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In Reply Refer to:
08ESMF00-2013-F-0534

June 16, 2021

Serge Stanich
Director of Environmental Services
California High-Speed Rail Authority
770 L Street, Suite 620
Sacramento, California 95814
Serge.Stanich@hsr.ca.gov

Subject: Formal Consultation on the California High-Speed Rail System: Bakersfield to Palmdale Project Section

Dear Serge Stanich:

This letter is in response to the California High-Speed Rail Authority's (Authority) request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Bakersfield to Palmdale Project Section of the California High-Speed Rail (HSR) System (proposed project) in Kern and Los Angeles counties, California. This letter is sent to the Authority in its role as the federal lead agency for the Bakersfield to Palmdale Project Section under the National Environmental Policy Act (NEPA) and other federal laws. Pursuant to 23 United States Code (U.S.C.) 327, under the NEPA Assignment Memorandum of Understanding (MOU) between the Federal Railroad Administration (FRA) and the State of California, effective July 23, 2019, the Authority is the federal lead agency for environmental reviews and approvals for all Authority Phase 1 and Phase 2 projects. Under the MOU, the Authority has been assigned FRA's Endangered Species Act (Act) Section 7 (16 U.S.C. 1536) responsibilities for consultations (formal and informal) with respect to HSR and other projects described in subpart 3.3 of the MOU.

At issue are the proposed project's effects on the following federally listed species:

Species federally listed as endangered:

- California jewelflower (*Caulanthus californicus*) (jewelflower)
- Kern mallow (*Eremalche kernensis*) (mallow)
- San Joaquin woolly-threads (*Monolopia congdonii*) (woolly-threads)
- Bakersfield cactus (*Opuntia basilaris* var. *treleasei* [*O. treleasei*]) (cactus)
- blunt-nosed leopard lizard (*Gambelia sila*) (lizard)
- southwestern willow flycatcher (*Empidonax traillii extimus*) (flycatcher)
- California condor (*Gymnogyps californianus*) (condor)

- least Bell's vireo (*Vireo bellii pusillus*) (vireo)
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) (kangaroo rat)
- San Joaquin kit fox (*Vulpes macrotis mutica*) (kit fox)

Species federally listed as threatened:

- San Joaquin adobe sunburst (*Pseudobahia peirsonii*) (sunburst)
- Kern primrose sphinx moth (*Euproserpinus euterpe*) (moth)
- desert tortoise (*Gopherus agassizii*) (tortoise)
- Western Distinct Population Segment (Western DPS) of yellow-billed cuckoo (*Coccyzus americanus*) (cuckoo)

Critical habitat has been designated for the tortoise, flycatcher, condor, vireo, and cuckoo. Because no designated or proposed critical habitat for these species occurs in the action area, it is not considered in this Biological Opinion.

This response is provided under the authority of the Act of 1973, as amended (16 U.S.C. 1531 et seq.), and in accordance with the implementing regulations pertaining to interagency cooperation (50 Code of Federal Regulations [CFR] 402).

The federal action on which we are consulting is the construction, operation, and maintenance of the Authority's Bakersfield to Palmdale Project Section of the HSR system, and specifically the Preferred Alternative, Alternative 2 with the Refined Cesar Chavez National Monument (CCNM) Design Option (Preferred Alternative) (proposed action). Pursuant to 50 CFR 402.12(j), you submitted a biological assessment (BA) and a BA supplement for our review and requested concurrence with the findings presented therein. These findings conclude the proposed action may affect, and is likely to adversely affect the following federally listed species: the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox.

In considering your request, we based our evaluation on the following:

1) Extensive coordination between the Service and the Authority (and the FRA prior to the MOU, as described above) from April 2015 through June 2021 regarding the proposed project, conservation measures, and framework for evaluating the effects of the proposed action on federally listed species
2) The April 2020 and June 2021 letters from the Authority to the Service requesting initiation of formal consultation
3) The *Bakersfield to Palmdale Project Section Biological Assessment*, dated April 2020 and updated September 2020
4) The *Bakersfield to Palmdale Project Section Biological Assessment Supplement*, dated June 2021
5) Correspondence between the Authority and the Service
6) Other information available to the Service

The Service concurs with your determination that the project, as proposed, may affect but is not likely to adversely affect the jewelflower, the woolly-threads, the cuckoo, and the flycatcher based on the following reasons:

1) The species have not been documented and are not expected to occur in the action area

2) Proposed conservation measures, as provided under Description of the Proposed Action, including CM-PLT-01 and CM-PLT-02 for the jewelflower and the woolly-threads, and CM-Avian-01 for the cuckoo and the flycatcher will be implemented and will avoid adverse effects should the species unexpectedly occur within the action area
3) The small amount of suitable habitat in the action area

The Service also concurs with your determination that the project, as proposed, may affect but is not likely to adversely affect the condor based on the following reasons:

1) Implementation of proposed conservation measures, as provided below (CM-CACO-01 through CM-CACO-07)
2) Implementation of proposed general conservation measures, as described under the Description of the Proposed Action, including CM-GEN-20, which states that the project, including the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities, will be designed to be bird and raptor-safe (i.e., avoid electrocution and strike) in accordance with applicable Avian Power Line Interaction Committee (APLIC) recommendations 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)
3) The Authority's commitment to designing the project's catenary system to provide a minimum safe distance between the conductors of 83 horizontal inches and 52 vertical inches to avoid condor electrocution (Authority 2020)
4) No nesting habitat for the condor occurs within the action area

Conservation Measures Specific to California Condor

**CM-CACO-01: Coordinate with the Service on California Condor Locations**

The Project Biologist will coordinate with the Service at least seven days prior to initiation of construction activities (including vegetation removal) within the California condor's range to review California condor tracking locations so that appropriate monitoring and avoidance measures can be determined. The Designated Biologist or Biological Monitor will continue to review California condor tracking locations daily using available data or website managed by the Service for the purpose of implementing monitoring and avoidance measures.

**CM-CACO-02: Monitor for California Condor**

A Biological Monitor with California condor experience will be present during construction activities occurring within two miles of where California condor have been observed within the prior 14 days, based on the most recent tracking and location information obtained from the Service prior to construction activities. The Biological Monitor will have the ability to halt construction activities if a California condor enters the Work Area and may be affected by project activities. Monitoring of the condor will continue until the condor has left the two-mile buffer area.

**CM-CACO-03: Work Timing Restrictions Near California Condor Roosting Locations**

If California condors are observed roosting within 0.5 mile of the construction area, no construction activity will occur between one hour before sunset and one hour after sunrise or until the Designated Biologist or Biological Monitor has determined that the bird(s) have left the area. The Designated Biologist will review construction activities seven days prior to initiation of construction activities.

**CM-CACO-04: Implement Avoidance Measures for California Condor**

During any ground-disturbing activities in the range of California condor, the Project Biologist will implement the following avoidance measures:

- Construction materials in Work Areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored and secured when not in use.
- Litter, small artificial items (screws, washers, nuts, bolts, etc.), and all food waste will be stored in self-closing, sealable containers with lids that latch to prevent entry by wind, common ravens, and mammals. All trash receptacles will be inspected and collected regularly; the contents disposed of from Work Areas on a daily basis to prevent spillage and maintain sanitary conditions. The receptacles will be removed from the project area when construction or O&M activities are complete.
- All fuels, fluids, 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 wildlife will be immediately addressed.
- The project will 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.
- Polychemical lines will not be used or stored on site to preclude wildlife, especially California condor, from obtaining and ingesting pieces of polychemical lines.

**CM-CACO-05: Implement Helicopter Avoidance Measures for California Condor**

The Project Biologist will coordinate with the Service, as appropriate, prior to helicopter use that could affect condor, to establish that no known individuals are in the project area. If condors are present, helicopter use will be avoided until the birds have left the area. If condors are observed in helicopter construction areas, further helicopter use will be avoided until the Designated Biologist or Biological Monitor has determined that the condors have left the area. The Designated Biologist and Biological Monitors will have radio contact with the project foreman, who will be in radio contact with the helicopter pilot. The biologist will provide real-time information updates to the project foreman and helicopter pilot to avoid conflicts with condors.

**CM-CACO-06: Stop Work and Implement Hazing Methods for California Condor**

If a California condor(s) lands or is observed in or near a Work Area, the Designated Biologist or Biological Monitor will assess the construction activities occurring and determine whether there is a potential hazard to the condor. Activities determined to be a potential hazard will be stopped until the condor has abandoned the area. After 15 minutes, if a condor has not left of its own volition, the Designated Biologist or Biological Monitor, or other Service-approved personnel, will implement Service-approved hazing methods in accordance with the Service Recovery Program's *Guidance on Hazing California Condors* (Service 2014).

If the California condor does not leave the area within 30 minutes of the initiation of hazing, the Designated Biologist or Biological Monitor will notify the Project Biologist. The Project Biologist will coordinate with the Authority and the Service to determine the appropriate actions.

**CM-CACO-07: Implement Removal of Carrion that may Attract California Condor**

Dead and injured wildlife found in the right-of-way and tracks will be removed during construction and O&M when the train is not in operation. During O&M within California condor range, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of carrion in the right-of-way.

Because no populations of the jewelflower, the woolly-threads, the cuckoo, or the flycatcher are known to exist in the action area, the absence of nesting habitat for condor, and the conservation measures proposed by the Authority, the Service believes that adverse effects to these species from the proposed action are extremely unlikely to occur, and are therefore discountable for purposes of this consultation. While condor is known to occur in the action area, with the implementation of the above measures, as well as the project design features, adverse effects to this species are not anticipated.

The remainder of this document provides our biological opinion on the effects of the proposed action on the following federally listed species: the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox.

**Consultation History**

| | |
|---|---|
| April to December 2015 | The Authority initiated informal consultation with the Service; coordinated meetings with the Service; provided maps of the proposed alignments and species models to the Service; requested a list of species for consideration for the BA. |
| January to December 2016 | The Authority coordinated with the Service regarding species information, modeling, and mitigation. |
| January to June 2017 | The Authority coordinated with the Service regarding species information, modeling, and mitigation. |
| December 6, 2018 | The Authority resumed informal consultation with the Service, including providing a Draft BA for review. |
| March 25 and May 6, 2019 | The Authority and the Service held workshops and reviewed Service comments on the Draft BA. |
| April 20, 2020 | The Authority requested formal consultation with the Service for the proposed project and submitted the Bakersfield to Palmdale Project Section BA. |
| September 15, 2020 | The Authority submitted an updated BA based on modifications to the project footprint. |
| June 2021 | The Authority submitted a supplement to the BA. |

# BIOLOGICAL OPINION

## Description of the Proposed Action

*Project Overview*

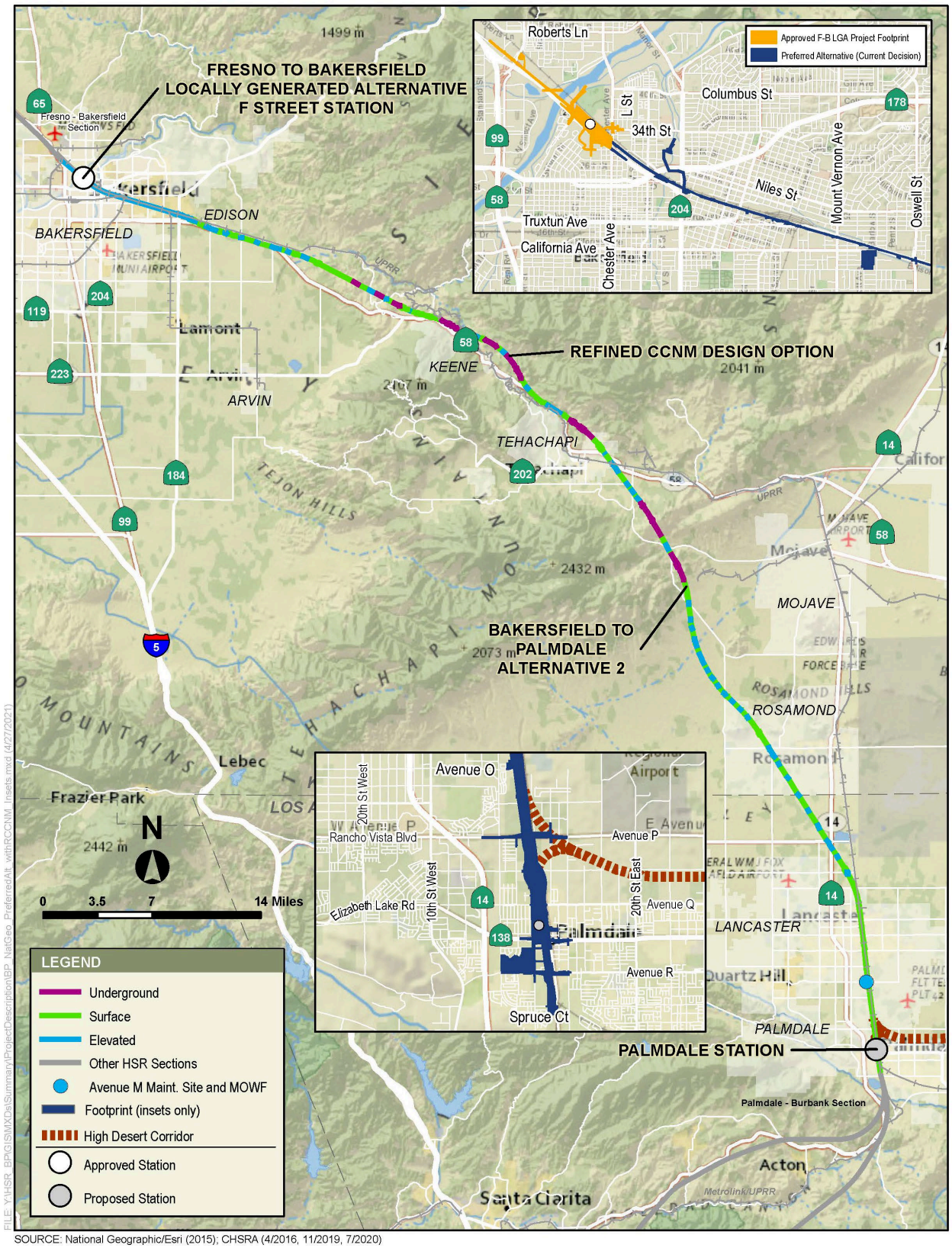
The proposed action is the construction, operation, and maintenance of the approximately 85-mile Bakersfield to Palmdale Project Section of the HSR system. The State of California proposes to build an HSR system to connect the major population centers of the San Francisco Bay Area with the Los Angeles metropolitan region. The HSR system is envisioned as an electrically powered, high-speed, steel-wheel-on-steel-rail technology with state-of-the-art safety, signaling, and automated train-control systems. The trains would be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment. The Authority has identified Alternative 2 with the Refined CCNM Design Option as the Preferred Alternative for the Bakersfield to Palmdale Project Section. The alignment would begin 1.4 miles north of the Bakersfield Station and travel southeast through the Tehachapi Mountains generally following State Route (SR) 58 to Tehachapi and then south through Rosamond, Lancaster, and Palmdale along the existing rail corridor, ending 1.1 miles south of the Palmdale Station (Figure 1).

The alignment would start in Bakersfield on an elevated structure 1.4 miles north of the Bakersfield Station at the Project Section's northern logical terminus and continue to the north of and along the SR 204/Edison Highway corridor before transitioning to the SR 58 corridor east of Morning Drive. The alignment would continue along an elevated embankment north of SR 58, crossing over the Edison Road/SR 58 interchange to the south side of SR 58, continuing to parallel the existing freeway before crossing back over SR 58 just past Towerline Road (both crossings on elevated structures). Four additional elevated structures would be required between Edison Road and the crossing of SR 58 east of Towerline Road to cross the alignment over existing north-south Malaga Road, Comanche Drive, Tejon Highway, and Towerline Road. The alignment would continue eastbound parallel to Edison Highway, crossing over Caliente Creek on a viaduct.

From Caliente Creek to Bealville Road, the alignment would begin to climb the Tehachapi Mountains, roughly following the existing Tejon Ranch Conservancy easement boundary. This part of the alignment would require a combination of cut sections, fill sections, tunnels, and viaducts before reaching Bealville Road approximately five miles northwest of Keene. It would cross over Caliente Creek, Bena Road, Caliente Bodfish Road, and an access road on viaducts and pass through three tunnels approximately 1,500, 1,630, and 2,000 feet in length.

From Bealville Road to the City of Tehachapi the alignment generally follows the SR 58 corridor and similarly includes sections of cut and fill, tunnels, and viaducts. The section from Bealville Road to Keene has three viaducts: one crossing Tehachapi Creek, an access road and the Union Pacific Railroad (UPRR); a second crossing an access road; and the third crossing Tweedy Creek and an access road. Two tunnels are present in this section, approximately 6,000 and 4,100 feet in length.

Where it passes Nuestra Señora Reina de La Paz and the CCNM (La Paz), the alignment would emerge at grade from the 4,100-foot tunnel approximately 0.5 mile north of La Paz at its closest, before the viaduct crossing at Tweedy Creek. An approximately 1,500-foot-long berm would be constructed to the same height as the catenary for the track. The berm would be an average of 80 feet in height from the existing ground level.




SOURCE: National Geographic/Esri (2015); CHSRA (4/2016, 11/2019, 7/2020)

**Figure 1 Bakersfield to Palmdale Project Section Preferred Alternative—Alternative 2 with the Refined CCNM Design Option**

From La Paz and Tweedy Creek, the alignment would continue at grade before entering an approximately 8,900-foot long tunnel that would emerge approximately 0.5 mile north of Broome Road then cross a viaduct spanning an access road near the Broome Road and SR 58 interchange. The alignment would continue at grade in the existing SR 58 right-of-way (ROW) corridor, where the freeway would be relocated to the south, before crossing SR 58 and Tehachapi Creek by means of a 4,600-foot long viaduct. Where SR 58 turns south, the alignment would continue southeast, enter an approximately 8,800-foot-long tunnel and cross another viaduct over a new section of Challenger Drive, then cross over SR 58 near Arabian Drive.

The alignment would traverse the Tehachapi Valley on an embankment or fill section, crossing local roads on viaducts. The alignment would pass through the mountains southeast of Tehachapi in an approximately 14,100-foot tunnel, roughly following Tehachapi Willow Springs Road. It would then descend in cut and viaducts into the northern Antelope Valley east of a realignment of Tehachapi Willow Springs Road, near the Cameron Canyon Road intersection and the Pacific Crest Trail. The alignment would then pass just west of the CalPortland Company existing limestone quarry in an approximately 11,200-foot tunnel and continue southeast toward the community of Rosamond on an embankment or fill section crossing local roads on viaducts.

