll-free "hotline" regarding the project section construction activities. The Authority shall arrange for all incoming messages to be logged (with summaries of the contents of each message) and for a designated representative of the Authority to respond to hotline messages within 24 hours (excluding weekends and holidays). The Authority shall make a reasonable good faith effort to address all concerns and answer all questions, and shall include on the log its responses to all callers. The Authority shall make a log of the in-coming messages and the Authority's responsive actions publicly available on its website. The contractor shall provide the Authority with an annual report by January 31 of the following year documenting how it implemented the noise-monitoring program.								
N&V-MM#2	Construction Vibration Mitigation Measures	Prior to construction involving impact pile driving within 50 feet of any building the contractor shall provide the Authority with a vibration technical memorandum documenting how project pile driving criteria will be met. Upon approval of the technical memorandum by the Authority, and where a noise-sensitive receptor is present, the Contractor shall comply with the vibration reduction methods described in that memorandum. Potential construction vibration building damage is only anticipated from impact pile driving at very close distances to buildings. If pile driving occurs more than 25 to 50 feet from buildings, or if alternative methods such as push piling or auger piling are used, damage from construction vibration is not expected to occur. When a construction scenario has been established, pre-construction surveys will be conducted by the Contractor at locations within 50 feet of pile driving to document the existing condition of buildings in case damage is reported during or after construction. The Contractor will arrange for the repair of damaged buildings or will pay compensation to the property owner.	Pre-construction/ construction/ post-construction	Reporting/ funding	Pre-construction surveys to establish baseline/ weekly monitoring during construction/ post-construction repairs, as needed	Authority/ Contractor	Authority/ Contractor	Pre-construction surveys to establish baseline/ ongoing weekly monitoring during construction/ post-construction assessments and repairs building damage as needed	Contract requirements and specifications	Impact N&V #2: Construction Vibration Impact PK #2: Temporary Access, Air Quality, Noise, and Visual Impacts

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
N&V-MM#3	Implement California High-Speed Rail Project Noise Mitigation Guidelines	Various options exist to address the potentially severe noise effects from high-speed train operations. The Authority has developed Noise Mitigation Guidelines for the statewide HSR system that sets forth three categories of mitigation measures to reduce or offset severe noise impacts from HSR operations: sound barriers, sound insulation, and noise easements. The Guidelines also set forth an implementation approach that considers multiple factors for determining the reasonableness of sound barriers as mitigation for severe noise impacts, including structural and seismic safety, cost, number of affected receptors, and effectiveness. Sound barrier mitigation would be designed to reduce the exterior noise level from HSR operations from severe to moderate, according to the provisions of the FRA noise and vibration manual (FRA 2012) and Figure 3.4-1 [of the Final EIR/EIS]. The Noise Mitigation Guidelines, included as Appendix 3.4-B [of the Final EIR/EIS], describe the following mitigation measures and approach: **Sound Barriers** Prior to operation of the HSR, the Authority will install sound barriers where they can achieve between 5 and 15 dB of exterior noise reduction, depending on their height and location relative to the tracks. The primary requirements for an effective sound barrier are that the barrier must (1) be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) be of an impervious material with a minimum surface density of four pounds per square foot, and (3) not have any gaps or holes between the panels or at the bottom. Because many materials meet these requirements, aesthetics, durability, cost, and maintenance considerations usually determine the selection of materials for sound barriers. Depending on the situation, sound barriers can become visually intrusive. Typically, the sound barrier style is selected with input from the local jurisdiction to reduce the visual effect of barriers on adjacent lands uses, refer to Aesthetic Options for Non-Station Structures, 2017. For example, sound barriers could be solid or transparent, and made of various colors, materials, and surface treatments. Pursuant to the Noise Mitigation Guidelines, recommended sound barriers must meet the following criteria to be considered a reasonable and feasible mitigation measure: • Achieve a minimum of 5 decibels (dB) of noise reduction. • The minimum number of affected sites should be at least 10. • The length should be at least 800 feet. • Must be cost-effective. The maximum sound barrier height would be 14 feet for at-grade sections. Berm and berm/wall combinations are the preferred types of sound barriers where space and other environmental constraints permit. On aerial structures, the maximum sound barrier height would also be 14 feet, but barrier material would be limited by engineering weight restrictions for barriers on the structure. All sound barriers would be designed to be as low as possible to achieve a substantial noise reduction. Table 3.4-28 through Table 3.4-33 [of the Final EIR/EIS] show the reasonableness of each feasible sound barrier (achieve a minimum 5	Pre-construction/ post-construction	Design	Prior to final design/ prior to operation/ monthly reporting during operation	Authority/ Contractor	Authority/ Contractor	Implement sound barriers as needed or acquire easements on properties severely affected by noise	Contract requirements and specifications/ California High-Speed Rail Project Noise Mitigation Guidelines	Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers Impact PK #6: Project Changes to Park or Recreation Facility Use or Character

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		dBA reduction) along with their height, approximate length, number of benefited receivers, total construction cost, number of unmitigated severe impacts, and number of residual impacts (with mitigation) for each barrier height. Sound barriers were determined to be reasonable when the cost to construct the barriers would not exceed combined dollar amount of each benefited receiver. Table 3.4-28 [of the Final EIR/EIS] shows that two sound barriers were evaluated under the Bakersfield Station—F-B LGA alignment. Sound Barrier Nos. 5 and 6 were determined to be both feasible and reasonable. Details of the sound barrier analysis are provided in the *Fresno to Bakersfield Section Noise and Vibration Technical Report* [Authority 2018]. Table 3.4-29, Table 3.4-30, Table 3.4-31, and Table 3.4-32 [of the Final EIR/EIS] show that 14 sound barriers were evaluated under Alternatives 1, 2, 3, and 5, respectively, for the Bakersfield to Palmdale (Between Station Areas) alignment. For each alternative, 10 barriers were determined to be both feasible and reasonable. Table 3.4-33 [of the Final EIR/EIS] shows that three sound barriers were evaluated in the Palmdale Station area. Sound Barrier Nos. 15, 16 and 17 were determined to be both feasible and reasonable. Figures 3.4-B-10 through 3.4-B-13 in Appendix 3.4-A [of the Final EIR/EIS] show the proposed sound barrier locations. The Authority will work with the communities to identify how the use and height of sound barriers would be determined. Also, as shown in Table 3.4-28, Table 3.4-29, Table 3.4-30, Table 3.4-31, Table 3.4-32, and Table 3.4-33, some receptors have the potential to remain severely impacted after mitigation is considered, or in some cases, implemented. All such receptors would be classified as residual severe impacts. Table 3.4-34, Table 3.4-35, and Table 3.4-36 show the breakdown of receptors also classified as residual severe impacts, based on land use in each category, that were not evaluated with a sound barrier because they are located in areas that do not meet the minimum number of 10 severely impacted receivers and the minimum barrier length of 800 feet. As shown in Table 3.4-34, there are no residual severe impacts under the Bakersfield Station—F-B LGA Alignment. Table 3.4-35 and Table 3.4-36 show the residual severe impacts under the Bakersfield to Palmdale (Between Station Areas) Alignment and the Palmdale Station Alignment, respectively, for each B-P Build Alternative. As discussed under F-B LGA N&V-MM#6 and N&V-MM#6, below, an updated noise and vibration assessment will be completed in final design prior to the start of construction **Install Building Sound Insulation** If sound barriers are not proposed for receptors with severe impacts, or if proposed sound barriers would not reduce exterior sound levels to below a severe impact level, the Authority would consider building sound insulation as a potential additional mitigation measure on a case-by-case basis. Sound insulation of residences and institutional buildings to improve outdoor-to-indoor noise reduction is a mitigation measure that can be considered when the use of sound barriers is not feasible in providing a reasonable level (5 to 7 dBA) of noise reduction. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where sound barriers are not feasible or desirable and for buildings where indoor sensitivity is of most concern.								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to windows, by sealing holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air conditioning so that windows do not need to be opened. **Noise Easements** If a substantial noise reduction cannot be completed through installation of sound barriers or building sound insulation, the Authority will consider acquiring a noise easement on properties with a severe impact on a case-by-case basis. An agreement between the Authority and the property owner can be established wherein the property owner releases the right to petition the Authority regarding the noise level and subsequent disruptions. This would take the form of an easement that would encompass the property boundaries to the right-of-way of the rail line. The Authority would consider this mitigation measure only in isolated cases where other mitigation is ineffective or infeasible.							
N&V-MM#4	Vehicle Noise Specification	During high-speed rail (HSR) vehicle technology procurement, the Authority will require bidders to meet the federal regulations (40 C.F.R. Part 201.12/13) at the time of procurement for locomotives (currently a 90-dB-level standard) operating at speeds of greater than 45 mph.	Post-construction	HSR vehicle purchasing	HSR operation	Authority	Authority	HSR vehicle noise specification	Contract requirements and specifications	Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers Impact N&V #5: Impacts from Project Vibration
N&V-MM#5	Special Trackwork	Prior to construction, the Contractor shall provide the Authority with an HSR operation noise technical report for review and approval. The report shall address the minimization/elimination of rail gaps at turnouts. Because the impacts of HSR wheels over rail gaps at turnouts increases HSR noise by approximately 6 dB over typical operations, turnouts can be a major source of noise impact. If the turnouts cannot be moved from sensitive areas, the noise technical report will recommend the use of special types of trackwork that eliminate the gap. The Authority will require the project design to follow the recommendations in the approved noise impact report.	Pre-construction	Design	Prior to construction	Authority/ Contractor	Authority/ Contractor	Provide operation noise technical report to determine If special trackwork is required	Contract requirements and specifications	Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers Impact N&V #5: Impacts from Project Vibration
N&V-MM#6	Additional Noise and Vibration Analysis Following Final Design	Prior to construction, the contractor shall provide the Authority with an HSR operation noise technical report for review and approval. If final design or final vehicle specifications result in changes to the assumptions underlying the noise technical report, the Authority shall prepare necessary environmental documentation, as required by CEQA and NEPA, to reassess noise impacts and mitigation. Table 3.4-37 [of the Final EIR/EIS] shows potential vibration mitigation procedures.	Pre-construction	Design	Prior to construction/ final vehicle specification	Authority (vehicle)/ Contractor	Authority (vehicle)/ Contractor	Reassessment of noise and vibration impacts and recommended mitigation following final design	Submit assessment and supplemental environmental documentation	Impact N&V #3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers Impact N&V #5: Impacts from Project Vibration

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
N&V-MM#7	Station, Maintenance-of-Way Facility, and Traction Power Substation	In order to reduce the noise from the facilities, the Authority will implement the following noise mitigation measures, which will be accomplished as part of facility design: • Enclose as many of the activities within the facility as possible. • Eliminate windows in the building that would face toward noise-sensitive land uses adjacent to the facility. If windows are required to be located on the side of the facility facing noise-sensitive land uses, they should be the fixed type of windows with a sound transmission class rating of at least 35. If the windows must be operable, they should be closed during nighttime activities. • Close facility doors where the rails enter the facility during nighttime activities. • Locate tracks that cannot be located within the facility on the far side of the facility from adjacent noise-sensitive receivers. • For tracks that cannot be installed away from noise-sensitive receivers, install sound barrier along the tracks in order to protect the adjacent noise-sensitive receivers. • Locate all mechanical equipment (compressors, pumps, generators, etc.) within the facility structure. • Locate any mechanical equipment located exterior to the facility (compressors, pumps, generators, etc.) on the far side of the facility from adjacent noise-sensitive receivers. If this is not possible, this equipment should be located within noise enclosures to mitigate the noise during operation. • Point all ventilation ducting for the facility away from the adjacent noise-sensitive receivers.	Pre-construction/ operation	Design/ facility operation	During final design/ facility operation	Authority/ Contractor	Authority/ Contractor	Reduce noise from the facilities	Contract requirements and specification	Impact N&V #7: Noise Impacts from HSR Stationary Facilities
N&V-MM#8	Startle Effect Warning Signage	The following signage will be posted along the Pacific Crest Trail: ▪ A passive warning sign at approximately 1,300 feet or farther from the alignment warning of an upcoming train crossing ▪ An active warning sign at 60+ feet of the alignment warning users of an upcoming train crossing and the approximate time for the crossing (number of minutes)	Construction	Install signage	Prior to operation	Contractor/ Authority	Contractor/ Authority	Install warning signage along the Pacific Crest Trail	Contract requirements and specifications	Impact N&V #4: Noise Effects on Wildlife and Domestic Animals

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Electromagnetic Interference and Electromagnetic Fields										
EMI/EMF-MM#1	Protect Sensitive Equipment	The Authority would contact entities where sensitive equipment is located to evaluate the potential impacts of both HSR Project–related EMF RF and EMI on imaging equipment prior to completion of final design. Where necessary to avoid interference, the final design would include suitable design provisions to prevent EMI. These design provisions may include establishing magnetic field shielding walls around sensitive equipment or installing RF filters into sensitive equipment. HSR-related EMI may affect highly susceptible, unshielded sensitive RF equipment such as older MRI systems and other measuring devices common to medical and research laboratories. Most of the devices manufactured today have adequate shielding from all potential EMI sources; however, the potential exists for older devices to be affected and require shielding. A shielded enclosure is very effective at preventing external EMI. Metallic materials are used for shielding (specifically high-conductivity metals for high-frequency interference, such as from HSR operation), and high-permeability metals are used for low-frequency interference. Often either the housing of the affected device is coated with a conductive layer or the housing itself is made conductive. In some situations, it may be necessary to reduce EMI for a suite of devices by creating a shielded room or rooms. Attenuation, or the effectiveness of EMI shielding, is the difference between an electromagnetic signal's intensity before and after shielding. Attenuation is the ratio between field strength with and without the presence of a protective medium measured in decibels (dB). This decibel range changes on a logarithmic scale, so an attenuation rating of 50 dB indicates a shielding strength 10 times that of 40 dB. In general, a shielding range between 60 dB and 90 dB represents a high level of protection, while 90 dB to 120 dB is exceptional.	Pre-construction	Design	Prior to final design	Authority/ Contractor	Authority/ Contractor	Protect nearby equipment sensitive to EMF/EMI	Contract requirements and specifications	Impact EMI/EMF #1: Impacts During Construction Impact EMI/EMF #5: Effects on Sensitive Equipment from Electromagnetic Interference
Public Utilities and Energy										
PU&E-MM#1	Reconfigure or Relocate Substations and/or Substation Components	Reconfigure existing Magunden Substation ancillary components located approximately 250 feet north of the Union Pacific Railroad mainline in Bakersfield, south of Mills Drive.	Pre-construction	Design	Prior to final Design	Authority/ Contractor	Authority/ Contractor	Reconfigure existing Magunden Substation ancillary components	Contract requirements and specifications	Impact PU&E #6: Potential Conflicts with Existing Utilities
Biological and Aquatic Resources										
BIO-MM#1	Conduct Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities	Prior to any ground disturbing activity, the Project Biologist will conduct presence/absence botanical field surveys for special-status plant species and special-status plant sensitive natural communities in all potentially suitable habitats within a Work Area. The surveys shall be consistent with Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018) and Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2001). The Project Biologist will flag and record in GIS the locations of any observed special-status plant species and special-status plant sensitive natural communities and provide appropriate buffers for avoidance.	Pre-construction	Surveying/ monitoring/ reporting	Report findings at least 30 days prior to ground disturbance	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct protocol-level surveys for special-status plant species and communities/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#2	Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species	Prior to any ground disturbing activity, the Project Biologist will collect seeds and plant materials and stockpile and segregate the top four inches of topsoil from locations within the Work Area where species listed as threatened or endangered under the FESA, threatened, endangered, or candidate for listing under CESA, state-designated "Rare" species, and California Rare Plant Rank 1B and 2 species were observed during surveys for use on off-site locations. Suitable sites to receive salvaged material include Authority mitigation sites, refuges, reserves, federal or state lands, and public/private mitigation banks. If relocation or propagation is required by authorizations issued under the FESA and/or CESA, the Project Biologist will prepare a plant species salvage plan to address monitoring, salvage, relocation and/or seed banking of federal or State-listed plant species The plan will include provisions that address the techniques, locations, and procedures required for the collection, storage, and relocation of seed or plant material; collection, stockpiling, and redistribution of topsoil and associated seed. The plan will also include requirements related to outcomes such as percent absolute cover of highly invasive species, as defined by the California Invasive Plant Council (less than documented baseline conditions), maintenance, monitoring, implementation, and the annual reporting. The plan will reflect conditions required under regulatory authorizations issued for federal or state-listed species. The Project Biologist will submit the plan to the Authority for review and approval.	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	In accordance with agency permit requirements	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement monitoring, salvage, relocation, and propagation of special-status plant species/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species
BIO-MM#6	Prepare and Implement a Restoration and Revegetation Plan	Prior to any ground disturbing activity, the Project Biologist will prepare a Restoration and Revegetation Plan (RRP) to address temporary impacts resulting from ground disturbing activities within areas that potentially support special-status species, wetlands and/or other aquatic resources. Restoration activities may include, but not be limited to: grading landform contours to approximate pre-disturbance conditions, re-vegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands and/or other aquatic resources. Consistent with section 1415 of the Fixing America's Surface Transportation Act (FAST Act) restoration activities will provide habitat for native pollinators through plantings of native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10 percent compared to the pre-disturbance condition, or to a level determined through a comparison with an appropriate reference site consisting of similar natural communities and management regimes. The RRP will outline at a minimum: a. Procedures for documenting pre-construction conditions for restoration purposes. b. Sources of plant materials and methods of propagation. c. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	In accordance with agency permit requirements	Authority/ Contractor/ Project Botanist	Authority/ Contractor/ Project Botanist	Prepare and implement RRP/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact BIO #10: Operation Impacts on Aquatic Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		d. Specification of success criteria for re-established plant communities. e. Specification of the remedial measures to be taken if success criteria are not met. f. Methods and requirements for monitoring restoration/replacement efforts, which may involve a combination of qualitative and/or quantitative data gathering. g. Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31st of the following year. The RRP will be submitted to the Authority and regulatory agencies, as defined in the conditions of regulatory authorizations, for review and approval.								
BIO-MM#7	Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species	Prior to any ground disturbing activities, the Project Biologist will conduct pre-construction surveys in suitable habitat to determine the presence or absence of special-status reptiles and amphibian species within the Work Area. These surveys will be conducted in accordance with any required protocols. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities in a Work Area. The results of the pre-construction survey will be used to guide the placement of Environmentally Sensitive Areas (ESAs) or conduct species relocation.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/	Authority/ Contractor/ Project Biologist/	Presence-absence surveys of special-status reptiles and amphibian species within the construction footprint conducted 30 days prior to ground disturbance/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#8	Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species	The Project Biologist will monitor all initial ground disturbing activities that occur within suitable habitat for special-status reptiles and amphibians, and will conduct clearance surveys of suitable habitat in the Work Area on a daily basis. If a special-status reptile or amphibian is observed, the Project Biologist will identify actions, to the extent feasible, sufficient to avoid impacts on the species and to allow it to leave the area on its own volition. Such actions may include establishing a temporary ESA in the area where a special-status reptile or amphibian has been observed and delineating a 50-foot no-work buffer around the ESA. In circumstances where a no-work buffer is not feasible the Project Biologist will relocate any of the species observed from the Work Area. For federal or state-listed species, relocations will be undertaken in accordance with regulatory authorizations issued under the FESA and/or CESA.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Clearance surveys as needed for special-status reptiles and amphibians/ avoidance or relocation of such species/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#11	Conduct Surveys for Blunt-Nosed Leopard Lizard	No more than twelve months before the start of any ground disturbing activity, in accordance with authorizations under FESA, a habitat assessment of the project footprint will be conducted by the Project Biologist in suitable habitat for the blunt-nosed leopard lizard to identify all habitat suitable for blunt-nosed leopard lizard within the project footprint. Within twelve months prior to any ground-disturbing activity, the Project Biologist will conduct surveys for blunt nosed leopard lizard in blunt-nosed lizard suitable habitats (e.g., areas containing burrows) within the Work Area. These surveys will be conducted in accordance with the Approved Survey Methodology for the Blunt-Nosed Leopard Lizard (CDFW 2019), or other more recent guidelines, if available. In instances where blunt-nosed leopard lizards are observed at any time during presence/absence surveys, pre-construction surveys, or construction monitoring, USFWS and CDFW will be notified of the occurrence within two business days.	Pre-construction/ construction	Surveying/ monitoring/ reporting	As established by regulatory compliance agencies/ notify USFWS and CDFW of occurrence within two business days	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Habitat assessment in suitable habitat for blunt-nosed leopard lizard/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#13	Implement Avoidance Measures for Blunt-Nosed Leopard Lizard	For Work Areas where surveys confirm that blunt-nosed leopard lizards are absent, the Project Biologist may install Wildlife Exclusion Fencing (WEF) along the perimeter of the Work Area. The WEF will be monitored daily and maintained. During the non-active season for blunt-nosed leopard lizards (October 16 through April 14), to the extent feasible, ground disturbing activities will not occur in areas where blunt-nosed leopard lizards or signs of the species have been observed and that contain burrows suitable for blunt-nosed leopard lizards. If ground disturbing activities are scheduled during the non-active season, suitable burrows identified during the surveys will be avoided through establishment of 50-foot no-work buffers. The Project Biologist may reduce the size of the no-work buffers if information indicates that the extent of the underground portion of burrows is less than 50 feet. During the active season when blunt-nosed leopard lizards are moving above-ground (April 15 through October 15), the following measures will be implemented in areas where blunt-nosed leopard lizards or signs of blunt-nosed leopard lizards have been observed: • Establishment of No-Work Buffers. The Project Biologist will establish, monitor, and maintain 50-foot no-work buffers around burrows and egg clutch sites identified during surveys. The50-foot no-work buffers will be established around burrows in a manner that allows for a connection between the burrow site and the suitable natural habitat adjacent to the Construction Footprint so that blunt-nosed leopard lizards and/ or hatchlings may leave the area after eggs have hatched. Construction activities will not occur within the 50-foot no-work buffers until such time as the eggs have hatched and blunt-nosed leopard lizards have left the area. • Fencing of Work Areas. Prior to installing wildlife exclusion fence (WEF), the Project Biologist will confirm that no blunt-nosed leopard lizards are present within a Work Area by conducting focused blunt-nosed leopard lizard observational surveys for 12 days over the course of a 30to 60-day period. At least one survey session will occur over 4 consecutive days. These observational surveys may be paired with scent detection dog surveys for blunt-nosed leopard lizard scat.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Install WEF where surveys confirm blunt-nosed leopard lizard is absent/ monitor WEF daily/ establish no-work buffers/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– Within 3 days of completing these surveys with negative results, WEF will be installed in a configuration that accounts for burrow locations and enables blunt-nosed leopard lizards to leave the Work Area. The following day, the Project Biologist will conduct an observational survey. If no blunt-nosed leopard lizards are observed, the Project Biologist will install additional WEF to further enclose the Work Area. This Work Area will be monitored daily while the WEF is in place. – If blunt-nosed leopard lizards are observed prior to installing the last of the WEF, the Project Biologist will continue observational surveys until the lizard is observed leaving the Work Area or until 30 days elapse with no blunt-nosed leopard lizards observations within the Work Area.								
BIO-MM#14	Conduct Pre-construction Surveys and Delineate Active Nest Exclusion Areas for Breeding Birds	Prior to any ground-disturbing activity, including vegetation removal, staging, and site visits scheduled to occur during the bird breeding season (February 1 to September 1), the Project Biologist will conduct visual pre-construction surveys within the Work Area for nesting birds and active nests (nests with eggs or young) of non-raptor species listed under the Migratory Bird Treaty Act and/or the Fish and Game Code. These surveys will be conducted in accordance with any required protocols. In the event that active bird nests are observed during the pre-construction survey, the Project Biologist will delineate no-work buffers. No-work buffers will be set at a distance of 75 feet, unless a larger buffer is required pursuant to regulatory authorizations issued under the FESA and/or CESA. No-work zone buffers will be maintained until nestlings have fledged and are no longer reliant on the nest or parental care for survival or the Project Biologist determines that the nest has been abandoned. In circumstances where it is not feasible to maintain the standard no-work buffer, the no-work buffer may be reduced, provided that the Project Biologist monitors the active nest during the construction activity to ensure that the nesting birds do not become agitated. Additional measures that may be used when no-work buffers are reduced include visual screens and sound barriers. If established no-work zone buffers cannot be implemented, the Project Biologist will establish a new buffer.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Visual pre-construction surveys in suitable habitats for nesting birds/ establish no-work buffers/ monitor active bird nests/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#15	Conduct Pre-construction Surveys and Monitoring for Raptors	If construction or other vegetation removal activities are scheduled to occur during the breeding season for raptors (January 1 to September 1), no more than 14 days before the start of the activities, the Project Biologist will conduct pre-construction surveys for nesting raptors in areas where suitable habitat is present. Specifically, such surveys will be conducted in habitat areas within the Construction Footprint and, where access is available, within 500 feet of the boundary of the Construction Footprint. If breeding raptors with active nests are found, the Project Biologist will delineate a 500-foot buffer (or as modified by regulatory authorizations for species listed under FESA and/or CESA) around the nest to be maintained until the young have fledged from the nest and are no longer reliant on the nest or parental care for survival or until such time as the Project Biologist determines that the nest has been abandoned. Nest buffers may be adjusted if the Project Biologist determines that smaller buffers would be sufficient to avoid impacts on nesting raptors. If established no-work zone buffers cannot be implemented, Project Biologist will establish a new buffer.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys in suitable habitats for nesting raptors/ establish no-work buffers/ monitor active raptor nests/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#16	Implement Avoidance Measures for California Condor	During any ground-disturbing activities within the range of the California condor, as delineated in the USFWS database, the Authority will implement the following avoidance measures: • The Project Biologist will be present for construction activities occurring within two miles of known California condor roosting sites. • If USFWS informs the Authority or if the Authority is otherwise made aware that California condors are roosting within 0.5 miles of a Work Area, no construction activity will occur during the period between one hour before sunset and one hour after sunrise. • All construction materials located within Work Areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored, covered, and secured when not in use. • Littering of trash and food waste is prohibited. All litter, small artificial items (screws, washers, nuts, bolts, etc.), and food waste will be collected and disposed of from Work Areas on at least a daily basis. • All fuels and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured and/or secondary containment facilities as necessary. Any spills of liquid substances that could harm condors will be immediately addressed. • Avoid the use of ethylene glycol-based anti-freeze or other ethylene glycol-based liquid substances. All parked vehicles/equipment will be kept free of leaks, particularly anti-freeze. Vehicles will be checked daily for leaks. • Polychemical lines will not be used or stored on-site to preclude condors from obtaining and ingesting pieces of polychemical lines. • If a California condor(s) lands in any Work Area, the Project Biologist will assess construction activities occurring at the time and determine whether those activities present a potential hazard to the individual California condor. Activities determined by the Project Biologist to present a potential hazard to the California condor will be stopped until the bird has abandoned the area. Methods approved by USFWS for hazing California condors to encourage abandonment of the construction site, Guidance on Hazing California Condors (September 2014), may be used as necessary. • The Project Biologist will coordinate with USFWS prior to construction-related uses of helicopters to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Monitor construction within two miles of known California condor roosting sites/ limit construction hours if California condors are roosting within 0.5 mile of Work Area/ properly store construction materials in Work Areas that could pose a risk of entanglement/ coordinate with USFWS prior to construction-related uses of helicopters/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#17	Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures	Surveys must be performed no more than one year prior to the commencement of construction activities. The Project Biologist will conduct surveys for Swainson's hawk during the nesting season (March through August) within both the Work Area and a 0.5-mile buffer surrounding the Work Area, provided access to such areas is available. No sooner than 30 days prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys of nests identified during the earlier surveys to determine if any are occupied. The initial nesting season surveys and subsequent pre-construction nest surveys will follow the protocols set out in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee [SHTAC] 2000), and for the areas within the Antelope Valley, the *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and California Department of Fish and Game, 2010).	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys for nesting Swainson's hawks/ monitor active nests/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#18	Implement Avoidance and Minimization Measures for Swainson's Hawk Nests	Any active Swainson's hawk nests (defined as a nest used one or more times in the last five years) found within 0.5-mile of the boundary of the Work Area during the nesting season (February 1 to September 1) will be monitored daily by the Project Biologist to assess whether the nest is occupied. If the nest is occupied, the Project Biologist will establish no-work buffers following consultation with CDFW and CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's hawks (*Buteo swainsoni*) in the Central Valley of California (CDFG 1994). The status of the nest will be monitored until the young fledge or for the length of construction activities, whichever occurs first. Adjustments to the buffer(s) may be made in consultation with CDFW. If an occupied Swainson's hawk nest tree is to be removed, an incidental take permit under CESA will be obtained and impacts will be minimized and fully mitigated.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Monitor active Swainson's hawk nests/ establish nest avoidance buffer zones/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#20	Conduct Protocol Surveys for Burrowing Owls	Prior to any ground disturbing activity, the Project Biologist will conduct protocol-level surveys for burrowing owl within suitable habitat located in the Work Area and/or extending 500 feet from the boundary of the Work Area, where access is available. Surveys will be conducted in accordance with guidelines in the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012c).	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Protocol-level surveys for burrowing owls/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#21	Implement Avoidance and Minimization Measures for Burrowing Owl	Occupied burrowing owl burrows that will be directly affected by ground disturbing activities will be relocated in accordance with CDFW's Staff Report on Burrowing Owl Mitigation (CDFG 2012). To the extent feasible, the Project Biologist will establish 600-foot no-work buffers around occupied burrowing owl burrows in the Work Area during the nesting season (February 1 through September 1). If the no-work buffer is not feasible and occupied burrows will be relocated during the nesting season, relocation will occur either before the birds have begun egg-laying and incubation or after the Project Biologist has determined that the juveniles from the occupied burrows are foraging independently and are capable of independent survival.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish no-work buffers around occupied burrowing owl burrows/ relocation as needed/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#22	Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys in potentially suitable habitat within the Work Area to identify burrows or signs of presence of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse. The surveys will be conducted within two years of, and at least 14 days before, the start of ground disturbing activities in a Work Area. These surveys will be conducted in accordance with any required protocols.	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct habitat assessment surveys for special-status small mammal species/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#23	Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	If burrows or signs of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse are observed during pre-construction surveys, the Project Biologist will establish Environmentally Sensitive Areas (ESAs) and install Wildlife Exclusion Fencing at least 14 days before the start of ground disturbing activities in areas where burrows or signs were observed. To the extent feasible, no-work buffers extending 50 feet beyond the ESAs will be established. The WEF will be installed in a manner that provides for the exclusion of the special-status small mammals from the Work Area, but allows them to exit the area. After the WEF is installed, the Project Biologist will conduct trapping and relocation for Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, and Tulare grasshopper mouse, in coordination with CDFW and USFWS regarding appropriate methods and required permits.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish no-work buffers if burrows or signs of special-status small mammal species are detected/ relocation as needed/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#25	Conduct Pre-construction Surveys for Special-Status Bat Species	No earlier than thirty days prior to the start of ground disturbing activities in a Work Area, the Project Biologist will conduct a visual and acoustic survey (over the course of one day and one evening at a minimum) for roosting bats in the Work Area and extending 500 feet from the boundary of the Work Area, where access is available. Such surveys will be conducted only in those areas in which bridges, abandoned structures, trees with large cavities or dense foliage are present within a half mile of the boundary of the Work Area.	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct visual and acoustic pre-construction survey for roosting bats/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#26	Implement Bat Avoidance and Relocation Measures	Prior to any ground-disturbing activity, the Project Biologist shall survey for active hibernacula or maternity roosts. If active hibernacula or maternity roosts are identified in the Work Area or 500 feet extending from the Work Area during pre-construction surveys, they will be avoided to the extent feasible. Clearing and grubbing will be prohibited adjacent to the roost site. Lighting use near the roost site where it would shine on the roost or interfere with bats entering or leaving the roost will also be prohibited. Operation of internal combustion equipment, such as generators, pumps and vehicles shall be prohibited within 300 feet of the roost site. If avoidance of a hibernacula is not feasible, through coordination with CDFW, portions of the features that provide naturalized habitat will be maintained to the greatest extent possible. In addition, improvements will be made to existing roost sites and/or new roost sites on buildings or within the project site area will be provided. New roosts will be in place prior to the initiation of project-related activities to allow enough time for bats to relocate. Additionally, if avoidance of a hibernacula is not feasible, the Project Biologist will prepare a relocation plan to remove the hibernacula and provide for construction of an alternative bat roost outside of the Work Area. The relocation plan will be submitted to CDFW for review prior to construction activities. The Project Biologist will implement the relocation plan before the commencement of any ground disturbing activities that will occur within 500 feet of the hibernacula. Removal of roosts will be guided by accepted exclusion and deterrent techniques.	Pre-construction/ Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Avoid active or hibernation roosts, if feasible/ if necessary, prepare and implement relocation plan for bat roosts/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#27	Implement Bat Exclusion and Deterrence Measures	If non-breeding or non-hibernating individuals or groups of bats are found roosting within the Work Area, the Project Biologist will facilitate the eviction of the bats by either opening the roosting area to change the lighting and airflow conditions, or installing one-way doors or other appropriate methods. To the extent feasible, the Authority will leave the roost undisturbed by project activities for a minimum of one week after implementing exclusion and/or eviction activities. Steps will not be taken to evict bats from active maternity or hibernacula; instead such features may be relocated pursuant to a relocation plan.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Safely evict bats from roosts except for established maternity roosts and occupied hibernation roosts/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#28	Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures	Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys for ringtail and ringtail den sites within suitable habitat located within the Work Area. These surveys will be conducted no more than 30 days before the start of ground disturbing activities in a Work Area. The Project Biologist will establish 100-foot no-work buffers around occupied maternity dens throughout the pup-rearing season (May 1 through June 15) and a 50-foot no work buffer around occupied dens during other times of the year.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for American badger and ringtail den sites in suitable habitats/ establish no-work buffer around occupied dens/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#29	Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Minimization Measures	Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys for American Badger den sites within suitable habitat located within the Work Area. These surveys will be conducted no less than 14 days and no more than 30 days prior to the start of ground disturbing activities in a Work Area. The Project Biologist will establish a 100-foot no-work buffer around occupied maternity dens throughout the pup-rearing season (February 15 through July 1) and a 50-foot no-work buffer around occupied dens during other times of the year. If non-maternity dens are found and cannot be avoided during construction activities, they will be monitored for badger activity. If the Project Biologist determines that dens may be occupied, passive den exclusion measures will be implemented for three to five days to discourage the use of these dens prior to project disturbance activities.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for American badger and ringtail den sites in suitable habitats/ establish no-work buffer around occupied dens/ conduct passive den exclusion for non-maternity dens/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#30	Conduct Pre-construction Surveys for San Joaquin Kit Fox	Within 30 days prior to the start of any ground disturbing activity, the Project Biologist will conduct pre-construction surveys in modeled suitable habitat, including urban suitable habitat, within the Work Area. The surveys will be conducted in accordance with USFWS' San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999) between May 1 and September 30 for the purpose of identifying potential San Joaquin kit fox dens. If any occupied or potential dens are found during pre-construction surveys, they will be flagged and a 50-foot no-work buffer will be established around the den until the den is cleared, if necessary to allow construction activities to proceed.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for San Joaquin kit fox dens/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#31	Minimize Impacts on San Joaquin Kit Fox	The Authority will implement USFWS' *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* [USFWS 2011] to minimize impacts on this species, including: • Disturbance to all kit fox dens will be avoided to the extent feasible. • Construction activities that occur within 200 feet of any occupied dens will cease within one-half hour after sunset and will not begin earlier than one-half hour before sunrise, to the extent feasible. • All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored within the Construction Footprint for one or more overnight periods will be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved. • If a San Joaquin kit fox is detected within a Work Area during construction, the Project Biologist will request approval from the Service and CDFW to capture and relocate the kit fox if it does not safely leave the area by its own volition. • To minimize the temporary impacts of WEF and construction exclusion fencing on kit fox and their movement/migration corridors during construction, artificial dens will be installed along the outer perimeter of WEF and construction exclusion fencing. Artificial dens or similar escape structures will also be installed at dedicated wildlife crossing structures to provide escape cover and protection against predation. The artificial dens will be located on parcels owned by the Authority or at locations where access is available.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation	Authority/ Contractor/ Project Biologist/ Mitigation	Implement USFWS's Standardized Recommenda-tions for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS 2011)/ report findings	Condition of Design Build Contract Condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#32	Restore Temporary Riparian Habitat Impacts	Within ninety days of completing construction in a Work Area, the Project Biologist will direct the revegetation and recontouring, as necessary, of any riparian areas temporarily disturbed as a result of the construction activities, using appropriate native plants and seed mixes. Native plants and seed mixes will be obtained from stock originating from areas within the local watershed, to the extent feasible. The Project Biologist will monitor restoration activities consistent with provisions in the Restoration and Revegetation Plan (RRP) (BIO-MM#6).	Construction/ post-construction	Restoration/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Revegetate disturbed riparian areas/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact HWR #1: Temporary Construction Impacts to Floodplains and Floodways
BIO-MM#33	Restore Aquatic Resources Subject to Temporary Impacts	Within ninety day of the completion of construction activities in a Work Area, the Authority will begin to restore aquatic resources that were temporarily affected by the construction. Aquatic resources are those resources considered waters of the U.S. under the federal Clean Water Act and/or waters of the state under the Porter-Cologne Act. As set out in the Restoration and Revegetation Plan (RRP), such areas will be, to the extent feasible, restored to their natural topography. In areas where gravel or geotextile fabrics have been installed to protect substrate and to otherwise minimize impacts, the material will be removed and the affected features will be restored. The Authority will revegetate affected aquatic resources using appropriate native plants and seed mixes (from local vendors where available). The Authority will conduct maintenance monitoring consistent with the provisions of the RRP.	Construction/ post-construction	Restoration/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Restore disturbed aquatic resources/ conduct revegetation/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #10: Operation Impacts on Aquatic Resources
BIO-MM#34	Monitor Construction Activities within Aquatic Resources	The Project Biologist will monitor construction activities that occur within or adjacent to aquatic resources, including activities associated with the installation of protective barriers (e.g., silt fencing, sandbags, fencing), install and/or removal of creek material to accommodate crossings, construction of access roads, and removal of vegetation. As part of this effort, the Project Biologist will document compliance with applicable avoidance and minimization measures including measures set forth in regulatory authorizations issued under the CWA and/or Porter-Cologne.	Construction/ post-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct monitoring of construction activities in and adjacent to jurisdictional waters/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #4: Construction Impacts on Aquatic Resources Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
BIO-MM#35	Implement Transplantation and Compensatory Mitigation Measures for Protected Trees	Prior to ground disturbing activities, the Project Biologist will conduct surveys in the Work Area to identify protected trees. The Project Biologist will establish ESAs around protected trees with the potential to be affected by construction activities, but do not require removal. The ESAs will extend outward five feet from the drip lines of such protected trees. The Authority will provide compensatory mitigation for impacts on protected trees, including impacts associated with removing or trimming a protected tree. Compensation will be based on requirements set out in applicable local government ordinances, policies and regulations. Compensatory mitigation may include, but is not limited to, the following: • Transplantation of protected trees to areas outside of the Work Area. • Replacement of protected trees at an off-site location, based on the number of protected trees impacted, at a ratio not to exceed 3:1 for native trees, 10:1 for heritage trees, or 1:1 for ornamental trees, unless higher ratios are required by local government ordinances or regulations. • Contribution to a tree-planting fund.	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ restoration/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct protected trees surveys/ compensate for impacts and effects to protected tree resources/ prepare and implement a monitoring and maintenance program to monitor transplanted trees/ report findings	Condition of design-build contract	Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #12: Operation Impacts on Protected Trees