Through Rosamond, the alignment would travel southeast past the east side of Willow Springs International Raceway, where it would proceed over Rosamond Boulevard toward the north end of Los Angeles County and the city of Lancaster. In the Lancaster area, the alignment would continue on an embankment or fill, and pass over SR 138 and SR 14 near their interchange and over other local roads on viaducts. The alignment would then enter Lancaster at Avenue H, running parallel to the Sierra Highway and the relocated UPRR corridor through Lancaster and into Palmdale. From Avenue H through Lancaster, the alignment would combine the HSR, UPRR, and Metrolink rail corridors into one combined corridor. The alignment would continue at-grade and pass under most local roads that have been modified to cross over HSR, the exceptions being undercrossings at Avenue I, and Lancaster Boulevard near the Lancaster Metrolink station at Lancaster Boulevard.

The new combined rail corridor would be placed as close as possible to the easterly edge of existing Sierra Highway and then widened approximately 220 feet to the east to accommodate all three rail systems. The alignment would require the relocation of the UPRR and Metrolink facilities in the corridor from north of Avenue H to approximately Avenue L. The alignment would create separate ROW for the UPRR and Metrolink rail corridors to the east of the HSR ROW, which would align east of Sierra Highway and west of the UPRR corridor.

The Lancaster Metrolink station would be relocated to accommodate the HSR. The existing station building would be replaced with a new structure approximately 550 feet north of its current location. The existing Metrolink platforms would be relocated approximately 140 feet east and 400 feet north of its existing location. The Metrolink parking lot and station building would be connected to the relocated platform via an Americans with Disabilities Act-compliant pedestrian underpass that would pass beneath the HSR tracks and the relocated Metrolink and UPRR tracks.

To avoid airspace restrictions from the U.S. Air Force Plant 42 Airport to the south, the alignment would begin a transition to the west at Avenue K. This transition would continue to Avenue M, where the HSR alignment would be situated west of the existing UPRR/Metrolink ROW, which would remain in its existing location. The HSR alignment would dip below the existing grade from approximately Avenue L at Avenue O and continue south parallel to and along the westerly side of the existing rail corridor to the Palmdale Station at the Palmdale Transportation Center. The westerly transition of the alignment, from Avenue K to Avenue O,

would require the relocation of approximately 4.5 miles of Sierra Highway to the west. Preliminary routes for this highway relocation would vary between 500 and 2,900 feet west of its existing location. This would provide a separation of 500 to 2,900 feet between the rail corridor and the highway. The alignment would end approximately 1.1 miles south of the Palmdale Station at the Project Section's southern logical terminus.

*Project Footprint*

The project footprint extends from the Project Section's northern logical terminus, approximately 1.4 miles north of the Bakersfield Station to its southern logical terminus, approximately 1.1 miles south of the Palmdale Station (Figure 2). The project footprint extends to the physical limits of the construction activities associated with the proposed action and includes all areas that will be permanently or temporarily affected by the proposed action. The project footprint includes all components and ROW needed to construct, operate, and maintain all permanent HSR features between the Project Section's logical termini. The estimated project footprint (i.e., combined permanent and temporary disturbance areas) for the proposed action is expected to be no greater than approximately 9,882 acres.

The project footprint primarily consists of rail ROW that would include both a northbound and a southbound track in a corridor ranging from 60 feet wide, where elevated on a viaduct, to several hundred feet wide, where on embankment or in cut. Additional ROW would be required to accommodate associated facilities and improvements, such as maintenance facilities and equipment storage areas, permanent access roads, traction power substations (TPSS), switching and paralleling stations, train signaling and communication facilities, grade separations (overheads and underpasses), intrusion protection barriers, and wildlife crossing structures. The project footprint also includes areas for utility relocations, roadway relocations, electrical power connections, and construction activities (e.g., laydown, storage, and similar areas). The project footprint consists of the limits of cut and fill, plus all access roads and areas required for operating, storing, and refueling construction equipment.

Due to the Design/Build nature of the project, design refinements will occur as construction progresses, which may result in shifts in the project footprint into adjacent habitat. In addition, acquisition of ROW will provide access for surveys and updated habitat mapping. The HSR system, project footprint, and modeled habitat acreages included in the text below are based on the best available information at this time. Regardless of the final project footprint, project impacts will be similar geographically as well as in general nature and magnitude.

*High-speed Rail System Infrastructure*

The infrastructure and systems of the proposed project consist of trains (i.e., rolling stock), tracks, grade-separated ROW, stations, train control, power systems, and maintenance facilities. The design includes a double-track rail system and the HSR system safety criteria also requires grade-separated overheads or underpasses for roadways or roadway closures and modifications to existing systems that do not span the planned ROW.

Vehicles and Track Sections

The HSR System would be designed for the operation of trainsets ranging from 8 to 16 cars that are 9 to 11 feet wide and 660 to 1,320 feet long and designed to operate at a top speed of 220 mph. The number of trains per day, night, and during the peak hour are 174, 22, and 15, respectively, and represent the total combining both northbound and southbound.


SOURCE: National Geographic/Esri (2015); CHSRA (4/2016, 11/2019, 7/2020)

**Figure 2 Bakersfield to Palmdale Project Section Preferred Alternative Project Footprint**

The proposed project would consist of a fully dedicated, grade-separated rail line using five different track sections: at-grade, fill, cut, tunnel, and elevated. Types of bridges that might be built include pre-cast, cast-in-place, and balanced cantilever segmental.

At-grade track sections would be used in areas where the ground is relatively flat and in rural areas where interference with local roadways is infrequent. The height of at-grade sections may vary to accommodate slight changes in topography and provide clearance for stormwater culverts and structures to allow water flow as well as occasional wildlife movement. Off-site culverts would be placed to convey off-site flow.

Fill sections would be used where it is necessary to raise the rail alignment so it can cross over existing surface-level rail tracks, roads, or highways. The guideway would be raised off the existing ground on a fill platform with 2:1 side slopes or flatter. Fill sections are also necessary intermittently when traversing mountains or irregular terrain to cross over intermittent low points and drainage crossings.

Cut sections would be used when the rail profile needs to be lowered so it can cross under existing surface-level rail tracks, roads, highways, or in mountainous regions. The cut section embankment heights vary from 0 to about 250 feet and are benched every 30 feet vertically. The guideway would be lowered below the existing ground with 2:1 slopes or flatter, unless in rocky stable terrain, where steeper slopes may be appropriate with approval of the Geotechnical Engineer. Cut sections would be used mainly for short distances in highly urbanized and constrained situations, or when traversing mountainous or irregular terrain to cross through intermittent high points and ridges, such as the Tehachapi Mountains. Cut sections would be used in some cases when it is less disruptive to the existing traffic network to depress the rail profile under crossing roadways or for roads or highways when it is more desirable to depress the roadway underneath a surface HSR alignment. Retaining walls are also used to minimize the impact area by preventing the grading catch points from chasing existing slopes or to avoid ground features. The retaining wall heights vary from 6 to 77 feet and the lengths vary from 33 to 9,200 feet.

Tunnel sections would be used when the rail alignment traverses highly variable topography or highly constrained, densely developed urban areas. The tunnels have two basic configurations: a single tunnel containing both tracks and dual-bore tunnels with a single track in each tunnel. Some locations would require cut-and-cover tunnels for short distances. Each cut-and-cover tunnel would have an internal width of approximately 24 feet. Jet fans would be provided where required for ventilation.

Each dual-bore tunnel would have an internal diameter of approximately 28 feet, with a typical center-to-center spacing for the twin tunnels of 66 feet. The single tunnel would have an internal width of approximately 49 feet and the minimum distance between track centerlines would be approximately 25 feet. Tunnels would be fully lined in some areas for structural, water and gas tightness, and aerodynamic reasons.

Tunnel portals provide a transition from the tunneled sections to cut, at-grade, or elevated sections. During construction, portals serve as the primary access to the tunnels. In the permanent configuration, facilities and infrastructure elements would be located at the portals to support HSR tunnel operations, including provisions needed to meet first responder, fire and life safety, and ventilation requirements. The principal factors influencing which elements of the portal infrastructure are required are tunnel length, the proximity of tunnels to the portals, accessibility, and environmental impacts.

The following major portal infrastructure elements are incorporated in the portal design, based on preliminary engineering design, and are subject to change as the project design is refined:

- Noise Attenuation Hood at the portals up to 150 feet long
- Portal Ventilation Building, a three-story, roughly 65-foot-tall building requiring direct access to the tunnels and located immediately over the tunnel portal
- Access Road provides access to the portals and is required for emergency responders, evacuating passengers, and maintenance staff. A 22-foot-wide access road runs up and around the portal ventilation building to provide access to the third floor
- Emergency Vehicle Assembly and Turnaround Area, minimum 75-foot by 75-foot and located adjacent to the tunnel portal
- Rescue Area/Passenger Assembly Area, 5,000-square-foot minimum, as close as practical to the tunnel portal and well lit
- Fire Hydrants and Water Supply for tunnel firefighting purposes. Supplied by the 4-inch water line along the alignment for tunnel water needs
- Area Lighting system needed to illuminate the portal site during a train evacuation
- Train Surface Evacuation and Fire Control Zone located immediately outside the portal
- Communication Facilities tower, approximately 100 feet in height and 6 feet in diameter, may be required to enable reliable transmission
- Rock Fall and Debris Containment consisting of trench excavations or berms
- Detention Pond required to handle stormwater runoff for each portal location (less than 1 acre in size)
- Parking for Tunnel Maintenance and Traction Power Facilities, approximately eight spaces provided for maintenance staff
- Public Utilities may include water, electricity, telephone, and sewer lines

Elevated sections may be used in urban areas where extensive road networks must be maintained. They may also be used in rugged, mountainous, or otherwise uneven terrain to ensure a level track and reduce the impacts associated with very tall fill section heights or other grade-stabilizing measures. The alignment would utilize elevated sections ranging in length from approximately 130 to 48,300 feet. Elevated sections must have a minimum clearance of approximately 17 feet over roadways and approximately 24 feet over railroads. Pier supports would vary between 12 feet and 20 feet in diameter at ground level. Such structures could also be used to cross water bodies; even though the trackway might be at-grade on either side, the width of the water channel could require a bridge to span the floodplain.

Elevated sections have two basic configurations: twin structures, each with a single track, or a single structure with both tracks. Each twin structure would be approximately 50 feet wide, except in transition areas where the width of each twin structure would be approximately 59 feet. Additionally, the typical spacing between the twin structures would vary between approximately 21 and 41 feet. The width of each single structure would vary between approximately 44 and 53 feet and the typical center-to-center spacing for the twin structure would be 66 feet.

Where elevated sections cross over a roadway or railway on a very sharp skew (degree of difference from the perpendicular) straddle bent pier structures, spaced as needed (typically 110 feet apart), that span the functional/operational limit of a roadway, highway, or railway would be

used. Typical roadway and highway crossings that have a small skew (i.e., the crossing is nearly perpendicular) would use intermediate piers in medians and span the functional ROW. For some larger skew angle crossings median piers would result in excessively long spans that are not feasible.

Grade Separations

The HSR system would be a fully grade-separated and access-controlled guideway. There would be no surface road crossings and the HSR system would not share its rails with freight trains. The following list describes possible scenarios for HSR grade separations for roadways, irrigation and drainage facilities, and wildlife:

- Elevated HSR Road Crossings: In urban areas it may be more feasible to raise the HSR to minimize impacts on the existing roadway system. This type of grade separation may also be used in mountainous, uneven, or rural areas.
- Roadway Overheads and Underpasses: Where state and local roads are affected by the HSR alignment they would be shifted and rebuilt to maintain their function. Where roads cross the alignment, overheads or underpasses would be used to provide continued mobility for local residents and farm operations. Some roads may be closed and alternate routes provided. Typical roadway overheads would vary in width between 25 and 123 feet. Overheads would have 2 to 6, 12-foot lanes depending on the existing facility. They would include shoulders, a bike lane, and a sidewalk, or a combination of these. The minimum clearance height would be 27 feet over the HSR. The HSR alignment would require underpasses for the HSR to travel over some roadways. Roadway widths would vary between 10 and 164 feet.
- Tunnels: The HSR alignment would require tunneling in certain areas due to topography or other constraints, such as grade limitations and grade separations. Tunnels are specifically relevant for the Tehachapi segment of the proposed action.
- Irrigation and Drainage Facilities: The HSR alignment would affect some existing drainage and irrigation facilities, which would be modified, improved, or replaced as needed to maintain existing drainage and irrigation functions and to support HSR drainage requirements. Types of drainage crossings that might be built include drainage overheads (bridges), large box culverts, or, for some wider river crossings, limited piers within the ordinary high-water channel.
- Wildlife Crossing Structures: Wildlife crossing structures designed for the proposed action generally consist of a 6-foot concrete arch, perpendicular to the rail, in the embankment that supports the HSR tracks. The length of these crossing structures varies depending on the embankment width. The preliminary design includes 39 wildlife crossing structures placed to minimize effects of the proposed action on wildlife permeability. Generally, wildlife crossings were reviewed for fenced at-grade segments at intervals of 0.31 mile for small to medium species and one mile for large species. A minimum preliminary design height requirement of 17.5 feet was established at roadway crossings. Other preliminary wildlife crossing design criteria used were less than 200 feet in length, less than 2 percent slope, natural bottom substrate, and near natural grade.

  Achieving both the desired crossing intervals and all design criteria is infeasible at some locations; for example, where the width of the HSR fill slope adjacent to natural grade would exceed the desired maximum crossing length. However, additional design elements such as the tunnels, elevated sections of the alignment, road overcrossings or

undercrossings, and crossings of drainages, would avoid impacts to wildlife movement entirely or minimize those impacts since they essentially unimpeded connectivity for wildlife.

The Authority has analyzed site-specific movement corridors to determine design refinements that would incorporate appropriate wildlife crossings as necessary and as feasible to facilitate wildlife movement. The analysis included information from, and consultation with, stakeholders and agencies. The assessment identified important ecoregions for wildlife movement, areas where wildlife movement may be constrained for various species, appropriate locations and sizes for dedicated crossings, and measures to avoid, minimize, or mitigate the effects.

Additional wildlife crossing structure designs may include larger structures (10-foot concrete arch) to accommodate taller species such as mule deer (*Odocoileus hemionus*) within their species range. However, at several locations the HSR is in a cut below natural grade. In these cases, overcrossings were designed to accommodate wildlife movement over the HSR alignment. In several instances, wildlife crossings were combined with roads or a drainage; these crossings would consist of a 30-foot-wide dirt shoulder adjacent to the road or drainage. A physical separation or barrier, such as a wall, would be built between the crossing area and the road. In the instances where wildlife crossings are combined with roads or drainages, the wildlife crossing would be visible to wildlife.

Access Roads

Access roads are required to provide emergency and maintenance access from public roadways to HSR facilities. Access roads would be located continuously along both sides of the tracks except where the alignment is in a tunnel or on a bridge, where roads terminate and walkways are provided. Additional access roads would provide connections from public roadways to HSR facilities in between every tunnel or bridge, providing access to every segment of at-grade track. Access roads within the HSR ROW would be paved, with a minimum width of 22 feet to provide maintenance and emergency access. Access roads within the HSR ROW would be restricted for use by authorized HSR personnel and emergency responders. On public roads up to the HSR ROW use would be unrestricted. All parcels would have roadway access or be acquired if access to the parcel cannot reasonably be otherwise provided. Temporary access roads are required to provide construction access along the HSR alignment in mountainous terrain. Temporary access roads would be removed and restored to pre-construction conditions upon construction completion.

Traction Power Distribution

Implementation of the HSR system would not entail the construction of a separate power source. Instead, it would include the extension of underground or overhead power transmission lines to a series of TPSSs positioned along the HSR corridor that would even out the power feed from the power supply company to the train system.

Trains would draw electric power from an overhead contact system (OCS) consisting of a series of mast poles approximately 24 feet higher than the top of the rail, with contact wires suspended from the mast poles between 17 and 19 feet from the top of the rail. The train would have an arm, called a pantograph, that would make and maintain contact with this wire and provide power to the train. The mast poles would be spaced approximately every 200 feet along straight portions of the track and as close as every 70 feet in tight-turn track areas. The OCS would be

connected to the switching stations and the power supply would consist of a 2- by 25-kilovolt (kV) OCS for all electrified portions of the statewide system.

Based on the HSR system's estimated power needs, each TPSS would encompass approximately 32,000 square feet (200 by 160 feet) and be located at approximately 30-mile intervals. TPSSs would be built at locations where high-voltage power lines cross near the HSR alignment. Each TPSS would have two 115/50-kV or 230/50-kV single-phase transformers, both of which would be rated at 60 megavolt-amperes. The autotransformer feed system would step down the transmission voltage to 50 kV (phase-to-phase), with 25 kV (phase-to-ground) to power the traction power distribution system. TPSSs would require a buffer area for safety purposes. The TPSSs and associated feeder gantries may be screened from view with a perimeter wall or fence. Each TPSS site would have a 20-foot-wide access road (or easement) from the street access point to the protective fence perimeter at each parcel location. Each site would require a parcel of up to 2 acres.

Traction power switching stations would be required at approximately 15-mile intervals, midway between the substations. Each traction power switching station would encompass approximately 14,400 square feet (160 by 90 feet). Traction power paralleling stations would be required at approximately 5-mile intervals between the TPSS and the switching stations. Each traction power paralleling station would encompass approximately 9,600 square feet (120 by 80 feet). The traction power switching and paralleling stations and associated feeder gantries may be screened from view with a perimeter wall or fence.

Each TPSS would have two 115/50-kV or 230/50-kV single-phase transformers. These transformers would interconnect the TPSS to two breaker-and-a-half bays built at a new utility switching station within the fence line of an existing utility facility via a short section of 230-kV transmission or 115-kV power lines (tie-lines). Per Authority requirements, the proposed interconnection points would need redundant transmission (i.e., double-circuit electrical lines) from the point of interconnection, with each interconnection connected only to two phases of the transmission source. A new utility switching station would encompass approximately 32,200 square feet (160 by 220 feet) and include an approximately 975-square-foot (15- by 65-foot) control building, a 525-square-foot (15- by 35-foot) battery building, and, if required, a retention basin. The utility switching station may be screened from view with perimeter walls or fences.

The Authority has developed conceptual locations for electrical interconnections along the HSR alignment. Electric power utility improvements as designed, including construction and permanent maintenance easements, are included in the project footprint. Network upgrades could include modifications to existing infrastructure such as expansion of existing substations and reconductoring of existing electrical lines (i.e., replacement of power structures [poles and lattice steel towers] and electrical conductors with taller structures and more efficient electrical wires or new electrical lines). All network upgrades would be implemented pursuant to California Public Utilities Commission General Order 131-D. Nine paralleling stations, three substations, and one switching station would be in Kern County and two paralleling stations and one switching station would be in Los Angeles County.

Signaling and Train-control Elements

A computer-based, enhanced automatic train control system would control the trains. The system would use a radio-based communications network that would include a fiber-optic backbone and communications towers at intervals of approximately three miles or less. Signaling and train control elements within the ROW would include 18 by 15-foot communications shelters or signal huts/bungalows. Train control facilities ranging from 2,450 square feet (70 by 35 feet) to

7,175 square feet (110 by 65 feet) would be located along the track. Communications towers within these facilities would use a 6- to 8-foot-diameter, 100-foot-tall pole. The communications facilities would be in the vicinity of track switches and would be grouped with other traction power, maintenance, station, and similar HSR facilities where possible. Where communications towers cannot be located with TPSSs or other HSR facilities, the communications facilities would be located near the HSR corridor in a fenced area of approximately 40 feet by 25 feet.

Track Structure

The track structure would consist of either a direct fixation system (with track, rail fasteners, and slab) or ballasted track. Ballasted track requires more frequent maintenance than slab track but is less expensive to install. Slab track would be used for track supported by structures longer than 1,000 feet, while ballast would be used for track supported by earthwork or structures shorter than 1,000 feet.

Maintenance Facilities

The proposed project would include one maintenance-of-way facility (MOWF), two maintenance-of-infrastructure sidings facilities (MOIS), and a light maintenance facility (LMF) facility. Two maintenance facility site options were evaluated in the Lancaster area, the Lancaster North site and the Avenue M site. The Authority evaluated these two locations with regard to the Authority's criteria for maintenance sites and determined that the Preferred Alternative should include a MOWF at Avenue M in Lancaster and Palmdale. One reason for the Avenue M site being chosen is that the footprint area is of sufficient size to accommodate an LMF in the future. Avenue M is on the west side of the HSR alignment and to the west of existing Sierra Highway. The site extends generally between W Avenue L-4 and Avenue O. It is primarily in an open, urban area and offers a good location for both an LMF and MOWF due to its 230-acre size and proximity to freight rail for delivery of materials. The two MOIS facilities are proposed in Edison and in Tehachapi.

The MOWF would be outfitted to support maintenance activities for tunnels and high viaducts for approximately 50 to 75 miles in either direction. The functional requirements of the MOWF includes: six yard tracks plus one siding track (1,600 feet), approximately 8,150 feet of yard track capacity, stockpile areas for ballast and other bulk materials, secured stockpile areas for non-bulk materials, and road-rail vehicle access locations. The MOWF may be co-located with the nearest LMF to consolidate HSR resources and minimize community impacts. MOWF facilities are estimated to be approximately 30 acres in size, including roadways and parking.

The MOIS facilities would be centrally located within the 50- to 75-mile maintenance sections on either side of the MOWF. More than one location may be required in some maintenance sections because of difficult terrain, such as the Tehachapi Mountains. The MOIS facilities are approximately five acres in size.

LMFs require yard tracks, plus two runaround/transfer tracks, and shop tracks designed to accommodate a minimum of one trainset each. The Project Section would require a total of 29 facility tracks (21 yard tracks and eight shop tracks). The LMF would also include a train wash and wheel detection facilities. The recommended LMF configuration would require approximately 40 to 110 acres.

*Stations*

Two stations would serve the Project Section: one in Bakersfield and one in Palmdale. Station facilities include public and nonpublic areas, station site improvements to facilitate intermodal

connectivity and station accessibility, and ancillary facilities. Both stations would include the following elements: passenger boarding platforms; station head house with ticketing, waiting areas, passenger amenities, vertical circulation, administration and employee areas, and baggage and freight-handling service; short-term and long-term vehicle parking; pick-up and drop-off areas; motorcycle/scooter and bicycle parking; waiting areas and queuing space for taxis and shuttle buses; and pedestrian walkway connections.

The Bakersfield Station would be located at F Street along the proposed HSR alignment parallel to the existing rail corridor. The entire site would be approximately 46 acres, with approximately 2.2 acres of the site designated for the two station buildings. To facilitate vehicle circulation, F Street would cross under SR 204. Additional circulation improvements are required including new roadway providing access from the 30th Street and Alder Street intersection, realignment of the Chester Avenue and 34th Street intersection, conversion of the Chester Avenue and 32nd Street intersection to a right-in/right-out driveway into the station site, and closure of SR 204 North and South frontage roads to accommodate construction of the F Street interchange ramps.

The Palmdale Station would be located along the proposed HSR alignment parallel to the existing rail corridor. The existing Palmdale Transportation Center would be expanded to the south to accommodate the HSR system and would be bounded by Technology Drive to the north and Palmdale Boulevard to the south. The Palmdale Station would consist of train platforms, pedestrian walkways/connectors, a transit plaza pick-up/drop-off facility for private automobiles, and surface parking areas. The station facilities would be located on approximately 50 acres.

Train platforms would be built along either side of the proposed HSR alignment, beginning approximately 200 feet south of E Avenue Q. In addition, the existing Metrolink platform would be replaced by a 700-foot Metrolink platform east of the HSR platform. Pedestrian access would connect the train station/platforms to surrounding parking areas, which would provide 3,300 potential parking spaces in multiple lots by 2040. The closest parking spots would be located at station entrances, while the farthest parking spots would be within 0.5 mile of the station. Two transit centers, one on either side of the HSR alignment, would house bus terminals for buses and shuttles.

*Pre-construction Activities*

During final design, the Authority or its contractor would conduct several pre-construction activities to determine how to best stage and manage actual construction. These activities include the following:

- Conducting geotechnical investigations to define precise geology, groundwater, seismic, and environmental conditions to guide final design and construction methods. Helicopters may be utilized to access geotechnical field investigation sites.
- Identifying construction laydown and staging areas used for geotechnical investigations, mobilizing personnel, stockpiling materials, and storing. In some cases, these areas would also be used to assemble or pre-fabricate components of guideway or wayside facilities. The Authority or its contractor would also identify pre-casting yards, temporary spoil storage, workshops, and temporary storage of delivered construction materials. Field offices and temporary jobsite trailers would also be located at the staging areas. After conclusion of construction and geotechnical investigations, the staging, laydown, and pre-casting areas would be restored to pre-construction conditions.
- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials. Demolition would require strict

controls to ensure that adjacent buildings or infrastructure are not damaged or otherwise affected by the demolition efforts.

- Relocating utilities. The contractor would work with the utility companies to relocate or protect in place high-risk utilities prior to construction and geotechnical investigations.
- Implementing temporary, long-term, and permanent road closures to reroute or detour traffic away from construction activities. Handrails, fences, and walkways would be provided for the safety of pedestrians and bicyclists.
- Constructing the access and haul routes. This activity would require clearing and grubbing, potential demolition and relocation of utilities, establishment of detours, erection of safety devices, and earthmoving activities. Haul routes would use existing roads as much as possible. The project would require inbound and outbound and off-road and on-road earth haul routes for import and removal of materials.
- Locating temporary batch plants as needed to produce Portland cement concrete or asphaltic concrete. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. The contractor would be responsible for implementing procedures for reducing air pollutant emissions, mitigating noise impacts, and reducing the discharge of potential pollutants from the use of equipment, materials, and waste products into storage drains or watercourses.
- Conducting other studies and investigations as needed, such as local business or agriculture surveys to identify usage, delivery, shipping patterns, and critical times of the day or year for business, planting, or harvesting activities in order to develop construction requirements and worksite traffic control plans and identify potential alternative routes, cultural resource investigations, and historic property surveys.
- Constructing access roads to connect the HSR ROW with existing local roads. The contractor would be responsible for roads within the ROW to extend access to tunnel portals and on-site construction staging sites. The contractor would maintain these on-site temporary roads and relocate them as general project grading develops.
- The contractor must sequence the tunnel/bridge construction with the mass grading to provide access to these sites, which are in remote areas. Grading would begin with bulldozers and other appropriate equipment for pioneering roads. The contractor would construct haul roads suitable for dump trucks. Construction of tunnels and extended viaduct structures would require specialized heavy equipment to accomplish the work. Access roads to reach tunnel portals and bridge locations must be suitable for highway-legal trucks and trailers (“18-wheelers”) to deliver equipment and materials. Where nighttime construction lighting would be required, the Contractor would be required to shield such lighting and direct it downward in a manner that minimizes the light that falls outside the project boundaries.

*Non-operational Right-of-way*

In certain negotiated ROW purchase situations, the Authority may enter into agreements to acquire properties or portions of properties that are not directly needed for the construction of the HSR Project and are not intended to be part of the operational ROW. These are known as excess properties and are distinct from severed remnant parcels (evaluated as part of the project footprint). The Authority would need to conduct various management and maintenance activities

on them. The activities required on a given parcel may include structure demolition, vegetation management, pest management, site security, and structure maintenance.

The Authority has identified locations for potential construction staging and laydown areas and pre-casting yards, as well as batch plant, rock crushing, and rail storage and welding areas included within the preliminary engineering design. One 6.1-acre staging area would be in Bakersfield. Eight staging areas ranging in size from 0.7 acre to 6 acres would be in or around Edison. An approximately 45-acre staging, rock crushing, and pre-cast area and a 12-acre rail storage and welding area would also be located near Edison. One 3.3 acre and one 4.6-acre laydown area and a 9.5-acre staging area would be in Keene. In Tehachapi there would be two laydown areas, each 3.3 acres, one 151.6-acre staging, rock crushing, and pre-cast area, and one 12-acre rail storage and welding area. In the Antelope Valley, one 3.3-acre laydown area, one 24.8-acre staging, rock crushing, and pre-cast area, and one 15.5-acre rail storage and welding area. Lancaster would have five laydown areas ranging from 0.5 acre to 1.9 acres and two staging areas of 12.6 and 16 acres. One 1.5-acre laydown area would be in Palmdale.

*Major Construction Activities*

Major construction activities anticipated for the proposed project include earthwork; at-grade construction; bridge, aerial structure, road and wildlife crossing construction; roadway detours; tunnels; railroad systems construction; and station construction.

Earthwork

Earthwork is the disturbance of soil or earth by any means, including, tunneling, drilling, infilling, stockpiling, dumping of soil or sand, and construction/reconstruction of any track, embankment, or drainage channel. Earth support is an important factor in constructing deep excavations that would be encountered in some portions of the project. The three general excavation support categories are described below.

- Open-cut slope would be used in areas where sufficient room is available to open-cut the area and slope the sides back to meet the adjacent existing ground surface, taking into account the natural slope of adjacent ground material and global stability in the area.
- Temporary excavation support structures such as soldier piles and lagging, sheet-pile walls, slurry walls, secant piles, or tangent piles, may be installed to support vertical or near-vertical faces of excavations in areas where space is not available for open-cut slope. These structures do not contribute to the final load-carrying capacity of the tunnel or trench structure and would be either abandoned in place or dismantled as the excavation is backfilled.
- Permanent structures such as slurry walls, secant piles, or tangent pile walls may be installed to support vertical or near-vertical faces of the excavation in areas where space is not available for open-cut slope and would form part of the permanent final structure.

For the proposed action, a balanced earthwork condition is not achievable due to profile changes and would result in approximately 2.4 million cubic yards of excess spoils from cut slope excavation and tunnel construction. Those materials would be stockpiled in the area north of SR 58 in the vicinity of Bealville Road. These materials would be similar to materials excavated throughout the project footprint and could be either processed into soils or conglomerates or left in the condition they are pulled out of the ground (ripped and dumped).

Bridge, Aerial Structure, Road Crossing, and Wildlife Crossing Construction

Elevated guideways would be designed and built as single-box segmental girder construction. Where needed, other structural types would be considered and used, including steel girders, steel truss, and cable-supported structures. The following provides an overview of the construction methods required for foundations, substructures, and superstructures of bridges, aerial structures, and roadway crossings:

- Foundations: A typical aerial structure foundation pile cap is supported by an average of four large-diameter bored piles with diameters ranging from five to nine feet. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings to stabilize pile shaft excavation. The estimated pile production rate is four days per pile installation. Additional pile installation methods available to the contractor include bored piles, rotary drilling cast-in-place piles, driven piles, and a combination of pile jetting and driving. Upon completing the piles, pile caps can be built using conventional methods. For pile caps constructed near existing structures, such as railways, bridges, and underground drainage culverts, temporary sheet piling may be used to minimize disturbances to adjacent structures. Sheet piling installation and extraction are anticipated to be achieved using hydraulic sheet piling machines.
- Substructure: Typical aerial structures of up to 90 feet would be built using cast-in-place concrete bent caps and columns supported upon pile caps with large-diameter cast-in-drilled hole piles. A self-climbing formwork system equipped with a hydraulic operated winched lifting device may be used to construct piers and portal beams over 90 feet high. In general, a three-day cycle for each 12-foot pour height can be achieved.
- Superstructure: The final design would depend on the contractor's means and methods of construction and may include several different methods such as span-by-span, incrementally launched, progressive cantilever, and balanced cantilever.

Road crossings of existing railroads, roads, and the HSR would be built on the line of the existing road or offline at some locations. When built online, the existing road would be closed or temporarily diverted. When built offline, the existing road would be maintained in use until the new crossing is completed. Where new roadway underpasses of existing railroads are required, a temporary shoofly track would be built to maintain railroad operations during underpass construction.

Wildlife structures would also include dedicated overcrossings or concrete arch undercrossings. Where bridges, aerial structures, and road crossings coincide with proposed dedicated wildlife crossing structures, such features would serve the function of, and supersede the need for, dedicated wildlife crossing structures or dual-purpose road and wildlife crossings. These crossings would include fencing designed to prevent wildlife from entering the road.

Construction of foundations and substructures would be similar to construction of the aerial structures but on a smaller scale. The superstructure would likely be built using pre-cast, pre-stressed, concrete girders and cast-in-place deck. Approaches to the bridges would be earthwork embankments, mechanically stabilized earth wall, or other retaining structures.

Roadway Detours

Some proposed grade separations at major arterials are close to one another and would require roadway detours during construction. To facilitate the construction of the roadway grade separations in these areas the contractor would phase the construction by closing and building every other arterial.

In the Edison area major arterials are spaced about 1 mile apart, starting on the north end with Vineland Road and ending at Towerline Road. Only Vineland Road would need to be closed during the construction of the grade separation; all other arterials could remain open during construction, including both crossings of SR 58.

In the Lancaster area, major arterials are spaced 1 mile apart, starting on the north end with Avenue G and ending at Avenue M. The first phase of construction of the proposed project would include the closure and construction of Avenues G, I, K, and M. The second phase of construction would include the closure and construction of Avenues H, J, and L. Approximately 4.5 miles of Sierra Highway, from north of Avenue K to Avenue O, would be relocated to the west. Once the relocations are complete, all traffic could be shifted to the relocated Sierra Highway.

Tunnels

Tunnel construction would occur at various locations in the Tehachapi Mountains. The selected two-track single tunnel or single-track double tunnel configuration would depend on alignment, ground conditions, construction method, portal configuration, approach structures, fire and life safety, and operations and maintenance (O&M) considerations.

The primary methods for tunnel construction are the sequential excavation method, cut-and-cover, and the tunnel boring machine (TBM) method. The sequential excavation method uses drilling and blasting excavation or excavator-type equipment that produces an arched tunnel cross-section. Cut-and-cover is built by open-cut methods to create stand-alone structures where soil conditions are questionable, or the amount of overburden is less than desirable. A TBM is typically used when tunnels exceed one mile in length.

The sequential excavation method, drill and blast construction, and TBM construction would progress at rates of approximately 10, 20, and 30 feet per day, respectively. Total utilized equipment for each method would require approximately 10 operating hours per day. Surface disruption would occur with construction of tunnel portals and cut-and-cover tunnels. Two cut-and-cover tunnels are proposed in the Project Section.

Railroad Systems Construction

The railroad systems would include trackwork, traction electrification, signaling, and communications. Trackwork is the first rail system to be built after completion of earthwork and structures and must be in place at least locally to start traction electrification and railroad signalizing installation. Trackwork construction of new tracks generally requires the welding of transportable lengths of steel running onto longer, continuous lengths already present (approximately 0.25 mile). These are placed in position on crossties or track slabs and field-welded into continuous lengths.

Tie and ballast construction, which would be used for surface and minor structures, typically uses crossties and ballast that are distributed along the trackbed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands and in areas of limited accessibility, this operation may be accomplished by using the established ROW with material delivery via the constructed rail line. For major civil structures, slab-track construction would be used. Slab-track construction is a non-ballasted track form employing pre-cast track supports.

Traction electrification equipment to be installed includes TPSSs and the OCS. TPSSs are typically fabricated and tested in a factory then delivered by tractor-trailer to a prepared site

adjacent to the alignment. The OCS is assembled in place over each track and includes poles, brackets, insulators, conductors, and other hardware.

Signaling equipment to be installed includes wayside cabinets and bungalows, communications towers, wayside signals (at interlocking), switch machines, insulated joints, impedance bounds, and connecting cables.

Station Construction

HSR stations would be newly constructed. Existing train operations, including station capacity and passenger levels of service, would be maintained during construction. The typical construction sequence would be as follows:

- Demolition and Site Preparation: The contractor would construct detour roadways, new station entrances, construction fences and barriers, and other elements required due to taking existing facilities on the worksite out of service. The contractor would perform street improvement work, site clearing and earthwork, drainage work, and utility relocations.
- Structural Shell and Mechanical/Electrical Rough-Ins: The contractor would construct foundations and erect the structural frame for the new station, enclose the new building, and/or construct new platforms and connect the structure to site utilities. The contractor would rough-in electrical and mechanical systems and install specialty items such as elevators, escalators, and ticketing equipment.
- Finishes and Tenant Improvements: The contractor would install electrical and mechanical equipment, communications and security equipment, finishes, and signage.

*Construction Materials and Equipment*

The materials required for construction would include steel rails; building materials for the maintenance facilities, control buildings, and power supply facilities; concrete; reinforcing steel; ballast; cement; aggregates; specialized train system components; fuel; and water. The materials would be delivered and stored at the project site for use.

Fill material would be excavated from construction activities in the project footprint. Railroad ballast may be drawn from existing, permitted quarries with sufficient supply quantities located closest to the construction areas from the Bay Area to southern California, including those in the southern Central Valley and Antelope Valley. Ballast would be delivered by a combination of rail and trucks. All materials would be suitable for construction purposes and free from toxic pollutants in toxic amounts in accordance with Section 307 of the Clean Water Act, and state and local requirements, as applicable.

Various types of construction equipment would be used in the different phases of the project. These may include, but are not limited to: flatbed trucks, water trucks, service trucks, boom trucks, excavators, dozers, forklifts, tractors, loaders, backhoes, trenchers, cranes, lifts, scrapers, rollers, asphalt pavers, sweepers, air compressors, aggregate spreaders, concrete saws, bore/ drill rigs, welders, cement and mortar mixers, and generator sets.