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#36	Install Aprons or Barriers within Security Fencing	Prior to final construction design the Project Biologist will review the fencing plans along any portion of the permanent right-of-way that is adjacent to natural habitats (e.g., alkali desert scrub, annual grassland) and confirm that the permanent security fencing will be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches above ground to prevent special-status reptiles, amphibians and mammals from moving through or underneath the fencing and gaining access to areas within the right-of-way. At the 12-inch depth of the below grade portion of the apron, it will extend or be bent at an approximately 90-degree angle and oriented outward from the right-of-way a minimum of 12-inches, to prevent fossorial mammals, reptiles, and amphibians from digging or tunneling below the security fence and gaining access to the right-of-way. A climber barrier (e.g., rigid curved or bent overhang) will be installed at the top of the apron to prevent reptiles, amphibians and mammals from climbing over the apron. The Project Biologist will ensure that the selected apron material and climber barrier does not cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for quarterly inspection and repair of the fencing. The specific design and method for installation of an apron or barrier may vary as required by regulatory authorizations issued under FESA and/or CESA. Prior to operation the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats (e.g., alkali desert scrub, annual grassland) and confirm that the fencing has been appropriately installed. Fencing plan review and field inspection will be documented in a memorandum from the Project Biologist and provided to the Authority.	Pre-construction/ construction	Final design/ surveying/ monitoring/ reporting	Yearly or at other appropriate intervals	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Install permanent aprons of barriers adjacent to prevent special-status reptiles, amphibians, and mammals from gaining access to right-of-way/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#37	Minimize Effects to Wildlife Movement Corridors during Construction	To the extent feasible, the Authority will avoid placing fencing, either temporarily or permanently, within known wildlife movement corridors in those portions of the alignment where the tracks are elevated (e.g., viaducts or bridges). The Authority will avoid conducting ground disturbing activities in wildlife movement corridors during nighttime hours, to the extent feasible, and will shield nighttime lighting to avoid illuminating wildlife movement corridors in circumstances where avoidance of such activities is not feasible. Steps to minimize lighting effects to wildlife movement corridors during construction will be consistent with BIO-MM#86: Implement Lighting Minimization Measures During Construction.	Pre-construction/ construction	Final design/ surveying/ monitoring/ reporting	Yearly or at other appropriate intervals	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Avoid placement of fencing adjacent to wildlife movement corridors/ report findings	Condition of Design Build Contract Construction	Impact BIO #5: Construction Impacts on Wildlife Movement

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#38	Compensate for Impacts to Listed Plant Species	The Authority will provide compensatory mitigation for direct impacts to federal and State-listed plant species based on the number of acres of plant habitat directly affected. Such mitigation will include the following measures: • Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts to federally listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under FESA. • Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts to State-listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under CESA. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, Bio-MM# 53.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate impacts on special-status plants at a 1:1 ratio based on actual acres of direct effects/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species
BIO-MM#42	Provide Compensatory Mitigation for Impacts on Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat and Nelson's Antelope Squirrel	The Authority will provide compensatory mitigation to offset the permanent and temporary loss of suitable habitat for the Tipton kangaroo rat and Nelson's antelope squirrel. Mitigation will be provided at a ratio of 1:1, unless a higher ratio is required by authorizations issued under FESA for Tipton kangaroo rat or blunt-nosed leopard lizard, or under CESA for Tipton kangaroo rat or Nelson's antelope squirrel. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for permanent and temporary loss of suitable habitat for blunt-nosed leopard lizard, Tipton kangaroo rat and Nelson's antelope squirrel/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#43	Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat	To compensate for permanent impacts on active Swainson's hawk nest trees (i.e., trees in which Swainson's hawks were observed building nests during protocol-level surveys described in BIO-MM#48) and foraging habitat, the Authority would provide project-specific compensatory mitigation that replaces affected nest trees and provides foraging habitat. Lands proposed as compensatory mitigation for Swainson's hawk would meet the following minimum criteria: • Support at least three mature native riparian trees suitable for Swainson's hawk nesting (i.e., valley oak, Fremont cottonwood, or willow) for each Swainson's hawk nest tree (native or nonnative) removed by construction of the project extent, which results in a 3:1 ratio. • Support at least one Swainson's hawk nesting territory in the last 5 years. • Contribute to the project extent's mitigation commitment for Swainson's hawk foraging habitat, which would be calculated based on the following ratios: – 1:1 for impacts on Active Primary Foraging Habitat – 0.75:1 for impacts on Active Secondary Foraging Habitat – 0.5:1 for impacts on Active Tertiary Foraging Habitat.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensatory mitigation that replaces Swainson's hawk nesting trees and provides natural lands for foraging/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#44	Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat	To compensate for permanent impacts on nesting, occupied, and satellite burrows for burrowing owls and/or their habitat, the Authority will provide compensatory mitigation at a minimum ratio of 1:1 using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for permanent impacts burrowing owls/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#45	Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat	The Authority will provide compensatory mitigation for impacts on modeled San Joaquin kit fox habitat through the acquisition of suitable habitat that is acceptable to USFWS and CDFW. Habitat will be replaced at a minimum ratio of 1:1 for natural lands and at a ratio of 3:1 for suitable urban or agricultural lands, unless a higher ratio is required by regulatory authorizations issued under FESA and/or CESA. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, Bio-MM# 53.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Mitigate for impacts to San Joaquin kit fox habitat/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#46	Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat	The Authority will compensate for permanent impacts on riparian habitats at a ratio of 2:1, unless a higher ratio is required by agencies with regulatory jurisdiction over the resource. Compensatory mitigation may occur through habitat restoration, the acquisition of credits from an approved mitigation bank, or participation in an in lieu fee program.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Mitigate permanent riparian habitat impacts through compensation/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #9: Operation Impacts on Special-Status Plant Communities
BIO-MM#47	Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts on Aquatic Resources	The Authority will prepare and implement a Compensatory Mitigation Plan (CMP) that identifies mitigation to address temporary and permanent loss, including functions and values, of aquatic resources as defined as waters of the U.S. under the federal Clean Water Act (CWA) and/or waters of the State under the Porter-Cologne Act. Compensatory mitigation may involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through one or more of the following methods: • Purchase of credits from an agency-approved mitigation bank. • Preservation of aquatic resources through acquisition of property. • Establishment, restoration, or enhancement of aquatic resources. • In lieu fee contribution determined through consultation with the applicable regulatory agencies. The following ratios will be used for compensatory mitigation unless a higher ratio is required pursuant to regulatory authorizations issued under Section 404 of the CWA and/or the Porter-Cologne Act: • Vernal pools: 2:1. • Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type, function and values lost. • 1:1 off-site for permanent impacts. • 1:1 on-site and 0.1:1 to 0.5:1 off-site for temporary impacts. For mitigation involving establishment, restoration, enhancement, or preservation of aquatic resources by the Authority, the CMP will contain the following information: • Objectives. A description of the resource types and amounts that will be provided, the type of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed or ecoregion. • Site selection. A description of the factors considered during the term sustainability of the resource. • Adaptive management plan. A management strategy to address changes in site conditions or other components of the compensatory mitigation project.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement CMP for temporary and permanent impact on aquatic resources/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact BIO #10: Operation Impacts on Aquatic Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• Financial assurances. A description of financial assurances that will be provided to ensure that the compensatory mitigation will be successful. In circumstances where the Authority intends to fulfill compensatory mitigation obligations by securing credits from approved mitigation banks or in-lieu fee programs, the CMP need only include the name of the specific mitigation bank or in-lieu fee program to be used and the method for calculating credits.								
BIO-MM#50	Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	Prior to ground disturbing activities associated with habitat restoration, enhancement, and/or creation actions at a mitigation site, the Authority will conduct a site assessment of the Work Area to identify biological and aquatic resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife. Based on the results of the site assessment, the Authority will obtain any necessary regulatory authorizations prior to conducting habitat restoration, enhancement and/or creation activities, including authorization under FESA or CESA, Fish and Game Code Section 1600 et seq., the Clean Water Act, and the Porter-Cologne Act. The Authority will implement the following measures to avoid or minimize impacts to species habitat and aquatic biological resources during habitat restoration, enhancement or creation activities: • IAMF: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training • IAMF: Establish Monofilament Restrictions • IAMF: Prevent Entrapment in Construction Materials and Excavations • IAMF: Delineate Equipment Staging Areas and Traffic Routes • IAMF: Dispose of Construction Spoils and Waste • IAMF: Clean Construction Equipment • IAMF: Maintain Construction Sites • MM: Conduct Pre-construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds • MM: Conduct Pre-construction Surveys and Monitoring for Raptors • MM: Restore Temporary Riparian Habitat Impacts • MM: Restore Aquatic Resources Subject to Temporary Impacts • MM: Prepare and Implement a Weed Control Plan • MM: Notify and Report on "Take" • MM: Delineate Environmentally Sensitive Areas and Install Wildlife Exclusion Fencing • MM: Limit Vehicle Traffic and Construction Site Speeds • MM: Work Stoppage The off-site habitat restoration, enhancement, and preservation program would be designed, implemented, and monitored consistent with the terms and conditions of the federal and State permit authorizations as they apply to their jurisdiction and resources on-site. Potential impacts on site-specific hydrology and the downstream resources would be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and a stormwater pollution prevention plan would be implemented as appropriate.	Pre-construction/ construction/ post-Construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Implement measure to avoid and minimize impacts during of-site habitat restoration, enhancement, and creation/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact BIO #10: Operation Impacts on Aquatic Resources Impact BIO #12: Operation Impacts on Protected Trees

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		The Authority or its designee would report on compliance with permitting requirements. The Authority, or its designee, would be responsible for the monitoring and tracking of the program, would prepare a memorandum of compliance, and would submit it to the appropriate regulatory agency.								
BIO-MM#53	Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	The Authority will prepare a Compensatory Mitigation Plan that sets out the compensatory mitigation that will be provided to offset permanent and temporary impacts to federal and State-listed species and their habitat, fish and wildlife resources regulated under Section 1600 et seq. of the Fish and Game Code, and certain other special-status species. The CMP will include the following: • A description of the species and habitat types for which compensatory mitigation is being provided. • A description of the methods used to identify and evaluate mitigation options. Mitigation options will include one or more of the following: – Purchase of mitigation credits from an agency-approved mitigation bank. – Protection of habitat through acquisition of fee-title or conservation easement and funding for long-term management of the habitat. Title to lands acquired in fee will be transferred to CDFW and conservation easements will be held by an entity approved in writing by the applicable regulatory agency. In circumstances where the Authority protects habitat through a conservation easement, the terms of the conservation easement will be subject to approval of the applicable regulatory agencies, and the conservation easement will identify applicable regulatory agencies as third party beneficiaries with a right of access to the easement areas. – Payment to an existing in-lieu fee program. • A summary of the estimated direct permanent and temporary impacts to species and species habitat. • A description of the process that will be used to confirm impacts. Actual impacts to species and habitat could differ from estimates. Should this occur, adjustments will be made to the compensatory mitigation that will be provided. Adjustments to impact estimates and compensatory mitigation will occur in the following circumstances: – Impacts to species (typically measured as habitat loss) are reduced or increased as a result of changes in project design, – Pre-construction site assessments indicate that habitat features are absent (e.g., because of errors in land cover mapping or land cover conversion), – The habitat is determined to be unoccupied based on negative species surveys, or – Impacts initially categorized as permanent qualify as temporary impacts. • An overview of the strategy for mitigating effects to species. The overview will include the ratios to be applied to determine mitigation levels and the resulting mitigation totals.	Pre-construction/ construction	Design/ final design/ mitigation	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare CMP for temporary and permanent impacts on special-status species and their habitat	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• A description of habitat restoration or enhancement projects, if any, that will contribute to compensatory mitigation commitments. • A description of the success criteria that will be used to evaluate the performance of habitat restoration or enhancement projects, and a description of the types of monitoring that will be used to verify that such criteria have been met. • A description of the management actions that will be used to maintain the habitat on the mitigation sites, and the funding mechanisms for long-term management. • A description of adaptive management approaches, if applicable, that will be used in the management of species habitat. • A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.							
BIO-MM#54	Prepare and Implement an Annual Vegetation Control Plan	Prior to the operation and maintenance of the HSR, the Authority will prepare an Annual Vegetation Control Plan (VCP) to address vegetation removal for the purpose of maintaining clear areas around facilities, reducing the risk of fire, and controlling invasive weeds during the operational phase. The Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property (California Department of Transportation [Caltrans] [2014]). Vegetation will be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The VCP will be updated each winter and completed in time to be implemented no later than April 1 of each year. The annual update to the VCP would include a section addressing issues encountered during the prior year and changes to be incorporated into the VCP. The plan will describe site-specific vegetation control methods, as outlined below: • Chemical vegetation control methods • Mowing program consistent with Section 1415 of the FAST Act • Other non-chemical vegetation control • Other chemical pest control methods (e.g., insects, snail, rodent) Only Caltrans-approved herbicides may be used in the vegetation control program. Pesticide application will be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide efforts to control of noxious/invasive weeds if such programs have been established by local agencies.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement VCP for vegetation removal for the purpose of maintaining clear areas/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#55	Prepare and Implement a Weed Control Plan	Prior to any ground disturbing activity during the construction phase, the Project Biologist will develop a Weed Control Plan (WCP), subject to review and approval by the Authority and the SWRCB. The purpose of the WCP is to establish approaches to minimize and avoid the spread of invasive weeds during ground disturbing activities during construction and operations and maintenance. The WCP will include, at a minimum, the following: • A requirement to delineate Environmentally Sensitive Areas (ESAs) in the field prior to weed control activities. • A schedule for weed surveys to be conducted in coordination with the BRMP. • Success criteria for invasive weed control. The success criteria would be linked to the BRMP standards for on-site work during ground disturbing activities. In particular, the criteria would establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council (Cal-IPC), to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10 percent or is 10percent greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met. • Provisions to ensure consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP. • Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods. • Timeframes for weed control treatment for each plant species. • Identification of fire prevention measures.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement WCP minimize and avoid the spread of invasive weeds/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#56	Conduct Monitoring of Construction Activities	During any initial ground disturbing activity, the Project Biologist will be present in the Work Area to verify compliance with avoidance and minimization measures, to establish ESAs, and install wildlife exclusion fencing (WEF) and construction exclusion fencing (exclusion fencing).	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Project Biologist will be present in Work Area to verify compliance with avoidance and minimization measures	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #8: Operational Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#58	Establish Environmentally Sensitive Areas and Non-Disturbance Zones	Prior to any ground disturbing activity in a Work Area, the Project Biologist will use flagging to mark Environmentally Sensitive Areas (ESAs) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. The Project Biologist will also direct the installation of Wildlife Exclusion Fencing (WEF) to prevent special-status wildlife species from entering Work Areas. The WEF will have exit doors to allow animals that may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the Work Area, as appropriate, to avoid and minimize impacts to special-status species or aquatic resources outside of the Work Area during the construction period. The ESAs, WEF, and exclusionary fencing will be delineated by the Project Biologist based on the results of habitat mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Project Biologist. The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.	Pre-construction/ construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Demarcate ESAs and No-Work areas	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #10: Operation Impacts on Aquatic Resources
BIO-MM#60	Limit Vehicle Traffic and Construction Site Speeds	Prior to any ground disturbing activities, the Project Biologist will ensure that appropriate measures have been instituted to restrict project vehicle traffic within the Construction Footprint to established roads, construction areas, and other permissible areas. The Project Biologist will establish vehicle speed limits of no more than 15 mph for unimproved access roads and for temporary and permanent construction areas within the Construction Footprint. The Project Biologist will also direct that access routes be flagged and marked and that measures be adopted to prevent off-road vehicle traffic.	Pre-construction/ construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish and demarcate vehicle access routes and speed limits/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #7: Operational Impacts on Special-Status Plant Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#61	Establish and Implement a Compliance Reporting Program	The Project Biologist will prepare monthly and annual reports documenting compliance with all IAMFs, mitigation measures, and requirements set forth in regulatory agency authorizations. The Authority will review and approve all compliance reports prior to submittal to the regulatory agencies. Reports will be prepared in compliance with the content requirements outlined in the regulatory agency authorizations. Pre-activity survey reports will be submitted within 15 days of completing the surveys and will include: • Location(s) of where pre-activity surveys were completed, including latitude and longitude, Assessor Parcel Number, and HSR parcel number. • Written description of the surveyed area. A figure of each surveyed location will be provided that depicts the surveyed area and survey buffers over an aerial image. • Date, time, and weather conditions observed at each location. • Personnel who conducted the pre-activity surveys. • Verification of the accuracy of the Authority's habitat mapping at each location, provided inwriting and on a figure. • Observations made during the survey, including the type and locations (written and GIS) of any sensitive resources detected. • Identification of relevant measures from the BRMP to be implemented as a result of the survey observations. Daily Compliance Reports will be submitted to the Authority via EMMA within 24 hours of each monitoring day. Non-compliance events will be reported to the Authority the day of the occurrence. Daily Compliance Reports will include: • Date, time, and weather conditions observed at each location where monitoring occurred. • Personnel who conducted compliance monitoring. • Project activities monitored, including construction equipment in use. • Compliance conditions implemented successfully. • Non-compliance events observed. Daily Compliance Reports will also be included in the Monthly Compliance Reports, which will be submitted to the Authority by the 10th of each month and will include: • Summary of construction activities and locations during the reporting month, including any non-compliance events and their resolution, work stoppages, and take of threatened or endangered species. • Summary of anticipated project activities and Work Areas for the upcoming month. • Tracking of impacts to suitable habitats for each threatened and endangered species identified in USFWS and CDFW authorizations, including: – An accounting of the number of acres of habitats for which we provide compensatory mitigation that has been disturbed during the reporting month, and	Pre-construction/ construction	Monitoring/ reporting	Monthly and annually	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish and implement compliance reporting program/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #6: Construction Impacts on Protected Trees

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– An accounting of the cumulative total number of acres of threatened and endangered species habitat that has been disturbed during the project period. • Up-to-date GIS layers, associated metadata, and photo documentation used to track acreages disturbed. • Copies of all pre-activity survey reports, daily compliance reports, and non-compliance/ work stoppage reports for the reporting month. Annual Reports will be submitted to the Authority by the 20th of January and will include: • Summary of all Monthly Compliance Reports for the reporting year. • A general description of the status of the project, including projected completion dates. • All available information about project-related incidental take of threatened and endangered species. • Information about other project impacts on the threatened and endangered species. • A summary of findings from pre-construction surveys (e.g., number of times a threatened or endangered species or a den, burrow, or nest was encountered, location, if avoidance was achieved, if not, what other measures were implemented). • Written description of disturbances to threatened and endangered species habitat within Work Areas, both for the preceding 12 months and in total since issuance of regulatory authorizations by USFWS and CDFW, and updated maps of all land disturbances and updated maps of identified habitat features suitable for threatened and endangered species within the project area. • Written compliance with the reporting requirements established by any WDRs that have been issued. In addition to the compliance reporting requirements outlined above, the following items will be provided for compliance documentation purposes: • If agency personnel visit the Construction Footprint in accordance with BIO-IAMF#2, the Project Biologist will prepare a memorandum within one day of the visit that memorializes the issues raised during the field meeting. This memorandum will be submitted to the Authority via EMMA. Any issues regarding regulatory compliance raised by agency personnel will be reported to the Authority and the Contractor. • Compliance reporting will be submitted to the Authority via EMMA in accordance with the report schedule. The Project Biologist will prepare and submit compliance reports that document the following: – Implementation and performance of the Restoration and Revegetation Plan described in BIO-MM. – Summary of progress made regarding the implementation of the Weed Control Plan described in BIO-MM. – Compliance with work window restrictions described in BIO-IAMF. The memorandum will be provided to the Authority for compliance monitoring documentation purposes.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– Compliance with BIO-MM: Notify and Report on "Take". – Compliance with BIO-MM: Establish Environmentally Sensitive Areas and Non-Disturbance Zones and Install Wildlife Exclusion Fencing. – Compliance with BIO-IAMF: Establish Monofilament Restrictions; the Project Biologist. – Compliance with BIO-IAMF: Prevent Entrapment in Construction Materials and Excavations. – Compliance with BIO-IAMF: Delineate Equipment Staging Areas. – Compliance with BIO-IAMF: Clean Construction Equipment. – Compliance with BIO-MM: Limit Vehicle Traffic and Construction Site Speed. – Compliance with BIO-IAMF: Design the Project to be Bird Safe. – Compliance with BIO-IAMF: Dispose of Construction Spoils and Waste has been properly disposed. – BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF: Maintain Construction Sites. • Work stoppages and measures taken under BIO-MM: Stop Work and Remove Special Status Species from Construction Sites will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within two business days of the work stoppage.								
BIO-MM#62	Prepare Plan for Dewatering and Water Diversions	Prior to initiating any construction activity that occurs within open or flowing water, the Authority will prepare a dewatering plan, which will be subject to the review and approval by the applicable regulatory agencies. The plan will incorporate measures to minimize turbidity and siltation. The Project Biologist will monitor the dewatering and/or water diversion sites, including collection of water quality data, as applicable. Prior to the dewatering or diverting of water from a site, the Project Biologist will conduct pre-activity surveys to determine the presence or absence of special-status species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, the Project Biologist will relocate the species (unless the species is Fully Protected under State law), with any regulatory authorizations applicable to the species.	Pre-construction/ construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement dewatering and waste diversion plan/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
BIO-MM#63	Work Stoppage	In the event that any special-status wildlife species is found in a Work Area, the Project Biologist will have the authority to halt work to prevent the death or injury to the species. Any such work stoppage will be limited to the area necessary to protect the species and work may be resumed once the Project Biologist determines that the individuals of the species have moved out of harm's way or the Project Biologist has relocated them out of the Work Area. Any such work stoppages and the measures taken to facilitate the removal of the species, if any, will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within two business days of the work stoppage.	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Halt work to relocate special-status wildlife species (if possible)/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#64	Establish Wildlife Crossings	The Authority will create dedicated wildlife crossings to accommodate wildlife movement across permanently fenced infrastructure (consistent with any wildlife corridor assessment prepared), where wildlife movement would be significantly reduced. Prior to final construction design the Project Biologist shall confirm appropriate placement and dimensions of wildlife crossings. For terrestrial wildlife, all crossings will conform to the minimum spacing and dimensions identified in the Wildlife Corridor Assessment (Appendix I of the *Biological and Aquatic Resources Technical Report*), unless different dimensions are specified in authorizations issued under FESA or CESA. To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations: • Native earthen bottom • Ledges or tunnels will be incorporated into the design to facilitate safe passage of small mammals • Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible • Openness and clear line of sight from end to end • Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water) • Slight grade at approaches to prevent flooding • Limited open space between crossing and cover/habitat • Separation from human use areas (e.g., trails, multiuse undercrossings) • Avoidance of artificial light at approaches to wildlife crossings (Steps to minimize lighting effects to wildlife crossings will be consistent with BIO-MM#86: Implement Lighting Minimization Measures During Construction, and BIO-MM#87: Implement Lighting Minimization Measures for Operations.) • Implement the following noise minimization measures as identified in the Wildlife Corridor Assessment: – Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines (www.hsr.ca.gov/). – Install sound barriers to minimize noise impacts, as follows; ▪ Peak train sound exposure levels (SEL) that exceed 100 dBA at a distance of 50 feet beyond the perimeter fence along the full extent of all at-grade rail segments within the Tehachapi Linkage Design. ▪ Peak train SEL less than 100 dBA below or within 200 feet of any viaduct sections passing through areas of natural vegetation. ▪ Peak train SEL less than 80 dBA at the entrance or approach to smaller crossing structures (bridges or culverts). Although 100 dBA is the generally accepted threshold for impacts to wildlife, most humans are “highly annoyed” by 80 dBA noise. The Occupational Safety and Health Administration requires that hearing protection be available to workers in environments that exceed 85 dBA	Pre-construction/ Construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish wildlife crossings/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #11: Operation Impacts on Wildlife Movement