*Construction Timeline*

The Authority would begin implementing its construction plan upon receiving the required environmental approvals and securing needed funding. Given the size and complexity of the HSR project, the design and construction work may be divided into several procurement packages. In general, the procurement would address the following: civil/structural

infrastructure, including design and construction of passenger stations, maintenance facilities, and ROW facilities; trackwork, including design and construction of direct-fixation track and sub-ballast, ballast, ties and rail installation, switches, and special trackwork; and core systems, such as traction power, train controls, communications, the operations center, and the procurement of rolling stock.

One or more design/build (D/B) packages would be developed, and the Authority would then issue construction requests for proposals, start ROW acquisition, and procure construction management services to oversee physical construction of the project. The Authority anticipates that the selected contractor(s) will complete final design over a period of three to five years. During this period, and in advance of the start of construction, the Authority would begin securing environmental compensatory mitigation and finalize ROW and third-party agreements. As design nears completion, and in advance of the initiation of construction, the Authority would complete species habitat assessment, protocol level, and pre-construction surveys. These surveys would be phased with project buildout and the start of activities at each Work Area.

Once construction beings, work is envisioned to be underway at several locations along the route during peak construction periods, with overlapping construction of various project elements. Working hours and workers present at any time would vary depending on the activities being performed. Where construction fencing is required, it would be restricted to areas designated for construction staging and areas where public safety is an issue. Although the D/B contractor would set the actual schedule, the approximate schedule for construction would be eight years. A breakdown of estimated durations of activities is provided in Table 1.

*Operations and Service Plan*

High-speed Rail Service

The conceptual HSR service plan for Phase 1 describes service from Anaheim and Los Angeles, through the Central Valley from Bakersfield to Merced, and northwest into the Bay Area. Phase 2 of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento.

Three basic service types are planned for the HSR system: 1) express trains, which would serve major stations only and provide fast travel times (i.e., a run time between downtown San Francisco and Los Angeles Union Station of 2 hours and 40 minutes); 2) limited-stop trains, which would skip stations along a route to provide faster service between stations; and 3) all-stop trains, which would focus on regional service.

Most trains would provide limited-stop services and offer a relatively fast run time along with connectivity among various intermediate stations. Numerous limited-stop patterns would be provided to achieve a balanced level of service at the intermediate stations. The service plan envisions at least four limited-stop trains per hour in each direction, all day long, on the main route between San Francisco and Los Angeles. Each intermediate station in the Bay Area, the Central Valley between Fresno and Bakersfield, Palmdale in the high desert, and Sylmar and Burbank in the San Fernando Valley would be served by at least two limited-stop trains every hour—offering at least two reasonably fast trains per hour to San Francisco and Los Angeles. Selected limited-stop trains would be extended south of Los Angeles as appropriate to serve projected demand.

**Table 1 Construction Schedule**

| Activity | Tasks | Duration[1] |
|---|---|---|
| ROW Acquisition | • Proceed with ROW acquisitions after the Authority approves a Record of Decision and once the State Legislature appropriates funds in the annual budget | Typically completed in 2 years (after the Record of Decision) |
| Survey and Pre-Construction | • Locate utilities<br>• Establish ROW and project control points and centerlines<br>• Establish or relocate survey monuments<br>• Conduct geotechnical investigations | 2 years |
| Mobilization | • Safety devices<br>• Special construction equipment | 6 months at each construction staging location. |
| Site Preparation | • Utility and roadway relocation<br>• Clearing/grubbing ROW<br>• Establishment of detours and haul routes<br>• Preparation of construction equipment yards, stockpile materials, and pre-cast concrete segment casting yard | 2 – 3 years overall. Within six months at each construction staging location. |
| Earthmoving | • Excavation and earth support structures | 4 years. Highly dependent on chosen staging and sequencing. |
| Tunneling | • Construct tunnels at planned locations | 3 – 5 years. Dependent on selected technology and geotechnical findings. |
| Construction of Road Crossings | • Surface street modifications<br>• Grade separations | 4 – 5 years. Dependent on alternative chosen and number of grade separations to be built. |
| Construction of Elevated Structures | • Aerial structure and bridge foundations, substructure, and superstructure | 3.5 – 5 years. |
| Track Laying | • Includes backfilling operations and drainage facilities | 2 years |
| Systems | • Train control systems<br>• Overhead contact system<br>• Communication system<br>• Signaling equipment | 2 years |
| Demobilization | • Includes site cleanup | 1 year |
| Maintenance Facilities | • Construction of facilities along the alignment | 2 years |

[1] The duration of some of the listed activities may overlap.

Including the limited-stop trains on the routes between Sacramento and Los Angeles and between Los Angeles and San Diego, and the frequent-stop local trains between San Francisco and Los Angeles and Anaheim and between Sacramento and San Diego, every station on the HSR network would be served by at least two trains per hour per direction throughout the day and at least three trains per hour during the morning and afternoon peak periods. Stations with higher ridership demand would generally be served by more trains than those with lower estimated ridership demand.

The service plan provides direct train service between most station pairs at least once per hour. Certain routes may not always be served directly, and some passengers would need to transfer from one train to another at an intermediate station, such as Los Angeles Union Station, to reach their destination. Generally, the Phase 1 conceptual operations and service plan offers a wide spectrum of direct-service options and minimizes the need for passengers to transfer.

Phase 1 of the HSR system would open in stages, from 2025 through 2029. Upon completion, the Phase 1 HSR system would extend from a north terminal in San Francisco to the south terminal at Anaheim. The Project Section would connect the Central Valley to the Antelope Valley, closing the existing passenger rail gap over the Tehachapi Mountains with proposed stations in Bakersfield and at the Palmdale Transportation Center.

Lighting

In general, the ROW would not be lighted except at stations and associated maintenance and electrical facilities. Station lighting would be designed to provide safety for arriving and departing passengers in urban areas. Maintenance and electrical facilities would have permanent lighting for both interior and exterior areas, as needed to support operations, including those operations that require lighting 24 hours per day. Typically, exterior lights would be mounted on tall masts, towers, or poles and illuminate the area with light-emitting diode (LED) luminaires. The lights would be angled toward the ground to limit reflectance on the surrounding community. Lighting associated with maintenance and security would be minimal and would be required to be focused on the site, minimizing light spillage onto neighboring areas. Light generated by HSR trains, tracks, signs, and signals would be minimal and would be directed to the tracks to minimize light spillover.

Maintenance Activities

The Authority would regularly perform maintenance along the track and railroad ROW, as well as on the power, train control, signaling, communications, and other vital systems required for safe operation of the HSR system. The FRA would specify standards of maintenance, inspection, and other items in a set of regulations (i.e., Rule of Particular Applicability) to be issued in the next several years. The brief descriptions of maintenance activities described below are based on best professional judgment regarding future practices in California. Offsite drainages are to be maintained by the adjacent property owner and not maintained by the Authority.

- Track and ROW: The track at any point would be inspected several times per week using measurement and recording equipment aboard special measuring trains. These trains are similar to the regular trains but would operate at a lower speed. They would run between 12:00 a.m. and 5:00 a.m. and would usually pass over any given section of track once per night.

  Most adjustments to the track and routine maintenance would be accomplished in a single night at any specific location, with crews and material brought by work trains along the

line. When rail resurfacing (i.e., rail grinding) is needed (perhaps several times per year), specialized equipment would pass over the track sections at five to 10 mph.

Approximately every four to five years, the ballasted track would require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, and vibrating "arms" to move and position the ballast under the ties. The train would typically cover a one-mile-long section of track during one night's maintenance. Slab track, which is expected to comprise track at elevated sections, would not require this activity. No major track components are expected to require replacement through 2040.

Other maintenance of the ROW, aerial structures, and bridge sections of the alignment would include drain cleaning, vegetation control, litter removal, and other inspection that would typically occur monthly to several times per year.

- Power: The OCS along the ROW would be inspected nightly, with repairs being made when needed. Required repairs would typically be accomplished during a one-night maintenance period. Other inspections would occur monthly. The status and many of the functions of substations and smaller facilities outside of the trackway would be monitored remotely. However, visits would be made to repair or replace minor items and would also be scheduled several times per month to check the general site. No major component replacements for the OCS or the substations are expected through 2040.
- Structures: Visual inspections of the structures along the ROW and testing of fire/life safety systems and equipment in or on structures would occur monthly; inspections of all structures for structural integrity would occur at least annually. Steel structures would also require painting every several years. Repair and replacement of lighting and communication components of tunnels and buildings would be performed on a routine basis. No major component replacements or reconstruction of any structures are expected through 2040.
- Signaling, Train Control, and Communications: Inspection and maintenance of signaling and train control components would be guided by FRA regulations and standards to be adopted by the Authority. Typically, physical in-field inspection and testing of the system would occur four times per year using hand-operated tools and equipment. Communication components would be inspected and maintained routinely. This would usually occur at night, although daytime work may be conducted if the Work Area is clear of the trackway. No major component replacement for these systems is expected through 2040.
- Stations: Each station would be inspected and cleaned daily. Inspections of the structures, including the platforms, would occur annually. Inspections of other major systems, such as escalators, heating and ventilation systems, ticket-vending machines, and the closed-circuit television system would be according to manufacturer recommendations. Major station components are not expected to require replacement through 2040.
- Perimeter Fencing and Intrusion Protection: Fencing and intrusion protection systems would be monitored remotely and inspected periodically. Maintenance would occur as needed; however, fencing or systems are not expected to require replacement before 2040.

*Compensatory Habitat*

The Authority will provide compensatory habitat mitigation that seeks to increase the amount of conserved wetlands and protected habitat for special-status species (including federally listed species), preserve and enhance important wildlife movement corridors, and consolidate and expand existing protected habitat.

The Authority will secure conservation easements, and develop long-term management plans, for compensatory mitigation sites. The list of potential compensatory mitigation sites has not been finalized and is subject to augmentation with Service approval. The final compensatory mitigation sites would be selected based on their relatively high conservation value (e.g., proximity to other protected habitats or conserved areas (e.g., core habitat areas, linkages connecting core habitat patches), location within important wildlife movement corridors, recovery areas, or designated critical habitat, the presence of listed species and/ or suitable habitat (i.e., high species richness/high biodiversity sites), mitigation habitat overlap among species, and ability to satisfy the requirements of the Service and other permitting agencies). The permanent protection of the compensatory mitigation sites would also support goals identified for the mallow, the cactus, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox in the recovery plans for these species by protecting habitat; and protection of key wildlife movement corridors for kit fox (Service 1984, Service, 1996, Service 1998a, Service 1998b, Service 2011a).

For all proposed mitigation sites, long-term management plans, conservation easements, and funding analyses for the long-term endowments will be submitted to the Service for review and approval before the plans are finalized and implemented. The Authority may also purchase habitat compensation credits at a Service-approved mitigation site or conservation bank in addition to securing compensatory sites.

To avoid a temporal loss of habitat and reduce project effects to listed species, the Authority's proposed mitigation strategy includes securing compensatory mitigation prior to the start of construction. Compensatory mitigation would be secured in phases in accordance with the progress of construction of the Bakersfield to Palmdale Project Section. As such, the Authority's proposed mitigation strategy will ensure that the compensatory mitigation will be secured before or concurrent with the commencement of construction for each Construction Package (CP). In the event that it is not possible to secure all of the compensatory mitigation for each CP in advance, it will be completed no later than 18 months after the initiation of ground disturbance of each CP.

All areas of habitat loss for federally listed species would be documented in compliance reporting. This documentation would include GIS data layers, associated metadata, and photo documentation of areas of habitat loss for each species. For each species, a cumulative acreage of habitat loss would be presented in a table.

*Reporting*

The Authority will submit monthly and annual reports to the Service documenting compliance with the conservation measures and this biological opinion. The reports will include summaries of the habitat assessment and species-specific pre-activity surveys and findings, observations and incidental take of threatened or endangered species, compliance with conservation measures successfully implemented, non-compliance events and corrections or adjustments to meet compliance, an accounting of the cumulative total number of acres of species suitable habitat that has been disturbed (with associated GIS layers, associated metadata, and photo documentation), and the type and number of acres for which compensatory mitigation has been secured.

*Conservation Measures*

The Authority has proposed the following measures to minimize effects on federally listed species. The measures proposed below are considered part of the proposed action evaluated by the Service in this biological opinion.

The results of the habitat suitability modeling, described below, will be used as a guide during species' habitat assessment surveys. However, Designated Biologists will consider all areas in and adjacent to the project footprint when determining where surveys are warranted. Habitat assessment, protocol level surveys, and pre-construction surveys will be phased with project buildout and the start of activities at each Work Area.

General Measures

**CM-GEN-1: Establish Qualified Biologists and Biological Monitors**

At least 15 days prior to the onset of activities, the Authority will submit, for review and approval by the Service, the name(s), contact information, and relevant qualifications and experience of Project Biologists and Designated Biologists who will conduct activities specified in the following measures. The roles of biologists will be as follows:

- **Project Biologists.** For each section or construction package, the Authority will identify a Project Biologist(s). For their section or construction package, the Project Biologist(s) will be responsible for implementation of the conservation measures, oversee the scheduling and work of Designated Biologists and Biological Monitors, and develop compliance reporting.
- **Designated Biologists.** Designated Biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. Designated Biologists may be Service-approved on a species-specific basis, in which case Designated Biologists will only be authorized to conduct surveys and implement other measures for the covered species for which they have been approved. The Designated Biologists will have support from Biological Monitors. Designated Biologists will submit memoranda and reports to the Authority to document compliance with conservation measures.
- **Biological Monitors.** Biological Monitors will report directly to a Designated Biologist for implementation of species measures or directly to the Project Biologist for implementation of general measures. Biological Monitors will be selected by the Authority based on their documented experience with and understanding of the ecology of the species included in the biological opinion. Biological Monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting compliance monitoring, and reporting their compliance monitoring activities. Biological Monitors also may assist Designated Biologists in implementing species-specific conservation measures under the direct, on-site, supervision of the Designated Biologist.

No ground-disturbing project activities (e.g., geotechnical investigations, utility realignments, creation of staging areas, or initial vegetation clearing and grubbing) will begin until written authorization is received from the Service.

**CM-GEN-2: Conduct Monitoring of Construction Activities**

The Designated Biologist or Biological Monitor will be present in the Work Area to verify compliance with avoidance and minimization measures, including during ground- or vegetation-disturbing activities in or adjacent to Environmentally Sensitive Areas (ESA), wildlife exclusion fencing (WEF), and construction exclusion fencing (exclusion fencing).

**CM-GEN-3: Prepare and Implement a Biological Resources Management Plan**

Prior to construction activities, the Project Biologist will prepare the Biological Resources Management Plan (BRMP). The goal of the BRMP will be to provide the Project Biologist, Designated Biologists, and Biological Monitors with an organized reference and reporting tool to verify that the mitigation measures and terms and conditions are implemented and reported in a timely manner. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility designations. These will include all conservation measures and repair, mitigation, and compensatory actions included in the biological opinion. These measures and conditions will be tracked through final design, implementation, and post-construction phases. For all measures, terms, and conditions, requirements and planned mechanisms for documenting and reporting compliance will be identified. The BRMP will also identify the individual responsible for post-construction compliance reporting. All project environmental plans, such as the Restoration and Revegetation Plan (RRP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. 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 Biologist(s), Designated Biologists, and Biological Monitor(s), including those responsible for notification and report of injury or mortality of federally- or state-listed species
- Measures to preserve topsoil and control erosion
- Design and locations of protective fencing around ESA and the construction staging areas
- Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance in sensitive habitat areas
- Specific measures for the protection of 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 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

- Notification and reporting requirements in the event of an accidental death or injury to a federally listed species during project activities or failure to meet conservation measures included in the biological opinion

The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.

**CM-GEN-4: Prepare and Implement a Restoration and Revegetation Plan**

Prior to any ground-disturbing activity, the Project Biologist will prepare an RRP to address temporary impacts resulting from ground-disturbing activities in 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, restoration activities will provide habitat for native pollinators by planting native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on non-native 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 be submitted to the Authority for review and approval.

**CM-GEN-5: Prepare and Implement a Weed Control Plan**

Prior to any ground-disturbing activity during the construction phase, the Project Biologist will develop a WCP.

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 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 will be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria will establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council, 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 10 percent 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

**CM-GEN-6: Facilitate Regulatory Agency Access**

Throughout the construction period, the Authority or its designee will allow access by the Service or other resource agency staff 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. If agency personnel visit the project footprint, the Project Biologist will prepare a memorandum within three 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.

**CM-GEN-7: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training**

Prior to any ground-disturbing activity, the Project Biologist will prepare a WEAP to train construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. 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 Designated Biologist or Biological Monitor is not available to present the training in person.

At a minimum, WEAP training materials will include the following information: key provisions of the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, California Fish and Game Code 1600, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or 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; the contact person and procedures in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.

The Designated Biologist or Biological Monitor will present WEAP training to all construction personnel prior to working 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 Designated Biologist or Biological Monitor, travel in the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. Training materials will include a fact-sheet handout or wallet-sized card conveying this information to be distributed to all participants in WEAP training sessions and will be provided in other languages as necessary to accommodate non-English

speaking workers. All construction staff will attend 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 construction crew training attendee will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The Project Biologist will submit the signed WEAP training forms to the Authority monthly, and annually the Authority will certify that WEAP training had been provided to all construction personnel. Each month, the Project Biologist will provide updates relevant to the training to construction personnel during the daily safety (tailgate) meeting.

**CM-GEN-8: Conduct Operation and Maintenance Period WEAP**

Prior to initiating 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 the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or 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 BRMP, annual vegetation and management plan, WCP, and security fencing, ESAs, and WEF maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority 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.

**CM-GEN-9: Establish Monofilament Restrictions**

Prior to any ground-disturbing activity, the Biological Monitor will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control materials. Non-monofilament substitutes including coconut coir matting, tackified hydroseeding compounds, rice straw wattles, and reusable erosion, sediment, and wildlife control systems that have been approved by the regulatory agencies (e.g., ERTEC Environmental Systems products) may be used.

**CM-GEN-10: Avoid Animal Entrapment**

At the beginning and end of each work day all excavated, steep-walled holes or trenches that are more than eight inches deep with sidewalls steeper than a 1:1 (45 degree) slope will be inspected for trapped animals and, at the close of each day, will be covered with plywood or similar materials or provided a minimum of one escape ramp constructed of fill earth per 10 feet of trenching. Before such holes or trenches are filled, they will be thoroughly inspected for trapped wildlife by the Biological Monitor(s).

All construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored overnight in the project footprint will be covered and elevated at least one foot above ground. Pipes or similar structures, regardless of diameter, will be covered such that avian

entrapment is avoided. All pipes, culverts, and similar structures will be inspected for wildlife before such material is moved, buried, or capped.

**CM-GEN-11: Delineate Equipment Staging Areas and Traffic Routes**

Prior to any ground-disturbing activity, the Designated Biologist and Biological Monitor(s) will establish staging areas for construction equipment in areas that minimize effects to 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 in areas that will be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Designated Biologist and Biological Monitor(s) will flag and mark access routes to ensure that vehicle traffic in the project footprint is restricted to established roads, construction areas and other designated areas.

**CM-GEN-12: Dispose of Construction Spoils and Waste**

The contractor will dispose of waste materials associated with construction, including soil materials unsuitable for reuse, in local landfills permitted to take these types of materials, and in conformance with State and federal laws.

**CM-GEN-13: 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 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 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 fine mesh material (e.g., Animex Fencing or similar) and delineated by the Designated 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 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.

Fencing installation will be monitored by a Designated Biologist or Biological Monitor to ensure that federally listed species are not injured or killed during installation. Temporary fencing will be installed in areas of construction that are beyond the perimeter of the right-of-way or in areas where construction staging will occur. After installation of the temporary fencing, the Work Area will be surveyed by a Designated Biologist(s) to confirm the absence of federally-listed wildlife. The ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Designated Biologist or Biological Monitors to ensure its integrity and that wildlife are not trapped.

**CM-GEN-14: 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 adjacent to natural habitats 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 in 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 wildlife from digging or tunneling below the security fence. A climber barrier (e.g., rigid curved or bent overhang) will be installed at the top of the apron to prevent wildlife from climbing over the apron. The Project Biologist may coordinate with the Service prior to completion of the fencing design.

The Project Biologist will ensure that the selected apron material and climber barrier will not have the potential to cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for yearly inspection and repair of the fencing.

Prior to construction and operation, the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats and confirm that the fencing has been appropriately installed. Both the fencing plan review and field inspection will be documented in memorandums from the Project Biologist and provided to the Authority.

**CM-GEN-15: 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 will be significantly reduced. Prior to final construction design the Project Biologist will confirm appropriate placement and dimensions of wildlife crossings.

For terrestrial wildlife, crossings will conform to the minimum spacing and dimensions identified in the *Bakersfield to Palmdale Project Section Wildlife Corridor Assessment Report* (Authority and FRA 2018) unless different dimensions are specified in authorizations issued under the Act.

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

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.

**CM-GEN-16: Work Stoppage**

During construction activities, the Designated Biologists and general Biological Monitors will have stop work authority to protect any federally listed wildlife species in the project footprint. This work stoppage will be coordinated with the Authority or its designee. The Contractor will suspend vegetation- or ground-disturbing activities in the Work Area(s) where the potential construction activity could result in injury or mortality of listed species; work may continue in other areas. The Contractor will continue the suspension until the individual leaves voluntarily or is moved to an approved release area using Service-approved handling techniques and methods, or as required by the Service.

**CM-GEN-17: Enforce Construction Speed Limit**

A speed limit of 15 mph will be enforced during project construction for all vehicles operating on unimproved access roads and in temporary and permanent construction areas in the limit of direct effect.

**CM-GEN-18: Implement Avoidance of Nighttime Light Disturbance**

Prior to construction requiring nighttime lighting, the Contractor will prepare a Lighting Plan verifying how the Contractor will shield nighttime construction lighting and direct it downward in such a manner to minimize the light that falls outside the construction site boundaries. The Lighting Plan will be submitted to the Authority for review and approval prior to any work requiring nighttime lighting. The Lighting Plan will describe the type of lighting that will be used, maximum level of lumens to be emitted, and a schematic showing where lighting equipment will be stationed and which cardinal direction(s) the lighting equipment will face. Permanent or temporary, fixed, exterior lighting, including motion triggered security lighting that casts light beyond the project footprint between sunset and sunrise will not be used.

**CM-GEN-19: Implement Water or Dust Palliative Measures**

Water or dust palliatives will be applied to the construction right-of-way, 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 in 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 (e.g., desert tortoise), common ravens (*Corvus corax*), or other wildlife to the project site. Operational ponding will be avoided through careful grading and hydrologic design. Water tanks will be covered with secure lids. Leaking hoses, tanks, or other sources of inadvertent pooling will be repaired immediately or moved offsite.

**CM-GEN-20: Design the Project to be Bird Safe**

Prior to final construction design, the Authority, in consultation with the Project Biologist, will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities 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 guy wires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers)
- 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* (Service 2018a)
- 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
- 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 and minimize potential for collision

Additional bird operational actions would be required for dry lakes and playas, Audubon Important Bird Areas, and documented avian movement corridors. These measures include:

- 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.

**CM-GEN-21: Prohibit Pets in Work Areas**

No pets will be allowed on site during construction or O&M.

**CM-GEN-22: Prepare Post-Construction Compliance Report**

A post-construction compliance report will be submitted to the Service upon completion of each construction package, as defined by the Authority-Contractor D/B contracts. The post-construction compliance report will provide the following information:

- Dates of project groundbreaking and completion
- Pertinent information concerning the success of the project in meeting compensation and other conservation measures
- Known project effects on listed species
- Observed incidences of injury or mortality of any listed species
- Other pertinent information

**CM-GEN-23: Notification of Dead, Injured, or Sick Wildlife**

The Authority will notify the Service within 24 hours if dead, injured, or sick listed species are observed.

Conservation Measures Specific to Federally Listed Plants

**CM-PLT-01: Conduct Pre-construction Surveys for Listed Plants and Implement Avoidance and Minimization Measures**

Prior to ground- or vegetation-disturbing activities, the Designated Biologist will conduct surveys for listed plants' suitable habitat. The Designated Biologist(s) will conduct protocol level surveys for federally listed plant species prior to any ground or vegetation-disturbing activities in suitable habitat for federally listed plant species during the appropriate bloom period for each species. Habitat assessment and protocol level surveys will be phased with project buildout and the start of activities at each Work Area.

The surveys will 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* (Service 2000). The Designated Biologist will flag and record in GIS the locations of any observed federally listed plant species. Prior to surveys and if a reference population exists, reference populations for target survey species will be visited, to confirm bloom conditions and ensure target species have flowers or other discernible features necessary to identify plants.

If federally listed plants are observed during plant surveys, ESA fencing will be installed to protect the population or individuals, plus a 100-foot buffer (where access permitted). If plants cannot be avoided, they will be documented prior to impacts or salvage efforts. Documentation will include density and percent cover of the affected species; key habitat characteristics, including soil type, associated species, hydrology, and topography; and photo documentation of pre-construction conditions.

Prior to any vegetation- or ground-disturbing activity, the Designated Biologist will salvage plants, if feasible, collect seeds and plant materials and stockpile and segregate the top four inches of topsoil from locations in the Work Area where federally listed plant species were observed during surveys for use on off-site locations. The salvage and collection of plants and materials will be conducted in accordance with a Salvage, Relocation, and Monitoring Plan (SRMP).

**CM-PLT-02: Prepare and Implement Salvage, Relocation, and Monitoring Plan for Listed Plants**

The Project Biologist will implement an SRMP to address monitoring, salvage, relocation and/or seed banking of federally listed plant species. The plan will include the following at a minimum:

- Provisions that address the techniques, locations, and procedures required for the collection, storage, and relocation of seed and plant material.
- Provisions that address the techniques, location, and procedures required for the collection, stockpiling, and redistribution of topsoil and associated seed.
- Provisions for requirements related to performance, maintenance, monitoring, implementation, funding, adaptive management, and the annual reporting requirements.

The relocation or propagation of these plants and their seed will be performed at a suitable mitigation site, as appropriate for each species. Suitable sites to receive salvaged plants and materials include Authority mitigation sites, refuges, reserves, federal or state lands, and public/private mitigation banks.

The Project Biologist will submit the plan to the Authority and Service for review and approval prior to vegetation- or ground-disturbing activity where federally listed species occur.

Conservation Measures Specific to Bakersfield Cactus

**CM-BACA-01: Implement Avoidance Measures for Bakersfield Cactus**

Areas in the project footprint that support Bakersfield cactus will be avoided to the extent feasible. Portions of the known population adjacent to the alignment will be protected with ESA fencing, plus a 100-foot buffer (where access permitted). ESA fencing will be installed prior to initiation of ground- or vegetation-disturbance, under the guidance of the Designated Biologist or Biological Monitor. Fenced individuals will be monitored twice annually in late winter and mid-spring (timed for maximum production of annual invasive species) for the duration of construction at that location to ensure that the fencing has not resulted in an increased cover of invasive species due to the potential exclusion of herbivores.

**CM-BACA-02: Implement Translocation of Bakersfield Cactus**

In the event individual Bakersfield cactus cannot be avoided and will be directly impacted in the Work Area, the Project Biologist will include translocation of Bakersfield cactus individuals in an SRMP, which will be prepared per the requirements of CM-PLT-02. The SRMP will outline the methodologies for translocation of Bakersfield cactus individuals from the project footprint which will follow practices that maximize survival of outplantings, according to current research on best practices identified in recent research published by the California State University Stanislaus Endangered Species Recovery Program (e.g., Cypher et al. 2015) and others, as relevant at the time of translocation. In addition, the SRMP will contain details regarding proposed translocation sites and maintenance and management of translocated individuals. Translocation sites will be selected with priority given to maintaining size of the impacted occurrence on permanently protected land (e.g., existing preserves and/or designated conservation sites) by planting translocated individuals in suitable habitat at perimeters of occupied habitat and providing maintenance and management as described in the SRMP. Where this is infeasible, translocation sites will be as close as possible to the impacted site(s), with similar topography, soils, vegetation, aspect, and drainage as the salvage locations. The Project

Biologist will submit the SRMP to the Authority and Service for review and approval prior to the start of construction in areas that support Bakersfield cactus.

Conservation Measures Specific to Kern Primrose Sphinx Moth

**CM-KPSM-01: Conduct Pre-construction Surveys for Kern Primrose Sphinx Moth Suitable Habitat and Implement Avoidance and Minimization Measures**

Prior to ground- or vegetation-disturbing activities, the Designated Biologist will conduct surveys for Kern primrose sphinx moth suitable habitat. Suitable habitat for the species includes sandy alluvial soils in and beside washes that support its larval host plants (*Camissonia contorta* and *C. campestri*s). Habitat assessment surveys will be phased with project buildout and the start of activities at each Work Area. Results of the survey efforts will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey sites.

If Kern primrose sphinx moth suitable habitat is observed, the following measures will be implemented:

- Host plants will be flagged and avoided to the greatest extent feasible through establishment of ESAs and 50-foot non-disturbance zones.
- If host plants cannot be avoided, the no-disturbance buffer will be maintained, to the extent feasible, until the flight and larval seasons (cumulatively, February 1 through May 31) are passed, to allow sufficient time for the adults to lay eggs and for the larvae to pupate and disperse from the area.
- A Designated Biologist or Biological Monitor familiar with the life history and identification of Kern primrose sphinx moth will monitor disturbance to or removal of host plants and will have the authority to stop work if Kern primrose sphinx moth are observed.
- Kern primrose sphinx moth larval host plants will be seeded or planted in temporary disturbance areas after work is complete in and beside washes with sandy alluvial soils. The reseeded or planted area will be of comparable amounts to what is disturbed.

Conservation Measures Specific to Blunt-nosed Leopard Lizard

**CM-BNLL-01: Conduct Pre-construction Surveys for Blunt-Nosed Leopard Lizard and Implement Avoidance Measures**

No more than 12 months before the start of ground-disturbing activities, a habitat assessment of the project footprint plus a 100-foot buffer (where access permitted) will be conducted by the Designated Biologist to identify suitable habitat for blunt-nosed leopard lizard. Suitable habitat for the species will be determined by the presence of burrows or other suitable shelters, appropriate vegetation cover, and appropriate topography. Habitat assessment surveys will be phased with project buildout and the start of activities at each Work Area.

Within 12 months prior to ground-disturbing activities, the Designated Biologist will conduct protocol level surveys for blunt-nosed leopard lizard where suitable habitat has been identified. 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. These surveys may be paired with scent detection dog surveys for blunt-nosed leopard lizard scat. The protocol level surveys will be phased with project buildout and the start of activities at each

Work Area. Survey reports will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey site.

Where protocol level surveys are negative for blunt-nosed leopard lizard:

- WEF and construction exclusionary fencing will be installed as per CM-GEN-13 immediately following surveys around the Work Area and access roads to ensure that no blunt-nosed leopard lizards can enter the Work Area.
- The WEF installation will be overseen by a Designated Biologist with knowledge of blunt-nosed leopard lizard biology.
- The Designated Biologist will maintain and monitor the WEF daily.
- Protocol level surveys will be conducted if one year has elapsed since the last survey was conducted to reconfirm the absence of blunt-nosed leopard lizard if WEF is not installed or maintained to exclude blunt-nosed leopard lizards from the Work Area.

Where protocol level surveys are positive for blunt-nosed leopard lizard:

- During the non-active season for blunt-nosed leopard lizards (October 16 through April 14) the following measures will be implemented:
  - 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.
  - 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 to prevent impacts until the active season.
  - The no-work buffer will be established by placing ESA fence and WEF around suitable burrow sites in a manner that allows for a connection between the burrow site and the suitable natural habitat adjacent to the project footprint so that lizards can leave the Work Area during the active season. This connection will be achieved by the inclusion of one-way escape exits spaced every 100 feet in the fencing.
  - The Designated Biologist may reduce the size of the no-work buffers in consultation with and approval by the Service.
- During the active season when blunt-nosed leopard lizards are moving above-ground (April 15 through October 15), the following measures will be implemented:
  - The Designated Biologist will establish, monitor, and maintain 50-foot no-work buffers (where access permitted) around burrows and egg clutch sites identified during surveys.
  - The buffers will be established around burrows by the ESA fence and WEF being placed in a manner that allows for a connection between the burrow site and suitable natural habitat adjacent to the project footprint so that blunt-nosed leopard lizard adults and hatchlings may leave the Work Area after eggs have hatched. This connection will be achieved by the inclusion of one-way escape exits spaced every 100 feet in the fencing.
  - 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.

— The Designated Biologist will conduct protocol level surveys to confirm the absence of blunt-nosed leopard lizards prior to the initiation of work in the buffer areas. These surveys may be paired with scent detection dog surveys for blunt-nosed leopard lizard scat.

Temporary ESA, WEF, and exclusion fencing will be monitored daily and maintained. In suitable habitat for blunt-nosed leopard lizard, temporary fencing will be installed in accordance with current standard guidance (e.g., non-gaping, non-climbable barrier) to prevent blunt-nosed leopard lizards from gaining access into the Work Area.

Conservation Measures Specific to Desert Tortoise

**CM-DETO-01: Conduct Pre-construction Surveys for Desert Tortoise and Implement Avoidance Measures for Burrows**

Prior to the start of ground- or vegetation-disturbing activities, a Designated Biologist familiar with desert tortoise and their sign will conduct pre-construction surveys in suitable habitat for desert tortoise. The surveys will be phased with project buildout and the start of activities at each Work Area and will be conducted in general accordance with the Service protocol *Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii;* Service 2018b) or current pre-project survey protocol. The survey(s) will occur no more than 48 hours before the start of ground- or vegetation-disturbing activity in each Work Area in suitable habitat for desert tortoise and may be conducted any time of year, but preferably during the desert tortoise active period (i.e., early March through early June, and September through early November). The survey will consist of transect surveys spaced no greater than 15 feet apart and will include a 50-foot buffer (where access permitted) around the Work Area. Results of the survey effort will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey site.

If active burrows (i.e., burrow with tortoise present) are identified in the project footprint:

- A 50-foot non-disturbance buffer (where access permitted) will be established, maintained, and monitored.
- The buffer will be established by routing the ESA fence and WEF around the active burrows in a manner that allows for desert tortoise to leave the project footprint.
- Following the procedures and precautions outlined in the *Desert Tortoise (Mojave Population) Field Manual (Gopherus agassizii)* (Service 2009), all desert tortoise pallets and burrows that are not practical to avoid will be examined and excavated by hand during the clearance survey by the Designated Biologist and collapsed to prevent re-entry.

**CM-DETO-02: Implement Avoidance Measures for Desert Tortoise**

Following the pre-construction desert tortoise survey(s):

- Where construction activities will be of short duration (i.e., less than one month) in suitable tortoise habitat, full-time monitoring by a Biological Monitor with experience with desert tortoise 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.

- Where construction activities will occur for more than one consecutive month in suitable tortoise habitat:
  - A Biological Monitor with desert tortoise experience will be present during all construction activities.
  - Desert tortoise exclusionary fencing, barriers, and guards will be installed and maintained to avoid take of desert tortoise, including destruction of nests, or their potential habitat in the project footprint. ESA fencing and WEF in desert tortoise habitat will be constructed to standards outlined in *Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise* (*Gopherus agassizii*) (Service 2018b) and will be used to delineate the area. The WEF will be maintained and monitored daily during the desert tortoise active period (i.e., early March through early June, and September 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 active period, fence inspections will occur at least once weekly.
  - ESA fence and WEF design will incorporate shade structures on the exterior of the fence to provide refuge and reduce the risk of hyperthermia for desert tortoise walking along the fence. Construction of shade structures will follow Service guidance (e.g., Service 2018d).

If any project vehicle must drive off established routes in suitable tortoise habitat, a Biological Monitor will walk immediately in front of the vehicle to search for desert tortoise. The Biological Monitor will visually account for 100 percent of the footprint of the route or work location plus a 15-foot buffer (where access permitted) on each side.

During project implementation, all workers will immediately inform the Biological Monitor if a desert tortoise is observed in or near project Work Areas. All work in the vicinity of the animal which could cause disturbance, injury or mortality, will cease immediately.

**CM-DETO-03: Prepare and Implement Project Guidelines for Handling Desert Tortoise during Construction**

Prior to construction activities, the Designated Biologist will prepare and implement project specific guidelines to move desert tortoise a short distance (i.e., no more than 984 feet) out of harm's way, based on the *Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance* (Service 2018c), *Health Assessment Procedures for the Mojave Desert Tortoise (Gopherus agassizii): A Handbook Pertinent to Translocation* (Service 2013a), and *Desert Tortoise (Mojave Population) Field Manual (Gopherus agassizii)* (Service 2009) or other current Service guidelines. The project guidelines will provide details on desert tortoise surveys, for moving desert tortoises out of harm's way, and will include methodology for visual desert tortoise body condition assessments. Project procedures and guidelines will be provided to the Service for review and approval prior to the start of construction.

Desert tortoises found in Work Areas will be moved by the Designated Biologist out of harm's way a short distance to an undisturbed suitable habitat area beyond the construction site, no more than 984 feet from where it was found and within its territory, to the greatest extent feasible. Preferred locations for release include areas where alternate burrows or appropriate shelter (i.e., shade of shrubs) are available.