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		and that workers use hearing protection at 90 dBA. Therefore, an 80 dBA threshold is appropriate for confined structures intended to facilitate animal movement. ▪ Berms and berm/wall combinations will be used to shield nearby natural habitat and/or crossing structures from loud noise that exceeds 100 dBA at distances greater than 50 feet from the perimeter fence. In addition, the Authority will incorporate features to accommodate wildlife movement into the design of bridges and culverts that are replaced or modified as part of project construction, wherever feasible. Project Biologist review of final construction design for consistency with placement and dimensions of wildlife crossings will be verified in a memorandum provided to the Authority. The Authority would also develop a monitoring and adaptive management plan to monitor the effectiveness and use of crossing designs. The plan would include the following minimum components: • **Monitoring methods**. Consistent with local monitoring efforts, which primarily use camera stations and other remote sensing equipment to document use, monitoring would focus on crossings within defined wildlife movement corridors. To the extent feasible, the Authority could also contribute funding to local organizations currently conducting wildlife movement monitoring to meet monitoring requirements outlined in the measure, provided the efforts are occurring within the same defined wildlife movement corridors. • **Monitoring.** Monitoring would start no less than 2 years following construction (to allow time for habituation), and total initial monitoring period would not exceed 5 years following construction. Additional monitoring associated with adaptive management would be confined to the location triggering the adaptive management and would not exceed 5 years. • **Success criteria.** Success criteria would be based on the expected use by movement guild representatives known to be present in the region. • **Adaptive management.** Adaptive management would include modifications to design features, if feasible, such as cover and substrate; use of new technologies to attract animals to the crossing; fencing; adjacent land management changes, if feasible; or other measures that may be determined to be feasible in the future. The monitoring and adaptive management plan would be developed in coordination with wildlife agency staff and local wildlife movement stakeholders.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#65	Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles	At least one year prior to the start of any ground disturbing activities and construction, the Project Biologists will conduct nesting season surveys for eagles. Surveys for bald and golden eagle nests will be conducted within 4 miles of any construction areas supporting suitable nesting habitat and important eagle roost sites and foraging areas. Surveys will be conducted in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols [Pagel et al. 2010], and CDFW's Bald Eagle Breeding Survey Instructions [CDFW 2017], or current guidance. A nesting territory or inventoried habitat will be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season. Prior to initial construction activities, the Project Biologist will conduct a pre-construction sweep of the project site for golden eagle use and will provide no-work zone buffers where active nests are identified.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction nesting surveys for eagles/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#66	Implement Avoidance Measures for Active Eagle Nests	Prior to the start of any ground disturbing activity, if an occupied nest (as defined by Pagel et al., 2010) is detected within 4 miles of the work areas, the Authority will implement a 1-mile line-of- sight and 0.5 mile no line-of-sight no work buffer during the breeding season (January 1 through August 31) to ensure that construction activities do not result in injury or disturbance to eagles. The no work buffer will be maintained throughout the breeding season or until the young have fledged and are no longer dependent upon the nest or parental care that includes nest use for survival. Factors to be considered for determining buffer size will include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained and nests monitored until the Project Biologist has determined that young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival. Eagle nest exclusion zones may be removed if monitoring reveals the nest to be inactive as determined by the Project Biologist. An inactive eagle nest is one that is "no longer being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days prior to, and including, at present" (USFWS 2016). Monitoring to demonstrate inactivity of eagle nests will follow observational procedures described by Pagel et al. (2010). In bald and golden eagle nesting territories, the Project Biologist will examine debris piles daily and determine if there is a potential to attract prey species. If the Project Biologist determines debris piles may attract prey species and pose a danger to eagles, the debris piles will be removed or moved.	Pre-construction/ Construction	Surveying/ monitoring/ reporting	Weekly or established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Implement and maintain no line-of-sight no-work buffer during the breeding season/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#67	Provide Compensatory Mitigation for Loss of Eagle Nests	If preconstruction surveys identify active eagle nests in the permanent impact area, the Authority, in consultation with the USFWS and the CDFW, will develop a nest relocation or replacement plan for the affected nest(s). The plan will describe why there is no practicable alternative to nest removal while enabling project extent construction. Any relocation or replacement of eagle nests will be in accordance with the Bald and Golden Eagle Protection Act and subject to the following minimum requirements: • The nest will be relocated, or a suitable nest will be provided, within the same territory to provide a viable nesting option for the affected eagle pair. • Post construction monitoring to confirm continued nesting within the affected nesting territory will occur for a minimum of 3 years using observation procedures described by Pagel et al. (2010).	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ monitoring/ compensatory mitigation/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Compensatory mitigation that replaces eagle nests/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#68	Avoid and Minimize Impacts to White-tailed kite	If construction activities are scheduled to occur between February 1 and August 31, the Project Biologist will conduct surveys for white-tailed kite. Surveys will cover a minimum of a 0.5-mile radius around the construction area. If nesting white-tailed kites are detected, the Project Biologist will establish a 0.25 mile no disturbance buffer unless the Project Biologist determines that smaller buffers would be sufficient to avoid impacts, with agency consultation. Buffers will be maintained until the Project Biologist has determined that the young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival.	Pre-construction/ construction	Surveying/ monitoring/ compensatory mitigation/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Pre-construction surveys for white-tailed kite/ establish no-disturbance buffer/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#69	Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies	Prior to initiation of construction at any location within 300 feet of suitable nesting habitat, the Project Biologist with experience surveying for and observing tricolored blackbird will conduct preconstruction surveys to establish use of nesting habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat within 300 feet of proposed construction areas, where access allows, during the nesting season (February 1–September 15). If construction is initiated near suitable habitat during the nesting season, pre-construction nesting surveys will be conducted within 10 days prior to construction. If active tricolored blackbird nesting colonies are identified, construction activities will avoid the nesting colonies during the breeding season (February 1–September 15) to the extent practicable within 300 feet of the colony, consistent with the CDFW's Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015 (CDFW 2015). This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined through coordination with CDFW. If tricolored blackbirds colonize habitat adjacent to construction after construction has been initiated, the Authority will coordinate with CDFW to determine the best course of action to avoid impacts.	Pre-construction/ construction	Surveying/ monitoring/ compensatory mitigation/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Pre-construction surveys for tricolored blackbird colonies/ establish no-disturbance buffer/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#70	Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat	The Authority will provide compensatory mitigation to offset impacts on tricolored blackbird. Compensatory mitigation will replace permanent loss of habitat with habitat that is commensurate with the type (nesting, roosting, and foraging) and amount of habitat lost. Suitable tricolored blackbird nesting habitat will be permanently protected or restored and managed at a ratio of 3:1 (protected or restored: affected) at a location subject to CDFW approval, and in close proximity to the nearest breeding colony observed within the past 15 years, if possible. Suitable breeding season foraging habitat will be protected and managed at a ratio of 1:1 (protected: affected) at a location subject to CDFW approval. Suitable roosting habitat will be protected or restored at a ratio of 1:1 (protected: affected) if not occupied, and a ratio of 2:1 (protected: affected) if occupied by tricolored blackbirds. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan, BIO-MM#53.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensatory mitigation to replace permanent loss of tricolored blackbird nesting habitat/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#71	Implement California Condor Avoidance Measures during Helicopter Use	Prior to construction-related uses of helicopters, the Project Biologist will coordinate with USFWS to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, including the helicopter's flight pattern from its origination, during construction use and the return flight, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.	Pre-construction/ construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Coordinate with USFWS prior to construction-related uses of helicopters/ ensure no California condor in helicopter use area/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#72	Implement Avoidance of Nighttime Light Disturbance for California Condor	Nighttime light disturbance will be minimized in and adjacent to suitable habitat where California condor may be present. In the event that nighttime lighting is required, it will be focused, shielded, and directed away from adjacent suitable habitat including nighttime roost areas. During construction, the Project Biologist will be on site during nighttime light use to determine if the lighting poses a risk or otherwise disturbs or harms condors.	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Nighttime lighting shall be focused, shielded, and directed away from adjacent suitable California condor habitat/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#73	Implement Removal of Carrion that may Attract Condors and Eagles	During operation and within California condor foraging areas, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of a carcass (carrion) within the right-of-way that could be an attractant to condors and eagles. Dead and injured wildlife found in the right-of-way will be removed during construction and during operations when the train is not in operation.	Construction/ operation	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Remove carrion from right-of-way/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#74	Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities	For construction activities involving the use of a helicopter, the buffer for nesting birds will be 200-feet horizontal and 150-feet vertical. Buffers will be measured from the location of the nest. If a nest is located on a tower or a tree the vertical buffer begins from the nest location. For raptors, that are not state or federal special status raptors the default buffer is 300-feet.	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Maintain helicopter buffer for nesting birds/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species

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BIO-MM#75	Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	Prior to ground disturbing activity in areas that Kern primrose sphinx moths are found, the following additional measures will be implemented: • All Biological Monitors will be trained on the life history and identification of Kern primrose sphinx moth. • As necessary, conduct an additional survey(s) for Kern primrose sphinx moth host and nectaring plants in areas where adults are observed. To the maximum extent feasible, host and nectaring plants will be flagged and a 25-foot buffer shall be installed to avoid when eggs and/or larvae may be present (February through May). Larval host plants include evening primrose (*Camissionia contorta epilobiodes*) and filaree (*Erodium cicutarium*). • Initial ground or vegetation disturbing activities will be avoided in areas where Kern primrose sphinx have been observed until the flight and larval seasons (cumulatively, February 1through May 31) are passed to allow sufficient time for the adults to lay eggs and for the larvae to pupate.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction survey for Kern primrose sphinx moth host and nectaring plants/ avoid areas where moth has been observed/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities
BIO-MM#76	Implement Wildlife Rescue Measures	During construction, maintenance and operation if an injured or trapped wildlife species, including but not limited to birds and raptors, are observed the Project Biologist shall be notified immediately to determine if it is appropriate to release or take the wildlife species to the nearest CDFW permitted rehabilitation center. The Project Biologist will follow all relevant guidelines for federal and state listed species. If an injured or trapped bird is incidentally observed during maintenance or construction, personnel will notify the Project Biologist immediately to determine if it is appropriate to release or take the bird to the nearest CDFW permitted rehabilitation center.	Construction/ post-construction/ operation	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Notify CDFW of injured or trapped wildlife species/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #11: Operation Impacts on Wildlife Movement
BIO-MM#77	Implement Wildlife Height Requirements for Enhanced Security Fencing	Prior to final construction design the Project Biologist shall review the fencing plans to confirm Security Fencing design will prevent access into the right-of-way and tracks by mountain lion. Security fencing height will be increased to a minimum of 10-feet tall in mountain lion suitable habitat as identified in the Wildlife Corridor Assessment and determined by the Project Biologist. If the fence is placed on a slope, the fence height will be adjusted (increased) to ensure that mountain lion and mule deer cannot jump from an upslope position over the fence; fence height on slopes will be determined by Project Biologist. During the fencing plan review the Project Biologist will evaluate the fence design for the purpose of avoiding harm, injury, entanglement or entrapment to wildlife species. Prior to operation, the Project Biologist will field inspect the fencing along any portion where increased height was determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.	Pre-construction/ construction	Design/ final design/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Review and implement fencing plans to prevent access into right-of-way and tracks by mountain lion/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #11: Operation Impacts on Wildlife Movement

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BIO-MM#78	Install Wildlife Jump-outs	Prior to final construction design the Project Biologist shall review the fencing plans for placement of wildlife jump-outs. In areas with documented ungulate or other large mammal movement, where terrain or project design (e.g., at-grade crossings) could allow these large animals to enter the right-of-way, features to reduce access (e.g., taller fencing or wildlife barriers at crossings) or features to allow large animals to escape from the fenced right-of-way (e.g., wildlife jump-outs or escape ramps) would be incorporated into the project at these locations. Specific locations of these features would be based on the behavior of target species (e.g. mule deer, mountain lion, black bear), adjacent habitat and terrain, and other design constraints as determined by the Project Biologist and Project Engineer. Prior to operation, the Project Biologist will field inspect the fencing for appropriate placement of jump-outs as determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.	Pre-construction/ construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Review the fencing plans for placement of wildlife jump-outs/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #11: Operation Impacts on Wildlife Movement
BIO-MM#79	Mitigation for Desert Tortoise	In addition to the IAMFs and Standard Biological Mitigation Measures discussed previously in this section and other sections, such as Section 3.3: Air Quality and Global Climate Change and Section 3.8: Hydrology and Water Resources, the following mitigation would be implemented to avoid and minimize effects of the proposed action on desert tortoise during construction and O&M activities. These measures include, worker environmental awareness program (WEAP) trainings; biological monitoring during all ground-and vegetation-disturbing activities; wildlife exclusion barriers and fencing of environmentally sensitive areas; monofilament netting restrictions; specific entrapment avoidance procedures for open holes and trenches; establishment of vehicle traffic routes and construction site speed limits; the authority for the biological monitor(s) to halt work in the event a listed species is identified; and the configuration of wildlife crossing infrastructure. The preparation and implementation of the following plans will also be integrated into the project; Restoration and Revegetation Plan; Biological Resources Management Plan; Annual Vegetation Management Plan; Weed Control Plan; BMP Field Manual for construction site housekeeping that includes trash containment and disposal; a Fugitive Dust Control Plan; a Construction Management Plan that addresses spill prevention; and a Construction Stormwater Pollution Prevention Plan. In addition, the following species-specific mitigation measures will be implemented to further avoid and minimize potential adverse effects of the proposed action on desert tortoise: • Prior to construction activities, a project-specific Desert Tortoise Translocation/Relocation Plan will be prepared for incorporation in to the project's Biological Resources Management Plan (Plan). The Plan will provide details on desert tortoise clearance surveys and relocation, including procedures to follow in the event that a tortoise becomes trapped. These will be consistent with Guidelines for Handling Desert Tortoise during Construction Projects, or other current USFWS guidelines [USFWS 2010]. The Plan will also include methodology for visual desert tortoise body condition assessments, in accordance with the Health Assessment Handbook or most up-to-date USFWS guideline.	Pre-construction/ construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare a Desert Tortoise Translocation-Relocation Plan/ conduct pre-activity clearance surveys for desert tortoise/ establish and maintain non-disturbance buffer around desert tortoise burrows/ avoid injury and death to desert tortoises/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		• Conduct phased, focused pre-activity clearance surveys prior to the start of ground or vegetation disturbing activities in modeled suitable habitat for desert tortoise, or areas of documented occurrences if outside of modeled habitat. The survey(s) shall be conducted by Project Biologist(s) or their designee familiar with desert tortoise and their sign. The surveys shall be conducted in general accordance with the USFWS protocol *Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (USFWS 2010). The survey will occur no more than 48 hours before planned activity and may be conducted during any time of year, but preferably during the desert tortoise active period (i.e., early March through early November). It will consist of transect surveys spaced no greater than 15 feet and include a 50-foot buffer. • All burrows that could provide shelter for desert tortoise will be avoided to the greatest extent practical. If active burrows are identified in the project footprint, a 50-foot non-disturbance buffer will be established, maintained, and monitored. The buffer will be established by routing the ESA fence and wildlife exclusion fencing (WEF) around the active burrows in a manner that allows for desert tortoise to leave the project footprint. Burrows that cannot be avoided will be excavated during the clearance survey by the Project Biologist or their designee. • Following the pre-activity survey(s): – Where construction activities will occur for more than one consecutive month, desert tortoise exclusionary fencing, and barriers will be installed and maintained to avoid take of desert tortoise, including destruction of nests, or their potential habitat within the project footprint. ESA fencing and WEF will be used to delineate the area (in accordance with BIO-MM#36). The WEF will be maintained and monitored daily during the desert tortoise activity period (i.e., early March through early November) to ensure it is maintained in good condition, and to determine if tortoises are “trapped” along the fence searching for a way to access the other side. Outside of the desert tortoise activity period, fence inspections will occur at least once weekly. – Where construction activities will be of short duration (i.e., less than one month), full-time monitoring by the Biological Monitor may be used in lieu of fencing. In these situations, a daily pre-activity clearance sweep will be conducted by the Biological Monitor prior to start of daily construction activities. – If any project vehicle must drive off established routes in suitable tortoise habitat, the route or work location will be walked immediately prior to, or in front of vehicle being driven by the Biological Monitor. The Biological Monitor shall visually account for 100 percent of the footprint of the route or work location plus a 15-foot buffer on each side. • Any construction pipe, culvert, or similar structure with a diameter greater than three inches stored less than eight inches aboveground, outside a fenced area of desert tortoise habitat, and left unattended for any length of time during the desert tortoise active period (i.e., early March through early June, and September								

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		through early November) will be inspected for desert tortoise before the material is moved, buried, or capped. As an alternative, all such structures may be capped prior to staging or placed on pipe racks. • Any time a vehicle or construction equipment is parked for more than 10 minutes outside of the fenced area, the ground under the vehicle will be inspected for the presence of desert tortoise before the vehicle/equipment is moved. If a desert tortoise is present, the vehicle/equipment will not be moved until the desert tortoise moves on its own away from the vehicle/equipment. If it does not move in 15 minutes during construction, the Biological Monitor may capture and relocate the animal to a safe location according to USFWS protocol and in accordance with the Desert Tortoise Relocation Plan. During O&M, trained and approved personnel may move a desert tortoise out of harm's way that does not move on its own, in accordance with the approved Desert Tortoise Relocation Plan. • To the extent feasible, nighttime light disturbance will be minimized in and adjacent to suitable habitat where desert tortoise may be present. In the event that nighttime lighting is required, the lighting will be focused, shielded, and directed away from adjacent suitable habitat. • Measures will be implemented to ensure that construction and O&M activities do not attract common ravens to the ROW by providing food or water subsidies, perch sites, roost sites, or nest sites. All activity work areas will be kept free of trash and debris. Particular attention will be paid to remove and avoid accumulation of "micro-trash" (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny) and organic waste that may attract or subsidize predators. All trash will be covered, kept in closed containers, or otherwise removed from the project site at the end of each day or at regular intervals prior to periods when workers are not present at the site. Dead and injured wildlife found in the project footprint will be removed, as needed, to reduce attraction of opportunistic predators. Dead and injured wildlife will be handled and removed in accordance with any applicable project permits and plans. • The ESA fence, the WEF, and the O&M Security Fence Maintenance Plan will include provisions for reptiles and mammals (e.g., enhanced with barriers, such as flashing or slats, for six inches below ground surface to 12 inches above) along portions of the project that are adjacent to modeled suitable habitat to prevent individuals from gaining access to the alignment ROW. • Water or dust palliatives will be applied to the construction ROW, dirt roads, trenches, spoil piles, and other areas where ground disturbance takes place to minimize dust emissions and topsoil erosion. Dust palliatives will be nontoxic to wildlife and plants. For construction within suitable habitat for listed species, the Biological Monitor will patrol areas of disturbance to ensure that water does not puddle for long periods and attract listed species, common ravens, or other wildlife to the project site. Operational ponding will be avoided through careful grading and hydrologic design.							

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BIO-MM#80	Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee	Surveys for Crotch bumble bee in suitable habitat (identified by species habitat suitability modeling) in the project footprint would be conducted by qualified biologists within 1 year prior to the start of construction. Surveys would be conducted during four evenly spaced sampling periods during the flight season (March–September) (Thorp et al. 1983). For each sampling event, the biologist(s) would survey suitable habitat within the project footprint and, as access outside the footprint permits, a 100-foot buffer surrounding the project footprint using nonlethal netting methods for 1 person-hour per 3 acres of the highest quality habitat or until 150 bumble bees are sighted, whichever comes first. If initial sampling of a given habitat area indicates that the habitat is of low quality or nonexistent, no further sampling of that area would be required. General guidelines and best practices for bumble bee surveys would follow USFWS' *Survey Protocols for the Rusty Patched Bumble Bee* (*Bombus affinis*) (USFWS 2019), which are consistent with other bumble bee survey protocols used by The Xerces Society (Hatfield et al. 2017; Washington Department of Fish and Wildlife et al. 2019). If surveys conducted within 1 year prior to construction identify occupied Crotch bumble bee habitat within the project footprint or the 100-foot buffer, the project biologist would then conduct additional pre-construction surveys of such habitat for active bee nest colonies and associated floral resources (i.e., flowering vegetation on which bees from the colony are observed foraging) no more than 30 days prior to any ground disturbance between March and September. The purpose of this pre-construction survey would be to identify active nest colonies and associated floral resources outside of impact areas that could be avoided by construction personnel. The project biologist would establish, monitor, and maintain no-work buffers around nest colonies and floral resources identified during surveys. The size and configuration of the no-work buffer would be based on best professional judgment of the project biologist. At a minimum, the buffer would provide at least 50 feet of clearance around nest entrances and maintain disturbance-free airspace between the nest and nearby floral resources. Construction activities would not occur within the no-work buffers until the colony is no longer active (i.e., no bees are seen flying in or out of the nest for three consecutive days, indicating the colony has completed its nesting season and the next season's queen has dispersed from the colony).	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys of Crotch bumblebee habitat/ establish, and maintain no-work buffer/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#81	Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee	The Authority would provide compensatory mitigation for impacts on habitat for Crotch bumble bee. Impacts on occupied habitat (confirmed through presence/absence surveys as described in BIO-MM#80) would be compensated for at a ratio of 3:1, unless a higher ratio is required pursuant to an authorization issued under CESA, through the purchase of CDFW-approved bank credits (if available) or through preservation of habitat in perpetuity, including suitable habitat currently preserved by the Authority.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts to habitat for Crotch bumblebee/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO #8: Operational Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#82	Avoid Direct Impacts on Monarch Butterfly Host Plants	Prior to any ground-disturbing activities, the Project Biologist would survey for monarch butterfly larval host plants (native milkweed species) within suitable habitat. If host plants are found, the Project Biologist would conduct surveys for adult butterflies during the peak flight period for Southern California (approximately October 1 through March 15) to determine presence/absence or presence may be assumed. Where adult butterflies are present or assumed to be present, construction personnel would avoid host plants in temporary impact areas where feasible. In the event host plants are impacted in temporary impact areas, native milkweed species would be replanted.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys of monarch butterfly larval host plants (native milkweed species), and maintain no-work buffer/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species
BIO-MM#83	Provide Compensatory Mitigation for Impacts on Monarch Butterfly Breeding and Foraging Habitat	The Authority would provide compensatory mitigation to offset impacts on breeding and foraging habitat for monarch butterfly at a ratio of 2 to 1. Compensatory mitigation could include one or more methods as described in BIO-MM#53.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts to habitat for Monarch Butterfly/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#84	Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens	It is recognized that mountain lions are secretive and difficult to survey and can change den locations every couple of weeks. Prior to the initiation of construction, the Authority would consult with the CDFW and other mountain lion experts to develop a survey protocol to locate and identify denning mountain lions in and adjacent to the project to avoid adversely disturbing the mother and kittens. Prior to any ground-disturbing activity, regardless of the time of year, the Project Biologist would conduct pre-construction surveys for known or potential mountain lion dens within suitable habitat located within the work area and within 2,000 feet of the work area, where access is permitted. These surveys would be conducted no less than 14 days and no more than 30 days prior to the start of ground-disturbing activities in a work area. The definition for known, and potential, mountain lion den types is as follows; ▪ **Known Den**. Any existing natural den or human-made structure that is used or has been used at any time in the past by a mountain lion. Evidence of use may include historical records; past or current radio telemetry or tracking study data; mountain lion sign, such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a mountain lion; ▪ **Potential Den**. Any thick vegetation, boulder piles, rocky outcrops, or undercut cliffs within the species' range for which available evidence is insufficient to conclude that it is being used or has been used by a mountain lion. Potential dens will include the following characteristics: 1) refuge from predators (coyotes, golden eagles, other mountain lions) or 2) shielding of the litter from heavy rain and hot sun. The Project Biologist will use location-specific survey methods to identify known and potential dens. The survey method will consider topography, vegetation density, safety, and other factors. Surveys will be conducted by a qualified biologist (i.e., a biologist with demonstrated experience in mountain lion biology, identification, and survey techniques) and may involve the establishment of camera stations, scent stations, pedestrian surveys (looking for tracks, caches,	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction coordination with CDFW to develop a survey protocol and surveys of mountain lion dens and maintain no-work buffer/ report findings	Condition of design-build contract/ condition of regulatory permits	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		etc.), or other appropriate methods. Survey methods used will be designed to avoid the disturbance of known or potential dens to the extent feasible. If known, or potential, mountain lion dens are identified or observed during pre-construction surveys, mountain lion dens will be assumed to have kittens present until the Project Biologist can document that they are not present and/or that the den is not being used. A nondisturbance buffer of at least 2,000 feet will be established around the known or potential den until the Project Biologist can document and confirm that the den is not occupied. If the den is determined to be occupied, the 2,000-foot nondisturbance buffer will be maintained until the den is confirmed abandoned by the Project Biologist. Construction may proceed if the Project Biologist determines that the den is not being used by mountain lions. However, ground disturbance would be limited to those days between October 1 and January 31 within 2,000 feet of known or potential dens to the extent feasible. Mountain lions can breed year-round; however, most breeding activity and births occur during the spring and summer months between February 1 and September 30.							
BIO-MM#85	Provide Compensatory Mitigation for Impacts on Mountain Lion Core and Patch Habitat	The Authority would provide compensatory mitigation for impacts on mountain lion core and patch habitat through the preservation of suitable habitat that is acceptable to CDFW. Habitat would be replaced at a minimum ratio of 2:1 for permanent impacts on breeding/foraging habitat and high-priority foraging and dispersal habitat, and at a ratio of 1:1 for low-priority foraging and dispersal habitat, unless a higher ratio is required by regulatory authorizations issued under the California Endangered Species Act. Compensatory mitigation would be provided using one or more of the methods described in BIO-MM#53 and would, where feasible and acceptable to CDFW, contribute to preserving important movement lands across the HSR alignment.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts to habitat for mountain lion core and patch habitat	Condition of design-build contract/ condition of regulatory permits	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species
BIO-MM#86	Implement Lighting Minimization Measures During Construction	The Authority would avoid conducting ground-disturbing activities within known wildlife habitat during nighttime hours, to the extent feasible. If nighttime work is necessary, the Authority would minimize impacts to adjacent habitat by: • Conducting nightwork only within the boundaries of previously disturbed, cleared and grubbed areas, • Shielding and directing nighttime lighting to avoid illuminating wildlife habitat, including movement corridors, • Using the minimum lighting levels approved by OSHA (29 CFR 1926.56) for general construction (i.e., 5 foot-candles or 54 lux), • Minimizing the direction of construction vehicle headlights towards offsite locations and use low beams or turn off headlights when safety considerations permit, and • Minimizing the duration of lighting by using remote monitoring systems or other methods to ensure security of the construction site during hours it is not in use.	Construction	Reporting	Weekly	Contractor	Contractor	Construction/ weekly reporting	Contract requirements/ specifications	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #5: Construction Impacts on Wildlife Movement

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
BIO-MM#87	Implement Lighting Minimization Measures for Operations	To address the permanent and intermittent impacts from lighting, the Authority would implement measures to minimize the intensity and duration of operational lighting of permanent facilities (e.g., traction power facilities, radio sites, and maintenance facilities), as well as intermittent train lighting, to the extent feasible: • Outdoor lighting at operational facilities would be consistent with minimum OSHA requirements established by 29 CFR 1926.56 when the facilities are in use. To the extent feasible, the Authority would minimize the duration of lighting at operational facilities by using methods other than lighting (e.g., remote monitoring systems), to ensure security of facilities during nighttime hours they are not in use, • Nighttime lighting will have shields or cowls (or other devices to limit lighting) installed to direct the light downward to reduce the standard luminous intensity distribution curve to contain the light to the boundaries of the project site to the extent practicable, Train headlights would use the minimum standard allowed by the FRA under 49 CFR 229.125 (a single headlight of at least 200,000 candelas) within non-tunnel portions of the project section.	Operations	Reporting and monitoring	Monthly	Authority/ contractor	Contractor	Implement measures to minimize the intensity and duration of operational lighting of permanent facilities and intermittent train lighting	Reporting contract requirements/ specifications	Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #11: Operation Impacts on Wildlife Movement
Hydrology and Water Resources										
WQ-MM#1	Floodplain Protection: Construction	The Bakersfield to Palmdale Project Section would implement the following measures during the construction period: • Standard floodplain measures would be implemented, including revegetation BMPs during construction. BMPs may include preservation of existing vegetation to the maximum extent practicable, limiting the number of equipment trips across floodplain crossing, selecting equipment that exerts the least amount of ground surface pressure, use of vegetated buffers on slopes, application of hydraulic mulch on disturbed streambanks, and restoration of floodplains impacted by construction activities. • Weather would be monitored by construction works for heavy storms and potential flood flows. If a heavy storm or flood event is identified, construction equipment would be relocated outside of the floodplain.	Construction	Reporting and monitoring	Weekly	Contractor/ local districts	Contractor	Construction/ weekly reporting	Reporting contract requirements/ specifications	Impact HWR #1: Temporary Construction Impacts to Floodplains and Floodways
WQ-MM#2	Regional Dewatering Permits	The Bakersfield to Palmdale Project Section would be required to comply with statewide and regional Dewatering Permits per SWRCB and RWQCB requirements. For portions of the project section under the jurisdiction of the Central Valley RWQCB, the Central Valley RWQCB Dewatering Permits would apply: • The Central Valley RWQCB's Order No. R5-2013-0074, NPDES No. CAG995001, Waste Discharge Requirements General Order for Dewatering and Other Low Threat Discharges to Surface Waters, allows discharges provided they do not contain significant quantities of pollutants and either (1) the discharge is four months or less in duration, or (2) the average dry-weather discharge does not exceed 0.25 million gallons per day. • The Central Valley RWQCB's Resolution No. R5-2013-0145, Approving Waiver of Reports of Waste Discharge and Waste Discharge Requirements for Specific Types of Discharge within the Central Valley Region, covers discharges to land from dewatering activities.	Pre-construction/ construction/ post-construction	Reporting and monitoring	Weekly	Contractor	Contractor/ Authority	Weekly reporting	Reporting contract requirements/ specifications	Impact HWR #3: Temporary Construction Impacts to Surface Water Quality

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		For portions of the project section under the jurisdiction of the Lahontan RWQCB, the Lahontan RWQCB Dewatering Permits would apply: • The Lahontan RWQCB's Order No. R6T-2014-0049, NPDES No. CAG996001, Renewed Waste Discharge Requirements and General Permit for Limited Threat Discharges to Surface Waters, encourages the disposal of wastewater on land, where practicable, and requires applicants for this general permit to evaluate land disposal as the first alternative. This general permit covers discharges provided that the discharge does not contain significant quantities of pollutants. • The Lahontan RWQCB's Order No. R6T-2010-0024, NPDES No. CA G916001, Waste Discharge Requirements for Surface Water Disposal of Treated Groundwater, covers discharges of water from a groundwater treatment unit to surface waters.								
WQ-MM#3	Tunnel Constructability and Hydrogeological Monitoring	The Authority would implement the following measures during tunnel construction: • Excavation of the tunnels would include continuous probing ahead of the tunnel face to assess the ground and groundwater conditions. • Pre-excavation grouting would be used to control groundwater inflows and provide face stability where applicable. • All tunnels would be waterproofed. • The tunneling and lining methods chosen, the pretreatment of the ground mass, and the tunnel lining design, would be implemented to reduce groundwater inflows. • The tunnel lining would be inspected regularly throughout the construction phase to monitor for potential leaks. Should leaks be found, the lining would be repaired immediately and assessed for future integrity. Any freestanding water that leaks into the tunnel would be treated prior to discharge to minimize impacts from pollutants such as sediment or other contamination. • All construction water shall be captured and treated prior to discharge to minimize impacts from pollutants such as sediment or other contamination. • In the event that any active wells would be affected by tunnel construction activities, the wells would be re-drilled deeper to reach the groundwater level, relocated to different location, or the water reinjected. • Hydrogeological modeling would be conducted to assess the potential impacts of removing groundwater from bedrock storage during construction (including long term drainage into the tunnel). • Groundwater depth, flow, and quality would be monitored at nearby domestic wells, springs, and seeps prior, during, and after construction. Monitoring of groundwater, if impacted, would continue until the water system has normalized to pre-construction conditions. • The Authority would implement a Groundwater Adaptive Management and Monitoring Program (AMMP) to minimize potential impacts on water resources supported by groundwater resources, including springs and seeps, as well as from surface water resources supported by groundwater, the Authority proposes	Pre-construction/ construction/ post-construction	Reporting and monitoring/ design	Weekly	Contractor	Authority/ Contractor	Weekly reporting	Reporting contract requirements/ specifications	Impact HWR #4: Temporary Construction Impacts to Groundwater Volume, Quality, and Recharge

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		to implement a long-term Groundwater Adaptive Management and Monitoring Program (AMMP), which will include ongoing monitoring, management, and reporting activities to detect, address, and remedy groundwater and hydrology impacts that may arise during and after tunneling in a timely manner. The AMMP would advance a flexible strategy to respond to monitoring information that indicates changes to existing conditions resulting from project activities. In addition, if monitoring demonstrates that adaptive management actions taken to address such changes are not achieving the intended outcomes, management actions will be modified, or other strategies implemented to meet the objectives. The AMMP would include the following components, at a minimum, to avoid or minimize and address impacts on water resources supported by groundwater, including seeps/springs: – **Groundwater Modeling:** —The Authority would develop a groundwater model that can be used to predict where groundwater and surface water impacts are likely to occur. The model would be updated during construction with additional geological information generated during tunnel construction, and the updated model would be used to predict potential changes in groundwater conditions and anticipate adaptive management needs. o – **Monitoring Program:** —The Authority would develop a monitoring program to detect real-time changes in groundwater and surface water conditions and vegetation cover and special-status species habitat most likely to be affected by tunnel construction during and after construction through comparison to baseline conditions and use of paired reference sites. – **Numeric Triggers:** —The Authority would establish numeric triggers that require implementation of adaptive management measures to avoid or reduce impacts on groundwater and surface water resources and associated habitat for special-status species during construction. Adaptive management measures may include modifying construction methods, providing supplemental water to affected resources, and other feasible measures that would reduce or avoid a predicted impact. – **Water Quality Treatmen**t: —To the extent feasible, the Authority would provide water quality treatment for groundwater inflows and beneficially reuse groundwater inflows as part of the adaptive management program or discharge treated groundwater to receiving waterbodies.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
WQ-MM#4	Floodplain Protection: Operation	The project would be designed to remain operational during flood events and to minimize increases in base flood elevations. Measures for floodplain protection would include the following: • HSR system sites and critical facilities would be located above the 500-year flood elevation. • If the floodplain cannot be spanned, a Conditional Letter of Map Revision and Letter of Map Revision would be required to be processed through the Central Valley Flood Protection Board and FEMA during final design where the increase in water surface elevation exceeds a 1-foot rise in the 100-year base flood elevation. All floodplain crossings would be analyzed in more detail for FEMA compliance during subsequent engineering phases. • Embankment fill would be protected with slope protection such as rock-slope protection or gabions. • A Spill, Prevention, Containment and Control Plan would be implemented to reduce the amount of sediment deposited within 100-year floodplains and reduce the potential for released chemicals to migrate into flood zones during operation. • In cases where piers or column support structures would need to be placed within the flow channel to support the aerial or bridge structure, analysis of the flow within the channel and analysis of the scour at the piers would be performed. The results of this analysis would determine the optimal shape and depth of the piers and pier footings to mitigate the impacts flood waters would have on the structure supports. Backwater would be minimized by optimizing the pier's shape and minimizing the number of piers within the channel.	Pre-construction/ construction/ post-construction	Reporting and monitoring	Weekly	Contractor	Contractor/ Authority	Construction/ weekly reporting	Reporting contract requirements/ specifications	Impact HWR #5: Permanent Operation Impacts to Floodplains and Floodways Impact HWR #7: Permanent Operation Impacts to Surface Water Quality
Hazardous Materials and Wastes										
HMW-MM#1	Limit Use of Extremely Hazardous Materials near Schools during Construction	Prior to Construction, the Contractor will prepare a memorandum regarding hazardous materials best management practices related to construction activity for approval by the Authority. The memorandum will confirm that the Contractor will not handle or store an extremely hazardous substance (as defined in California Public Resources Code § 21151.4) or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified pursuant to subdivision (j) of § 25532 of the Health and Safety Code within 0.25 mile of a school. The memorandum will acknowledge that prior to construction activities, signage would be installed to delimit all work areas within 0.25 mile of a school, informing the Contractor not to bring extremely hazardous substances into the area. The Contractor would be required to monitor all use of extremely hazardous substances. The above construction mitigation measure for hazardous materials and wastes is consistent with California Public Resources Code § 21151.4. The memorandum will be submitted to the Authority prior to any construction involving an extremely hazardous substance.	Pre-construction/ construction	Reporting and monitoring	Memorandum approved 30 days prior to start of construction. During construction, submit weekly reports or reporting requirements as established by the approved memorandum	Contractor Hazardous Materials Monitor	Contractor	Hazardous materials memorandum/ weekly reporting	Hazardous materials memorandum	Impact HMW#4: Temporary Hazardous Materials and Waste Activities near Schools