Prior to the Designated Biologist moving desert tortoise out of the Work Area, the biologist will survey the relocation site to ensure that suitable burrows or shelter for desert tortoise exist. If no

burrows or shelter are available, shade structures will be installed along the outer perimeter of the ESA and WEF following the guidelines in the *Desert Tortoise (Mojave Population) Field Manual (Gopherus agassizii)* (Service 2009) and *Shade Structures for Desert Tortoise Exclusion Fence: Design Guidance* (Service 2018d), or as updated or replaced by the Service.

Only Designated Biologists authorized by the Service will handle desert tortoises.

**CM-DETO-04: Inspect Structures that Provide Potential Shelter for Desert Tortoise**

Any construction pipe, culvert, or similar structure with a diameter greater than three inches that is stored less than eight inches aboveground, outside a fenced area of desert tortoise habitat, and left unattended for any time period when desert tortoise are active (i.e., early March through early June and September through early November) will be inspected for desert tortoise before the material is moved, buried, or capped. As an alternative, all such structures will be capped or placed on pipe racks.

**CM-DETO-05: Inspect under Vehicles in Desert Tortoise Habitat**

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 Designated Biologist may move the animal out of harm's way to a safe location a distance of no greater than 984 feet (300 meters), according to Service protocol.

**CM-DETO-06: Installation of Desert Tortoise Guards**

In occupied desert tortoise habitat and in areas of high vehicular construction traffic, desert tortoise guards that resemble cattle guards will be installed and connected to the exclusionary fencing at construction area entry points and permanent rail alignment maintenance access points to prohibit desert tortoise from crossing into the construction area right-of-way and alignment but still allowing the passage of construction vehicles. The desert tortoise guard will have a clear escape route away from construction activity for any desert tortoise that should fall into the guard. The guard will be inspected daily for desert tortoise during the species' active period (i.e., early March through early June, and September through early November) and to ensure the escape route is free of obstruction. The guard will also be cleared of debris that may allow desert tortoise passage across the guard and out of construction area. Outside of the desert tortoise active period, guard inspections will occur at least once weekly. The desert tortoise guard will be maintained throughout its use during the construction process by the Designated Biologist or Biological Monitor.

**CM-DETO-07: Implement Common Raven Avoidance Measures in Desert Tortoise Habitat**

Measures will be implemented to ensure construction and O&M activities do not attract common ravens to the right-of-way by creating food or water subsidies, perch sites, roost sites, or nest sites. All active Work Areas will be kept free of trash and debris. All trash will be covered, kept in self-closing sealable containers with lids that latch to prevent entry by wind, common ravens, and mammals, and 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 to reduce attraction of opportunistic predators. Dead and

injured wildlife will be handled and removed in accordance with any applicable project permits and plans.

A Designated Biologist with knowledge of common raven identification (including nests) and desert tortoise remains (e.g., carcass, shell and bone fragments) will be approved by the Service. The Designated Biologist will survey for presence of common ravens and nests within 100 feet of the project facilities in desert tortoise habitat for the purpose of identifying ravens that may prey upon desert tortoise. Nest locations will be recorded using a GPS unit and mapped for future surveys to search for tortoise remains in proximity to the nests.

**CM-DETO-08: Regional Raven Management Funding**

Various project components will likely provide subsidies in the form of perches, nest sites, and food (i.e., trash and wildlife mortality related to the project) for common ravens, a known predator of desert tortoise. The maintenance facilities (e.g., MOWFs and LMFs) and the Palmdale Station are most likely to provide raven subsidies based on their size and range of activities that they include. Although these facilities are not located directly within desert tortoise habitat, common ravens can travel extensive distances within a single day between foraging, nesting, and roosting areas. To address the project-related increase in raven subsidies, the Authority will contribute $105 per acre for the estimated permanent disturbance footprint of the Avenue M Maintenance site and MOWF and the Palmdale Station on a one-time basis to the regional management and monitoring program fund for the common raven in the California Desert Conservation Area maintained by the National Fish and Wildlife Foundation. These funds will be used to monitor the number of common ravens throughout conservation areas for the desert tortoise, control common ravens that prey on desert tortoises, monitor the effectiveness of management techniques, and cooperate on research and development of additional tools to reduce desert tortoise predation by common ravens.

Conservation Measures Specific to Federally Listed Riparian Nesting Birds

**CM-Avian-01: Conduct Pre-construction Surveys for Federally Listed Riparian Nesting Birds and Implement Avoidance Measures**

No more than 30 days prior to any ground- or vegetation-disturbing activity, the Designated Biologist will make an initial site visit to determine if suitable habitat for western yellow-billed cuckoo, southwestern willow flycatcher, or least Bell's vireo exists in the Work Area, plus a 500-foot buffer (where access permitted).

Where suitable habitat is present, the Designated Biologist will conduct surveys prior to ground- or vegetation-disturbing activities, adhering to guidance in:

- *A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of Yellow-billed Cuckoo* (Halterman et al. 2015)
- *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (Sogge et al. 2010)
- *Least Bell's Vireo Survey Guidelines* (Service 2001)

Habitat assessment and species surveys will be phased with project buildout and the start of activities at each Work Area. Following the surveys, the Designated Biologist(s) will conduct bi-monthly surveys (every two weeks) during construction activities that occur within 500 feet of suitable habitat during the nesting season for riparian nesting bird species or as required by the survey guidelines. If construction activities are subsequently halted or delayed by more than two

weeks (14 days) during the nesting season for riparian nesting bird species, the Designated Biologist(s) will repeat surveys five days prior to the re-initiation of construction activities. Upon re-initiation of construction activities, the Designated Biologist will conduct the bi-monthly surveys. A survey report will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey site.

If a federally listed nesting bird or nest is detected within 500 feet of construction or maintenance activities, the Designated Biologist will establish a 300-foot no-work buffer (where access permitted) around the individual or nest to the extent practicable. The Designated Biologist may adjust the size of the no-work buffer in coordination with the Authority and Service. The Designated Biologist or Biological Monitor will have the authority to halt work if federally listed nesting birds exhibit distress and/or abnormal nesting behavior.

The no-work buffer will remain in place until the Designated Biologist has determined that the individual(s) has left the area or the nest has failed or the young have fledged and are no longer reliant upon the nest site. The Designated Biologist will adjust the no-work buffer size and/or location to ensure that adults and young are not adversely affected by construction.

For construction activities involving the use of a helicopter, the nest buffer for federally listed nesting birds will be 500-feet horizontal and 300-feet vertical. Buffers will be measured from the location of the nest, regardless of where the nest is located.

Conservation Measures Specific to Tipton Kangaroo Rat

**CM-TKR-01: Conduct Pre-construction Surveys for Tipton Kangaroo Rat and Implement Avoidance and Minimization Measures**

The Designated Biologist will conduct habitat assessment surveys in Tipton kangaroo rat potential habitat in the project disturbance footprint plus a 500-foot buffer (where access permitted) within 30 days prior to vegetation or ground-disturbing activities in each Work Area. Where suitable habitat occurs, the Designated Biologist will conduct surveys to determine the presence/absence of kangaroo rat burrows or their signs. The surveys will be phased with project buildout and the start of activities at each Work Area. If no burrows or sign of potential kangaroo rats are observed, no further measures will be required.

If kangaroo rat sign is observed in Tipton kangaroo rat suitable habitat, it will be assumed to be Tipton kangaroo rat in the absence of trapping. Trapping conducted to identify the species of kangaroo rat will follow *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats* (Service 2013b). If trapping is conducted and no Tipton kangaroo rats are detected after five consecutive trapping nights, no further measures will be required. The Project Biologist will submit the survey findings report prior to the start of vegetation- or ground-disturbing activities to the Authority to document compliance with this measure.

In areas where Tipton kangaroo rat are assumed or confirmed to be present:

- ESA fence and WEF will be installed at least 14 days prior to construction or ground-disturbing activities.
- The fencing will be installed under the supervision of the Designated Biologist or Biological Monitor.
- The WEF will be installed at the boundary of the Work Area and will have exits to allow animals inside an enclosed area to leave the Work Area.

- No-work buffers will extend 50 feet beyond the WEF (where access permitted) to avoid and minimize impacts to kangaroo rats outside of the Work Area during the construction period.
- All construction activities within 50 feet of any assumed or confirmed Tipton kangaroo rat burrow will cease one-half hour before sunset and will not begin earlier than one half hour before sunrise to avoid impacts from artificial light to this nocturnal species.

In areas of the project footprint where Tipton kangaroo rat are assumed or confirmed to be present and cannot be avoided:

- Trapping to relocate individuals immediately outside of the Work Area will be conducted following *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats* (Service 2013b).
- Trapping will be phased with project buildout.
- Trapped Tipton kangaroo rats will be relocated to suitable habitat adjacent to and outside the Work Area, and to the extent feasible, released in areas that are known to be absent of other Tipton kangaroo rats.
- Trapping will continue until no Tipton kangaroo rats are detected for five consecutive trapping nights.

Conservation Measures Specific to San Joaquin Kit Fox

**CM-SJKF-01: Conduct Pre-construction Surveys for San Joaquin Kit Fox and Implement Exclusion Areas around Dens**

Within 30 days prior to the start of any ground-disturbing activity in each Work Area, the Designated Biologist will conduct pre-construction surveys in suitable habitat for San Joaquin kit fox in the Work Area plus a 500-foot buffer (where access permitted). If no potential dens or sign of San Joaquin kit fox are observed, no further measures will be required. The surveys will be phased with project buildout and the start of activities at each Work Area.

Potential dens will be monitored for a minimum of five consecutive nights with a trail camera and tracking medium to evaluate den status and determine the presence/absence of San Joaquin kit fox. If there is a risk that cameras may be stolen or vandalized, then at that site, monitoring may be conducted using tracking medium only with prior concurrence from the Service. All potential San Joaquin kit fox dens will be mapped and photo documented and described in the survey report. The Project Biologist will submit a survey findings report prior to start of ground-disturbing activities to the Authority to document compliance with this measure.

Except for den excavations, disturbance to natal, atypical, known, or potential San Joaquin kit fox dens (see definitions below) will be avoided to the maximum extent practical. If a den is present within or adjacent to the Work Area, a non-disturbance exclusion zone will be marked by ESA fencing and WEF as described below. The WEF will have exit doors appropriately sized for kit fox to allow animals inside an enclosed area to leave the Work Area. Natal dens will not be enclosed with WEF until they are no longer occupied. The buffer distances described below may be adjusted based on the conditions of the site and recommendations from the Designated Biologist following consultation with the Service.

- **Potential Den.** 100 feet buffer. A potential den includes all natural earthen dens/burrows with entrances/tunnels 3.5 inches in diameter or larger, but for which there are no historic records or current evidence of use.

- **Atypical Dens.** 100 feet buffer. Atypical dens are manmade structures that could potentially be or are currently in use by San Joaquin kit fox. Atypical dens may include, but are not limited to, pipes, culverts and diggings beneath concrete slabs and buildings.
- **Known Den.** 100 feet buffer. A known den is any existing natural den structure that is in use or has historically been used at any time in the past.
- **Natal Den.** 250 feet buffer. A natal den is any den that has historically been used or is currently being used by San Joaquin kit fox to whelp and/or rear pups.

**CM-SJKF-02: Minimize Impacts on San Joaquin Kit Fox**

The Authority will implement the Service's *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (Service 2011b) to minimize impacts on this species, as well as the following measures:

- 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 four inches or greater that are stored within the Work Area 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.
- To minimize the temporary impacts of WEF and construction exclusion fencing on kit fox and their movement/migration corridors during construction, for every den identified in the Work Area, one artificial den will be installed along the outer perimeter of adjacent 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.
- If construction activities within the non-disturbance exclusion zone of active dens cannot be avoided, the agency-approved Project Biologist may initiate passive harassment measures during this period after receiving concurrence from the Service.

**CM-SJKF-03: Implement San Joaquin Kit Fox Den Excavation Measures**

Dens in the project footprint may be excavated under the direct supervision of the Designated Biologist the next day after no kit fox are detected for a minimum of five consecutive nights of den monitoring using trail cameras and tracking medium. If a kit fox is observed at the den during the monitoring period, the den will continue to be monitored until at least five consecutive nights have passed without kit fox detection at the den. If the kit fox does not leave the den, the agency-approved Designated Biologist may initiate passive harassment measures upon receiving concurrence from the Service.

After a den is determined to be unoccupied, it may be excavated under the direction and supervision of the Designated Biologist. Dens will be fully excavated to the end of all tunnels, and then backfilled with dirt and compacted to ensure that kit foxes cannot reenter or use the den site during construction activities.

Destruction of any occupied natal or pupping dens will not occur without prior written approval from the Service.

Artificial dens will be installed outside of Work Areas along the outer perimeter of the ESA fence and WEF and/or up to 200 feet distant, as access and conditions permit, to provide cover for displaced kit fox. Artificial dens will be installed prior to excavation of a known occupied den. Artificial den design and materials will conform to those recommended by the Service at the time of project construction.

**Action Area**

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." The action area encompasses the project footprint and lands surrounding it. The estimated length of the alignment will extend approximately 85 miles between the Project Section's northern logical terminus, approximately 1.4 miles north of the Bakersfield Station, to its southern logical terminus, approximately 1.1 miles south of the Palmdale Station (Figure 1 and Figure 2). The area affected by disturbance from noise, vibrations, dust, and lighting during project construction is expected to extend up to 100 feet (from both sides of the project footprint) for federally listed plant species and 1,000 feet (from both sides of the project footprint) for federally listed wildlife species. Associated project structures, such as roadway improvements, overcrossings, related ancillary facilities, and other permanent project elements, are included in the estimated project action area. The action area is estimated to include a total of 13,642 acres for plants and 41,766 acres for wildlife, which will be considered for the purposes of this biological opinion.

**Analytical Framework for the Jeopardy Determination**

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

**Status of the Species**

*Kern mallow*

Please refer to the *Kern Mallow* (Eremalche kernensis = Eremalche parryi ssp. kernensis) *5-year Review* (Service 2020a) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Bakersfield cactus*

Please refer to the *Bakersfield Cactus* (Opuntia treleasei = Opuntia basilaris ssp. treleasei) *5-year Review* (Service 2020b) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*San Joaquin adobe sunburst*

Please refer to the *Hartweg's golden sunburst* (Pseudobahia bahiifolia) and *San Joaquin adobe sunburst* (Pseudobahia peirsonii) *5-year Review* (Service 2007) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Kern primrose sphinx moth*

Please refer to the *Kern Primrose Sphinx Moth* (Euproserpinus euterpe) *5-Year Review* (Service 2020c) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Blunt-nosed leopard lizard*

Please refer to the *Species Status Assessment for the Blunt-nosed Leopard Lizard* (Gambelia sila) *Version 1.0* (Service 2020d) for the current status of the species. No change in the species' listing status was recommended in the Service's most recent 5-year review (Service 2020e). Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Desert tortoise*

Please refer to the *Mojave Population of the Desert Tortoise* (Gopherus agassizii) *5-Year Review: Summary and Evaluation* (Service 2010) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no

proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Least Bell's vireo*

Please refer to the *Least Bell's Vireo* (Vireo bellii pusillus) *5-Year Review: Summary and Evaluation* (Service 2006) for the current status of the species. The 5-year review recommended that the species be downlisted to threatened. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*Tipton kangaroo rat*

Please refer to the *Tipton Kangaroo Rat* (Dipodomys nitratoides nitratoides) *5-Year Review* (Service 2020f) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

*San Joaquin kit fox*

Please refer to the *Species Status Assessment Report for the San Joaquin Kit Fox* (Vulpes macrotis mutica) *Version 1.0* (Service 2020g) for the current status of the species. No change in the species' listing status was recommended in the Service's most recent 5-year review (Service 2020h). Threats evaluated during that review have continued to act on the species since the review was published. To date, no proposed action has had a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

**Environmental Baseline**

The action area encompasses three ecoregions (sections): the Central Valley Ecoregion (Section 1), the Tehachapi Foothills and Mountains Ecoregion (Section 2), and the Antelope Valley Ecoregion (Section 3) (Figure 3). These sections traverse a landscape composed primarily of open natural land, subject to varying levels of disturbance associated with activities such as cattle and sheep ranching, wind energy, and off-road vehicle use.

Mineral/rock extraction occurs in some locations, and in the larger metropolitan areas of Bakersfield, Tehachapi, and Palmdale, the habitat is highly disturbed and fragmented by urban, agricultural, highway, and local transportation land uses. Sections 1 and 3 have an arid to semi-arid climate with generally hot and dry summers. Section 2 experiences a typical Mediterranean climate pattern characterized by warm, dry summers and cool, wet winters.

Section 1 extends approximately 24 miles from the Project Section's northern terminus in Bakersfield to near the junction of SR 223 and SR 58 in the Tehachapi foothills. The terrain is moderately flat with an elevation between 408 feet to 1,923 feet. Land use is predominantly urban and agricultural in and near Bakersfield, transitioning to grassland and scalebroom (*Lepidospartum squamatum*) scrub on the eastern edge of the Central Valley.

Section 2 extends approximately 26 miles from near the junction of SR 223 and SR 58 in the Tehachapi foothills, through the Tehachapi Mountains, to approximately two miles south of Oak Creek Road near the southeastern boundary of the Tehachapi foothills.

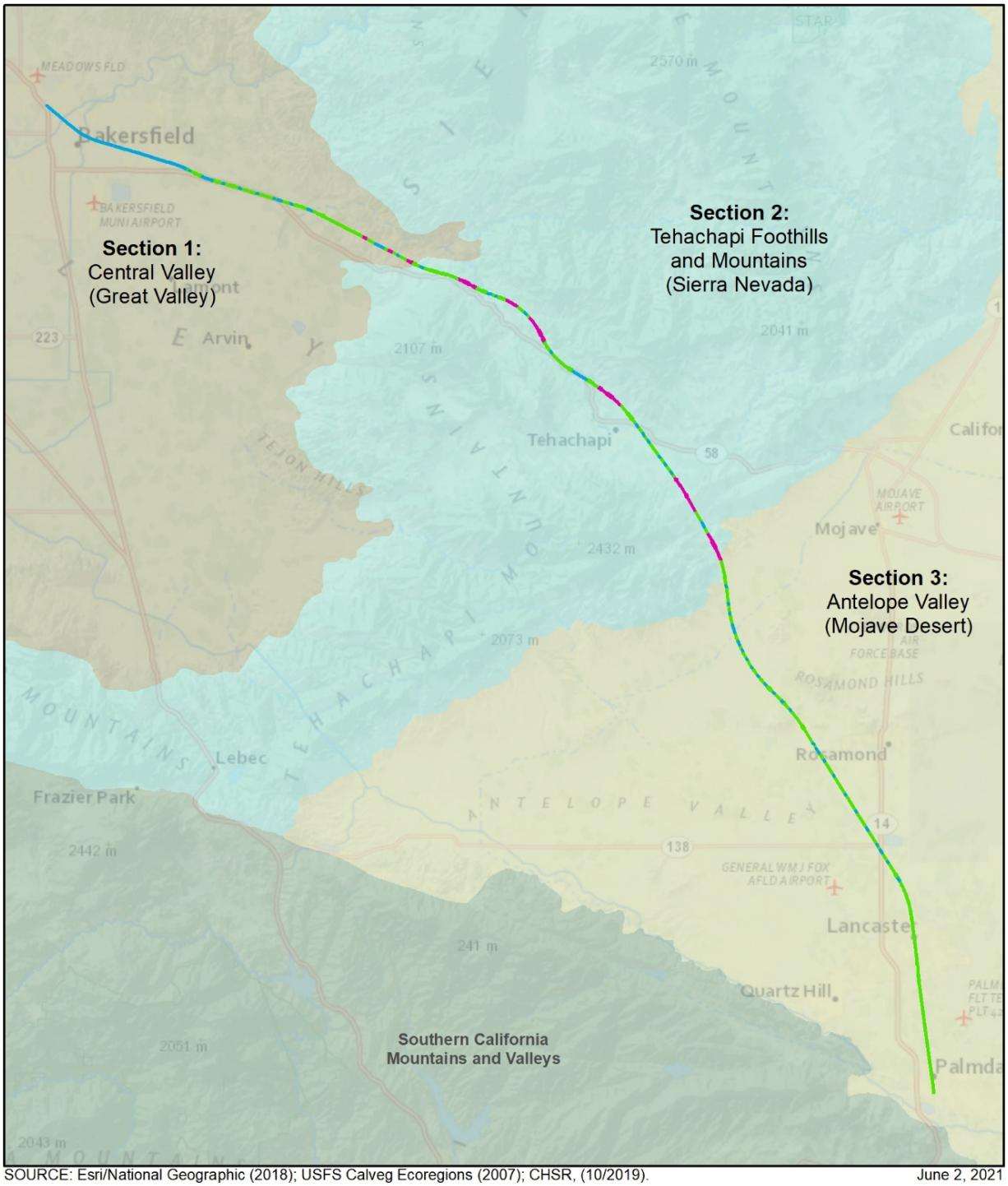



**Figure 3 Bakersfield to Palmdale Project Section—Ecoregions**

The terrain in the action area varies between gently sloping hills and valleys to a complex mix of steep hills and valleys in the mountains with the elevation an elevation between 1,682 feet to 5,015 feet. The low foothills along the edge of the urban and agricultural areas are covered predominantly in grassland that is utilized for grazing. Mountainous areas are dominated by blue oak (*Quercus douglasii*) and California foothill pine (*Pinus sabiniana*) woodlands, with Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and willows (*Salix* spp.) in the larger drainages. Disturbed areas are primarily occupied by annual grasslands. The desert-facing slopes of the mountains are covered by California juniper (*Juniperus californica*) and California buckwheat (*Eriogonum fasciculatum*) scrub at higher elevations, and by Joshua tree (*Yucca brevifolia*) woodland, creosote bush (*Larrea tridentata*) scrub, and cheesebush (*Ambrosia salsola*) scrub at lower elevations.

Section 3 extends approximately 35 miles from approximately two miles south of Oak Creek Road the near the southeastern boundary of the Tehachapi foothills to the Project Section's southern terminus in Palmdale. The landscape is dominated by alluvial basins, scattered remnant mountains worn away by erosion or buried by sediment and debris, and dry lake playas (Norris and Webb 1990). Elevation in the action area ranges from 2,308 feet to 3,942 feet.

The gently undulating topography consists of a mosaic of shallow claypan depressions interspersed among surrounding vegetation and vegetated mounds (termed claypan mosaics). Much of the action area passes through active and fallow agricultural lands. Undeveloped portions are predominantly vegetated with creosote bush, cattle saltbush (*Atriplex polycarpa*), Joshua trees, and Nevada jointfir (*Ephedra nevadensis*) at higher elevations, and by shadscale (*Atriplex confertifolia*) at lower elevations, with rubber rabbitbrush (*Ericameria nauseosa*) and grassland in disturbed areas.

*Species*

The Authority used species habitat suitability modeling initially to delineate potentially suitable habitat (hereinafter referred to as "modeled habitat") and to estimate potential species distribution in the action area along the alignment. It can be reasonably assumed that not all modeled habitat will be occupied. The modeling effort used a combination of newly developed rule-based models for the mallow, the cactus, the sunburst, the moth, the lizard, and the vireo, and statistical models developed for the tortoise, the kangaroo rat, and the kit fox from previous regional planning efforts. Rule-based models identified potentially suitable habitat based on scientific literature and species expert input related to the physical and biological habitat parameters associated with species occurrence. The precision of the species models is greatest in the project corridor, where detailed vegetation mapping was conducted for the permanent and temporary project impact footprints and within 500 feet of the permanent and temporary project impact footprints, using high resolution aerial photography and field reconnaissance surveys where access was available.

The results of the species habitat suitability modeling were applied to the following:

- **Impact estimates:** The species habitat suitability models were overlain with the proposed project footprint to determine the total area of potential impact to each species modeled habitat.
- **Developing avoidance and minimization measures and determining habitat offsets:** Species habitat suitability models provided information for the development and application of species-specific conservation measures, and for the determination of the amount of compensatory mitigation that may be required for impacts to each species habitat.

Kern mallow

The action area contains 1,180 acres of modeled habitat for the mallow, which are all in Section 1. Approximately 212 acres of modeled habitat for the mallow are in the project's temporary disturbance footprint and approximately 669 acres are in the permanent disturbance footprint.

There are no known occurrences of the mallow in the action area and this species was not detected during botanical surveys conducted for the proposed project where access was granted in 2011, 2013, 2015, or 2016. However, there is a documented, presumed extant occurrence of the mallow in the California Natural Diversity Database (CNDDB) from 2009 in a Tejon Ranch conservation unit, approximately 2.8 miles south of the action area in Section 2 (CDFW 2020). While the mallow has not been documented in the action area, its presence is assumed based on the presence of suitable habitat in the action area and proximity to documented occurrences.

Bakersfield cactus

The action area contains approximately 3,902 acres of modeled habitat for the cactus. There are approximately 1,101 acres of modeled habitat in Section 1 and 2,801 acres in Section 2. Approximately 463 acres of modeled habitat for the cactus are in the project's temporary disturbance footprint and approximately 2,525 acres are in the permanent disturbance footprint.

There are two extant CNDDB records for the cactus reported in the action area in Section 2, east of Bakersfield (CDFW 2020). Cactus were observed during botanical surveys conducted for the proposed project where access was granted in 2015 and 2016 (Rincon Consultants 2015, Rincon Consultants 2016). These observations occurred at the east edge of the Central Valley in Caliente Creek in Section 1 and on adjacent hillslopes near Bena Road in Section 2. The individuals were mapped in locations that overlapped one of the CNDDB records.

San Joaquin adobe sunburst

The action area contains approximately 2,220 acres of modeled habitat for the sunburst. There are approximately 955 acres of modeled habitat in Section 1 and 1,265 acres in Section 2, primarily from Caliente Creek to Tweedy Creek southeast of Bakersfield. Approximately 245 acres of modeled habitat for the sunburst are in the project's temporary disturbance footprint and approximately 1,517 acres are in the permanent disturbance footprint.

There are no documented occurrences for the sunburst in the action area. However, approximately 400 sunburst were observed during botanical surveys conducted for the proposed project where access was granted in 2015 and 2016 (Rincon Consultants 2015, Rincon Consultants 2016). This population was located on Tejon Ranch in Section 2, immediately adjacent to the action area (i.e., approximately 100 feet outside the survey area), approximately two miles southwest of Ilmon, between SR 58 and Bena Road. While the sunburst has not been documented in the action area, its presence is assumed based on the presence of suitable habitat in the action area and observations of this species immediately adjacent to the action area.

Kern primrose sphinx moth

The action area contains approximately 4,860 acres of modeled habitat for the moth. There are approximately 2,409 acres of modeled habitat in Section 1 and 2,451 acres in Section 2. Approximately 218 acres of modeled habitat for the moth are in the project's temporary disturbance footprint and approximately 968 acres are in the permanent disturbance footprint.

The moth is typically found in sandy alluvial soils in and beside washes that support its larval host plants, evening primrose (*Camissonia contorta*) in the Walker Basin and sun cup

(*Camissonia campestris*) in the Carrizo Plain and Cuyama Valley. During the project's 2015 and 2016 botanical surveys, the moth's host plants were observed in areas of sandy/gravelly soils, including streambeds on Tejon Ranch in Section 1 and Section 2 (Rincon Consultants 2015, Rincon Consultants 2016).

The ephemeral watercourses and alluvial fans in the foothills of the San Joaquin Valley and Tehachapi Mountains in the action area (Section 1 and Section 2) are between these geographic areas of known occurrence (Walker Basin in Kern County, Carrizo Plain in San Luis Obispo County, and Cuyama Valley at the intersection of Santa Barbara, San Luis Obispo, Ventura, and Kern counties). Therefore, although no documented occurrences for the moth exist in the action area, its presence is assumed where *Camissonia* occurs in sandy washes of Section 1 and Section 2. The moth is not expected to be present in the San Joaquin Valley floor of Section 1 because suitable habitat is largely absent due to modification by agriculture and development.

Blunt-nosed leopard lizard

The action area contains 5,519 acres of modeled habitat for the lizard. There are approximately 4,519 acres of modeled habitat in Section 1 and 1,000 acres in Section 2. Approximately 322 acres of modeled habitat for the lizard are in the project's temporary disturbance footprint and approximately 1,309 acres are in the permanent disturbance footprint.

Following our review of the distribution and extent of modeled habitat for the lizard in the action area, it is our professional judgement that the habitat suitability modeling overestimates the range of where lizards potentially occur along the project and thus overestimates the amount of suitable habitat available. Specifically, we believe that lizards are potentially present in undeveloped habitat around Caliente Creek and the adjacent lower Tehachapi foothills (Figure 2). Based on the length of this section and the footprint of the project, we estimate there are approximately 382 acres of suitable habitat for the lizard in the project footprint. Lizards were not observed during general wildlife and habitat assessment surveys conducted for the proposed action where access was granted in 2011 and 2015. Because of the presence of suitable habitat in the action area, this species is assumed to be present in small or isolated populations in annual grassland habitats with sparse vegetation and appropriate sandy soils near the San Joaquin Valley floor in Section 1.

Desert tortoise

The action area contains approximately 16,084 acres of modeled habitat for the tortoise, including approximately 961 acres of modeled habitat in Section 2 and 15,123 acres in Section 3. The southern portion of the action area is in the Western Mojave Recovery Unit for tortoise (Service 2011a) and an indicator for where tortoises potentially occur. Approximately 680 acres of potentially suitable modeled habitat for the tortoise are in the project's temporary disturbance footprint and approximately 3,108 acres are in the permanent disturbance footprint.

Following our review of the distribution and extent of modeled habitat for the tortoise in the action area, it is our professional judgement that existing survey and monitoring data and other information from the vicinity of the project (Authority 2020, Bransfield 2021) provide a more accurate method for estimating the potential area of suitable habitat and numbers of tortoises in the action area. Specifically, we believe that the habitat suitability modeling overestimates the range of where tortoises potentially occur along the project and thus overestimates the amount of suitable habitat available. We based this determination on the results of surveys and monitoring conducted for numerous industrial-scale solar projects, wind-energy projects, and transmission lines in the area (Bransfield 2021). These surveys found very low numbers of tortoises in the

foothills of the southern slope of the Tehachapi Mountains and no tortoises south of the town of Mojave. Similarly, the California Natural Diversity Database includes a small number of isolated tortoise records from within 10 miles of the action area in the Antelope Valley and southeast edge of the Tehachapi Mountains. The southernmost observations of tortoise that we are aware of in the vicinity of the project were on Backus Road at its junction with State Route 14 (Bransfield 2021) and at Champagne Road and Tehachapi Willow Springs Road near Rosamond (CNDBB 2020). Protocol level surveys for desert tortoises conducted by the Authority in 2012 within a limited area of the project footprint found no tortoises.

We used this information to determine the extent of the project where tortoises could occur; the northernmost area was where the project emerged at surface level from the Tehachapi Mountains and the southernmost area was where the project intersected with the Backus Road and Champagne Road area, west of, and between the towns of Mojave and Rosamond (Figure 2). Based on the length of this section and the footprint of the project, we estimate that tortoises are potentially present in approximately 738 acres of suitable habitat in the project footprint.

We used this area calculation to estimate the number of tortoises potentially occurring in the action area. Since 1999, the Service and Utah Division of Wildlife Resources have conducted line-distance sampling surveys for tortoises in the five recovery units delineated across the range of the species (Alison and McLuckie 2018). Data from these surveys are used to estimate tortoise density and abundance and monitor population trends in each of 17 different Tortoise Conservation Areas. Survey results from 2019 indicated that the estimated density of large tortoises (>180 mm carapace length) in the Fremont-Kramer Area of Critical Environmental Concern (ACEC), the nearest Tortoise Conservation Area to the project located approximately 11 miles to the east, was 2.7 large tortoises per square kilometer (247.1 acres) with 95% confidence intervals from 1.7 to 4.3 large tortoises per square kilometer (Service 2020i). Using the amount of suitable habitat estimated to be within the action area (738 acres) and the lower 95% confidence interval for the estimated density of tortoises in the Fremont-Kramer ACEC, we estimate that 5 large tortoises occur in the action area. We chose to use the lower 95% confidence interval from the density estimates because the project includes large areas with disturbed and degraded habitat. Therefore, we assume there are lower densities of tortoises in the action area compared to the Fremont-Kramer ACEC. Based on habitat conditions in the vicinity of the project and results of surveys and monitoring mentioned previously, we believe that these lower density estimates overestimate the number of tortoises that likely occur in the action area. We report numbers of large desert tortoises because individuals of this size are most likely to be detected by observers and therefore this was the metric reported for the line-distance sampling surveys.

Least Bell's vireo

The action area contains approximately 155 acres of modeled breeding habitat for the vireo. There are 39 acres of modeled habitat in Section 1 and approximately 116 acres in Section 2. Approximately six acres of modeled habitat for the vireo are in the project's temporary disturbance footprint and approximately 18 acres are in the permanent disturbance footprint.

There are no documented occurrences for the vireo in the action area in CNDDB. However, one individual was documented singing at Una Lake in 2005 and another was documented in the Lancaster area in 2006 (CDFW 2020). Both observations were approximately one mile outside the action area for Section 3. eBird (2020) reports Bell's vireo (*Vireo bellii*) in and adjacent to the action area, including a May 2000 observation of one individual in the action area in Palmdale and one individual at the Amargosa Creek Flood Basin, approximately one mile west of the action area, in May 2006 and 2012 and in May and June 2017.

Although riparian areas are preferred for breeding, the vireo may also use other habitat types in the action area as a transient during migration or dispersal. Because of the presence of suitable habitat in and near the action area, breeding and transient individuals are assumed to be present in the action area in suitable habitat.

Tipton kangaroo rat

The action area contains approximately 3,441 acres of modeled habitat for the kangaroo rat. There are approximately 2,564 acres of modeled habitat in Section 1 and 877 acres in Section 2. Approximately 195 acres of modeled habitat for the kangaroo rat are in the project's temporary disturbance footprint and approximately 908 acres are in the permanent disturbance footprint.

Following our review of the distribution and extent of modeled habitat for the kangaroo rat in the action area, it is our professional judgement that the habitat suitability modeling overestimates the range of where kangaroo rats potentially occur along the project and thus overestimates the amount of suitable habitat available. Specifically, we believe that kangaroo rats are potentially present in undeveloped habitat around Caliente Creek and the adjacent lower Tehachapi foothills (Figure 2). Based on the length of this section and the footprint of the project, we estimate there are approximately 244 acres of suitable habitat for the kangaroo rat in the project footprint. This species was not observed during general wildlife and habitat assessments surveys conducted for the proposed project where access was granted in 2011 and 2015. While the kangaroo rat has not been documented in the action area, its presence is assumed in undisturbed grassland habitat and open areas around Caliente Creek in Section 1.

San Joaquin kit fox

The action area contains approximately 10,408 acres of modeled habitat for the kit fox. There are approximately 9,075 acres of modeled habitat in Section 1 and 1,333 acres in Section 2. Approximately 3,530 acres of modeled habitat in Section 1 in Bakersfield is classified as urban suitable habitat. Portions of the action area are in recovery plan areas for the kit fox, including the Metropolitan Bakersfield Satellite Recovery Area (approximately 296 acres) and the Bakersfield to Tehachapi Foothills Linkage Area (approximately 1,602 acres). Approximately 564 acres of modeled habitat for the kit fox are in the project's temporary disturbance footprint and approximately 2,022 acres are in the permanent disturbance footprint.

The kit fox has been documented successfully living and reproducing in urban Bakersfield in Section 1. The Tehachapi foothills southeast of Bakersfield in Section 2 consist primarily of annual grasslands on gently sloping terrain; this natural habitat provides greater potential for kit fox utilization than intensively agriculturally developed areas. The CNDDB also reports two occurrences of the kit fox in the action area in Section 1 in and near Bakersfield (CDFW 2020).

*Stressors*

Common stressors in the action area to most or all the species include:

- Disturbance to habitat from urbanization, energy development (oil, gas, and solar), grazing, and agriculture
- Impacts from introduction of non-native invasive species (plants and insects)
- Herbicide and pesticide use
- Off-highway vehicle use
- Small population size

- Predation (for wildlife species, including nest brood parasitism for avian species)
- Climate change (including impacts from regional drought and fire)
- Inadequacy of existing regulatory mechanisms

Additional stressors for the tortoise include the presence of roads, routes, trails, railroads, and utility corridors in suitable habitat. Additional stressors for the kit fox include shooting and vehicle-caused mortality.

**Effects of the Action**

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The proposed action will result in temporary and permanent loss of suitable habitat for the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox.

*Kern mallow, Bakersfield cactus, and San Joaquin adobe sunburst*

The proposed action is anticipated to affect the mallow, the cactus, and the sunburst where suitable habitat is identified in the action area. Of the 881 acres of modeled habitat in the project footprint for the mallow, 2,988 acres for the cactus, and 1,762 acres for the sunburst, these species are reasonably certain to occur in approximately 818 acres, 2,821 acres, and 75 acres respectively of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed action. This habitat corresponds to areas where populations are known to or could occur, and required soil substrates and textures, vegetation communities, and/or elevation exist (i.e., core suitable habitat), and where adverse effects to the mallow, the cactus, and the sunburst are likely to occur if individuals are present. The remaining 63 acres, 167 acres, and 1,687 acres of modeled habitat for the mallow, the cactus, and the sunburst, respectively, are areas where these species have not been encountered or are outside of core suitable habitat. Effects to these species from construction and O&M activities could occur outside the project footprint but are not likely to be adverse.