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Safety and Security										
S&S-MM#1	Emergency Response of Local Fire, Rescue, and Emergency Service Providers to Incidents at Stations and Provide a Fair-Share Cost of Service	During the first three years of operation and maintenance, the Authority shall begin monitoring response of local fire, rescue, and emergency service providers to incidents at stations and provide a fair share of cost of service. Monitoring also should begin 1 year prior to opening of an HSR station. Service levels consist of the monthly volume of calls for fire and police protection, as well as county, city- or fire protection district-funded emergency medical technician (EMT)/ambulance calls that occur in the station site service areas. Prior to operation of the stations for HSR service, the Authority will enter into an agreement with the public service providers of fire, police, and emergency services to fund the Authority's fair share the cost of services above the average baseline service demand level f or the station and LMF service areas (as established during the monitoring period). The fair share will be based on projected passenger use for the first year of operations, with a growth factor for the first 5 years of operation. This cost-sharing agreement will include provisions for ongoing monitoring and future negotiated amendments as the stations are expanded or passenger use increases. Such amendments will be made on a regular basis for the first 5 years of station operation, as will be provided in the agreement. To ensure that services are made available, impact fees will not constitute the sole funding mechanism, although they may be used to fund capital improvements or fixtures (a police substation, additional fire vehicles, on-site defibrillators, etc.) necessary for service delivery. After the first 5 years of operation, the Authority will enter into a new or revised agreement with the public-service providers of fire, police, and emergency services to fund the Authority's fair share of services on an ongoing basis. The fair share will take into account the volume of ridership, past record and trends in service demand at the stations and LMF site, new local revenues derived from station area development, and any services that the Authority may be providing at the station.	Construction/ post-construction/ operation	Monitor/ Fair Share Agreement	Annually	Authority	Authority	Monitoring of service levels during construction and operation to determine baseline service demands, Fair share agreement	Authority to fund through fair share of services agreement	Impact S&S #12: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities
Socioeconomics and Communities										
SO-MM#3	Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	Prior to Construction, the Authority will minimize impacts resulting from the acquisition, displacement, and/or relocation of key community facilities The Authority will consult with the appropriate parties before land acquisition to assess potential opportunities to reconfigure land use and buildings and/or relocate affected facilities, as necessary, to minimize the disruption of facility activities and services, and to provide for relocation that allows the community currently being served to continue to use these services. The Authority will continue to implement a comprehensive non-English speaking language outreach program as land acquisition begins. This program will facilitate the identification of approaches that would maintain continuity of operation and allow space and access for the types of services currently provided and planned for these facilities. To avoid disruption to these community amenities, the Authority will provide for reconfiguring land uses or buildings, or relocation of community facilities is completed before the demolishing existing structures. The Authority shall document compliance with this measure through annual reporting.	Pre-construction/ construction/ post-construction	Reporting	Monthly	Authority	Authority	Monthly reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts	Impact SO #1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO #7: Permanent Displacement and Relocation of Community Facilities from Construction

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
SO-MM#4	Provide Access Modifications to Affected Farmlands	Prior to Construction in cases where partial-property acquisitions result in division of agricultural parcels by the HSR alignment or facilities, the Authority will evaluate with the property owner's input modified access, including the effectiveness of providing overcrossings or undercrossings of the HSR track to allow continued use of agricultural lands and facilities. This could include the design of overcrossings or undercrossings to allow farm equipment passage. The Contractor shall prepare a technical memorandum for Authority review and approval detailing outreach to affected property owners, evaluation results and what measures were implemented to address bifurcated agricultural properties.	Pre-construction/ construction/ post-construction	Reporting and monitoring; design	Monthly	Contractor	Contractor	Monthly reporting	Final design and construction/ monthly reporting	Impact SO #21: Permanent Agricultural Access Impacts and Road Closures from Operation Impact AG #6: Permanent Indirect Impacts to Important Farmland from Parcel Severance
Agricultural Farmland										
AG-MM#1	Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)	The Authority has entered into an agreement with the Department of Conservation California Farmland Conservancy Program to implement agricultural land mitigation for the California High-Speed Rail Project. The Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers. The performance standards for this measure are to preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands, within the same agricultural regions as the impacts occur, at a replacement ratio of not less than 1:1 for lands that are permanently converted to non-agricultural use by the project. In addition to mitigation for Important Farmlands that are permanently converted to nonagricultural use, the Authority will fund the purchase of an additional increment of acreage for agricultural conservation easements at a ratio of not less than 0.5:1 for Important Farmland within a 25-foot wide area adjacent to HSR permanently fenced infrastructure. The Authority shall document implementation of this measure through issuance of a compliance memorandum annually.	Pre-construction	Compliance reporting	Monthly	Authority and California Farmland Conservancy	Authority	Monthly reporting prior to construction	The Authority has entered into an agreement with the DOC and its California Farmland Conservancy Program to implement agricultural land mitigation for the HSR system.	Impact AG #5: Permanent Conversion of Important Farmland to Nonagricultural Use Impact AG #6: Permanent Indirect Impacts to Important Farmland from Parcel Severance Impact AG #7: Permanent Impacts to Important Farmland under Williamson Act or Farmland Security Zone Contracts, Local Zoning, or Agricultural Conservation Easement Lands
Parks, Recreation, and Open Space										
PC-MM#1	Temporary Use of Land from Park, Recreation, or School Play Areas During Construction	• **Temporary Impact Areas**—During final design, the California High-Speed Rail Authority's (Authority) Project Engineer shall evaluate all proposed temporary impact areas in parks, recreation resources, and school play areas and shall identify opportunities to further reduce the sizes of those temporary impact areas. All temporary impact areas in parks, recreation resources, and school play areas shown on the project plans and specifications would specify that the Design-Build Contractor cannot increase the size of any of those areas without consultation with and approval by the Project Engineer. • **Temporary Impact Areas**—The Authority would compensate for the temporary loss of parks, recreation resources, and school play areas caused by temporary impact areas during construction using one or more of the following methods: (1) providing substitute land for comparable recreational uses; or (2) providing financial compensation for the development of land suitable for comparable recreational uses; or (3) enhancing the unaffected land to ensure that the property retains equivalent usefulness. During final design, the Authority's Project Engineer shall consult with the affected jurisdictions and property owners to discuss the temporary impact	Pre-construction/ construction	Design/ reporting/ funding	Prior to final design	Authority	Authority	Before final design	Condition of design build contract/ Authority to provide compensation	Impact PK #1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		areas needed for construction of the High-Speed Rail (HSR) project and to determine the appropriate level of compensation for the use of land from park, recreation, or school play areas for the temporary impact areas. The Authority shall provide compensatory mitigation to fully mitigate the loss of recreational resources during project construction. It is anticipated that the compensation shall be payments for the temporary use of land from those resources for the period of time that land is used for temporary impact areas during project construction. • **Access Restrictions at Temporary Impact Areas**—The Authority's Project Engineer shall require the Design-Build Contractor to fence and gate all land in parks, recreation facilities, and school play areas used for temporary impact areas. The temporary impact areas would be appropriately signed to restrict access to those areas by park and recreation resource patrons and users of school play areas. The Authority's Project Engineer would require the Design-Build Contractor to maintain the fencing throughout the time period each temporary impact area is used and to remove the fencing only after all construction activity in an area is completed, the temporary impact area is no longer needed, and the land is ready to be returned to the property owner. • **Signing of Fenced Temporary Impact Areas**—The Authority's Project Engineer shall require the Design-Build Contractor to provide signing at each temporary impact area explaining why the area is fenced and access to the temporary impact area is restricted, the anticipated completion date of the use of the land for the temporary impact area, and contact information (for both the Authority's Project Engineer and the Design-Build Contractor) for the public to solicit further information regarding the temporary impact area and the project. • **Modifications to Recreation Uses**—In the event a temporary impact area requires the temporary use of land at a park, recreation resource, or school play area, and it is determined that the loss will be compensated for by providing replacement uses, the Authority's Project Engineer shall consult with the property owner/operator (1) on whether the property owner/operator wants those recreation uses replaced temporarily or permanently elsewhere on the property, and (2) if temporary or permanent replacement of those recreation uses is desired, on modifications that could be made to the remaining recreation area on the property to temporarily or permanently replace the recreation uses displaced by the temporary impact area. Any modifications to recreation areas outside the limits of a temporary impact area would be constructed/implemented prior to fencing and use of the temporary impact area.								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
PP-MM#1	Permanent Acquisition of Property from Publicly Owned Parks Under the California Park Preservation Act	Per Public Resources Code Division 5, Chapter 2.5, Section 5401 of the California Park Preservation Act, the Authority would provide compensation or land, or both, for all permanent acquisitions of property for HSR improvements from publicly owned parks, consistent with the requirements of the California Park Preservation Act of 1971. The California Park Preservation Act requires that the compensation or land, or both, for the taking of the park land and facilities be equal to one of the following: • The cost of acquiring substitute park land of comparable characteristics, substantially equal size, and condition • Substitute park land of comparable characteristics, substantially equal size, and condition • Any combination of substitute park land and compensation in an amount sufficient to provide substitute park land of comparable characteristics, substantially equal size, and condition During the right-of-way acquisition process, the Authority would consult with the public agency with jurisdiction over any publicly owned park from which the Authority requires permanent acquisition of property regarding the specific conditions of acquisition and compensation for, or replacement or enhancement of, other park property for the land that would be acquired.	Pre-construction	Prior to final design	Prior to final design	Authority	Authority	Authority to provide compensation or land or both per Public Resources Code Division 5, Chapter 2.5, Section 5401 of the California Park Preservation Act	Authority to provide compensation as required	Impact PK #3: Permanent Partial Acquisition of Property from Parks, Recreation, and School Play Area Resources Impact PK #4: Permanent Acquisition of Property from Publicly Owned Parks

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
PCT-MM#1	Temporary and Permanent Effects on the Pacific Crest Trail	• The Authority would continue to work with the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), and Pacific Crest Trail Association to advance the final design through a collaborative, context-sensitive solutions approach. Participants in the consultation process would meet on a regular basis to develop a consensus on the urban design elements to be incorporated into the final guideway design. The process would include activities to solicit community input in the affected trail segment. • The Authority would realign approximately 2,110 linear feet of the 2,650-mile-long trail west of the proposed viaduct to allow the trail to cross under the bridge structure at one location under Alternatives 1, 2, and 5. This proposed realignment is based on consultation to date with the USFS, the BLM, and the Pacific Crest Trail Association and is shown on Figure 3.15-4 [of the Final EIR/EIS], Proposed Pacific Crest Trail Realignment. Figure 3.15-4 [of the Final EIR/EIS] delineates the permanent and temporary impact areas for the project in purple and yellow, respectively. It also depicts the proposed trail realignment. • Use construction best management practices to control dust and noise (Section 3.3, Air Quality and Global Climate Change; Section 3.4, Noise and Vibration) during construction. • Where exposed to trail users, screen stockpiled material and construction excavations through the use of temporary construction barriers and other screens. Restore areas affected by construction to preconstruction conditions immediately after construction. Use native plant materials for revegetation where appropriate. • During construction, the Design-Build Contractor would monitor construction noise to verify compliance with the established FRA construction noise limits. The Contractor would be given the flexibility to meet the FRA construction noise limits in the most efficient and cost-effective manner. Compliance with these limits can be accomplished by either prohibiting certain noise-generating activities during nighttime hours or providing additional noise-control measures to meet the noise limits. The following noise control mitigation measures would be implemented as necessary for nighttime and daytime construction: – Install a temporary construction site sound barrier near a noise source. – Locate stationary construction equipment as far as possible from noise-sensitive sites. – Use low-noise-emission equipment. – Implement noise-deadening measures for truck loading and operations. – Monitor and maintain equipment to meet noise limits. – Line or cover storage bins, conveyors, and chutes with sound-deadening material. – Use acoustic enclosures, shields, or shrouds for equipment and facilities. – Use high-grade engine exhaust silencers and engine-casing sound insulation.	Pre-construction/ construction	Final design/ consultation	Prior to final design/ monthly reporting	Authority/ Contractor	Authority/ Contractor	Before final design/ monthly	Authority to consult as required/ monthly reporting	Impact PK #1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours Impact PK #6: Project Changes to Park or Recreation Facility Use or Character Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– Minimize the use of generators to power equipment. – Limit the use of public address systems – Grade surface irregularities on construction sites – Use moveable sound barriers at the source of the construction activity. – Limit or avoid certain noisy activities during nighttime hours. – To mitigate noise related to pile driving, the use of an auger to install the piles instead of a pile driver would reduce noise levels substantially. If pile driving is necessary, limit the time of day that the activity can occur. – In the procurement of a HSR vehicle technology, the Authority would require bidders to meet the federal regulations (40 Code of Federal Regulations 201.12/13) at the time of procurement for locomotives (currently a 90-decibel standard) for cars operating at speeds greater than 45 miles per hour. • Coordinate with the private property owner, the USFS, and the BLM regarding compensation for the maintenance easement to access the HSR facility and the areas under the viaduct during operation of the HSR project. • Work with the USFS and the BLM to prepare final design documents that minimize the visual impacts of the HSR future alignment on the Pacific Crest Trail users. This could include landscaping or other acceptable design features. • Use sound-attenuating measures along the guideway to minimize noise during operation of the HSR project. • Make the area under the viaduct accessible for equestrian use during operation of the HSR project. The area under the viaduct will provide at least 50 feet of vertical clearance to ensure equestrian accessibility during operation of the HSR project. ▪ Vegetation of the artificial slope planned for the vicinity of Tehachapi Willow Springs Road will conform to Mitigation Measure BIO-MM#6. This will require a Project Biologist to prepare a Restoration and Revegetation Plan to address impacts resulting from ground disturbing activities. ▪ The timing of construction adjacent to the PCT should avoid the 6-week peak-use time by through hikers and equestrians (April through mid-May) to the extent feasible. ▪ Specific mitigation (N&V-MM#8) would be implemented to reduce startle effect impacts on equestrian users on the PCT by providing advance warning signage ahead of the PCT crossing under the HSR viaduct. ▪ The Authority will enter into an agreement with the USFS, as identified in the USFS concurrence letter, to provide compensatory mitigation for impacts to the PCT from the train realignment, the HSR project crossing the PCT once, and the maintenance easement.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
PCT-MM#2	Temporary Trail Closures and Detours on the Pacific Crest Trail	• The trail shall remain open to hikers and equestrian users during construction by providing detours to maintain connectivity if construction requires temporary closures with collaboration between the USFS, BLM, and Authority. Provide clear signage and direction for alternative access routes and access points, and coordinate with local groups and jurisdictions using a variety of media to communicate the construction schedule and anticipated closures and detours. – During final design, the Authority's project engineer would require the design-build contractor to develop a Trail Facilities Plan addressing the short-term project impacts on the segment of the PCT within the construction limits of the project. That plan would address: ▪ Identification of trail segments that would be closed temporarily and detoured during construction ▪ Preparing a public awareness and notification plan ▪ Temporary closing trails during construction ▪ Developing and implementing detours for the temporarily closed trail segment ▪ Phasing of temporary trail closures to allow for effective detours to maintain connectivity of the facility around the construction areas ▪ Coordinating the trail closures and detours with the USFS and BLM ▪ Criteria for identifying detour routes and facilities ▪ Information signing for closures and detours ▪ Maintaining signing for closures and detours throughout the closure period and replacing lost or damaged signing ▪ Restoring trail segments to their original or better condition at the completion of project construction as outlined in the Pacific Crest Trail Design and Construction Standards found at: http://www.pcta.org ▪ Accommodation for hiker and equestrian use of selected detour routes Timing of construction should avoid the 6-week peak-use time by through-hikers and equestrians (April through mid-May) to the extent feasible – Prior to any temporary closures of the PCT, the Authority's project engineer would require the design-build contractor to coordinate with the USFS and BLM directors, or their representatives, to review the location of and need for each temporary trail closure. The Authority's project engineer would require the design-build contractor to develop detours for each closure in consultation with the USFS and BLM directors or their representatives. Prior to and during construction activities that would require the temporary closure of the trail, the Authority's project engineer would require the design-build contractor to comply with and implement the procedures in the Trail Facilities Plan, described above, for the affected PCT segment.	Pre-construction/ construction	Prepare Trail Facilities Plan	Prior to final design/ monthly reporting	Authority/ Contractor	Authority/ Contractor	Before final design/ monthly	Requirement of design build contract/ specifications	Impact PK #1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		– Signing for Trail Detours and Closures. The Authority's project engineer would require the design-build contractor to develop detour signs, in consultation with the USFS and BLM, notifying trail users of the upcoming temporary facility closure and directing the trail users to the temporary detour routes with estimated time frames. Appropriate directional and informational signage would be provided by the project design-build contractor prior to each closure and far enough in advance of the closure so trail users would not have to backtrack to get to the detour routes. – Contact Information at Trail Detours. The Authority's project engineer would require the design-build contractor to provide detour signing that includes contact information for the Authority's project engineer and the design-build contractor, and that informs trail users to contact the project engineer and/or the design-build contractor with questions or concerns regarding upcoming or active temporary trail closures. – Restoration of Impacted Trail Segments. The Authority's project engineer would require the design-build contractor to return trail segments closed temporarily during construction to their original, or better, condition after completion of construction, prior to their return to the control of the USFS and BLM. After project construction, the Authority's project engineer would require the design-build contractor to document that access to and connectivity of the affected trails were restored. – Compliance with the Trails Facilities Plan. Compliance with the Trails Facilities Plan would be documented in the environmental commitments record with text, photographs, maps, and correspondence, as appropriate.							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Aesthetics and Visual Resources										
AVQ-MM#1	Minimize Visual Disruption from Construction Activities	Prior to Construction (any ground-disturbing activity), the Contractor shall prepare a technical memorandum identifying how the project would minimize construction-related visual/aesthetic disruption and include the following activities: • Minimize pre-construction clearing to that necessary for construction. • Limit the removal of buildings to those that would obstruct project components. • When possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views. • After construction, regrade areas disturbed by construction, staging, and storage to original contours and revegetate with plant material similar in numbers and types to that which was removed, based upon local jurisdictional requirements. If no local jurisdictional requirements exist, replace removed vegetation at a 1:1 replacement ratio for shrubs and small trees, and 2:1 replacement ratio for mature trees. For example, if the Contractor removes 10 mature trees in an area, replant 20 younger trees that after 5 to 15 years (depending upon the growth rates of the trees) would be of a height and spread to provide visual screening similar to the visual screening provided by the trees that were removed for construction. Replaced shrubs shall be a minimum 5 gallon and replaced trees shall be a minimum 24-inch box in size and minimum 8 feet in height. Trees should be maintained and periodically monitored by the Authority for five to seven years to ensure survival and their continued health as they mature. • To the extent feasible, do not locate construction staging sites in the immediate foreground distance (0 to 500 feet) of existing residential neighborhoods, recreational areas, or other land uses that include high-sensitivity viewers. Where such siting is unavoidable, screen staging sites from viewers using appropriate solid screening materials such as temporary fencing and walls. Paint over or remove any graffiti or visual defacement of temporary fencing and walls within five business days of it occurring. The technical memorandum shall be submitted to the Authority for review and approval.	Pre-construction/ construction/ post-construction	Prepare technical memorandum	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVQ #1: Temporary Impacts Associated with Construction Staging, Equipment, Lighting, and Spoils Impact PK #2: Temporary Access, Air Quality, Noise, and Visual Impacts
AVQ-MM#2	Minimize Light Disturbance during Construction	Prior to Construction (any ground disturbing activity requiring nighttime construction), the Contractor shall prepare a technical memorandum verifying how the Contractor shall shield nighttime construction lighting and direct it downward in such a manner to minimize the light that falls outside the construction site boundaries. The technical memorandum shall be submitted to the Authority for review and approval.	Pre-construction/ construction	Prepare technical memorandum	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVQ #1: Temporary Impacts Associated with Construction Staging, Equipment, Lighting, and Spoils Impact PK #2: Temporary Access, Air Quality, Noise, and Visual Impacts

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
AVQ-MM#3	Incorporate Design Criteria for Elevated Guideways That Can Adapt to Local Context	Prior to Construction (any ground-disturbing activity), the Contractor shall work with the Authority and local jurisdictions to incorporate the Authority-approved aesthetic preferences for non-station structures into final design and construction. Refer to *Aesthetic Guidelines for Non-Station Structures* [Authority 2011a]. This shall include the following activities: • During the elevated guideway design process, establish a process with the affected jurisdiction over the land along the elevated guideway to advance the final design through a collaborative, context-sensitive solutions approach. Participants in the consultation process shall meet on a regular basis to develop a consensus on the urban design elements that are to be incorporated into the final guideway designs. The process shall include activities to solicit community input in the affected neighborhoods. Actions taken to help achieve integration with the local design context during the context-sensitive solutions process shall include the following: • Incorporate architectural elements, such as graceful curved or tapered sculptural forms and decorative surfaces, to provide visual interest. Include decorative texture treatments on large-scale concrete surfaces such as parapets and other portions of the elevated guideways. Also include a variety of textures, shadow lines, and other surface articulations to add visual and thematic interest. Closely coordinate the design of guideway columns and parapets with station and platform architecture to promote unity and coherence where guideways lie adjacent to stations. • Integrate trees and landscaping where possible to soften and buffer the appearance of guideways, columns, and elevated stations. This will be consistent with the principles of crime prevention through environmental design. • The designs in cities and unincorporated communities shall reflect the results of the context-sensitive solutions design process. During the context-sensitive solutions design process, the HSR project's obligations and constraints related to planning, mitigation, engineering, performance, funding, and operational requirements shall be taken into consideration. The technical memorandum shall be submitted to the Authority to document compliance.	Pre-construction/ construction	Compliance report	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities Impact PK #6: Project Changes to Park or Recreation Facility Use or Character

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
AVQ-MM#4	Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas	Prior to operation and maintenance of HSR, the Contractor shall plant trees (minimum 24-inch box and 8 feet in height) or other vegetation along the edges of the HSR rights-of-way in locations adjacent to residential areas to visually screen the elevated guideway and the residential area. The species of trees to be installed shall be selected based on their mature size and shape, growth rate, hardiness, and drought tolerance. Trees shall be visually consistent with surrounding vegetation in terms of vegetative type, color, texture, and form. No species on the Invasive Species Council of California's list of invasive species shall be planted. Upon maturity, the crowns of trees used shall be tall enough to partially, or fully, screen views of the elevated guideway from adjacent at-grade areas. Upon maturity, trees shall allow ground-level views under the crowns (with pruning if necessary) and will not interfere with the 15-foot clearance requirement for the guideway. The trees shall be maintained and periodically monitored by the Authority for five to seven years to ensure survival and their continued health as they mature. Irrigation systems shall be installed within the tree planting areas. The Contractor shall prepare a technical memorandum within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into the edges of the HSR right-of-way adjacent to residential uses. The technical memorandum shall be submitted to the Authority to document compliance.	Construction/ post-construction	Plant trees/ compliance report	Prior to operation planting trees/ 90 days of completing any construction section or segment documenting the species of trees that were incorporated into design	Contractor	Contractor	Prior to operation, planting trees/ 90 days of completing any construction section or segment documenting the species of trees that were incorporated into design	Contract requirements, specifications; landscaping, and maintenance will be provided by the Contractor for its scope of work until completion of the work at which time the Authority shall assume responsibility for landscaping or assign the responsibility to other third parties	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure
AVQ-MM#5	Replant Unused Portions of Lands Acquired for the HSR	Prior to operation and maintenance, the Contractor shall plant vegetation within land acquired for the project (e.g., shifting roadways) that are not used for the HSR or related supporting infrastructure, or other higher or better use. Plantings shall allow adequate space between the vegetation and the HSR alignment and catenary lines. All street trees and other visually important vegetation removed in these areas during construction shall be replaced with similar vegetation that, upon maturity, shall be similar in size and character to the removed vegetation. Replaced shrubs shall be minimum 5 gallon and trees shall be minimum 24-inch box and 8 feet in height. The Authority shall provide for continuous maintenance with appropriate irrigation systems. The Contractor shall install the irrigation system within the planting areas. No species listed on the Invasive Species Council of California's list of invasive species shall be planted.	Post-construction/ operations	Plant vegetation/ reporting	Prior to operation and maintenance planting trees/ monthly reporting	Authority	Authority	Prior to operation and maintenance planting trees/ monthly reporting	Authority to implement appropriate landscape and maintenance plan	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
AVQ-MM#6	Landscape Treatments along the HSR Overcrossings and Retained Fill Elements	During final design, the Authority shall consult with the affected local jurisdictions regarding the landscaping program for planting the slopes of overheads, embankments, and retained fill elements. Within 90 days from the completion of construction, the Contractor shall plant the surface of the ground below overheads (slope-fill overheads), embankments, and retained fill elements with plant species that are consistent with the surrounding landscape (in terms of vegetative type, color, texture, and form) and based on their mature size and shape, growth rate, and drought tolerance. No species on the list from the Invasive Species Council of California shall be planted. The landscaping shall be continuously maintained and appropriate irrigation systems shall be installed if needed. Where wall structures supporting the overheads or retained fill are proposed, the structure shall employ architectural details and low-maintenance trees and other vegetation to screen the structure, minimize graffiti, and reduce the effects of large walls. Surface coatings shall be applied on wood and concrete to facilitate cleaning and the removal of graffiti. Any graffiti or visual defacement or damage of fencing and walls shall be painted over or repaired within a reasonable time (approximately 10 business days) after notification. The Contractor shall prepare a technical memorandum documenting implementation and submit it to the Authority to demonstrate compliance.	Construction/ final design	Landscaping program implemented/ compliance reporting	During final design implement landscaping program/ monthly reporting	Authority	Contractor	During final design implement landscaping program/ monthly reporting	Contract requirements and specifications; landscaping and maintenance will be provided by the Contractor for its scope of work until completion of the work at which time the Authority shall assume responsibility for landscaping or assign the responsibility to other third parties	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure
AVQ-MM#7	Provide Sound Barrier Treatments	Prior to Construction (any ground-disturbing activity), the Contractor shall design a range of sound barrier treatments for visually sensitive areas, such as those areas where residential views of open landscaped areas would change or in urban areas where sound barriers would adversely affect the existing character and setting. The Contractor shall develop the treatments during the final design process and integrate them into the final project design. The treatments shall include, but are not limited to, the following: • Sound barriers along elevated guideways that may incorporate transparent materials where sensitive views would be adversely affected by opaque sound barriers. • Sound barriers made with nonreflective materials and of a neutral color. • Surface design enhancements and vegetation appropriate to the visual context of the area shall be installed with the sound barriers. Vegetation shall be installed consistent with the provisions of Project Mitigation Measure AVQ-MM#5. Surface enhancements shall be consistent with the design features developed for Project Mitigation Measure AVQ-MM#3 and shall include architectural elements (e.g., stamped pattern, surface articulation, decorative texture treatment), as determined acceptable to the local jurisdiction. Surface coatings shall be used on wood and concrete sound barriers to facilitate cleaning and the removal of graffiti. The Contractor shall prepare a technical memorandum documenting implementation and submit it to the Authority to demonstrate compliance.	Pre-construction/ construction	Reporting	Monthly	Contractor	Contractor	Construction/ monthly	Contract requirements/ specifications	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
AVQ-MM#8	Minimize Vertical Cut-Slopes in Tehachapi Mountains with Retaining Walls	Where high-sensitivity views or viewers could be strongly affected by tall, highly exposed, vertical cut slopes needed to accommodate at-grade segments in the Tehachapi Mountains, the Contractor shall incorporate retaining walls to avoid or reduce those impacts. Locations where this measure could be considered include cut-slopes in the vicinity of the Tehachapi Loop (station 18685), Golden Hills (station 18925), and Tehachapi Valley (station 19010). Where such walls are implemented, wall texture and color treatments shall be applied to minimize visual contrast and reflectivity and to blend with the surrounding setting. The Contractor shall prepare a technical memorandum documenting implementation and submit it to the Authority to demonstrate compliance.	Pre-construction/ Construction	Preparation of memorandum/ reporting	Monthly	Contractor/ Authority	Contractor/ Authority	Final design	Contract Requirements/ specifications	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure
AVQ-MM#9	Screen Traction Power Distribution Substations and Radio Communication Towers	Within 90 days of completing traction power substation or radio tower construction, the Contractor shall screen from public view the traction power substations (located at approximately 30-mile intervals along the HSR guideway), including radio towers where required, through the use of landscaping or solid walls/fences. This shall consist of context-appropriate landscaping of a type and scale that does not draw attention to the station or feature. Plant species shall be selected based on their mature size and shape, growth rate, hardiness, and drought tolerance. Planted shrubs shall be a minimum 5 gallon and trees shall be a minimum 24-inch box and 8 feet in height. No species on the Invasive Species Council of California's list shall be planted. The landscaping shall be continuously maintained and appropriate irrigation systems shall be installed within the landscaped areas. Walls shall be constructed of cinder-block or similar material and shall be painted a neutral color to blend in with the surrounding context. If a chain-link or cyclone fence is used, it shall include slats in the fencing. Any graffiti or visual defacement or damage of fencing and walls shall be painted over or repaired within a reasonable period, as agreed between the Authority and the local jurisdiction. The Contractor shall prepare a technical memorandum documenting how the requirements in this measure were implemented. The technical memorandum shall be submitted to the Authority to document compliance.	Construction/ post-construction	Reporting	Monthly	Contractor/ Authority	Contractor	Construction/ monthly reporting	Contract requirements/ specifications	Impact AVQ #7: Permanent Impacts from Construction of Electric Power Utility Improvements

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Cultural Resources										
CUL-MM#1	Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)	Once parcels are accessible and surveys have been completed, including consultation as stipulated in the MOA, additional archaeological may be identified. Unless design advances during the design-build phase require the APE to be modified, all built resources surveys were completed for the Bakersfield to Palmdale Project Section. For newly identified eligible properties that would be adversely affected, the following process would be followed, which would be presented in detail in the BETP and ATP: • The Authority would consult with the MOA signatories and concurring parties to determine the preferred treatment of the properties/resources and appropriate mitigation measures. • For CRHR-eligible archaeological resources, the Authority shall determine if these resources can feasibly be preserved in place, or if data recovery is necessary. The methods of preservation in place shall be considered in the order of priority provided in CEQA Guidelines § 15126.4(b)(3). If data recovery is the only feasible treatment the Authority shall adopt a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C). • Should data recovery be necessary, the Contractor's Principal Investigator (PI), in consultation with the MOA signatories and consulting parties, would prepare a data recovery plan, for approval from the Authority and in consultation with the MOA signatories. Upon approval, the Contractor's PI would implement the plan. • For archaeological resources the Authority shall also determine if the resource is a unique archaeological site under CEQA. If the resource is not a historical resource but is an archaeological site, the resource shall be treated as required in California Public Resources Code 21083.2 by following protection, data recovery, and/or other appropriate steps outlined in the ATP. The review and approval requirements for these documents would be outlined in the ATP. • For historic built resources, the Contractor's PI would amend the BETP to include the treatment and mitigation measures identified by the Authority in consultation with the MOA signatories and concurring parties. The Contractor's PI would implement the treatment and mitigation measures accordingly.	Pre-construction/ construction	Reporting	Weekly	Contractor/ Authority	Contractor/ Authority	Pre-construction surveys and construction/ weekly reporting or as dictated by the ATP and the MOA	PA	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
CUL-MM#2	Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable	During construction (any ground disturbing activities, including clearing and grubbing) should there be an unanticipated discovery, the Contractor shall follow the procedures for unanticipated discoveries as stipulated in the PA, MOA, and associated ATP. The procedures must also be consistent with the following: the SOI Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-42), as amended (National Park Service); and Guidelines for the Implementation of CEQA, as amended (Title 14 CCR Chapter 3, Article 9, Sections 15120–15132). Should the discovery include human remains, the Contractor, the Authority, and the FRA shall comply with federal and state regulations and guidelines regarding the treatment of human remains, including relevant sections of the Native American Graves Protection and Repatriation Act (§3(c)(d)); California Health and Safety Code, Section 8010 et seq.; and CPRC Section 5097.98; and consult with the Native American Heritage Commission, tribal groups, and the SHPO. In the event of an unanticipated archaeological discovery, the contractor would cease work in the immediate vicinity of the find, based on the direction of the archaeological monitor or the apparent location of cultural resources if no monitor is present. If no qualified archaeologist is present, no work can commence until it is approved by the qualified archaeologist in accordance with the MOA, ATP, and monitoring plan prepared for the specific archaeological discovery. The contractor's qualified archaeologist would assess the potential significance of the find and make recommendations for further evaluation and treatment as necessary. These steps may include evaluation for the CRHR and NRHP and necessary treatment to resolve significant effects if the resource is an historical resource or historic property. If, after documentation is reviewed and approved by the Authority, and they determine it is a historic property, and the SHPO concurs that the resource is eligible for the NRHP, or the Authority determines it is eligible for the CRHR, preservation in place shall be considered by the Authority in the order of priority provided in CEQA Guidelines § 15126.4(b)(3) and in consultation with the signatories and consulting parties to the MOA. If data recovery is the only feasible mitigation the contractor's qualified Principal Investigator (PI) shall prepare a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C), the MOA, and ATP, for the Authority's approval. The contractor shall notify the Authority, who shall notify the California State Lands Commission (CSLC), if the find is a cultural resource on or in the submerged lands of California and consequently under the jurisdiction of the CSLC. The Authority would comply with all applicable rules and regulations promulgated by CSLC with respect to cultural resources in submerged lands. If human remains are discovered on state-owned or private lands the contractor shall contact the relevant County Coroner to allow the Coroner to determine if an investigation regarding the cause of death is required. If no investigation is required and the remains are of Native American origin the Authority shall contact the Native American Heritage Commission to identify the most likely descendant (MLD). The MLD shall be empowered to reinter the remains with appropriate dignity. If the MLD fails to make a recommendation, the remains shall	Construction	Reporting	During construction	Contractor/ Authority	Contractor	Daily logs (during active monitoring)	ATP/MOA	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
		be reinterred in a location not subject to further disturbance and the location shall be recorded with the Native American Heritage Commission and relevant information center of the California Historical Resources Information System. If human remains are part of an archaeological site, the Authority and contractor shall, in consultation with the MLD and other consulting parties, consider preservation in place as the first option, in the order of priority called for in CEQA Guidelines Section 15126.4(b)(3). In consultation with the relevant Native American Tribes, the Authority may conduct scientific analysis on the human remains if called for under a data recovery plan and amenable to all consulting parties. The Authority would work with the MLD to satisfy the requirements of California Public Resources Code Section 5097.98. Performance tracking of this mitigation measure would be based on successful implementation and approval acceptance of the documentation by the SHPO and appropriate consulting parties.								
CUL-MM#3	Other Mitigation for Effects to Pre-Contact Archaeological Sites	Due to limited access to private properties during the environmental review phase of this project, the FRA's and Authority's ability to fully identify and evaluate archaeological resources within the APE has, correspondingly, also been limited. Thus, the majority of the project APE has not been subject to archaeological field inventories. As pedestrian field surveys are a necessary component of the archaeological resource identification and evaluation effort, the commitment to complete the field surveys, prior to ground disturbing activities associated with the project, are codified in the Memorandum of Agreement (MOA) that has been executed as a condition of this Final EIR/EIS. Access to previously inaccessible properties to complete the archaeological resource identification effort is expected to be available after the Record of Decision, during the design-build phase of the project. However, due to the design constraints associated with constructing a high-speed train, the ability to shift the alignment to avoid any newly identified archaeological resources at this late phase of the project delivery process is substantially limited and/or unlikely, as the alignment is already established. As such, impacts/effects to as-yet-unidentified significant archaeological resources as a result of this project are anticipated; however, the nature and quantity of such effects remains unknown until completion of the archaeological field identification and evaluation effort. Protocols for the identification, evaluation, treatment, and data-recovery mitigation of as-yet-unidentified archaeological resources are addressed in the MOA and Archaeological Treatment Plan. Efforts to develop meaningful mitigation measures for effects to as-yet-unidentified Native American archaeological resources that cannot be avoided will be negotiated with the tribal Consulting Parties. Measures that are negotiated among the MOA signatories and tribal Consulting Parties will be the responsibility of the Authority to implement.	Pre-construction	Pre-construction surveys	Prior to ground-disturbing activities	Authority	Authority	Prior to ground-disturbing activities	ATP/ MOA	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
CUL-MM#7	Prepare Interpretive or Educational Materials	The MOA and BETP would identify historic properties and historical resources that would be subject to historic interpretation or preparation of educational materials. Interpretive and educational materials would address the significance of the properties that would be affected by the project. Interpretive or educational materials could include, but are not limited to: brochures, videos, websites, study guides, teaching guides, articles or reports for general publication, commemorative plaques, or exhibits. The agreed-upon method of interpretation would be specified in the BETP for each property, resulting from consultation with the State Historic Preservation Officer (SHPO), MOA signatories and concurring parties. The contractor would be responsible for assembling the appropriate interdisciplinary team to fulfill the mitigation. The required professionals and their qualifications would be specified in the BETP. In the preparation of the interpretive or educational materials, the contractor's team would utilize previous research included in the environmental technical documents, images, narrative history, drawings, or other material produced for the mitigation described above. The interpretive or educational materials should be made available to the public in physical or digital formats, at local libraries, historical societies, or public buildings, as specified in the BETP.	Post-construction	Reporting	Annual	Authority	Post-construction/ annual reporting	Authority, in consultation with SHPO and appropriate consulting parties	BETP, Photographic documentation, plan for repairs to historic properties	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities Impact CUL-4: Permanent Operations—Potential Adverse Impacts on Built Resources
CUL-MM#9	Visual Screening	The MOA and BETP would identify historic properties and historical resources that would be subject to visual screening. Visual screening would be installed by the Contractor and consist of plant material that would minimize the view of the project from the property subject to mitigation. This treatment would minimize adverse effects on historic properties/historical resources. Plant species would be selected by the Contractor's interdisciplinary team of architectural historians and landscape architects based on species' mature size and shape, growth rate, appropriateness to the historic property, fire resistance, and drought tolerance. The design and recommended plant make-up of the screen would be reviewed and approved by the Authority in consultation with the MOA signatories and land owner or land-owning agency. No species that is listed on the Invasive Species Council of California's list of invasive species would be planted. The Contractor would arrange to have the landscaping continuously maintained for a period specified in the plan and appropriate irrigation systems would be installed if the landscape architect determines it is needed. The plan would define the terms of replacement should the plants die.	Construction/ post-construction	Reporting	Annual	Authority	Authority	Post-construction/ annual reporting	BETP photographic documentation/ visual screening plan	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities Impact CUL-4: Permanent Operations—Potential Adverse Impacts on Built Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
CUL-MM#11	Statewide Historical Interpretation Program	Prior to operation the Contractor shall provide the Authority with a cultural resources rail passenger visual and narrative electronic device application. Prior to preparing the application the Contractor shall obtain Authority approval of the application outline and content. The initial application shall be designed within a statewide context addressing the first operating segment with the ability to add future segments prior to their operation. Contractors of additional segments shall embellish the initial application and add relevant new segment cultural resource material. The cultural resources technical studies prepared to support the findings and effects identified in the environmental documents for each project section include prehistoric, Native American ethnographic, and historic contexts. The Authority is using these contexts as the foundation for a geographically referenced historical visual and narrative "application" for the total rail alignment, to be enjoyed by rail passengers through their smart phones or tablets, or other electronic devices. The MOA and BETP for each project section would identify historic themes to be developed for the application, as well as identify any properties to be specifically referenced, as agreed upon in consultation with the SHPO, MOA signatories, and consulting parties. In consultation with the Authority, the Contractor would be responsible for assembling the appropriate interdisciplinary team to synthesize the information and provide electronic files of exhibits found in the cultural resources studies that may be used for such a program. The required professionals and their qualifications would be specified in the BETP, as would the number, type, and format of required exhibits. Bibliographies for the technical documents may be used as a tool to locate additional visual material for the application. In the gathering of visual materials, the Contractor's team would also utilize any research, as appropriate, included in material produced for other interpretive mitigation. The contractor would ensure that all exhibits provided as recommended for use in the application be licensed or otherwise legally reproducible for such use.	Post-construction	Reporting	Annual	Contractor/ Authority	Contractor/ Authority	Post-construction/ annual reporting	BETP/ MOA	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities
Cumulative Impacts										
CUM-SO-MM#1	Coordination with Cumulative Construction Project Sponsors	During construction of the HSR project section, coordination would occur with the project sponsors or other entities, including local or regional governments, to coordinate construction schedules and potential closures, detours, and other elements of construction, to the greatest extent feasible, in order to minimize impacts on surrounding communities. Such coordination would include planning for vehicular, pedestrian, and bicycle detours; performing community outreach to ensure residents and businesses are aware of potential issues in advance; and allowing for public input and feedback in planning for construction.	Pre-Construction/ Construction	Notify and consult with departments/ agencies	Monthly	Contractor/ Authority	Contractor	Monthly, record keeping, and reporting	Meetings with departments/ agencies	Cumulative Construction Impacts to Population and Communities

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
Environmental Justice										
EJ-MM#1	EJ Community-Inclusive Process for Development of Aesthetic Treatments in Edison	The Authority shall follow its aesthetic options and aesthetic review procedures outlined in AVQ-IAMF#1 (Aesthetic Options) and AVQ-IAMF#2 (Aesthetic Review Process) for key non-station structures. In addition to seeking input from the City of Edison on aesthetic preferences and to minimize disproportionate visual or related community cohesion impacts, the Authority shall also seek input on aesthetic preferences for potential treatments from the visually impacted EJ communities residing within the EJ resource study area on Jacober Avenue and School Street in Edison. Visually impacted communities and the EJ resource study area are defined in Chapter 5 of the FEIS/FEIR.	Pre-Construction	Reporting	At incorporation or completion of design/monthly reporting during construction	Contractor	Contractor	Prepare aesthetics and aesthetics review technical memoranda	Condition of Authority's acceptance of the technical memoranda	Disproportionate visual/community cohesion impact findings described in Chapter 5 Environmental Justice, Section 5.9
EJ-MM#2	Equity Noise Analysis	Prior to Construction, the Authority's Contractor will prepare an operation noise technical report for Authority review and approval, as described in N&V-MM#6. As described in N&V MM#3, sound treatments will be proposed to impacted receptors based on the recommendations in the approved noise impact report. To minimize EJ impacts, the final technical report will include an assessment of whether remaining severe noise impacts, after application of recommended noise treatments and mitigations, may disproportionately impact EJ communities. If the report finds that disproportionate impacts may result, the Authority's contractor will prepare an additional report to assess whether any additional practicable measures may be undertaken to avoid, eliminate, or reduce the disproportionate noise impacts. The Authority will seek and consider the input of affected EJ sensitive receptors prior to finalizing the report.	Pre-Construction	Design	Prior to final design	Authority/Contractor	Authority/Contractor	Provide equity analysis in final operation noise technical report to determine if additional study or measures are needed.	Submit assessment as a part of N&V MM#3 and N&V MM#6	Disproportionate noise impact findings described in Chapter 5 Environmental Justice, Section 5.9

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Text
EJ-MM#3	EJ Relocation/Displacement Assistance	As described in SOCIO-IAMF#3 Relocation Mitigation Plan, the Authority will develop a relocation mitigation plan before any acquisitions occur, in consultation with affected cities and counties and property owners. The Plan will be designed to meet the objectives described in SOCIO-IAMF#3. To avoid or minimize disproportionate EJ impacts, the Plan will also include: (1) EJ Impact Minimization Measures: A description of measures taken or proposed to minimize adverse community cohesion effects of displacement and relocation on EJ communities, including a description of measures to relocate displacees in close proximity to their same community and an assessment of whether disproportionate effects remain after application of these measures; (2) EJ Outreach: The Authority shall seek and consider input from impacted EJ communities prior to finalizing the Authority's Plan; and (3) EJ Ombudsman: Creation of an additional ombudsman's position to address needs of EJ communities identified in Palmdale, Lancaster, and Bakersfield as disproportionately affected by displacements or relocations. The position will act as a single point of contact for property owners, residents, and tenants in EJ communities with potential disproportionate relocation impacts. EJ communities with potential disproportionate relocation impacts are geographically defined in the findings of Chapter 5 of the FEIR/FEIS.	Design/Construction	Prepare plan with identified EJ elements	Prior to acquisitions	Authority	Authority	Develop and include in relocation mitigation plan	Condition of design-build contract	Disproportionate relocation impact findings described in Chapter 5 Environmental Justice, Section 5.9

AQMD = Air Quality Management District
AVAQMD = Antelope Valley Air Quality Management District
APE = Area of Potential Effect
ATP = Archaeological Treatment Plan
Authority = California High-Speed Rail Authority
BETP = built environment treatment plan
BLM = Bureau of Land Management
BMP = best management practice
BRMP = biological resources management plan
CCR = California Code of Regulations
C.F.R. = Code of Federal Regulations
CDFG = California Department of Fish and Game (former name of CDFW)
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CESA = California Endangered Species Act
CMP = Compensatory Mitigation Plan and also Bay Area AQMD's Carl Moyer Memorial Air Quality Standards Attainment Program
CPRC = California Public Resources Code
CRHR = California Register of Historical Resources
CSLC = California State Lands Commission
CWA = Clean Water Act
dBA = A-weighted decibels
DOC = Department of Conservation
EIR/EIS = environmental impact report/environmental impact statement
EKAPCD = Eastern Kern Air Pollution Control District
EMI = electromagnetic interference
EMMA = Environmental Mitigation Management and Assessment system
ESA = environmentally sensitive area
FAST = Fixing America's Surface Transportation Act
F-B = Fresno to Bakersfield Project Section
FEMA = Federal Emergency Management Agency
FESA = Federal Endangered Species Act
FR = Federal Register
FRA = Federal Railroad Administration
GIS = geographic information system
HAER = Historic American Engineering Record
HABS = Historic American Building Survey
HALS = Historic American Landscape Survey
HSR = high-speed rail
LGA = locally generated alternative
MLA = most likely descendant
MOA = memorandum of agreement
MOU = memorandum of understanding
mph = miles per hour
MRI = magnetic resonance imaging
NEPA = National Environmental Policy Act
NPDES = National Pollutant Discharge Elimination System
NRHP = National Register of Historic Places
O_x = nitrogen oxides
PA = Programmatic Agreement
PCT = Pacific Coast Trail
PI = Principal Investigator
PM = particulate matter
RF = radio frequency
RFQ = requests for qualifications
RRP = Restoration and Revegetation Plan
ROD = record of decision
RWQCB = Regional Water Quality Control Board
SHPO = State Historic Preservation Officer
SHTAC = Swainson's Hawk Technical Advisory Committee
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
SOI = Secretary of the Interior
SOIS = Secretary of the Interior's Standards
SOQ = Statement of Qualification
SR = State Route
SWRCB = State Water Resources Control Board
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency
USFWS = U.S. Fish and Wildlife Service
VERA = Voluntary Emission Reduction Agreement
VCP = Vegetation Control Plan
VOC = volatile organic compounds
WCP = Weed Control Plan
WEAP = worker environmental awareness program
WEF = wildlife exclusion fencing

Table 3 Bakersfield to Palmdale Project Section: Impact Avoidance and Minimization Features

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Air Quality and Global Climate Change										
AQ-IAMF#1	Fugitive Dust Emissions	During construction, the Contractor shall employ the following measures to minimize and control fugitive dust emissions. The Contractor shall prepare a fugitive dust control plan for each distinct construction segment. At a minimum, the plan shall describe how each measure would be employed and identify an individual responsible for ensuring implementation. At a minimum, the plan shall address the following components unless alternative measures are approved by the applicable air quality management district. • Cover all vehicle loads transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed. • Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site. • Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting of the top 1 inch of soil but avoiding overland flow. Rain events may result in adequate wetting of top 1 inch of soil thereby alleviating the need to manually apply water. • Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph). • Suspend any dust-generating activities when average wind speed exceeds 25 mph. • Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover, to control fugitive dust emissions effectively. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression. • Stabilize all on-site unpaved roads and off-site unpaved access roads, using water or a chemical stabilizer/suppressant, to effectively control fugitive dust emissions. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression. • Carry out watering or presoaking for all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities. • For buildings up to 6 stories in height, wet all exterior surfaces of buildings during demolition. • Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper. • After the addition of materials to or the removal of materials from surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant.	Construction	Prepare plan/ Reporting	Weekly	Contractor	Contractor	Prepare a fugitive dust control plan	Condition of design-build contract	Impact AQ #1: Regional Air Quality Impacts during Construction Impact AQ #2: Compliance with Air Quality Plans during Construction Impact AQ #18: Cumulative Impacts during Operation Impact AVQ #1: Temporary Impacts Associated with Construction Staging, Equipment, Lighting, and Spoils Impact S&S #5: Temporary Exposure to Valley Fever Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO#16: Temporary Effects on Children's Health and Safety from Construction Impact LU #1: Potential for Construction to Temporarily Alter Existing Land Use Patterns

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
AQ-IAMF#2	Selection of Coatings	During construction, the Contractor shall use: • Low-volatile organic compound (VOC) paint that contains less than 10 percent of VOC contents (VOC, 10%). • Super-compliant or Clean Air paint that has a lower VOC content than that required by San Joaquin Valley Unified Air Pollution Control District Rule 4601, Eastern Kern Air Pollution Control District Rule 410, and Antelope Valley Air Quality Management District Rule 1113, when available. If not available, the Contractor shall document lack of availability, recommend alternative measure(s) to comply with Rule 4601, 410, and 1113, or disclose absence of measure(s) for full compliance and obtain concurrence from the Authority.	Construction	Low VOC-paint use	Monthly	Contractor	Contractor	Use of low-VOC paint during construction	Condition of design-build contract	Impact AQ #2: Compliance with Air Quality Plans during Construction Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO#16: Temporary Effects on Children's Health and Safety from Construction Impact LU #1: Potential for Construction to Temporarily Alter Existing Land Use Patterns
AQ-IAMF#3	Renewable Diesel	During construction, the Contractor would use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks. Renewable diesel must meet the most recent ASTM D975 specification for Ultra Low Sulfur Diesel and have a carbon intensity no greater than 50% of diesel with the lowest carbon intensity among petroleum fuels sold in California. The Contractor would provide the Authority with monthly and annual reports, through the Environmental Mitigation Management and Application (EMMA) system, of renewable diesel purchase records and equipment and vehicle fuel consumption. Exemptions to use traditional diesel can be made where renewable diesel is not available from suppliers within 200 miles of the project site. The construction contract must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand.	Construction	Renewable diesel fuel use	Monthly	Contractor	Contractor	Use of renewable diesel fuel during construction	Contract requirements and specifications	Impact AQ #1: Regional Air Quality Impacts during Construction Impact AQ #3: Greenhouse Gas Emissions during Construction
AQ-IAMF#4	Reduce Criteria Exhaust Emissions from Construction Equipment	Prior to issuance of construction contracts, the Authority would incorporate the following construction equipment exhaust emissions requirements into the contract specifications: 1. All heavy-duty off-road construction diesel equipment used during the construction phase would meet Tier 4 engine requirements. 2. A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit would be made available to the Authority at the time of mobilization of each piece of equipment. 3. The contractor would keep a written record (supported by equipment-hour meters where available) of equipment usage during project construction for each piece of equipment. 4. The contractor would provide the Authority with monthly reports of equipment operating hours (through the Environmental Mitigation Management and Assessment [EMMA] system) and annual reports documenting compliance.	Pre-construction	Contract specifications	Prior to construction	Authority	Authority	Exhaust emissions requirements incorporated into contract specifications	Contract requirements and specifications	Impact AQ #1: Regional Air Quality Impacts during Construction Impact AQ #2: Compliance with Air Quality Plans during Construction Impact AQ #8: Cumulative Impacts during Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
AQ-IAMF#5	Reduce Criteria Exhaust Emissions from On-Road Construction Equipment	Prior to issuance of construction contracts, the Authority would incorporate the following material hauling truck fleet mix requirements into the contract specifications: 1. All on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, would consist of a fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in the CARB's EMFAC 2014 database. 2. The contractor would provide documentation to the Authority of efforts to secure such a fleet mix. 3. The contractor would keep a written record of equipment usage during project construction for each piece of equipment and provide the Authority with monthly reports of VMT (through EMMA) and annual reports documenting compliance.	Pre-construction	Contract specifications	Prior to construction	Authority	Authority	Material hauling truck fleet mix requirements incorporated into contract specifications	Contract requirements and specifications	Impact AQ #1: Regional Air Quality Impacts during Construction Impact AQ #2: Compliance with Air Quality Plans during Construction Impact AQ #8: Cumulative Impacts during Construction
AQ-IAMF#6	Reduce the Potential Impact of Concrete Batch Plants	Prior to construction of any concrete batch plant, the contractor would provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures. Concrete batch plants would be sited at least 1,000 feet from sensitive receptors, including places such as daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant would implement typical control measures to reduce fugitive dust such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems, and other suitable technology, to reduce emissions to be equivalent to the USEPA AP-42 controlled emission factors for concrete batch plants. The contractor would provide to the Authority documentation that each batch plant meets this standard during operation.	Construction	Prepare plan/ Reporting	Prior to construction of concrete batch plants	Contractor	Contractor	Preparation of a concrete batch plant technical memorandum	Contract requirements and specifications	Impact AQ #2: Compliance with Air Quality Plans during Construction Impact AQ #7: Localized Air Quality Impacts from Concrete Batch Plants Impact AQ #18: Cumulative Impacts during Operation
Noise and Vibration										
NV-IAMF#1	Noise and Vibration	Prior to construction, the contractor shall prepare and submit to the Authority a noise and vibration technical memorandum documenting how the FTA and FRA guidelines for minimizing construction noise and vibration impacts would be employed when work is being conducted within 1,000 feet of sensitive receptors. Typical construction practices contained in the FTA and FRA guidelines for minimizing construction noise and vibration impacts include the following: • Construct sound barriers, such as temporary walls or piles on excavated material, between noisy activities and noise sensitive resources. • Route truck traffic away from residential streets, when possible. • Construct walled enclosures around especially noisy activities or around clusters of noisy equipment. • Combine noisy operations so that they occur in the same period. • Phase demolition, earthmoving, and ground-impacting operations so as not to occur in the same time period. • Avoid impact pile driving where possible in vibration sensitive areas.	Pre-construction/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor	Prepare a construction noise and vibration technical memorandum	Condition of design-build contract	Impact N&V #1: Construction Noise Impact N&V #2: Construction Vibration Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact LU #1: Potential for Construction to Temporarily Alter Existing Land Use Patterns

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Electromagnetic Interference and Electromagnetic Fields										
EMF/EMI-IAMF#1	Preventing Interference with Adjacent Railroads	*Technical Memorandum 3.00.10. Implementation Stage Electromagnetic Compatibility Program Plan* requires coordination with adjacent railroads. During Project Design, the Contractor would work with the engineering departments of railroads that operate parallel the HSR system to apply standard design practices to prevent interference with the electronic equipment operated by these railroads. Prior to Operation and Maintenance of each operating segment, the Contractor shall certify through issuance of a technical memorandum to the Authority that design provisions to prevent interference have been established and have been determined to be effective prior to the activation of potentially interfering systems of the HSR. The contractor would work with the railroad engineering departments where these railways parallel the HSR to apply the standard design practices to prevent interference with the electronic equipment operated by these railroads. Design provisions to prevent interference would be put in place and determined to be adequately effective by a qualified electrical engineering professional prior to the HSR activation of potentially interfering systems. The Authority's Design Criteria Manual Chapter 26 summarizes the applicable EMI/EMF design standards that the Authority would use for the project.	Design/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor/ Authority	Prepare electromagnetic compatibility technical memorandum	Condition of design-build contract	Impact EMI/EMF #1—Impacts During Construction Impact EMI/EMF #9—Effects on Adjacent Existing Rail Lines
EMF/EMI-IAMF#2	Controlling Electromagnetic Fields/ Electromagnetic Interference	Prior to construction, the contractor would prepare an EMI/EMF technical memorandum for review and approval by the Authority. The California HSR project shall adhere to international guidelines and comply with applicable federal and state laws and regulations. The HSR project design would follow Technical Memorandum 300.10, Implementation Stage Electromagnetic Compatibility Program Plan, the HSR Design Criteria Manual Chapter 26, which provides detailed electromagnetic compatibility (EMC) design criteria for the HSR systems and equipment, and HSR Design Criteria Manual Chapter 22, which addresses grounding requirements for third-party metallic structures, including fences and pipelines, which are parallel and adjacent to the California HSR System right-of-way. These documents describe the design practices to avoid EMI and to provide for HSR operational safety. Some measures of the ISEP include: • During the planning stage through system design, the Authority would perform EMC/EMI safety analyses, which would include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems. • Pipelines and other linear metallic objects that are not sufficiently grounded through the direct contact with earth would be separately grounded in coordination with the affected owner or utility to avoid possible shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures would be implemented. • HSR standard corrosion protection measures would be implemented to eliminate risk of substantial corrosion of nearby metal objects.	Design/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor/ Authority	Prepare EMI/EMF technical memorandum	Condition of design-build contract	Impact EMI/EMF #3—People with Implanted Medical Devices and Exposure to Electromagnetic Fields Impact EMI/EMF #5—Effects on Sensitive Equipment from Electromagnetic Interference Impact EMI/EMF #6—Electromagnetic Interference Effects on Schools Impact EMI/EMF #7—Potential for Corrosion of Underground Pipelines and Cables and Adjoining Rail Impact EMI/EMF #8—Potential for Nuisance Shocks Impact EMI/EMF #10—Wind Farm Electromagnetic Interference Effects Impact EMI/EMF #10—Wind Farm Electromagnetic Interference Effects

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Public Utilities and Energy										
PUE-IAMF#1	Design Measures	The HSR project design incorporates utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Thus, the project would not overburden utility services. The design elements are included in the design-build contract. Additionally, the Authority has adopted a sustainability policy that establishes project design and construction requirements that avoid and minimize impacts.	Design/ Construction	Reporting	At incorporation or completion of design/monthly reporting (during construction)	Contractor	Contractor	Incorporation of utilities and design elements that minimize electrical consumption into design	Condition of design-build contract	Impact PU&E #16: Construction Energy Consumption Impact PU&E #17: Operational Energy Demand
PUE-IAMF#2	Irrigation Facility Relocation	Where relocating an irrigation facility is necessary, the Contractor would verify the new facility is operational prior to disconnecting the original facility, where feasible. Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. The Contractor shall document all relocations in a memorandum for Authority review and approval.	Design/ Pre-construction	Reporting	Monthly	Contractor	Contractor	Verify new irrigation facilities are operational prior to disconnecting original facility	Condition of design-build contract	Impact PU&E #6: Conflicts with Existing Utilities
PUE-IAMF#3	Public Notifications	Prior to construction in areas where utility service interruptions are unavoidable, the Contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. The Contractor would submit the public communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.	Pre-construction/ Construction	Public notification	Monthly	Contractor	Contractor	Public notification of utility service interruptions 60 days in advance of work for verification	Condition of design-build contract	Impact AG #3: Temporary Utility and Infrastructure Disruption Impact PU&E #1: Planned Temporary Interruption of Utility Service Impact PU&E #2: Accidental Disruption of Services Impact PU&E #8: Effects from Upgrade or Construction of Power Lines
PUE-IAMF#4	Utilities and Energy	Prior to construction, the Contractor shall prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions. It would include upgrades of existing power lines to connect the HSR system to existing utility substations. The technical memorandum shall be provided to the Authority for review and approval.	Design/ Pre-construction	Prepare a technical memorandum	At incorporation or completion of design/monthly reporting (during construction)	Contractor	Contractor	Prepare service provider coordination technical memorandum	Condition of design-build contract	Impact AG #3: Temporary Utility and Infrastructure Disruption Impact PU&E #1: Planned Temporary Interruption of Utility Service Impact PU&E #2: Accidental Disruption of Services

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Biological and Aquatic Resources										
BIO-IAMF#1	Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	At least 15 business days prior to commencement of any ground-disturbing activity (including but not limited to geotechnical investigations, utility realignments, creation of staging areas, or initial clearing and grubbing), the Authority will submit the name(s) and qualifications of project biologists, designated biologists, species-specific biological monitors, and general biological monitors retained to conduct biological resource monitoring activities and implement avoidance and minimization measures. No ground-disturbing activity would begin until the Authority has received written approval from the USFWS, the NMFS, where applicable, and the CDFW that the biologists and monitors have been approved to conduct the specified work. The project biologist is responsible for ensuring the timely implementation of the biological avoidance and minimization measures, as outlined in the Biological Resources Management Plan (BRMP), and for guiding and directing the work of the designated biologists and Biological Monitors. Designated biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. In some instances, designated biologists will only be approved for specific species, in which case they will only be authorized to conduct surveys and implement measures for the species for which they have been approved. Species-specific biological monitors will be responsible for implementation of species-specific measures for the species for which they have been approved and will report directly to a designated biologist. General biological monitors will report directly to a designated biologist or to the project biologist. General biological monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting general compliance monitoring, and reporting on compliance monitoring activities. The term “project biologist” is used in these IAMFs to mean the project biologist, designated biologists, species-specific biological monitors, and general biological monitors, as appropriate. When the Authority is specified as implementing an IAMF, it is assumed that the Authority, or its contractor or agent, is implementing the IAMF under the supervision of biologists and biological monitors, as appropriate.	Pre-construction	Compliance reporting	15-days prior to ground disturbance	Authority	Authority	Submit names of biologists and monitors to regulatory agencies	EMMA	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees
BIO-IAMF#2	Facilitate Agency Access	Throughout the construction period, the Authority will allow access by the USFWS, NMFS, USACE, CDFW, and SWRCB to the project site. Because of safety concerns, all visitors will check in with the Authority’s resident engineer prior to entering the project footprint. In the event that agency personnel visit the project footprint, the project biologist will prepare a memorandum within 3 business days after the visit documenting the issues raised during the field meeting. The project biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.	Construction	Compliance reporting	3 days after regulatory agency site visit	Contractor	Contractor	Prepare memorandum documenting agency site visit	Condition of design-build contract	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-IAMF#3	Prepare Worker Environmental Awareness Program (WEAP) Training Materials and Conduct Construction Period WEAP Training	Prior to any ground-disturbing activity, the project biologist will prepare a WEAP for the purpose of training construction crews to recognize and identify sensitive biological resources that may be encountered in the project vicinity. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the project biologist and approved by the Authority may be used if the project biologist is not available to present the training in person. At a minimum, WEAP training materials will include the following information: key provisions of FESA, CESA, the Bald and Golden Eagle Protection Act (BGEPA), the MBTA, Cal. Fish and Game Code 1600, Porter-Cologne, and the CWA; the consequences and penalties for violation of or noncompliance with these laws, regulations, and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities, and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures. The project biologist will present WEAP training to all construction personnel before they work in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the project biologist, travel within the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information will be prepared by the project biologist for distribution to the construction crews and others who enter the project footprint. Fact sheet information will be duplicated in a wallet-sized format and will be provided in other languages as necessary to accommodate non-English-speaking workers. All construction staff will attend the WEAP training prior to beginning work on-site and will attend the WEAP training on an annual basis thereafter. Upon completion of the WEAP training, each member of the construction crew will sign a form stating that they attended the training, understand the information presented, and agree to comply with the requirements set out in the WEAP training. The project biologist will submit the signed WEAP training forms to the Authority on a monthly basis. On an annual basis, the Authority will certify that WEAP training has been provided to all construction personnel. On a monthly basis, the project biologist will provide updates relevant to the training to construction personnel during the daily safety ("tailgate") meeting.	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor/ Authority	Contractor/ Authority	Prepare WEAP/Annual (training)/ monthly (reporting)	WEAP	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-IAMF#4	Conduct Operation and Maintenance Period Worker Environmental Awareness Program (WEAP) Training	Prior to initiating operation and maintenance (O&M) activities, O&M personnel will attend a WEAP training session arranged by the Authority. At a minimum, O&M WEAP training materials will include the following information: key provisions of FESA, CESA, the BGEPA, the MBTA, Porter-Cologne, and the CWA; the consequences and penalties for violation of/noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the biological resources management plan, annual vegetation, and management plan, weed control plan, and security fencing and wildlife exclusion fencing maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority's environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority's environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.	Post-construction	Training program/ Reporting	Annual	Contractor/ Authority	Contractor/ Authority	WEAP Training/Annual reporting	WEAP	Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact BIO #10: Operation Impacts on Aquatic Resources Impact BIO #11: Operation Impacts on Wildlife Movement Impact BIO #12: Operation Impacts on Protected Trees
BIO-IAMF#5	Prepare and Implement a Biological Resources Management Plan	Prior to any ground-disturbing activity, the project biologist will prepare the BRMP, which would include a compilation of the biological resources avoidance and minimization measures applicable to the HSR section. All project environmental plans, such as the Restoration and Revegetation Plan (RPP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. The BRMP is intended to serve as a comprehensive document that sets out the range of avoidance and minimization measures to support the appropriate and timely implementation of those measures. The implementation of these measures will be tracked through the final design, construction, and operation phases. The BRMP will contain, but not be limited to, the following information: • A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources. • Specific measures for the protection of special-status species. • Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored. • Identification of agency-approved project biologists(s) and biological monitors(s), including those responsible for notification and report of injury or death of federally or State-listed species. • Measures to preserve topsoil and control erosion. • Design of protective fencing around environmentally sensitive areas (ESA) and the construction staging areas. • Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.	Pre-construction	Prepare plan	Prior to any ground-disturbing activity	Contractor	Contractor	Prepare BRMP	USFWS, USACE, SWRCB, and CDFW permits	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas. • Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements. • Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts to special-status species habitat compared to pre-construction impact estimates. The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.								
BIO-IAMF#6	Establish Monofilament Restrictions	Prior to any ground-disturbing activity, the project biologist will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control activities. The project biologist will identify acceptable material for such use, including: geomembranes, coconut coir matting, tackified hydroseeding compounds, and rice straw wattles (e.g., Earthsaver™ wattles: biodegradable, photodegradable, burlap). Within developed or urban areas, the project biologist may allow exceptions to the restrictions on the type of erosion control material if the project biologist determines that the construction area is of sufficient distance from natural areas to ensure the avoidance of potential impacts on wildlife.	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees
BIO-IAMF#7	Prevent Entrapment in Construction Materials and Excavations	At the end of each work day during construction, the Authority will cover all excavated, steep-sided holes or trenches more than 8 inches deep and that have sidewalls steeper than 1:1 (45-degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The Project Biologist will thoroughly inspect holes and trenches for trapped animals at the start and end of each work day. The Authority will screen, cover, or elevate at least 1 foot above ground all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight within the project footprint. These pipes, culverts, and similar structures will be inspected by the Project Biologist for wildlife before such material is moved, buried, or capped.	Construction	Monitoring/ Compliance reporting	Daily monitoring/ Monthly reporting	Contractor	Contractor	Daily monitoring/ monthly reporting	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-IAMF#8	Delineate Equipment Staging Areas and Traffic Routes	Prior to any ground-disturbing activity, the Authority will establish staging areas for construction equipment in areas that minimize effects on sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be located in areas that would be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Authority will flag and mark access routes to ensure that vehicle traffic within the project footprint is restricted to established roads, construction areas, and other designated areas.	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
BIO-IAMF#9	Dispose of Construction Spoils and Waste	During ground-disturbing activities, the Authority may temporarily store excavated materials produced by construction activities in areas at or near construction sites within the project footprint. Where practicable, the Authority will return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse will be disposed at an off-site location, in conformance with applicable State and federal laws.	Construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
BIO-IAMF#10	Clean Construction Equipment	Prior to any ground-disturbing activity, the Authority will ensure that all equipment entering the Work Area is free of mud and plant materials. The Authority will establish vehicle cleaning locations designed to isolate and contain organic materials and minimize opportunities for weeds and invasive species to move in and out of the project footprint. Cleaning may be done by washing with water, blowing with compressed air, brushing, or other hand cleaning. The cleaning areas will be located so as to avoid impacts on surface waters and appropriate Stormwater Pollution Prevention Plan (SWPPP) best management practices (BMP) will be implemented so as to further control any potential for the spread of weeds or other invasive species. Cleaning stations will be inspected regularly (at least monthly).	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees
BIO-IAMF#11	Maintain Construction Sites	Prior to any ground-disturbing activity, the Authority will prepare a construction site BMP field manual. The manual will contain standard construction site housekeeping practices required to be implemented by construction personnel. The manual will identify BMPs for the following topics: temporary soil stabilization, temporary sediment control, wind erosion control, non-stormwater management, waste management and materials control, rodenticide use, and other general construction site cleanliness measures. All construction personnel will receive training on BMP field manual implementation prior to working within the project footprint. All personnel will acknowledge, in writing, their understanding of the BMP field manual implementation requirements. The BMP field manual will be updated by January 31 of each year. The Authority will provide, on an annual basis, training updates to all construction personnel.	Pre-construction	Reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact HWR #3: Temporary Construction Impacts to Surface Water Quality

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-IAMF#12	Design the Project to be Bird Safe	Prior to final construction design, the Authority will ensure that the catenary system, masts, and other structures such as fencing are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006) and Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012). Applicable APLIC recommendations include, but are not limited to: • Ensuring sufficient spacing of phase conductors to prevent bird electrocution • Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible • Marking lines and fences (e.g. Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement. • Installing perch guards to discourage avian presence on and near project facilities • Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers). • Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks • Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning (USFWS 2018). • Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas. • Ensuring poles do not have openings that could entrap birds; including sealing or capping all openings in poles or providing for escape routes (e.g., openings accommodating escape for various species). • Designing aerial structures (e.g., viaducts and bridges) and tunnel portals to discourage birds and bats from roosting in expansion joints or other crevices. • Insulated wire or tree wire will be used for all electrical conduits to increase visibility of wires. Additional bird operational actions would be required for dry lakes and playas, Audubon Important Bird Areas and documented avian movement corridors. These measures include:	Pre-construction	Design	Prior to final design	Authority	Authority	Bird and raptor-safe design catenary system, masts, and other structures such as fencing	Condition of design-build contract	Impact BIO#2: Construction Impacts on Special-Status Wildlife Species

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions. • Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water. • Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of on-coming trains.								
WM-IAMF#1	Impediments to Movement	During ground-disturbing activities, the Contractor will keep wildlife crossing structures, land above tunnels, and other movement areas, as free possible of equipment, storage materials, construction materials, and other potential impediments. Before ground-disturbing activities, the Contractor will submit a construction avoidance and minimization plan for potential wildlife movement areas to the Project Biologist for concurrence. For the purposes of this section, “potential wildlife movement areas” include all lands dominated by native vegetation that are outside the final project footprint, where the final project footprint includes all fenced facilities and permanent cut and full slopes.	Pre-construction/ Construction	Monitoring/ reporting	Monthly	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Submit construction avoidance and minimization plan; keep wildlife crossing structures free of impediments	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement
WM-IAMF#2	Night Lighting	Contractors will minimize nighttime construction and keep night lighting (e.g., for security) from spilling into potential wildlife movement areas. If night work is required, lighting will avoid illuminating natural lands through directional lighting and shielding. Most terrestrial mammals that move at night will avoid areas with artificial night lighting (Rich and Longcore 2006). Artificial night lighting can impair the ability of nocturnal animals to navigate through areas (Beier 2006) and has been implicated in decline of reptile populations (Perry and Fisher 2006)	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Nighttime lighting shall be focused, shielded, and directed away from wildlife movement areas	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement
WM-IAMF#3	Noise	The Authority will monitor construction noise to verify compliance with FRA noise limits (FRA 2005). The Contractor can meet the FRA construction noise limits in the most efficient and cost-effective manner. The Contractor would have the flexibility of either prohibiting certain noise-generating activities during nighttime hours or providing additional noise control measures to meet the noise limits. To meet required noise limits, the following noise control minimization measures will be implemented as necessary, during both daytime and nighttime hours, in all potential wildlife movement areas: • Install a temporary construction site sound barrier near a noise source. • Avoid nighttime construction. • Locate stationary construction equipment as far as possible from potential wildlife movement areas, especially areas intended to become part of permanent wildlife crossing structures. • Re-route construction-related truck traffic along roadways that will cause the least disturbance to wildlife. • Use low-noise equipment. • Implement noise-deadening measures for truck loading and operations. • Monitor and maintain equipment to meet noise limits. • Line or cover storage bins, conveyors, and chutes with sound-deadening material.	Construction	Monitoring	Monthly	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Monitor construction noise to verify compliance, implement noise control measures in wildlife movement areas	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Use acoustic enclosures, shields, or shrouds for equipment and facilities. • Use high-grade engine exhaust silencers and engine-casing sound insulation. • Prohibit aboveground jackhammering and impact pile driving during nighttime hours. • Minimize the use of generators to power equipment. • Limit use of public address systems. • Use moveable sound barriers at the source of the construction activity. • Limit or avoid certain noisy activities during nighttime hours. • When possible, use an auger to install piles instead of a pile driver. If pile driving is necessary, limit the time of day the activity can occur to minimize effects on wildlife movement.								
WM-IAMF#4	Wildlife Exclusion Fencing	The Contractor will use wildlife-proof fencing to separate construction zones from natural habitats and agriculture. Exclusion barriers (e.g., silt fences) will be installed at the edge of the construction footprint. The design specifications of the exclusion fencing will be determined through consultation with the USFWS and/or the CDFW.	Pre-construction/ construction	Design/ surveying/ monitoring/ reporting	Monthly or as established by agency permit requirements	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Install wildlife-specific exclusion barriers/ reporting to document compliance	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement
WM-IAMF#5	Vehicle Traffic	Prior to any ground-disturbing activities, the Contractor will obtain confirmation from the Project Biologist that appropriate best management practices are in place to restrict project vehicle traffic within the construction area to established roads, construction areas, and other designated areas. The Contractor will establish vehicle traffic in locations disturbed by previous activities to prevent further adverse ground-disturbing effects, require observance of a 15 mph speed limit for construction areas in known or potential wildlife movement areas (adjacent to natural habitats) or areas with potential special-status species habitat, clearly flag and mark access routes, and prohibit off-road traffic. The Project Biologist will submit a memorandum to the Mitigation Manager and Authority to document compliance with this measure on a monthly basis.	Construction	Surveying/ monitoring/ reporting	Weekly reporting	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Contractor/ Project Biologist/ Mitigation Manager	Restrict project vehicle traffic/ weekly reporting to document compliance	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement
WM-IAMF#6	Restoration and Revegetation Plan for Wildlife Movement Corridors	Prior to any ground-disturbing activity, the Contractor's Project Biologist will prepare a Restoration and Revegetation Plan for ground-disturbances within areas within natural areas and agriculture that could provide movement corridors for wildlife. The Restoration and Revegetation Plan will also include: • Steps to remove temporary roads in a way that will discourage public access, • Steps to remove temporary fences and construction facilities, • Steps to remove construction debris and fill piles and restore natural soil profile and semi- natural grade, • Steps to restore hydrology, • Steps to restore natural vegetation using seed stock, cuttings and plants salvaged from the construction footprint, • Steps to monitor success of restoration efforts and follow up with additional treatments as needed.	Pre-construction	Prepare plan	Prior to construction/ monthly reporting	Project Biologist	Contractor/ Project Biologist	Prepare and implement Restoration and Revegetation Plan	Condition of design-build contract	Impact BIO #5: Construction Impacts on Wildlife Movement

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Hydrology and Water Resources										
HYD-IAMF#1	Stormwater Management	Prior to construction, the contractor shall prepare a stormwater management and treatment plan for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff would be evaluated. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, would be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority Technical Memorandum *2.6.5 Hydraulics and Hydrology Guidelines*. On-site stormwater management facilities would be designed and constructed to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques would be used to detain runoff on site and to reduce off site runoff such as constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, would be used where appropriate.	Design/	Prepare plan	At incorporation or completion of design	Contractor	Contractor	Prepare a stormwater management and treatment plan	Condition of design-build contract	Impact HWR #6: Permanent Operation Impacts to Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity Impact HWR #7: Permanent Operation Impacts to Surface Water Quality Impact HWR #8: Permanent Operation Impacts to Groundwater Volume, Quality, and Recharge Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #10: Operation Impacts on Aquatic Resources Impact PU&E #6: Conflicts with Existing Utilities Impact PU&E #13: Effects on Storm Drain Facilities
HYD-IAMF#2	Flood Protection	Prior to construction, the contractor shall prepare a flood protection plan for Authority review and approval. The project would be designed both to remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards will include the following: • Establish track elevation to prevent saturation and infiltration of stormwater into the sub-ballast. • Minimize development within the floodplain, to such an extent that water surface elevation in the floodplain would not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow [as applicable to locale]. Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation. • Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself would not increase existing 100-year floodwater surface elevations in Federal Emergency Management Agency-designated floodways, or as otherwise agreed upon with the county floodplains manager. The following design standards would minimize the effects of pier placement on floodplains and floodways:	Design	Prepare plan	At incorporation or completion of design	Contractor	Contractor	Prepare flood protection plan	Condition of design-build contract	Impact HWR #5: Permanent Operation Impacts to Floodplains and Floodways Impact BIO #1: Construction Impacts on Special-Status Plant Species Impact BIO#2: Construction Impacts on Special-Status Wildlife Species Impact BIO #3: Construction Impacts on Special-Status Plant Communities Impact BIO #4: Construction Impacts on Aquatic Resources Impact BIO #5: Construction Impacts on Wildlife Movement Impact BIO #6: Construction Impacts on Protected Trees Impact BIO #7: Operational Impacts on Special-Status Plant Species Impact BIO #8: Operational Impacts on Special-Status Wildlife Species Impact BIO #9: Operation Impacts on Special-Status Plant Communities Impact BIO #10: Operation Impacts on

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		• Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length. • Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance. • Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies. • Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential. • Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complimented with native riparian plantings or other natural stabilization alternatives that would restore and maintain a natural riparian corridor. • Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream flow velocity.								Aquatic Resources Impact BIO #11: Operation Impacts on Wildlife Movement Impact BIO #12: Operation Impacts on Protected Trees
HYD-IAMF#3	Prepare and Implement a Construction Stormwater Pollution Prevention Plan	Although the project is not required to obtain coverage under the SWRCB Construction General Permit, prior to construction (any ground-disturbing activities), the contractor shall comply with the SWRCB Construction General Permit requiring preparation and implementation of a SWPPP. The Construction SWPPP would propose BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs would include measures to incorporate permeable surfaces into facility design plans where feasible, and how treated stormwater would be retained or detained on site. Other BMPs shall include strategies to manage the amount and quality of overall stormwater runoff. The Construction SWPPP would include measures to address, but are not limited to, the following: • Hydromodification management to verify maintenance of pre-project hydrology by emphasizing on-site retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation (supplemented by detention where required). Additional flow control measures would be implemented where local regulations or drainage requirements dictate. • Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater. • Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition. • Implementing practices to reduce erosion of exposed soil, including soil stabilization, regular watering for dust control, perimeter siltation fences, and sediment catchment basins. • Implementing practices to maintain current water quality, including siltation fencing, wattle barriers, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, storage tanks, and sediment traps to arrest and settle sediment.	Pre-construction/ Construction	Permit compliance	At incorporation or completion of design/during monthly construction report	Contractor	Contractor	Prepare construction SWPPP	Condition of design-build contract	Impact HWR #1: Temporary Construction Impacts to Floodplains and Floodways Impact HWR #2: Temporary Construction Impacts to Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity Impact HWR #3: Temporary Construction Impacts to Surface Water Quality Impact HWR #4: Temporary Construction Impacts to Groundwater Volume, Quality, and Recharge Impact PU&E #4: Effects from Stormwater during Construction Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes. • Using diversion ditches to intercept surface runoff from off-site. • Where feasible, limiting construction to dry periods when flows in waterbodies are low or absent. • Implementing practices to capture and provide proper off-site disposal of concrete wash water, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatments (e.g., dry ice). • Developing and implementing a spill prevention and emergency response plan to handle potential fuel and/or hazardous material spills. Implementation of a SWPPP would be performed by the construction contractor as directed by the contractor's Qualified SWPPP Practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before, during and after storm events. Records of these inspections and monitoring results will be maintained by the construction contractor.								
HYD-IAMF#4	Prepare and Implement an Industrial Stormwater Pollution Prevention Plan	Prior to construction of any facility classified as an industrial facility, the contractor shall comply with existing water quality regulations. The stormwater general permit requires preparation of a SWPPP**Error! Bookmark not defined.** and a monitoring plan for industrial facilities that discharge stormwater from the site, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control.	Design/ Operation	Permit compliance	At incorporation or completion of design/during monthly operation report	Contractor	Contractor	Prepare operational SWPPP	Condition of design-build contract	Impact HWR #6: Permanent Operation Impacts to Drainage Patterns, Stormwater Runoff and Hydraulic Capacity Impact HWR #7: Permanent Operation Impacts to Surface Water Quality

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Geologic, Soils, Seismicity, and Paleontological Resources										
GEO-IAMF#1	Geologic Hazards	Prior to construction, the Contractor shall prepare a Construction Management Plan (CMP) addressing how the Contractor would address geologic constraints and minimize or avoid impacts on geologic hazards during construction. The plan would be submitted to the Authority for review and approval. At a minimum, the plan would address the following geological and geotechnical constraints/resources: a. Groundwater Withdrawal — Controlling the amount of groundwater withdrawal from the project, by re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section. b. Unstable Soils — Employing various methods to mitigate for the risk of ground failure from unstable soils. If soft or loose soils are encountered at shallow depths, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing, or jet-grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures. c. Subsidence — The Authority addresses subsidence in its design and construction processes. For the initial design, survey monuments were installed to establish a datum and set an initial track profile. In the construction phase, the design-build contractors for track bed preparation would conduct topographic surveys for preparation of final design. Because subsidence could have occurred since the original benchmarks (survey monuments) were established, the design-build contractor's topographic surveys would be used to help determine whether subsidence has occurred. The updated topographic surveys would also be used to establish the top of rail elevations for final design where the HSR system is outside established floodplain areas and above water surface elevations. Where the HSR system is in floodplain areas susceptible to flooding, consideration would be given to overbuild the height of the rail bed in anticipation of future subsidence. d. Water and Wind Erosion — The Contractor would implement erosion control methods as appropriate from the various erosion control methods documented in the Construction SWPPP (see HYD-IAMF#3), the Caltrans Construction Manuals, and the construction technical memorandum (see GEO-IAMF#6), and in coordination with other erosion, sediment, stormwater management and fugitive dust control efforts. Water and wind erosion control methods may include, but are not limited to, use of revegetation, stabilizers, mulches, and biodegradable geotextiles.	Design/ Construction	Prepare plan	At incorporation or completion of design/during monthly construction report	Contractor	Contractor	Prepare Construction Management Plan (CMP)	Condition of design-build contract	Impact GSS #1—Encountering Unstable Soils During Construction Impact Impact GSS #2—Soil Settlement at Structures or Along Trackway During Construction Impact GSS #3—Soil Erosion During Construction Impact GSS #4—Difficult Excavations Due to Bedrock and Hardpan During Construction Impact GSS #8—Effects of Unstable Soils During Operations Impact GSS #9—Effects of Soil Settlement During Operations Impact GSS #10—Effects of Moderate to High Shrink-Swell Potential During Operations Impact GSS #11—Effects of Moderately to Highly Corrosive Soils During Operations Impact GSS #12—Effects of Slope Failure During Operations HWR #4: Temporary Construction Impacts to Groundwater Volume, Quality, and Recharge

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		e. Soils with Shrink-Swell Potential — In locations where shrink-swell potential is marginally unacceptable, soil additives would be mixed with existing soil to reduce the shrink-swell potential. Construction specifications would be based upon the decision whether to remove or treat the soil. This decision is based on the soils, specific shrink-swell characteristics, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil. f. Soils with Corrosive Potential — In locations where soils have a potential to be corrosive to steel and concrete, the soils would be removed and buried structures would be designed for corrosive conditions, and corrosion-protected materials would be used in infrastructure.								
GEO-IAMF#2	Slope Monitoring	During O&M, the Authority shall incorporate slope monitoring by a Registered Engineering Geologist into the Operations and Maintenance procedures. The procedures shall be implemented at sites identified in the Construction Management Plan (CMP) where a potential for long-term instability exists from gravity or seismic loading including but not limited to at-grade sections where slope failure could result in loss of track support or where slope failure could result in additional earth loading to foundations supporting elevated structures.	Operation	Prepare plan/ Monitoring	Monthly during operation	Contractor	Contractor	Slope monitoring during operation	Condition of design-build contract	Impact GSS #12—Effects of Slope Failure During Operations Impact GSS #13—Effects of Seismicity during Operations Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources
GEO-IAMF#3	Gas Monitoring	Prior to Construction, the Contractor shall prepare a CMP addressing how gas monitoring would be incorporated into construction best management practices. The CMP would be submitted to the Authority for review and approval. Hazards related to potential migration of hazardous gases due to the presence of known oil and gas fields, areas of active or historic landfills, or other subsurface sources can be reduced or eliminated by following strict federal and state Occupational Safety & Health Administration (OSHA/Cal-OSHA) regulatory requirements for excavations, and by consulting with other agencies as appropriate, such as the Department of Conservation (Division of Oil and Gas) and the California Environmental Protection Agency, Department of Toxic Substances Control, regarding known areas of concern.	Design/ Construction	Prepare plan/ Design	Prior to construction	Contractor	Contractor	Preparation of a Construction Management Plan	Condition of design-build contract	Impact GSS #5—Potential Exposure to Hazardous Gas During Construction
GEO-IAMF#4	Historic or Abandoned Mines	Prior to Construction, the Contractor shall prepare a CMP addressing how historic and abandoned mines would be incorporated into construction BMPs. The CMP would be submitted to the Authority for review and approval. Depending on the properties of an individual mine, mitigations to address historic or abandoned mines could include: • Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Cleanup. Environmental cleanups at sites that are releasing or threatening to release hazardous substances such as heavy metals from acid mine drainage. • Non-CERCLA Cleanup. Cleanups of non-hazardous substance-related surface disturbance such as revegetation of disturbed areas, stabilization of mine tailings, reconstruction of stream channels and floodplains. • Safety Mitigation. Mitigation of physical safety hazards such as closure of adits and shafts and removal of dangerous structures.	Design/ Construction	Prepare plan/ Design	Prior to construction	Contractor	Contractor	Preparation of a Construction Management Plan	Condition of design-build contract	Impact GSS #6—Potential Encounters with Abandoned Mines During Construction

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GEO-IAMF#5	Hazardous Materials	Prior to Construction, the Contractor shall prepare a CMP addressing how the contractor would minimize or avoid impacts related to hazardous minerals (i.e., radon, mercury, and naturally occurring asbestos [NOA]) during construction. The CMP would be submitted to the Authority for review and approval. The CMP shall include appropriate provisions for handling hazardous mineral including, but not limited to, dust control, control of soil erosion and water runoff, and testing and proper disposal of excavated material.	Design/ Construction	Design/ Monitoring/ Reporting	Prior to construction	Contractor	Contractor	Preparation of a Construction Management Plan	Condition of design-build contract	Impact GSS #7—Potential Exposure to Hazardous Minerals During Construction
GEO-IAMF#6	Ground Rupture Early Warning Systems	Prior to Construction, the Contractor shall document how the project design incorporates installation of early warning systems, triggered by strong ground motion association with ground rupture. Known nearby active faults would be monitored. Linear monitoring systems, such as time domain reflectometers or similar technology, shall be installed along rail lines in the zone of potential ground rupture. These devices emit electronic information that is processed in a centralized location and would be used to temporarily control trains, thus reducing accidents due to fault creep. Damage to infrastructure from fault creep can be mitigated with routine maintenance, including minor realignment.	Design/ Construction	Design/ Monitoring	Prior to construction	Contractor	Contractor	Preparation of a Construction Management Plan	Condition of design-build contract	Impact GSS #13—Effects of Seismicity during Operations Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources
GEO-IAMF#7	Evaluate and Design for Large Seismic Ground Shaking	Prior to Construction, the Contractor shall document through preparation of a technical memorandum how all HSR components were evaluated and designed for large seismic ground shaking. Prior to final design, the Contractor would conduct additional seismic studies to establish up-to-date estimation of levels of ground motion. The most current Caltrans seismic design criteria at the time of design would be used in the design of any structures supported in or on the ground. These design procedures and features reduce to the greatest practical extent for potential movements, shear forces, and displacements that result from inertial response of the structure. In critical locations, pendulum base isolators may be used to reduce the levels of inertial forces. New composite materials may also be used to enhance seismic performance.	Design	Design/Studies	Prior to construction	Contractor/ Authority	Contractor/ Authority	At incorporation or completion of design	Seismic ground shaking design technical memorandum	Impact GSS #13—Effects of Seismicity during Operations Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources
GEO-IAMF#8	Suspension of Operations during an Earthquake	Prior to O&M activities, the Contractor shall document in a technical memorandum how suspension of operations during or after an earthquake was addressed in project design. Motion-sensing instruments to provide ground-motion data and a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake would be incorporated into final design. Monitoring equipment would be installed at select locations where high ground motions could occur. The system would then be inspected for damage due to ground motion and/or ground deformation, and then returned to service when appropriate.	Design/ Construction/ Operation	Reporting	As needed based on an earthquake event	Contractor/ Authority	Contractor/ Authority	At incorporation or completion of design/during monthly construction report	Technical memorandum prepared as needed based on an earthquake event	Impact GSS #13—Effects of Seismicity during Operations Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

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GEO-IAMF#9	Subsidence Monitoring	Prior to Operations and Maintenance, the Authority shall develop a stringent track monitoring program. Once tracks are operational, a remote monitoring program would be implemented to monitor the effects of ongoing subsidence. Track inspection systems would provide early warning of reduced track integrity. HSR train sets would be equipped with autonomous equipment for daily track surveys. This specification would be added to HSR train bid packages. If monitoring indicates that track tolerances are not met, trains would operate at reduced speed until track tolerances are restored. In addition, the contractor responsible for wayside maintenance would be required to implement a stringent program for track maintenance.	Design/ Operation	Program development	Monthly	Contractor	Contractor	Develop a stringent track monitoring program	Condition of design-build contract	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources
GEO-IAMF#10	Geology and Soils	Prior to construction, the Contractor shall document through issuance of a technical memorandum how the following guidelines and standards have been incorporated into facility design and construction: • 2015 American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Bridge Design Specifications and the 2015 AASHTO Guide Specifications for Load and Resistance Factor Seismic Bridge Design, or their most recent versions. These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications would provide minimum specifications for evaluating the seismic response of the soil and structures. • Federal Highway Administration (FHWA) Circulars and Reference Manuals: These documents provide detailed guidance on the characterization of geotechnical conditions at sites, methods for performing foundation design, and recommendations on foundation construction. These guidance documents include methods for designing retaining walls used for retained cuts and retained fills, foundations for elevated structures, and at-grade segments. Some of the documents include guidance on methods of mitigating geologic hazards that are encountered during design. • American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual: These guidelines deal with rail systems. Although they cover many of the same general topics as American Association of State Highway and Transportation Officials manuals, they are more focused on best practices for rail systems. The manual includes principles, data, specifications, plans, and economics pertaining to the engineering, design, and construction of railways. • California Building Code: The code is based on 2015 International Building Code (IBC). This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance. • International Building Code and American Society of Civil Engineers (ASCE)-7: These codes and standards provide minimum design loads for buildings and other structures. They would be used for the design of the maintenance facilities and stations. Sections in IBC and ASCE-7 provide minimum requirements for geotechnical investigations, levels of earthquake	Design/ Construction/ Operation	Design/ Reporting	At incorporation or completion of design/during monthly construction reporting	Contractor	Contractor	Prepare technical memorandum/ Implementation of guidelines during design, construction, and operation phases	Condition of design-build contract	Impact GSS #1—Encountering Unstable Soils During Construction Impact Impact GSS #2—Soil Settlement at Structures or Along Trackway During Construction Impact GSS #3—Soil Erosion During Construction Impact GSS #4—Difficult Excavations Due to Bedrock and Hardpan During Construction Impact GSS #8—Effects of Unstable Soils During Operations Impact GSS #9—Effects of Soil Settlement During Operations Impact GSS #10—Effects of Moderate to High Shrink-Swell Potential During Operations Impact GSS #12—Effects of Slope Failure During Operations Impact GSS #13—Effects of Seismicity during Operations

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		ground shaking, minimum standards for structural design, and inspection and testing requirements. • Caltrans Design Standards: Caltrans has specific minimum design and construction standards for all aspects of transportation system design, ranging from geotechnical explorations to construction practices. These amendments provide specific guidance for the design of deep foundations that are used to support elevated structures, for design of mechanically stabilized earth (MSE) walls used for retained fills, and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) and tie-back walls used for retained cuts. • Caltrans Construction Manuals: Caltrans has a number of manuals including Field Guide to Construction Dewatering, Caltrans Construction Site BMPs Manual and Construction Site BMP Field Manual and Troubleshooting Guide. These provide guidance and best management practices for dewatering options and management, erosion control and soil stabilization, non-stormwater management, and waste management at construction sites. • American Society for Testing and Materials (ASTM): ASTM has developed standards and guidelines for all types of material testing, from soil compaction testing to concrete-strength testing. The ASTM standards also include minimum performance requirements for materials.								
GEO-IAMF#11	Engage a Qualified Paleontological Resources Specialist	Prior to the 90 percent design milestone for each construction package (CP) within the Project Section, the Contractor would retain a Paleontological Resources Specialist (PRS) responsible for: • Reviewing the final design for the CP. • Developing a detailed Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the CP • The PRS would be responsible for implementing the PRMMP, including development and delivery of WEAP training, supervision of Paleontological Resource Monitors (PRMs), and evaluation and treatment of finds, if any, and preparation o f a final paleontological mitigation report, per the PRMMP and for each CP. Retention of PRS staff would occur in a timely manner, in advance of the 90 percent design milestone for each CP, such that the PRS is on board and can review the 90 percent design submittal without delay when it becomes available. If feasible, the same PRS would be responsible for all CPs within a given Project Section. All PRS staff shall meet or exceed the qualifications for a Principal Paleontologist as defined in the Caltrans current *Standard Environmental Reference*, Chapter 8 (Caltrans 2012). Appointment of PRS staff would be subject to review and approval by the Authority.	Design	Contractor would retain paleontological resources specialist	Prior 90 percent design milestone for each CP	Contractor	Contractor	Retain Paleontological Resources Specialist (PRS)	Condition of design-build contract	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

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GEO-IAMF#12	Perform Final Design Review and Triggers Evaluation	For each CP within the Project Section, the responsible PRS would evaluate the 90 percent design submittal to identify the portions of the CP that would involve work in paleontologically sensitive geologic units (either at the surface or in the subsurface), based on findings of the final Paleontological Resources Technical Report (TR) prepared for the Project Section. Evaluation would consider the location, areal extent, and anticipated depth of ground disturbance, the construction techniques that are planned/proposed, and the geology (i.e., location of geologic units with high paleontological resources) of the CP and vicinity. The evaluation and resulting recommendations would be consistent with guidance in the Society of Vertebrate Paleontology (SVP) *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP Impact Mitigation Guidelines Revision Committee 2010), *the SVP Conditions of Receivership for Paleontologic Salvage Collections* (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current *Caltrans Standard Environmental Reference* (Caltrans 2012). The purpose of the Final Design Review and Triggers Evaluation would be to develop specific language detailing the location and duration of paleontological monitoring and other requirements for paleontological resources applicable to each CP within the Project Section. Paleontological protection requirements identified through the Final Design Review and Triggers Evaluation would be recorded in a concise technical memorandum (“Final Design Review Requirements for Paleontological Resources Protection”), which would then be incorporated in full detail into the PRMMP for each CP. Those portions of the CP requiring paleontological monitoring would also be clearly delineated in the project construction documents for each CP.	Design	Reporting	Each CP	Contractor	Contractor	CP reporting	Condition of design-build contract	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
GEO-IAMF#13	Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan (PRMMP)	Following the Final Design Review and Triggers Evaluation for each CP, the PRS would develop a CP-specific PRMMP. For greater efficiency, PRMMPs may be written such that they cover more than one CP, as long as the specific requirements of the IAMFs are satisfied explicitly and in detail for each CP included. The PRMMP for each CP would incorporate the findings of the Design Review and Triggers Evaluation for that CP and would be consistent with the SVP *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP Impact Mitigation Guidelines Revision Committee 2010), the *SVP Conditions of Receivership for Paleontologic Salvage Collections* (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current *Caltrans Standard Environmental Reference* (Caltrans 2012). As such, the PRMMP would provide for at least the following: – Implementation of the PRMMP by qualified personnel, including the following positions: • Paleontological Resource Specialist: The PRS will be required to meet or exceed Principal Paleontologist Qualifications per Chapter 8 of the current Caltrans Standard Environmental Reference (Caltrans 2012). The Supervising Paleontologist may, but not necessarily, be the PRS who prepares the PRMMP. • Development of pre-construction and construction-period coordination procedures and communications protocols. • Evaluation as to whether a pre-construction survey by qualified personnel is warranted for the CP. In general, pre-construction surveys are beneficial if there is a strong possibility that significant paleontological resources (e.g., concentrations of vertebrate fossils) are exposed at the ground surface and would be destroyed during the initial clearing and grubbing phase of earthwork. Such a determination can usually be made during preparation of the paleontological resources TR. • Requirements for paleontological monitoring by qualified personnel of all ground-disturbing activities known to affect, or potentially affect, highly sensitive geologic units and for ground-disturbing activities affecting other geologic units in any areas where the PRS considers it warranted based on the findings of the Paleontological Resources TR or any pre-construction surveys. In all areas of the CP subject to monitoring, monitoring would initially be conducted full-time for all ground-disturbing activities. However, the PRMMP may provide for monitoring frequency in any given location to be reduced once approximately 50 percent of the ground-disturbing activity in locations has been completed, if the reduction is appropriate based on the implementing PRS' professional judgment in consideration of actual site conditions. • Provisions, if recommended by the PRS for paleontological monitoring of specific construction drilling operations. In general, small-diameter (i.e., less than 18 inches) drilling operations or drilling activities operations using bucket augers tend to pulverize impacted sediments and any contained fossils and are typically not monitored. The section in the PRMMP addressing monitoring program for drilling operations would rely, in part, on the information supplied by the CP design and geotechnical teams but	Design	Reporting	Each CP	Contractor	Contractor	CP reporting	Condition of design-build contract	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		would also take into consideration of the nature, depth, and location of drilling needed, and the anticipated equipment and staging configurations. • Provisions for the content development and delivery of paleontological resources Worker Environmental Awareness Program (WEAP) training. • Provisions for in-progress documentation of monitoring (and, if applicable, salvage/recovery operations) via "construction dailies" or a similar approved means. • Provisions for a "stop work, evaluate, and treat appropriately" response in the event of a known or potential paleontological discovery, including finds in highly sensitive geologic units, as well as finds, if any, in geologic units identified as less sensitive, or nonsensitive, for paleontological resources. • Provisions for sampling and recovery of unearthed fossils consistent with *SVP Standard Procedures* (SVP Impact Mitigation Guidelines Revision Committee 2010) and the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996). Recovery procedures would provide for recovery of both macrofossils and microfossils. • Provisions for acquiring a repository agreement from an approved regional repository for the curation, care, and storage of recovered materials, consistent with the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996). If more than one repository institution is designated, separate repository agreements must be provided. • Provisions for preparation of a final monitoring and mitigation report that meets the requirements of the Caltrans *Standard Environmental Reference* Chapter 8 provisions for the Paleontological Monitoring Report and Paleontological Stewardship Summary (Caltrans 2012). • Provisions for the preparation, identification, and analysis and curation of fossil specimens and data recovered, consistent with the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996) and any specific requirements of the designated repository institution(s).								
GEO-IAMF#14	Provide WEAP Training for Paleontological Resources	Prior to groundbreaking for each CP within the Project Section, the Contractor would provide paleontological resources WEAP training delivered by the PRS. All management and supervisory personnel and construction workers involved with ground-disturbing activities would be required to take this training before beginning work on the project. Refresher training would also be made available to management and supervisory personnel and workers as needed, based on the judgment of the PRS. At a minimum, paleontological resources WEAP training would include information on: • The coordination between construction staff and paleontological staff, • The construction and paleontological staff roles and responsibilities in implementing the PRMMP, • The possibility of encountering fossils during construction,	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor/ Authority	Contractor/ Authority	WEAP training	Condition of design-build contract	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• The types of fossils that may be seen and how to recognize them, and • The proper procedures in the event fossils are encountered, including the requirement to halt work in the vicinity of the find and procedures for notifying responsible parties in the event of a find. Training materials and formats may include, but are not necessarily limited to, in-person training, prerecorded videos, posters, and informational brochures that provide contacts and summarize procedures in the event paleontological resources are encountered. WEAP training contents would be subject to review and approval by the Authority. Paleontological resources WEAP training may be provided concurrently with cultural resources WEAP training. Upon completion of any WEAP training, the Contractor would require workers to sign a form stating that they attended the training and understand and would comply with the information presented. Verification of paleontological resources WEAP training will be provided to the Authority by the Contractor.								
GEO-IAMF#15	Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found	Consistent with the PRMMP, if fossil materials are discovered during construction, regardless of the individual making the discovery, all activity in the immediate vicinity of the discovery would halt and the find would be protected from further disturbance. If the discovery is made by someone other than the PRS or Paleontological Resource Monitors, the person who made the discovery would immediately notify construction supervisory personnel, who would in turn notify the PRS. Notification to the PRS would take place promptly (prior to the close of work the same day as the find), and the PRS would evaluate the find and prescribe appropriate treatment as soon as feasible. Work may continue on other portions of the CP while evaluation (and, if needed, treatment) takes place, as long as the find can be adequately protected in the judgment of the PRS. If the PRS determines that treatment (i.e., recovery and documentation) of unearthed fossil(s) is warranted, such treatment and any required reporting would proceed consistent with the PRMMP. The Contractor would be responsible for ensuring prompt and accurate implementation, subject to verification by the Authority. The stop work requirement does not apply to drilling operations because drilling typically cannot be suspended in mid-course. However, if finds are made during drilling, the same notification and other follow-up requirements would apply. The PRS would coordinate with construction supervisory and drilling staff regarding the handling of recovered fossils. The requirements of this IAMF would be detailed in the PRMMP and presented as part of the paleontological resources WEAP training.	Construction	Reporting	Daily logs during active monitoring	Contractor	Contractor	Weekly reporting (if resource is identified during construction)	PRMMP, WEAP	Impact Paleo-1: Geologic Units Sensitive to Unknown Paleontological Resources

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Hazardous Materials and Wastes										
HMW-IAMF#1	Property Acquisition Phase 1 and Phase 2 Environmental Site Assessments	During the right-of-way acquisition phase, Phase I environmental site assessments (ESA) shall be conducted in accordance with standard ASTM methodologies to characterize each parcel. The determination of parcels that require a Phase II ESA (e.g., soil, groundwater, soil vapor subsurface investigations) would be informed by a Phase I ESA and may require coordination with state and local agency officials. If the Phase II ESA concludes that the site is impacted, remediation or corrective action (e.g., removal of contamination, in-situ treatment, or soil capping) would be conducted with state and local agency officials (as necessary) and in full compliance with applicable state and federal laws and regulations.	Pre-construction/ Construction	Prepare plan	Monthly	Contractor	Contractor	Prepare Phase 1 ESA	Condition of design-build contract	Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials Impact HMW#3: Temporary Effects Due to Project Location on Potential Environmental Concern Sites or Sites on the Cortese List Impact HMW#4: Temporary Hazardous Materials and Waste Activities near Schools
HMW-IAMF#2	Work Barriers	Prior to construction (any ground-disturbing activities), the Contractor shall verify to the Authority through preparation of a technical memorandum the use of work barriers. Nominal design variances, such as the addition of a plastic barrier beneath the ballast material to limit the potential release of volatile subsurface contaminants, may be implemented in conjunction with site investigation and remediation.	Pre-construction/ Construction	Prepare technical memorandum	Monthly	Contractor	Contractor	Prepare work barrier technical memorandum	Condition of design-build contract	Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials
HMW-IAMF#3	Undocumented Contamination	Prior to construction, the Contractor shall prepare a CMP addressing provisions for the disturbance of undocumented contamination. The plan would be submitted to the Authority for review and approval. Undocumented contamination could be encountered during construction activities and the Contractor would work closely with local agencies to resolve any such encounters and address necessary clean-up or disposal. Copies of all required hazardous material documentation shall be provided within 30 days to the Authority.	Pre-construction/ Construction	Prepare plan/ Reporting	As needed	Contractor	Contractor	Prepare CMP/Reporting as needed	Condition of design-build contract	Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials Impact HMW#3: Temporary Effects Due to Project Location on Potential Environmental Concern Sites or Sites on the Cortese List
HMW-IAMF#4	Demolition Plans	Prior to Construction that involves demolition, the Contractor shall prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans would include a plan for lead and asbestos abatement and an assessment of other building materials that may contain hazardous materials, such as mercury and polychlorinated biphenyls. The plans shall be submitted to the Project Construction Manager (PCM) on behalf of the Authority for verification that appropriate demolition practices have been followed consistent with federal and state regulations regarding abatement of asbestos, lead paint, and other hazardous materials.	Pre-construction/ Construction	Prepare plan/Reporting	As needed	Contractor	Contractor	Prepare demolition plans/Reporting as needed	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials
HMW-IAMF#5	Spill Prevention	Prior to Construction (any ground disturbing activities), the Contractor shall prepare a CMP addressing spill prevention. A Spill Prevention, Control, and Countermeasure (SPCC) plan (or Soil Prevention and Response Plan if the total aboveground oil storage capacity is less than 1,320 gallons in storage containers greater than or equal to 55-gallons) shall prescribe BMPs to follow to prevent hazardous material releases and clean-up of any hazardous material releases that may occur. The plans would be prepared and submitted to the PCM on behalf of the Authority and shall be implemented during Construction.	Pre-construction/ Construction	Prepare plan/Reporting	As needed	Contractor	Contractor	Prepare CMP/Reporting as needed	Condition of design-build contract	Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
HMW-IAMF#6	Transport of Materials	During Construction, the Contractor would comply with applicable state and federal regulations, such as the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act. Prior to Construction the Contractor would provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport	Pre-construction/ Construction	Regulation compliance/ Reporting	Monthly	Contractor	Contractor	Weekly record keeping/monthly reporting	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials Impact HWR #3: Temporary Construction Impacts to Surface Water Quality Impact PU&E #15: Effects from Hazardous Waste Generation Impact SO#16: Temporary Effects on Children's Health and Safety from Construction
HMW-IAMF#7	Permit Conditions	During Construction, the Contractor would comply with the State Water Resources Control Board Construction Clean Water Act Section 402 General Permit conditions and requirements for transport, labeling, containment, cover, and other BMPs for storage of hazardous materials during construction. Prior to Construction, the Contractor shall provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs that would be implemented during Construction.	Pre-construction/ Construction	Prepare plan	Prior to construction	Contractor	Contractor	Prepare hazardous materials and waste plan	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
HMW-IAMF#8	Environmental Management System	To the extent feasible, the Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HSR system. The Authority would use an Environmental Management System to describe the process that would be used to evaluate the full inventory of hazardous materials as defined by federal and state law employed on an annual basis and would replace hazardous substances with nonhazardous materials. The Contractor shall implement the material substitution recommendation contained in the annual inventory.	Pre-construction/ Construction	Reporting	Annual	Contractor	Contractor	Annual reporting	Condition of design-build contract/EMS	Impact HMW#1: Temporary Effects from the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HMW#2: Temporary Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials Impact HMW#5: Intermittent Effects Due to the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HWR #3: Temporary Construction Impacts to Surface Water Quality
HMW-IAMF#9	Hazardous Materials Plans	Prior to Operations and Maintenance activities, the Authority shall prepare hazardous materials business plans, such as a plan defined in Title 19 California Code of Regulations or a SPCC Plan.	Post-construction	Prepare plans	Prior to operations	Authority	Authority	Prepare hazardous materials monitoring plans	Condition of design-build contract	Impact HMW#5: Intermittent Effects Due to the Routine Transport, Use, or Disposal of Hazardous Materials and Wastes Impact HMW#6: Intermittent Effects Due to Reasonably Foreseeable Upset and Accident Conditions that Involve the Release of Hazardous Materials

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Safety and Security										
S&S-IAMF#1	Construction Safety Transportation Management Plan	Prior to construction (any ground-disturbing activity), the Contractor shall prepare for submittal to the Authority a Construction Safety Transportation Management Plan. The plan would describe the Contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access. The plan would also specify the Contractor's procedures for implementing temporary road closures, including access to residences and businesses during construction, lane closures, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations. The Contractor shall prepare and submit monthly reports to the Authority documenting construction transportation plan implementation activities for compliance monitoring.	Pre-construction/ Construction	Prepare plan	Monthly	Contractor	Contractor	Prepare Construction Safety Transportation Management Plan	Condition of design-build contract	Impact S&S #2: Accidents Associated with Construction-Related Detours Impact S&S #4: Increased Response Times for Fire, Rescue, and Emergency Services from Temporary Road Closures
S&S-IAMF#2	Safety and Security Management Plan	Sixty days after receiving from the Authority a construction notice to proceed, the Contractor shall provide the Authority with a technical memorandum documenting how the following requirements, plans, programs and guidelines were considered in design, construction, and eventual operation to protect the safety and security of construction workers and users of the HSR. The Contractor shall be responsible for implementing all construction-related safety and security plans and the Authority shall be responsible for implementing all safety and security plans related to HSR operation. • Workplace worker safety is generally governed by the Occupational Health and Safety Act of 1970, which established the OSHA. OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Ca- OSHA. Under Cal-OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program. • The Authority has adopted a Safety and Security Management Plan to guide the safety and security activities, processes, and responsibilities during design, construction and implementation phases of the project to protect the safety and security of construction workers and the public. A Systems Safety Program Plan (SSPP) and a System Security Plan would be implemented prior to the start of revenue service to guide the safety and security of the operation of the HSR system. • Prior to construction, the Contractor shall provide the Authority with a Safety and Security Management Plan documenting how they would implement the Authority's safety and security requirements within their project scope. • Implement site-specific health and safety plans and site-specific security plans to establish minimum safety and security guidelines for contractors of, and visitors to, construction projects. Contractors would be required to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites. • Preparation of a Valley fever action plan that includes: (1) information on causes, preventative measures, symptoms, and	Pre-construction/ Construction	Prepare plan	Sixty days after receiving a construction notice to proceed	Contractor/ Authority	Contractor/ Authority	Prepare technical memorandum documenting compliance with safety requirements, plans, programs, and guidelines	Condition of design-build contract	Impact S&S #1: Accidents at Construction Sites Impact S&S #5: Temporary Exposure to Valley Fever

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		treatments for Valley fever to individuals who could potentially be exposed through construction activities (i.e., construction workers, monitors, managers, and support personnel); (2) continued outreach and coordination with California Department of Public Health; (3) coordination with county departments of public health to ensure that the above-referenced information concerning Valley fever is readily available to nearby residents, schools, and businesses and to obtain area information about Valley fever outbreaks and hotspots; and (4) provide a qualified person dedicated to overseeing implementation of the Valley fever prevention measures to encourage a culture of safety of the contractors and subcontractors. The Valley Fever Health and Safety designee shall coordinate with the county Public Health Officer and oversee and manage the implementation of Valley Fever control measures. The designee is responsible for ensuring the implementation of measures in coordination with the county Public Health Officer. Medical information would be maintained following applicable and appropriate confidentiality protections. The Valley Fever Health and Safety designee, in coordination with the county Public Health Officer, would determine what measures would be added to the requirements for the Safety and Security Management Plan regarding preventive measures to avoid Valley fever exposure. Measures shall include, but are not limited to, the following: (1) train workers and supervisors on how to recognize symptoms of illness and ways to minimize exposure, such as washing hands at the end of shifts; (2) provide washing facilities nearby for washing at the end of shifts; (3) provide vehicles with enclosed, air conditioned cabs and make sure workers keep the windows closed; (4) equip heavy equipment cabs with high-efficiency particulate air (HEPA) filters; and (5) make NIOSH-approved respiratory protection with particulate filters as recommended by the California Department of Public Health available to workers who request them. • System safety program plans incorporate FRA requirements and are implemented upon Authority approval. FRA's Systems Safety Program Plans requirements would be determined in FRA's new System Safety Regulation (49 C.F.R. 270). • Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules and practices, passenger safety, emergency response, and passenger equipment safety standards found in 49 C.F.R. Parts 200-299. • The *HSR Urban Design Guidelines* [Authority 2011b]) require implementing the principles of crime prevention through environmental design. The contractor shall consider four basic principles of crime prevention through environmental design during station design and site planning: (1) territoriality (design physical elements that express ownership of the station or site); (2) natural surveillance (arrange physical features to maximize visibility); (3) improved sightlines (provide clear views of surrounding areas); and (4) access control (provide physical guidance for people coming and going from a space). The HSR design includes emergency access to the rail right-of-way, and elevated HSR structure design includes emergency egress points.								

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Implement fire/life safety and security programs that promote fire and life safety and security in system design, construction, and implementation. The fire and life safety program is coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority would establish fire/life safety and security committees throughout the HSR section. • Implement system security plans that address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. A dedicated police force would ensure that the security needs of the HSR system are met. • The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at-grade sections and the provision of appropriate space as defined by fire and safety codes along at-grade sections of the alignment to allow for emergency response access. • Implement standard operating procedures and emergency operating procedures, such as the FRA-mandated Roadway Worker Protection Program to address the day-to-day operation and emergency situations that would maintain the safety of employees, passengers, and the public.								
S&S-IAMF#3	Hazard Analyses	The Authority's hazard management program includes the identification of hazards, assessment of associated risk, and application of control measures (mitigation) to reduce the risk to an acceptable level. Hazard assessment includes a preliminary hazard analysis and threat and vulnerability assessment. • The Authority's programmatic preliminary hazard analyses are developed in conformance with the FRA's *Collison Hazard Analysis Guide: Commuter and Intercity Passenger Service* (FRA 2007) and the U.S. Department of Defense's *System Safety Program Plan* (MIL-STD-882) to identify and determine the facility hazards and vulnerabilities so that they can be addressed—and either eliminated or minimized—by the design. • Threat and vulnerability assessments establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions. • During design and construction, the Contractor would conduct site-specific preliminary hazard analysis and threat and vulnerability assessments to apply the programmatic work to their specific project designs. The Authority's safety and security committees would be responsible for implementing the recommendations contained in the hazard analysis during HSR operation.	Pre-construction/ Construction	Reporting	Monthly	Authority	Authority	Monthly reporting	Condition of design-build contract	Impact S&S #14: Hazards to the High-Speed Rail from Nearby Facilities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
S&S-IAMF#4	Oil and Gas Wells	Prior to ground-disturbing activities, the Contractor shall identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks. Any active wells would be abandoned and relocated by the Contractor in accordance with the California Department of Conservation, Division of Oil, and Gas and Geothermal Resources (DOGGR) standards in coordination with the well owners. In the event that relocated wells do not attain the current production rates of the now-abandoned active wells, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HSR tracks would be inspected and re-abandoned, as necessary, in accordance with DOGGR standards and in coordination with the well owner. The Contractor would provide the Authority with documentation that the identification and inspection of the wells has occurred prior to construction.	Pre-construction	Regulatory Compliance/ Reporting	Monthly	Authority	Authority	Compliance with DOGGR standards/ Monthly reporting	Condition of design-build contract	Impact S&S #1: Accidents at Construction Sites Impact PU&E #9: Potential Conflicts with Oil Wells Impact HMW#3: Temporary Effects Due to Project Location on Potential Environmental Concern Sites or Sites on the Cortese List
Socioeconomics and Communities										
SOCIO-IAMF#1	Construction Management Plan	Prior to construction, the Contractor shall prepare a CMP providing measures that minimize impacts on low-income households and minority populations. The plan shall be submitted to the Authority for review and approval. The plan would include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on low-income households and minority populations. The plan would verify that property access is maintained for local businesses, residences, and emergency services. This plan would include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to businesses during construction. In addition, the plan would include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities.	Design/ Construction	Prepare plan	At incorporation or completion of design/monthly reporting (during construction)	Contractor	Contractor	Prepare CMP	Condition of design-build contract	Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO#16: Temporary Effects on Children's Health and Safety from Construction Impact TR #1: Temporary Road Closures during Construction
SOCIO-IAMF#2	Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act	The Authority must comply with the Uniform Act. The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of "just compensation." The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency's intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties. The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.	Design/ Construction/ Operation	Reporting and meeting with interested parties	Monthly	Authority	Authority	Comply with Uniform Act/Monthly reporting and record keeping	Compliance with acts, creation of ombudsman office and reporting	Impact SO#2: Permanent Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO#4: Permanent Displacement and Relocation of Local Residents from Construction Impact SO#5: Permanent Displacement and Relocation of Local Businesses from Construction Impact SO#7: Permanent Displacement and Relocation of Community Facilities from Construction Impact SO#10: Permanent Changes in School District Funding from Construction Impact SO#13: Permanent Property and Sales Tax Revenue Losses from Construction Impact SO#16: Temporary Effects on Children's Health and Safety from Construction Impact SO#20: Permanent Changes in

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		The California Relocation Assistance Act essentially mirrors the Uniform Act and also provides for consistent and fair treatment of property owners. However, because the Project would receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property would not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the "fair market value," where the property value is considered to be the highest price that would be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure Section 1263.320a). More detailed information about how the Authority plans to comply with the Uniform Act and the California Relocation Assistance Act is provided in the following three detailed relocation assistance documents modeled after Caltrans versions: • Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential) • Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home) • Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program								School District Funding from Operation Impact LU #2: Potential for Construction to Permanently Alter Existing Land Use Patterns Impact TR #3: Permanent Road Closures during Operation Impact PU&E #10: Potential Conflicts with Renewable Energy Facilities
SOCIO-IAMF#3	Relocation Mitigation Plan	Before any acquisitions occur, the Authority would develop a relocation mitigation plan, in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, relocation mitigation plan would be written in a style that also enables it to be used as a public-information document. The relocation mitigation plan would be designed to meet the following objectives: • Provide affected property and business owners and tenants a high level of individualized assistance in situations when acquisition is necessary and the property owner desires to relocate the existing land use. • Coordinate relocation activities with other agencies acquiring property resulting in displacements in the study area to provide for all displaced persons and businesses to receive fair and consistent relocation benefits. • Make a best effort to minimize the permanent closure of businesses and nonprofit agencies as a result of property acquisition. • Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation. • In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property.	Design/ Construction	Prepare plan	Prior to acquisitions	Authority	Authority	Develop relocation mitigation plan	Condition of design-build contract	Impact SO#2: Permanent Disruption to Community Cohesion or Division of Existing Communities from Project Construction Impact SO#4: Permanent Displacement and Relocation of Local Residents from Construction Impact SO#5: Permanent Displacement and Relocation of Local Businesses from Construction Impact SO#7: Permanent Displacement and Relocation of Community Facilities from Construction Impact SO#10: Permanent Changes in School District Funding from Construction Impact SO#13: Permanent Property and Sales Tax Revenue Losses from Construction Impact SO#14: Potential for Permanent Physical Deterioration from Construction Impact SO#20: Permanent Changes in School District Funding from Operation Impact LU #2: Potential for Construction to Permanently Alter Existing Land Use

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		• Provide those business owners who require complex permitting with regulatory compliance assistance. The relocation mitigation plan would include the following components: • A description of the appraisal, acquisition, and relocation process as well as a description of the activities of the appraisal and relocation specialists. • A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis. • Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research areas for relocation. • Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman would also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents.								Patterns Impact PU&E #10: Potential Conflicts with Renewable Energy Facilities
Station Planning, Land Use, and Development										
LU-IAMF#1	HSR Station Area Development General Principals and Guidelines	Prior to Operation and Maintenance, the Authority shall prepare a memorandum for each station describing how the Authority's station area development principles and guidelines are applied to achieve the anticipated benefits of station area development. Refer to HSR Station Area Development: General Principles and Guidelines, February 3, 2011 [Authority 2011c]	Post-construction	Reporting	For each station	Authority	Authority	Authority would prepare a technical memorandum for each station	Condition of design-build contract	Impact LU #2: Potential for Construction to Permanently Alter Existing Land Use Patterns
LU-IAMF#2	Station Area and Local Agency Coordination	Prior to Operation and Maintenance, the Authority shall prepare a memorandum for each station describing the local agency coordination and station area planning conducted to prepare the station area for HSR operations. Refer to HSR Station Area Development: General Principles and Guidelines, February 3, 2011 [Authority 2011c].	Post-construction	Reporting	For each station	Authority	Authority	Authority would prepare a technical memorandum for each station	Condition of design-build contract	Impact LU #2: Potential for Construction to Permanently Alter Existing Land Use Patterns Impact LU #3: Permanent Conversion of Existing and Planned Land Uses to Transportation Use
LU-IAMF#3	Restoration of Land Used Temporarily During Construction	Prior to any ground disturbing activities at the site of land to be used temporarily during construction, the Contractor shall prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation and successful achievement of restoration for temporary impacts. Before beginning construction use of land, the Contractor shall submit the restoration plan to the Authority for review and obtain Authority approval. The restoration plan shall include time-stamped photo documentation of the pre-construction conditions of all temporary staging areas. All construction access, mobilization, material laydown, and staging areas would be returned to a condition equal to the pre-construction staging condition. This requirement is included in the design-build construction contract requirements.	Pre-construction	Prepare restoration plan	Prior to construction	Contractor	Contractor	Contractor would prepare a restoration plan	Condition of design-build contract	Impact LU #1: Potential for Construction to Temporarily Alter Existing Land Use Patterns Impact LU #3: Permanent Conversion of Existing and Planned Land Uses to Transportation Use Impact PK #1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Agricultural Farmland and Forest Land										
AG-IAMF#1	Restoration of Important Farmland Used for Temporary Staging Areas	Prior to any ground-disturbing activities at the site of a temporary construction staging area located on Important Farmland, the contractor shall prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation, and successful achievement of restoration for temporary impacts. Actions shall include removing and stockpiling the top 18 inches of soil for replacement on-site during restoration activities. Before beginning construction use of sites on Important Farmland, the contractor shall submit the restoration plan to the Authority for review and obtain Authority (and if applicable, the landowner) approval. The restoration plan shall include time-stamped photo documentation of the pre-construction conditions of all temporary staging areas. All construction access, mobilization, material laydown, and staging areas on Important Farmlands would be returned to a condition equal to the pre-construction staging condition. This requirement is included in the design-build construction contract requirements.	Pre-construction	Reporting	At incorporation or completion of design	Contractor	Contractor	Prepare restoration plan	Condition of design-build contract	Impact AG #1: Temporary Use of Important Farmland Impact AG #2: Temporary Use of Important Farmland under Williamson Act Contracts
AG-IAMF#3	Farmland Consolidation Program	The Authority would establish and administer a farmland consolidation program to sell remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. In addition, the program would assist the owners of remnant parcels in selling those remnants to adjacent landowners, upon request. The goal of the program is to provide for continued agricultural use on the maximum feasible amount of remnant parcels that otherwise may not be economic to farm. The program would focus on severed remainder parcels, including those that were under Williamson Act or Farmland Security Act contract at the time of right-of-way acquisition and have become too small to remain in the local Williamson Act or Farmland Security Act program. The program would assist landowners in obtaining lot line adjustments where appropriate to incorporate remnant parcels into a larger parcel that is consistent with size requirements under the local government regulations. The program will operate for a minimum of 5 years after construction of the project section is completed. The Authority shall document implementation of this measure through issuance of a compliance memorandum, after the minimum operation period of 5 years has elapsed. The document shall be filed with Environmental Mitigation Management and Assessment System.	Operation	Establish program	Program would operate for a minimum of 5 years after construction of the project section is completed	Authority	Authority	Establish farmland consolidation program	Condition of design-build contract	Impact AG #6: Creation of Remnant Parcels of Important Farmland Impact SO#21: Permanent Agricultural Access Impact and Road Closures form Operation
AG-IAMF#4	Notification to Agricultural Property Owners	Prior to the start of any construction activity adjacent to farmland, the Authority shall provide written notification to agricultural property owners or leaseholders immediately adjacent to the disturbance limits for the HSR project section. The notification is to indicate the intent to begin construction, including an estimated date for the start of construction. In order to provide agricultural property owners or leaseholders sufficient lead time to make any changes to their operations due to project section construction, this notification shall be provided at least 3 months, but no more than 12 months, prior to the start of construction activity	Pre-construction	Public notification	Monthly	Authority	Authority	Notification to adjacent property owners and leaseholders at least 3 months, but no more than 12 months, prior to the start of construction activity	Condition of design-build contract	Impact AG #3: Temporary Utility and Infrastructure Disruption

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
AG-IAMF#5	Temporary Livestock and Equipment Crossings	Prior to the start of any construction activity adjacent to any farmland, the Authority shall coordinate with agricultural property owners or leaseholders to provide temporary livestock and equipment crossings to minimize impacts to livestock movement, as well as routine operations and normal business activities, during project construction.	Pre-construction	Public coordination/ Project design	Monthly	Authority	Authority	Coordination with agricultural property owners and leaseholders, design of livestock and equipment crossings	Condition of design-build contract	Impact AG #3: Temporary Utility and Infrastructure Disruption
AG-IAMF#6	Equipment Crossings	During final design, and in coordination with the property owners of land in use for agricultural operations, the Authority shall finalize the realignments of any affected access roads to provide equipment crossings to minimize impediments to routine agricultural operations and normal business activities that may result from long-term project operation.	Final design	Public coordination	Monthly	Authority	Authority	Coordination with agricultural property owners and leaseholders, design of agricultural access road realignments	Condition of design-build contract	Impact AG #6: Creation of Remnant Parcels of Important Farmland Impact SO#21: Permanent Agricultural Access Impact and Road Closures form Operation
Parks, Recreation and Open Space										
PK-IAMF#1	Parks, Recreation, and Open Space	Prior to construction, the Contractor shall prepare and submit to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks, recreation, and open space. Typical design measures to avoid or minimize impacts on parks and recreation may include: • Provide safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to existing park and recreation facilities. • Design guideway, system, and station features in such a way as to enhance the surrounding local communities. Provide easy crossings of the guideway which allows for community use under the guideway or at station areas.	Pre-construction	Reporting	At incorporation or completion of design/monthly reporting during construction	Contractor	Contractor	Prepare technical memorandum that documents project design features that minimize impacts to park, recreation, and open space	Condition of design-build contract	Impact PK #1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours
Aesthetics and Visual Quality										
AVQ-IAMF#1	Aesthetic Options	Prior to construction, the Contractor shall document, through issue of a technical memorandum, how the Authority's aesthetic guidelines have been employed to minimize visual impacts. The Authority seeks to balance providing a consistent, project-wide aesthetic with the local context for the numerous HSR non-station structures across the state. Examples of aesthetic options would be provided to local jurisdictions that can be applied to nonstandard structures in the HSR system. Refer to *Aesthetic Options for Non-Station Structures,* 2011.	Pre-construction	Reporting	At incorporation or completion of design/monthly reporting during construction	Contractor	Contractor	Prepare aesthetics technical memorandum	Condition of design-build contract	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure Impact SO#17: Permanent Disruption to Community Cohesion or Division of Existing Communities from Project Operation Impact LU #5: Potential for Operations to Permanently Conflict with Existing Land Uses

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
AVQ-IAMF#2	Aesthetics Review Process	Prior to construction, the Contractor shall document that the Authority's aesthetic review process has been followed to guide the development of non-station area structures. Documentation shall be through issuance of a technical memorandum to the Authority. The Authority would identify key non-station structures recommended for aesthetic treatment, consult with local jurisdictions on how best to involve the community in the process, solicit input from local jurisdictions on their aesthetic preferences, and evaluate aesthetic preferences for potential cost, schedule, and operational impacts. The Authority would also evaluate compatibility with project-wide aesthetic goals, include recommended aesthetic approaches in the construction procurement documents, and work with the Contractor and local jurisdictions to review designs and local aesthetic preferences and incorporate them into final design and construction. Refer to *Aesthetic Review Process for Non-Station Structures,* 2014.	Pre-construction	Reporting	At incorporation or completion of design/monthly reporting during construction	Contractor	Contractor	Prepare aesthetics review process technical memorandum	Condition of design-build contract	Impact AVQ #3: Permanent Impacts Related to Construction of a Large High-Speed Rail Structure Impact SO#17: Permanent Disruption to Community Cohesion or Division of Existing Communities from Project Operation
Cultural Resources										
CUL-IAMF#1	Geospatial Data Layer and Archaeological Sensitivity Map	Prior to Construction (any ground disturbing activities) and staging of materials and equipment, the Contractor's archaeologist or geoarchaeologist shall prepare a geospatial data layer identifying the locations of all known archaeological resources and built historic resources that require avoidance or protection, and areas of archaeological sensitivity that require monitoring within the area of potential effect (APE). The Contractor's archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards provided in 36 Code of Federal Regulations (CFR) Part 61, is to use, as appropriate, a combination of the following: known locations of archaeological sites and built historic properties, tribal consultation, landforms, depositional processes, distance to water, mapping provided in the Archaeological Treatment Plan, or historic mapping. This mapping is to be updated as the design progresses if it results in an expansion of the area of ground disturbance/APE, including temporary construction easements and new laydown and access areas. This mapping would be used to develop an archaeological monitoring plan to be prepared by the Contractor's archaeologist, and upon approval by the Authority, implemented by the Contractor's archaeologist. When design is sufficiently advanced, a geospatial data layer would be produced by the Contractor overlaying the locations of all known archaeological resources and built historic resources within the APE, for which avoidance measures are necessary, and all archaeologically sensitive areas, for which monitoring is required.	Design/Pre-construction	Prepare plan	At incorporation or completion of design	Contractor's archaeologist or geoarchaeologist	Authority	Prepare geospatial data layer	Condition of design-build contract	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
CUL-IAMF#2	Worker Environmental Awareness Program (WEAP) Training Session	Prior to Construction (any ground disturbing activity) construction contractor personnel who work on site would attend a WEAP training session provided by the Contractor. The WEAP would include cultural resources awareness training performed by the Contractor's archaeologist who meets the Secretary of the Interior's Professional Qualification Standards provided in 36 CFR Part 61. The Contractor would develop instructional materials and a fact sheet for distribution to the construction crews, and submit the materials, as well as qualifications of the personnel providing the training, to the Authority for approval at least 15 days prior to being permitted onsite access. The training would address measures required to avoid or protect built historic resources, educate crews on artifacts and archaeological features they may encounter and the mandatory procedures to follow should potential cultural resources be exposed during construction. Translation services shall be provided by the Contractor for non-English speaking participants. The training sessions shall be given prior to the initiation of any ground disturbance activities and repeated on an annual basis. Additionally, new construction crewmembers shall attend an initial WEAP training session prior to working on site. On completion of the WEAP training, construction crews would sign a form stating that they attended the training, understood the information presented, and would comply with the WEAP requirements. The Contractor's archaeologist would submit the signed WEAP training forms to the Mitigation Manager on a monthly basis. On an annual basis, the Contractor would provide the Authority with a letter indicating that regular WEAP training has been implemented and would provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the Contractor's archaeologist would provide updates and synopsis of the training to workers during the daily safety ("tailgate") meeting. Construction crews would be informed during the WEAP training that, to the extent possible, travel within the marked project site would be restricted to established roadbeds.	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor	Contractor	WEAP training	Condition of design-build contract	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
CUL-IAMF#3	Preconstruction Cultural Resource Surveys	Prior to Construction (any ground disturbing activities in areas not yet surveyed) and the staging of materials and equipment, the Contractor shall conduct pre-construction cultural resource surveys. Resulting from lack of legal access, much of the construction footprint may not have been surveyed. Once parcels are accessible the Contractor would have archaeologists or architectural historians, as appropriate, who meet the Secretary of the Interior professional qualification standards survey and complete reporting in appropriate document for archaeology and / or built resources, in accordance with documentation requirements stipulated in the Programmatic Agreement. Identified resources shall be evaluated for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The qualified archaeologist or architectural historian, as appropriate, would assess the potential to affect to historic properties (NRHP) by applying the effects criteria in 36 CFR Part 800.5(a)(1), and the potential of significant impacts to historical resources (CRHR) by applying the criteria in California Environmental Quality Act (CEQA) Guidelines 15064.5(b). Should the Authority determine, in consultation with the State Historic Preservation Office (SHPO), that any newly identified historic properties or historical resources would be adversely affected, the Built Environment Treatment Plan or Archeological Treatment Plan, as appropriate, would be amended, to document mitigation measures agreed upon by the MOA signatories. The schedule of these surveys would be dependent on the timing of obtaining legal access to the properties and may be driven by the need to complete construction-related activities, e.g., geotechnical borings, laydown yards, etc. Prior to beginning surveys, updated records searches may be required by the Authority, depending on the length of the passage of time, to validate that accurate information was obtained regarding previous inventory and evaluation efforts. The Contractor's archaeologist, in consultation with the Authority, would determine if an updated records search is required. If an updated records search is necessary, the search shall be performed by the Contractor's archaeologist.	Pre-construction	Conduct pre-construction surveys; Identify historic and/or cultural resources	Surveys conducted prior to ground disturbance	Contractor	Contractor	Cultural resource surveys conducted prior to ground disturbance	Condition of design-build contract	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities
CUL-IAMF#4	Relocation of Project Features when Possible	Changing the rail alignment to avoid newly discovered sites is likely infeasible; however, access areas and laydown sites may be relocated should their proposed location be found to be on archaeological sites or have the potential to affect historic built resources in the vicinity. The contractor would delineate all avoidance and protection measures for identified archaeological and built resources on construction drawings.	Construction	Relocation of access areas and laydown sites	As needed	Contractor	Contractor	Relocation access areas and laydown sites as needed to avoid archeological or historic built resources	Condition of design-build contract	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
CUL-IAMF#5	Archaeological Monitoring Plan and Implementation	Prior to construction the Contractor's professionally qualified archaeologist, as defined in the Programmatic Agreement, would prepare a monitoring plan based on the results of geospatial data layer and archaeological sensitivity map. The plan is to be reviewed and approved by the Authority prior to any ground-disturbing activities. During Construction (any ground disturbing activities) or staging of materials or equipment, the Contractor would be responsible for implementing the monitoring plan and providing archaeological and tribal monitoring of ground-disturbing construction activities with a potential to affect archaeological remains in areas identified as archaeologically sensitive in the Archaeological Treatment Plan. The Contractor shall obtain Authority approval of all persons providing archaeological or tribal monitoring.	Pre-construction/ Construction	Prepare and implement monitoring plan	Prior to construction (prepare plan)/ During construction (implement plan)	Contractor	Contractor	Prepare archaeological monitoring plan	Condition of design-build contract	Impact CUL-1: Permanent Construction-Period Potential Adverse Impacts on Archaeological Resources Due to Construction Activities
CUL-IAMF#6	Preconstruction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage	Prior to Construction (any ground disturbing activities that are within 1,000 feet of a historic built property) the Contractor may be required to assess the condition of construction-adjacent historic properties, and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage. The MOA and Built Environment Treatment Plan (BETP) would stipulate for which properties the plan is to be prepared. MOA signatories and consulting parties may comment on the adequacy of the assessments. Protection measures would be developed in consultation with the landowner or land-owning agencies as well as the SHPO and the MOA signatories and consulting parties, as required by the Programmatic Agreement. As the design progresses, additional properties may be identified by the Authority as requiring this plan. The plan shall record existing conditions in order to (1) establish a baseline against which to compare the property's post-project condition, (2) to identify structural deficiencies that make the property vulnerable to project construction related damage, such as vibration, and (3) to identify stabilization or other measures required to avoid or minimize inadvertent adverse effects. The plan would be further described in the BETP and be prepared by an interdisciplinary team, including (but not limited to) as appropriate, an architectural historian, architect, photographer, structural engineer, and acoustical engineer. Ambient conditions would be used to identify buildings that are sensitive receptors to construction-related vibration and require vibration monitoring during construction activities. Additional protective measures may be required if the property is vacant during construction. The plan content shall be outlined in the BETP and is to be completed and approved by the Authority, with protective measures implemented before construction begins within 1,000 feet of the subject building. The plan shall describe the protocols for documenting inadvertent damage (should it occur), as well as notification, coordination, and reporting to the SHPO, MOA signatories, and the owner of the historic property. The plan shall direct that inadvertent damage to historic properties shall be repaired in accordance with the Secretary of the Interior's (SOI) Standards for the Treatment of Historic Properties (U.S. Department of the Interior, 1995). The plan shall be developed in coordination with the Authority, and shall be submitted to the SHPO for review and approval. Protective plans would be required for buildings that would be moved as part of the project mitigation, including stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.	Pre-construction	Conduct assessment and protection plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Assess the condition of construction-adjacent historic properties and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage	MOA/PA/BETP	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
CUL-IAMF#7	Built Environment Monitoring Plan	Prior to Construction (any ground disturbing activities within 1,000 feet of a historic property or resource) the Contractor shall prepare a Built Environment Monitoring Plan (BEMP). Draft and final BEMP's would be prepared describing the properties that would require monitoring, the type of activities or resources that would require full-time monitoring or spot checks, the required number of monitors for each construction activity, and the parameters that would influence the level of effort for monitoring. Maximum vibration level thresholds may be established in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage the monitoring of which would be included in this monitoring plan. The BETP would outline the process for corrective action should the protection measures prove ineffective. Consultation procedures would also be defined in the BETP. The Contractor shall develop both the draft and final plans in coordination with the Authority, and shall be submitted to the SHPO for review and approval. The plan would be implemented prior to any ground-disturbing activities within 1,000 feet of properties identified as requiring monitoring, as specified in the BETP.	Pre-construction	Prepare monitoring plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Prepare a Built Environment Monitoring Plan (BEMP).	BETP	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities
CUL-IAMF#8	Implement Protection and/or Stabilization Measures	Implement the plan described in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage and in the Built Environment Treatment Plan. Such protection measures would include, but would not be limited to, vibration monitoring of construction in the vicinity of historic properties; cordoning off of resources from construction activities (e.g., traffic, equipment storage, personnel); shielding of resources from dust or debris; and stabilization of buildings adjacent to construction. Temporary stabilization and protection measures would be removed after construction is complete, and the historic properties would be restored to their preconstruction condition. For buildings that would be moved, treatment would include stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.	Pre-construction	Implement protection and/or stabilization measures	Per BETP	Contractor	Contractor	Implement historic built resource protection measures per BETP	BETP	Impact CUL-2: Permanent Construction-Period Potential Adverse Impacts on Built Resources due to Construction Activities
Transportation										
TR-IAMF#1	Protection of Public Roadways during Construction	Prior to Construction, the Contractor shall provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the proposed project site and implement post-project remedial pavement preservation work that is needed to restore the affected roadways to their pre-project Pavement Management index conditions. The photographic survey shall be submitted for approval to the agency responsible for road maintenance and the Authority. The Contractor shall be responsible for the repair of any structural damage to public roadways caused by HSR construction or construction access, returning any damaged sections to the equivalent of their original pre HSR construction structural condition or better. The Contractor shall survey the condition of the public roadways along truck routes providing access to the proposed project site after construction is complete. The Contractor shall complete a before- and after-survey report and submit it to the Authority for review, indicating the location and extent of any damage.	Pre-construction/ Post-construction	Survey/ Reporting	Immediately prior to and immediately following construction, and during construction as needed.	Contractor	Contractor	Provide a photographic survey	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction Impact TR #4: Circulation and Emergency Access during Operation

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
TR-IAMF#2	Construction Transportation Plan	The design-build contractor shall prepare a detailed Construction Transportation Plan (CTP) for the purpose of minimizing the impact of construction and construction traffic on adjoining and nearby roadways in close consultation with the local jurisdiction having authority over the site. The Authority must review and approve the CTP before the Contractor commences any construction activities. This plan would address, in detail, the activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The CTP would provide traffic controls pursuant to the *California Manual on Uniform Traffic Control Devices* sections on temporary traffic controls [Caltrans 2014] and would include a traffic control plan that includes, at a minimum, the following elements: • Temporary signage to alert drivers and pedestrians to the construction zone. • Flag persons or other methods of traffic control. • Traffic speed limitations in the construction zone. • Temporary road closures and provisions for alternative access during the closure. • Detour provisions for temporary road closures—alternating one-way traffic would be considered as an alternative to temporary closures where practicable and where it would result in better traffic flow than would a detour. • Identified routes for construction traffic. • Provisions for safe pedestrian and bicycle passage or convenient detour. • Provisions to minimize access disruption to residents, businesses, customers, delivery vehicles, and buses to the extent practicable—where road closures are required during construction, limit to the hours that are least disruptive to access for the adjacent land uses. • Provisions for farm equipment access. • Provisions for 24-hour access by emergency vehicles. • Safe vehicular and pedestrian access to local businesses and residences during construction. The plan would provide for scheduled transit access where construction would otherwise impede such access. Where an existing bus stop is within the work zone, the design-builder would provide a temporary bus stop at a safe and convenient location away from where construction is occurring in close coordination with the transit operator. Adequate measures would be taken to separate students and parents walking to and from the temporary bus stop from the construction zone. • Advance notification to the local school district of construction activities and rigorously maintained traffic control at all school bus loading zones, to provide for the safety of schoolchildren. Review existing or planned Safe Routes to Schools with school districts and emergency responders to incorporate roadway modifications	Design/ Construction	Prepare plan/ Reporting	At incorporation or completion of design/ implementation during construction	Contractor	Contractor	Prepare and implement CTP	Condition of design-build contract	Impact TR #1: Temporary Road Closures during Construction Impact TR #2: Circulation and Emergency Access during Construction Impact TR #4: Circulation and Emergency Access during Operation Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		that maintain existing traffic patterns and fulfill response route and access needs during project construction and HSR operations. • Identification and assessment of the potential safety risks of project construction to children, especially in areas where the project is located near homes, schools, daycare centers, and parks. • Promotion of child safety within and near the project area. For example, crossing guards could be provided in areas where construction activities are located near schools, daycare centers, and parks. CTPs would consider and account for the potential for overlapping construction projects.								
TR-IAMF#3	Off-Street Parking for Construction-Related Vehicles	The Contractor shall identify adequate off-street parking for all construction-related vehicles throughout the construction period to minimize impacts on public on-street parking areas. If adequate parking cannot be provided on the construction sites, the Contractor shall designate a remote parking area and arrange for the use a shuttle bus to transfer construction workers to/from the job site. This measure shall be addressed in the CTP.	Design/ Construction	Prepare plan	Prior to construction	Contractor	Contractor	Prepare CTP/Identify adequate off-street parking for all construction-related vehicles	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction
TR-IAMF#4	Maintenance of Pedestrian Access	The Contractor shall prepare specific construction management plans to address maintenance of pedestrian access during the construction period. Actions that limit pedestrian access would include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, provide covered walkways and fencing. The plan objective shall be to maintain pedestrian access where feasible (i.e., meeting design, safety, and Americans with Disabilities Act [ADA] requirements). This measure shall be addressed in the CTP.	Design/ Construction	Prepare plan	Prior to construction	Contractor	Contractor	Prepare construction management plans that address maintenance of pedestrian access	Condition of design-build contract	Impact TR #1: Temporary Road Closures during Construction Impact TR #2: Circulation and Emergency Access during Construction
TR-IAMF#5	Maintenance of Bicycle Access	The Contractor shall prepare specific construction management plans to address maintenance of bicycle access during the construction period. Actions that limit bicycle access would include, but not be limited to, bike lane closures or narrowing, closure or narrowing of streets that are designated bike routes, bridge closures, placement of construction-related materials within designated bike lanes or along bike routes, and other actions that may affect the mobility or safety of bicyclists during the construction period. Maintain bicycle access where feasible (i.e., meeting design, safety, and ADA requirements). This measure shall be addressed in the CTP.	Design/ Construction	Prepare plan	Prior to construction	Contractor	Contractor	Prepare construction management plans that address maintenance of bicycle access	Condition of design-build contract	Impact TR #1: Temporary Road Closures during Construction Impact TR #2: Circulation and Emergency Access during Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
TR-IAMF#6	Restriction on Construction Hours	The Contractor shall limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays to minimize impacts on traffic on roadways. The Contractor shall limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Areas where these restrictions would be implemented would be determined as part of the CTP. Based on Authority review of the CTP, the restricted hours may be altered due to local travel patterns.	Construction	CTP to be prepared prior to construction followed by reporting	Prior to construction/ Weekly	Contractor	Contractor	Prepare CTP/ Limit construction materials deliveries and employee arrival and departures	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction
TR-IAMF#7	Construction Truck Routes	The Contractor shall deliver all construction-related equipment and materials on the appropriate truck routes and shall prohibit heavy-construction vehicles from using alternative routes to get to the site. Truck routes would be established away from schools, daycare centers, and residences, or along routes with the least impact if the Authority determines those areas are unavoidable. This measure shall be addressed in the CTP.	Construction	CTP to be prepared prior to construction followed by reporting.	Prior to construction/ Weekly	Contractor	Contractor	Prepare CTP/ Establish truck routes	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction
TR-IAMF#8	Construction during Special Events	The Contractor shall provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic events or other special events that substantially (10 percent or more) increase traffic on roadways affected by project construction. Mechanisms include the presence of police officers directing traffic, special-event parking, use of within-the-curb parking, or shoulder lanes for through-traffic and traffic cones. This measure shall be addressed in the CTP.	Construction	CTP to be prepared prior to construction followed by reporting	Prior to construction/ Weekly	Contractor	Contractor	Prepare CTP/ Event coordination	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction
TR-IAMF#9	Protection of Freight and Passenger Rail during Construction	The Contractor shall repair any structural damage to freight or public railways that may occur during the construction period and return any damaged sections to their original structural condition. If necessary, during construction, a “shoofly” track would be constructed to allow existing train lines to bypass any areas closed for construction activities. Upon completion, tracks would be opened and repaired; or new mainline track would be constructed, and the “shoofly” would be removed. Contractor repair responsibility would be included in the design-build contract.	Construction	Design-build and CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	Repair structural damage to freight or public railways	Condition of design-build contract	Impact TR #2: Circulation and Emergency Access during Construction Impact TR #2: Circulation and Emergency Access during Construction Impact TR #4: Circulation and Emergency Access during Operation
TR-IAMF#11	Maintenance of Transit Access	The Contractor shall prepare specific Construction Management Plans to address maintenance of transit access during the construction period. Actions that limit transit access include, but are not limited to, roadway lane closures or narrowing, closure or narrowing of streets that are designated transit routes, bus stop closures, bridge closures, placement of construction-related materials within designated transit lanes, bus stop or layover zones or along transit routes, and other actions that may affect the mobility or safety of bus transit during the construction period. A plan objective shall be to maintain transit access where feasible (i.e., meeting design, safety, and ADA requirements). This measure shall be addressed in the CTP.	Construction	Design-build and CTP to be prepared prior to construction followed by reporting	Prior to construction/ Weekly	Contractor	Contractor	Prepare Construction Management Plans to address maintenance of transit access	Condition of design-build contract	Impact TR #1: Temporary Road Closures during Construction Impact TR #2: Circulation and Emergency Access during Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
TR-IAMF#12	Pedestrian and Bicycle Safety	Prior to construction, the Contractor shall provide a technical memorandum describing how pedestrian and bicycle accessibility would be provided and supported across the HSR corridor, to and from stations and on station property. Priority of safety for pedestrians and bicycles and vulnerable populations over motor vehicle access would be done in a way so as to encourage maximum potential access from non-motorized modes. Local access programs, such as Safe Routes to Schools, shall be maintained or enhanced. Access to community facilities for vulnerable populations shall be maintained or enhanced.	Pre-construction	Prepare technical memorandum	Prior to construction	Contractor	Contractor	Preparation of a pedestrian and bicycle accessibility technical memorandum	Condition of design-build contract	Impact TR #1: Temporary Road Closures during Construction Impact TR #2: Circulation and Emergency Access during Construction

AASHTO = American Association of State Highway and Transportation Officials
ADA = Americans with Disabilities Act
ASCE = American Society of Civil Engineers
ASTM = American Society for Testing and Materials
APE = area of potential effect
Authority = California High-Speed Rail Authority
BETP = built environment treatment plan
BMP = best management practice
BRMP = biological resources management plan
Cal OSHA = California Occupational Safety and Health Administration
Caltrans = California Department of Transportation
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CESA = California Endangered Species Act
C.F.R. = Code of Federal Regulations
CMP = construction management plan
CP = construction package
CTP = construction transportation plan
DOGGR = California Department of Conservation, Division of Oil, and Gas and Geothermal Resources
DWR = California Department of Water Resources
EIR = environmental impact report
EIS = environmental impact statement
EMF = electromagnetic field
EMI = electromagnetic interference
EMMA = Environmental Mitigation Management and Assessment
ESA = Environmental Site Assessment
FESA = Endangered Species Act
FAST Act = Fixing America's Surface Transportation Act
FRA = Federal Railroad Administration
FEMA = Federal Emergency Management Agency
GIS = geographic information system
HSR = high-speed rail
IBC = International Building Code
ISEP = Implementation Stage Electromagnetic Compatibility Program Plan
IAMF = impact avoidance and minimization feature
MOA = Memorandum of Understanding
NHPA = National Historic Preservation Act
NMFS = National Marine Fisheries Service
NOx = nitrogen oxide
O&M = operations and maintenance
OSHA = Occupational Safety & Health Administration
PM10 = particulate matter smaller than or equal to 10 microns in diameter
PRM = Paleontological Resource Monitors
PRMMP = Paleontological Resources Monitoring and Mitigation Plan
SHPO = State Historic Preservation Office
SJVAPCD = San Joaquin Valley Unified Air Pollution Control District
SR = State Route
SVP = Society of Vertebrate Paleontology
SWPPP = Stormwater Pollution Prevention Plan
SWRCB = State Water Resources Control Board
Uniform Act = Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service
VOCs = volatile organic compounds
WEF = wildlife exclusion fence zones
WEAP = Worker Environmental Awareness Program

Table 4 Fresno to Bakersfield Locally Generated Alternative Project Section: Impact Avoidance and Minimization Measures that Apply Only to the Bakersfield to Palmdale Project Section From Immediately South of the F Street Station to Oswell Street in the City of Bakersfield

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
Air Quality									
F-B AQ-IAMM#1	Truck Equipment	• Trucks will be covered to reduce significant fugitive dust emissions while hauling soil and other similar material. • All trucks and equipment will be washed before exiting the construction site.	Construction	Covering materials on truck beds, truck and equipment washing	Weekly	Contractor	Contractor	Covering materials on truck beds, truck and equipment washing	Condition of design-build contract
F-B AQ-IAMM#3	Trackouts	• Within urban areas, trackout will be immediately removed when it extends 50, or more, feet from the site.	Construction	Removal of accumulation from public streets	Weekly	Contractor	Contractor	Removal of accumulation from public streets	Condition of design-build contract
Biological Resources									
F-B BIO-IAMM#1	Environmental Design	At multiple locations, the route of the alternative alignments was altered to avoid impacts and effects to biological resources. During project design and construction, the Authority and FRA would implement measures to reduce impacts on air quality and hydrology based on applicable design standards. Implementation of these measures would also reduce impacts to biological resources. The design standards applicable to the project are listed in Appendix 2-D and the measures to be applied are summarized in Section 3.3, Air Quality and Global Climate Change and Section 3.8, Hydrology and Water Resources.	Pre-construction	Implement measures to reduce impacts	Prior to construction	Contractor	Contractor	Implement measures to reduce impacts	Condition of design-build contract
Cultural Resources									
F-B CUL-IAMM#1	Protective Measures	Cultural resources mitigation measures and commitments could occur prior to, during, and following construction. Protective measures, such as conducting archaeological training, building stabilization or archaeological site capping, and recordation of resources would take place prior to construction; other protective measures such as vibration monitoring for built resources or monitoring for archaeological resources during ground-disturbing activities would occur during construction. Measures that could take place after construction may include interpretive programs, including displays, interpretive signage, etc.	Pre-construction	Prepare assessment and protection plan	Monthly	Contractor/ Authority	Contractor/ Authority	Assess the condition of construction-adjacent historic properties and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage	MOA/PA/BETP
F-B CUL-IAMM#2	PA	The PA established the framework for the development and implementation of measures to avoid, minimize, and/or mitigate adverse effects on historic properties caused by the HST System, in compliance with Section 106 and NEPA. The PA also established that a MOA will be prepared for each section of the HST project to detail the HST project commitments to implement these treatments.	Pre-construction	Implement MOA	Monthly	Contractor/ Authority	Contractor/ Authority	Implement MOA	Condition of design-build contract
Geologic Resources									
F-B GEO-IAMM#2	Groundwater Withdrawal	Control the amount of groundwater withdrawal from the project, re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section.	Pre-construction	Prepare CMP	Monthly	Contractor	Authority/ Contractor	Prepare CMP	Reporting contract requirements/ specifications

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
F-B GEO-IAMM#4	Geotechnical Inspections	Prior to and throughout construction, conduct geotechnical inspections to verify that no new, unanticipated conditions are encountered, and to determine the locations of unstable soils in need of improvement.	Pre-construction/ Construction	Conduct inspections	Monthly	Contractor	Authority/ Contractor	Conduct geotechnical inspections	Condition of design-build contract
F-B GEO-IAMM#5	Improve Unstable Soils	Employ various methods to mitigate for the risk of ground failure from unstable soils. If the soft or loose soils are shallow, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing (CDSM), or jet-grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures. Both over-excavation and ground improvement methods have been successfully used to improve similar soft or loose soils. Lime treatment of heavy rail subgrades over soft soils has also been used successfully in the San Joaquin Valley. The application of these methods is most likely at stream and river crossings, where soft soils could occur; however, localized deposits could occur at other locations along the alignment. The ground improvement or over-excavation methods may also be necessary at the start of approach fills for elevated track sections or retained-earth segments of the alignment if the earth loads exceed the bearing capacity of the soil. Alternatively, at these locations, earth fills might be replaced by lightweight fill, such as lightweight concrete, extruded polystyrene (geofoam), or short columns, and cast-in-drilled hole (CIDH) piles might be used to support the transition from the elevated track to the at-grade alignment.	Design/ Construction	Prepare CMP	Monthly	Contractor	Contractor	Prepare CMP	Condition of design-build contract
F-B GEO-IAMM#6	Improve Settlement-Prone Soils	Settlement-prone soils are improved prior to facility construction. Ground improvement is used to transfer new earth loads to deeper, more competent soils. Another alternative is to use preloads and surcharges with wick drains to accelerate settlement in areas that are predicted to undergo excessive settlement. By using the preload and surcharge with wick drains, settlement would be forced to occur. The application of these methods is most likely at stream and river crossings, where soft soils are more likely to occur. Where groundwater is potentially within 50 feet of the ground surface, any below-ground excavations use well points in combination with sheet pile walls to limit the amount of settlement of adjacent properties from temporary water drawdown. Alternately, water can be re-injected to make up for localized water withdrawal.	Design/ Construction	Prepare CMP	Monthly	Contractor	Contractor	Prepare CMP	Condition of design-build contract
F-B GEO-IAMM#7	Prevent Water and Wind Erosion	Many mitigation methods exist for controlling water and wind erosion of soils. These include the use of straw bales and mulches, revegetation, and covering areas with geotextiles. Where the rate of water runoff could be high, riprap and riprap check dams could be used to slow the rate of water runoffs. Other BMPs for water are discussed in Section 3.8, Hydrology and Water Resources. Implementation of these methods is important where large sections of earth are exposed during construction, such as for retained-cut design segments.	Design/ Construction	Prepare CMP	Monthly	Contractor	Contractor	Prepare CMP	Condition of design-build contract
F-B GEO-IAMM#8	Modify or Remove and Replace Soils with Shrink-Swell Potential and Corrosion Characteristics	One option is to excavate and replace soils that represent the highest risk. In locations where shrink-swell potential is marginally unacceptable, soil additives will be mixed with existing soil to reduce the shrink-swell potential. The decision whether to remove or treat the soil is made on the basis of specific shrink-swell potential or corrosivity characteristics of the soil, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil.	Design/ Construction	Prepare CMP	Monthly	Contractor	Contractor	Prepare CMP	Condition of design-build contract
F-B GEO-IAMM#10	Secondary Seismic Hazards	As discussed above, various ground improvement methods can be implemented to mitigate the potential for liquefaction, liquefaction-induced lateral spreading or flow of slopes, or post-earthquake settlement. Ground improvement around CIDH piles improves the lateral capacity of the CIDH during seismic loading. CDSM, stone columns, EQ drains or jet-grouting develop resistance to lateral flow or spreading of liquefied soils.	Design/ Construction	Design to mitigate the potential for secondary seismic hazards	Monthly	Contractor	Contractor	Implement ground improvement methods	Condition of design-build contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
Hazardous Materials and Waste									
F-B HMW-IAMM#8	Storage of Hazardous Materials	Storage of hazardous materials during construction and operation will meet requirements for transport, labeling, containment, cover, and other BMPs to comply with the State Water Resources Control Board Construction General Permit conditions.	Post-construction	Prepare plans	Prior to operations	Authority	Authority	Prepare hazardous materials monitoring plan and SWPPP	Condition of design-build contract
F-B HMW-IAMM#9	Material Selection	To the extent feasible, the Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HST system. Moreover, using an Environmental Management System, the Authority will evaluate the full inventory of hazardous materials employed on an annual basis and will replace hazardous substances with nonhazardous materials to the extent possible. These standards and material specifications would aid in promoting safety for passengers and employees.	Post-construction	Annual review	Annually	Authority	Authority	Prepare annual review	Condition of design-build contract
Station Planning, Land Use, and Development									
F-B LU-IAMM#1	Zone of Responsibility	Although not strictly part of the project design, the Authority has established a certain “zone of responsibility” around the proposed stations. To that end, the Authority prepared and distributed Urban Design Guidelines (Authority [2010] 2011b) available on the Authority’s website to provide assistance in urban planning for the stations to help achieve great placemaking. The guidelines are based on international examples where cities and transit agencies have incorporated sound urban design principles as integrated elements of large-scale transportation systems. The application of sound urban design principles to the HST System will help to maximize the performance of the transportation investment, enhance the livability of the communities it serves, create long-term value, and sensitively integrate the project into the communities along the HST System corridor. The Authority and FRA have also provided planning grants for cities that could have an HST station to assist them in land use planning in the areas surrounding the stations.	Design/ Pre-construction	Implement sound design principals	Monthly	Contractor/ Authority	Contractor/ Authority	Implement sound design principals	Condition of design-build contract
F-B LU-IAMM #2	Construction Management Plan	Project design features would reduce some of the temporary land use impacts from project construction. These features are described in Section 3.12.6, Socioeconomics, Communities, and Environmental Justice, and in Section 3.3.8, Air Quality and Global Climate Change. They include implementation of a construction management plan to minimize temporary impacts on adjacent land uses and implementation of dust control measures during project construction.	Pre-construction	Prepare CMP	Monthly	Contractor	Contractor	Prepare CMP	Condition of design-build contract
Safety and Security									
F-B SS-IAMM#1	Emergency Vehicle Access	Final design includes development of a detailed construction transportation plan that would include coordination with local jurisdictions on emergency vehicle access. The plan would establish procedures for temporary road closures including: access to residences and businesses during construction, lane closure, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations.	Pre-construction/ Construction	Prepare plan	Monthly	Contractor	Contractor	Prepare Construction Safety Transportation Management Plan	Condition of design-build contract
F-B SS-IAMM#10	Environmental Design	HST urban design guidelines (Authority 2011b) require implementing the principles of Crime Prevention through Environmental Design. This is a design method that focuses on reducing opportunities for crime through the design and management of the physical environment. Four basic principles of Crime Prevention through Environmental Design should be considered during station and site planning: territoriality (designing physical elements that express ownership of the station or site); natural surveillance (arranging physical features to maximize visibility); improve sightlines (provide clear views of surrounding areas); and access control (physical guidance of people coming and going from a space).	Pre-construction	Implement measures to reduce impacts	Prior to construction	Contractor	Contractor	Implement measures to reduce impacts	Condition of design-build contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
Transportation									
F-B TR-IAMM #11	Additional Features in the Cities of Fresno and Bakersfield	In addition to the measures listed above, the Authority will also perform the following in the cities of Fresno and Bakersfield: • Maintain detection at signalized intersections where alignment changes or widening is necessary, in order that the traffic signal does not need to be placed on recall (fixed timing). • Changeable message signs (CMS) will be employed to advise motorists of lane closures or detours ahead. The CMSs will be deployed seven days before the start of construction at that location. • Where project construction would cause delays on major roadways during the construction period, the project will provide for a network of CMS locations to provide adequate driver notification. For example, construction-related delays at the railroad grade separations that lead to SR 99 interchanges will require CMS placement to the east to allow drivers to make alternate route decisions. In the case of work on Shaw Avenue, recommended placement would be a CMS at Shaw Avenue just east of SR 41 and a CMS at Shaw Avenue just east of Palm Avenue. Similar CMS usage will be required along Ashlan Avenue, Clinton Avenue, McKinley Avenue, Olive Avenue, and Belmont Avenue. • The Authority, in conjunction with the City of Fresno Public Works Department and City of Bakersfield Public Works Department, will develop a traffic management plan for the surface transportation network to minimize potential impacts on public safety services. • During project construction, alignment of roadways to be grade-separated and freeway overpasses to be reconstructed will be offset from the existing alignment to facilitate staged construction, wherever possible. The Authority will also include the following measures specific to the city of Fresno: – Clinton Avenue over SR 99 and Ashlan Avenue over the Union Pacific Railroad (UPRR) will be offset from their existing alignments to allow the existing roadway to remain open while the new structure is being built. It is recognized by the city that this type of staging may necessitate temporary ramps to and from SR 99 during various phases of construction. Four travel lanes will be maintained from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. on Shaw Avenue from Cornelia to Blythe Avenue (at UPRR), on Ashlan Avenue from Parkway to Valentine Avenue (at UPRR), and on Clinton Avenue from Marks Avenue to Weber Avenue (at SR 99). – The Veterans Boulevard overpass and construction of new alignments of Golden State Boulevard and Bullard Avenue will be completed and open to traffic prior to the closure of the Carnegie Avenue at-grade railroad crossing. – One lane of traffic in each direction must be maintained at all times for Olive Avenue and McKinley Avenue for construction of the proposed grade separations. No full closures of these crossings will occur, with the exception of short duration closures of less than 72 hours not more than once per month. – During any Belmont Avenue closures that are determined to be necessary, the adjacent crossings of Olive Avenue and Divisadero Street will remain open with no lane closures at the two crossings. – Two of the three crossings will remain open at any given time at the existing railroad crossings at Divisadero, Tuolumne, and Stanislaus	Design/ pre-construction/ construction	Implement measures in Bakersfield	Monthly	Contractor	Contractor	Implement measures to reduce impacts	Condition of design-build contract

Authority = California High-Speed Rail Authority
CDSM = cement deep soil mixing
CHA = collision hazard analysis
CIDH = cast-in-drilled hole
CMP = Construction Management Plan
CMS = changeable message sign
EQ = earthquake
FRA = Federal Railroad Administration
HSR = high-speed rail
MOA = Memorandum of Agreement
PHA = preliminary hazard analysis
RWQCB = Regional Water Quality Control Board
SHPO = State Historic Preservation Officer
SR = State Route
SWPPP = Stormwater Pollution Prevention Plan
TVA = threat and vulnerability assessment
UPRR = Union Pacific Railroad
U.S. = United States

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