Construction activities, such as vegetation clearing, ground disturbance, and operation of equipment and vehicles, may result in habitat loss, modification or degradation, disruption of soil seed banks, or injury or mortality to individuals of these species. If these species are present, the potential for effects will depend on whether individuals can be avoided. If these species are present and cannot be avoided, salvage and relocation will be implemented. Although the cactus is known to occur in the action area, relatively few of the individuals will be affected; they will be readily detectable year-round and relocated to suitable habitat.

Construction may result in loss, modification, or degradation of suitable habitat if non-native invasive plant species are introduced increasing competition for resources. However, most suitable habitat for these species occurs in areas subject to heavy grazing and non-native invasive plant species are already present and established. Additionally, these species may colonize portions of the project footprint that are temporarily impacted and revegetated upon completion of construction.

Habitat fragmentation may result in genetic isolation if seeds are unable to disperse across the project footprint. Seed dispersal agents are unknown for each of these species, but gravity, wind, water, and animals may aid with seed dispersal. The cactus produces seeds infrequently; this species more commonly grows from fallen pads that may be dispersed during flood events. The design of the proposed action includes systems to facilitate drainage and wildlife movement allowing seeds (or pads) to be carried via water and animals. Furthermore, wind will continue to function as a dispersal mechanism to carry seed through the security fencing and across the tracks. Therefore, this effect is anticipated to be low.

During the O&M phase of the proposed action, direct injury or mortality may result if activities occur in areas that these species colonize after construction. Application of herbicide may result in injury or mortality if overspray occurs. Fugitive dust released during O&M activities may result in reduced vigor leading to potential decline of individual plants. Ground disturbance and vegetation control via clearing and grubbing may facilitate the spread of non-native invasive plant species into habitats adjacent to the project through the introduction of seeds and propagules, resulting in increased competition for resources with these species. However, as noted above, non-native invasive plant species already persist in the majority of suitable habitat for these species in the action area.

To avoid and minimize effects to these species from the proposed action, the Authority has proposed general and species-specific conservation measures including pre-construction surveys, establishment of environmentally sensitive areas and non-disturbance zones, and salvage and relocation plans. Suitable habitat for these species that is temporarily disturbed will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the mallow, the sunburst, and the cactus will also be implemented for temporary and permanent impacts to suitable habitat.

*Kern primrose sphinx moth*

The project will result in effects to modeled habitat but does not affect known occupied habitat of the moth. Of the 1,186 acres of modeled habitat in the project footprint, moths are reasonably certain to occur in approximately 53 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed project. This habitat corresponds to washes where sandy alluvial soils may be present and could support the species' larval host plants (*Camissonia*) and where adverse effects are likely to occur if moths are present. The remaining 1,133 acres of modeled habitat are areas not associated with washes and where sandy soils that support the species' host plants appear to be absent or are only infrequently observed. Changes in moth behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction activities, including vegetation clearing (including removal of *Camissonia*), rail bed build up, and placement of temporary and permanent structures, may result in loss and modification of suitable habitat. Modification of habitat due to direct removal of host or nectaring plants, the introduction or spread of nonnative plants, dust, soil erosion and compaction, or alterations to hydrology may result in a reduction or decline of plant populations that support moth breeding and foraging. The loss or modification of habitat may result in increased competition for resources leading to competitive exclusion. Mortality or injury may result from collisions with vehicles or equipment and disturbance and displacement of individuals may result from noise, vibration, and air turbulence. Disturbance of occupied host plants or sandy soils may result in injury or mortality of eggs, pupae, larvae, or adults. Lighting may attract moths and may result in increased vulnerability to predation. These effects may in

turn disrupt normal breeding or foraging behaviors, resulting in increased mortality and decreased reproduction and survival.

O&M activities may result in limited to temporary displacement or direct morality or injury from passing trains and maintenance vehicles. O&M noise, light, and vibration disturbance from the trains, including nighttime train operations, from security lighting around facilities, and from routine maintenance and repair activities may result in disruption of behavior or displacement of individuals that occur near the project. Routine maintenance activities may include herbicide or pesticide application to reduce weeds and nuisance animals, which may reduce the fitness and lower survivorship of individual plants or moths. These effects may in turn result in abandonment of feeding and breeding sites, affecting the species' recovery.

To avoid and minimize adverse effects to the moth from the proposed action, the Authority has proposed general and moth-specific conservation measures including but not limited to pre-construction surveys, biological monitors, establishment of environmentally sensitive areas, avoidance of nighttime light disturbance, and water and dust palliative measures. Suitable habitat for the moth that is temporarily disturbed will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the moth will be implemented for temporary and permanent impacts to suitable habitat containing host plants (*Camissonia*) in sandy washes where moth are assumed to be present. The action area does not overlap with the known geographic range of the moth; however injury and mortality to eggs, larvae, pupae, and adults that occur in suitable habitat impacted by the proposed action where the moth is assumed to be present are likely unavoidable due to the cryptic nature of this species and its biology (e.g., short flight season for adults; burrows underground until suitable conditions occur).

*Blunt-nosed leopard lizard*

Lizards are reasonably certain to occur in approximately 382 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed project. This corresponds to undeveloped habitat that overlaps portions of modeled, core suitable habitat, potentially suitable habitat, and atypical habitat. This habitat extends approximately 3.3 linear miles along the project alignment from the eastern edge of active agricultural areas on the west side of Caliente Creek, east into the lower Tehachapi foothills to approximately 600 feet in elevation above Caliente Creek. We believe this is where lizard populations could occur and where adverse effects are likely to occur if lizards are present. The remaining modeled habitat outside of this area is where lizards are expected to be absent due to too much vegetative cover, increased topography, or active agricultural and urban land uses. Changes in lizard behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction related habitat loss, degradation, modification, or fragmentation may result in disruption or decline in feeding and breeding, loss of burrowing/refugia sites, disruption of movement corridors, and genetic isolation. Construction related operation of equipment and maintenance vehicles or placement of debris may result in injury or mortality of lizards, crush their burrows and/or nests, or entomb/entrap lizards. Noise and vibrations from construction equipment as well as habitat loss or modification may disturb any lizards in the action area causing them to leave the area and experience reduced fitness due to disruption of normal behaviors and increased pressure from competition and/or predation.

O&M activities may result in injury or mortality to lizards due to train or maintenance vehicle strikes. Impermeable infrastructure such as rail beds, ballast, or tracks may obstruct dispersal or migratory movements. Tall or elevated project components such as fencing and other structures

may provide increased perch sites for avian predators. Ongoing habitat changes due to maintenance activities involving pesticides and herbicides may reduce prey availability or otherwise alter the vegetation composition of areas within and adjacent to the project footprint. Noise or vibration during the operation of trains, including nighttime train operations, may disrupt normal behavior or displace individuals residing near the project, resulting in declines in feeding or breeding or causing them to abandon burrows or breeding sites.

To minimize and avoid these effects of the proposed action on the lizard, the Authority has proposed general and lizard specific conservation measures including pre-construction surveys, daily surveys, exclusion fencing, and biological monitors. Security fencing will be designed to exclude the species from accessing the ROW to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the lizard that is temporarily disturbed will be restored to pre-disturbance conditions following construction and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the lizard will also be implemented for temporary and permanent impacts to suitable habitat. Habitat fragmentation and substantial obstruction of movement will be avoided with implementation of wildlife crossing structures proposed throughout the alignment and will provide lizards with movement and dispersal corridors, though it may increase the potential for the species to encounter predators that may also be utilizing the wildlife crossings.

*Desert tortoise*

Tortoises are reasonably certain to occur in approximately 738 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed project. This habitat overlaps portions of modeled, moderate value suitable habitat and low value suitable habitat. This habitat extends approximately 4.7 linear miles along the project alignment from Backus Road, north to the lower Tehachapi foothills to approximately 3,600 feet in elevation. We believe this is where tortoise populations could occur and where adverse effects are likely to occur if tortoise are present. The remaining modeled habitat outside of this area is where tortoise populations appear to be absent, are only infrequently observed, or are associated with heavily urbanized areas in the Lancaster and Palmdale areas where tortoise have not been encountered. Changes in tortoise behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction of HSR infrastructure, such as security fences, elevated structures, rail beds, and associated facilities, may result in habitat modification or loss from reduction, degradation, fill, pollution, or conversion of suitable breeding or refugia habitat, including loss of vegetative cover or burrows. Introduction of non-native invasive plant species may alter the vegetation structure causing degradation of suitable habitat. Loss, fragmentation, or degradation of habitat may lead to displacement of tortoises into adjacent habitats.

Movement of individuals may be impeded during construction due to increased human disturbance, and associated noise, lights, and dust generated by project construction activities. Increased disturbance and/or inability to move freely may result in burrow/nest abandonment and/or displacement into adjacent habitat. Placement of temporary barriers (e.g., temporary fencing), construction staging areas, increased vehicular traffic, or construction laydown in suitable habitat may also affect the ability of the tortoise to move freely. Impedance of movement by obstacles may result in mortality from hypothermia if tortoises pace newly fenced or otherwise obstructed areas.

Injury or mortality may occur if vehicles or equipment strike the tortoise or crush their burrows or nests, if individuals fall into excavated areas becoming trapped, or during relocation activities.

The capture and handling of desert tortoises for translocation, in this case moving them out of harm's way, can subject them to stress which could cause tortoises to void their bladders and lose stored water. Averill-Murray (2002) demonstrated that desert tortoises that urinated during handling had lower survival rates than those that did not. Consequently, desert tortoises that void their bladders are at an increased risk of dying after their translocation.

The effects identified above and any other construction related activities that interfere with daily and seasonal activities may result in disruption of normal behaviors leading to reduced fecundity and foraging efficiency and decreased survival.

O&M activities may result in injury or mortality if tortoises gain access to the ROW and are exposed to collisions or crushing by maintenance vehicles or trains. Their burrows may be crushed by maintenance vehicles if individual tortoise become established in the ROW or on access roads. Noise, vibration, or light disturbance from train operation, including nighttime train operations, may disrupt or displace tortoises and alter behavior or use areas for individuals residing near the project, including current road crossing locations.

O&M activities may also result in injury or mortality due to increased intra- and interspecific competition due to displacement and exposure to pesticides aimed at other animals, such as California ground squirrels. Ongoing habitat modification may also occur with introduction of non-native invasive plant species and/or application of herbicides during maintenance activities. Herbicides may reduce food resources. O&M activities may also result in disruption of normal behaviors and displacement of tortoises into adjacent habitat.

The track and associated fencing create a linear barrier through otherwise contiguous areas of natural habitat. The track, fencing, and other permanent structures erected in natural lands and known linkages may affect individual tortoise's ability to move freely and limit dispersal, thereby potentially limiting genetic exchange necessary to support the ongoing survival and recovery of the species. Limited dispersal may also lead to increasing foraging competition and tortoises travelling parallel to linear features may experience greater risk of predation.

To avoid and minimize the effects of the proposed action on the tortoise, the Authority has proposed general and tortoise-specific conservation measures including but not limited to pre-construction surveys, biological monitoring, inspections of vehicles and potential shelters, wildlife crossings, avoidance measures for the tortoise and for burrows, and entrapment avoidance. Suitable habitat for the tortoise that is temporarily disturbed will be restored to pre-disturbance conditions following construction and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the tortoise will also be implemented for temporary and permanent impacts to suitable habitat.

Displaced tortoises may reoccupy portions of the project footprint that are temporarily impacted and revegetated upon completion of construction. Mortality of individuals in the fenced train ROW will be avoided as the security fencing will be designed to exclude the species from accessing the ROW. Wildlife crossing structures will be installed throughout the alignment to allow species migration and dispersal and avoid limiting genetic exchange. While the installation of wildlife crossing structures will minimize the impedance of movement for tortoises, they may increase the potential for the species to encounter predators that will also utilize the wildlife crossings.

*Least Bell's vireo*

The vireo prefers riparian areas for breeding, though individuals may use other habitat types in the action area during migration or dispersal. The proposed action is anticipated to affect the

vireo where breeding habitat is associated with water. Migrating individuals and migratory stopover habitat may also be affected by the proposed action. Vireos are reasonably certain to occur in approximately 24 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed project. This habitat corresponds to areas of suitable riparian habitat in the species' historic range where expanding vireo populations are beginning to recolonize and where adverse effects are likely to occur if vireo are present. Changes in vireo behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction activities, such as clearing of vegetation and road construction, may result in the reduction, degradation, fragmentation, fill, pollution, or conversion of suitable foraging, migratory, and breeding habitat. Construction-related introduction of non-native invasive plants may alter vegetation structure or otherwise degrade habitat. Fragmentation of habitat may result in increased edge (non-contiguous) habitat, potentially increasing the presence of avian predators. Loss or modification of habitat and the displacement of vireos into adjacent habitat may result in increased competition for food and nest sites and increased vulnerability to predators.

Operation of equipment and vehicles during construction may result in injury or mortality of individuals from collision and may destroy active nests, nestlings, or hatchlings if activities occur during the breeding season. Increased human disturbance, heavy equipment operation, and associated noise, light, and dust generated by construction activities may disrupt natural foraging and nesting activities and migratory patterns for the vireo. Increased intensity of disturbance may result in nest abandonment, stress-related reduced fecundity, reduced foraging efficiency, and increased flight response, which may result in difficulty in providing food to young and increased energy expenditure, possibly leading to loss of young.

An increase in predation may occur after the HSR system is constructed where security fencing, elevated structures, and other project components create new perch sites or provide protective cover for predatory birds and mammals. If vireos enter the ROW, injury or mortality may result from strikes by trains or maintenance vehicles, or from collisions with overhead power lines. Increased human disturbance and noise from O&M activities (such as passing trains, including nighttime train operations, and maintenance vehicle traffic) may result in displacement from breeding, foraging, or migratory habitat and alteration of natural behavior of individuals occurring near the project, leading to nest abandonment, loss of young, reduced fecundity, reduced foraging efficiency, increased flight response, and increased energy expenditure.

To minimize or avoid effects of the proposed action on the vireo, the Authority has proposed general and vireo-specific conservation measures including pre-construction nesting bird surveys, biological monitors, establishment of environmentally sensitive areas and non-disturbance zones, and bird safe project design. Suitable habitat for the vireo will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the vireo will also be implemented for temporary and permanent impacts to suitable habitat.

*Tipton kangaroo rat*

Loss, fragmentation, and/or alteration of suitable habitat may result from the construction of the proposed action. Kangaroo rats are reasonably certain to occur in approximately 244 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed action. This habitat corresponds to areas around Caliente Creek that are not subject to seasonal flooding and are free of urban and agricultural uses and overlaps portions of modeled and other potentially suitable habitat. This habitat extends approximately 1.9 linear miles along

the project alignment from the eastern edge of active agricultural areas on the west side of Caliente Creek, east into the lower Tehachapi foothills to approximately 400 feet in elevation above Caliente Creek. We believe this is where kangaroo rat populations could occur and where adverse effects are likely to occur if kangaroo rat are present. The remaining modeled habitat outside of this area is where kangaroo rat populations are expected to be absent due to too much vegetative cover, increased topography, or active agricultural and urban land uses. Changes in kangaroo rat behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction activities may result in reduction, degradation, fill, pollution, or conversion of suitable breeding or refugia habitat, including loss of vegetative cover or crushing of burrows. The placement of temporary barriers (e.g., temporary fencing), construction staging areas, increased vehicular traffic, or construction laydown in natural lands and linkages may affect the ability of kangaroo rats to move freely. Construction of security fences, elevated structures, rail beds, and associated facilities will also alter the landscape and may interfere with the daily and seasonal activities, movement, and dispersal of kangaroo rat. The introduction and colonization of non-native invasive plant species may reduce habitat suitability. Disruption of natural foraging, breeding, and movement patterns may result in nest/burrow abandonment, stress-related reduced fecundity, reduced foraging efficiency, increased flight response, increased energy expenditure, and loss of young. These effects may occur also occur to resident individuals if kangaroo rats are relocated to occupied habitat. Kangaroo rats trapped during pre-disturbance surveys and/or for relocation may be susceptible to injury or mortality during trapping and handling.

The installation of track segments, road crossing stations, maintenance facilities, or electrical substations may affect movement or alter the effectiveness of existing wildlife movement corridors. The installation of physical barriers such as fencing may increase exposure of kangaroo rat to predators whose movements are also altered by the proposed action. Sound and vibration related disruptions and uncontained trash from construction activities may alter kangaroo rat behavior or that of other species that may result in increased predation (e.g. attract a predator such as the common raven). Injury or mortality of kangaroo rats may result from vehicles or equipment crushing individuals or their burrows/nests, entrapment of individuals in excavations, pipes, culverts, or similar structures, or during relocation activities. Translocated or otherwise displaced kangaroo rats may experience increased intra- and interspecific competition for food, mates, and burrow/breeding sites.

O&M activities may disrupt normal kangaroo rat behaviors and displace rats in adjacent habitat, as well as cause injury or mortality due to increased intra- and interspecific competition and exposure to pesticides aimed at other animals, such as California ground squirrels. Noise, vibration, or light disturbance during the operation of trains, including from nighttime train operations, could disrupt or displace kangaroo rats residing near the project and change their behavior or use areas and decrease fecundity and survival. Habitat modification may occur with introduction of non-native invasive plant species and/or application of herbicides during maintenance activities. Injury or mortality may result if kangaroo rats gain access to the ROW and are killed through incidental crushing individuals or occupied burrows by the HSR train or maintenance vehicles.

To avoid and minimize the potential effects to the kangaroo rat from the proposed action, the Authority has proposed general and rat-specific conservation measures including but not limited to pre-construction surveys, a trapping and relocation plan, biological monitors, entrapment avoidance measures, wildlife crossings, and wildlife requirements for security fencing. Suitable habitat for the kangaroo rat that is temporarily disturbed will be restored to pre-disturbance

conditions following construction and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the kangaroo rat will also be implemented for temporary and permanent impacts to suitable habitat. Wildlife crossing structures are proposed throughout the alignment to allow species migration and dispersal. The conservation measures, including the linear nature of the project and installation of wildlife crossings, will avoid and minimize potential effects. Portions of the proposed action that will be placed in tunnels will have no linear surface barriers prohibiting wildlife movement. While the installation of wildlife crossing structures will minimize the impedance of movement for kangaroo rats, it may increase the potential for the species to encounter predators that will utilize the wildlife crossings.

Kangaroo rats temporarily displaced by construction may reoccupy portions of the project footprint that are temporarily impacted and revegetated upon completion of construction. Security fencing will be designed to exclude the species from accessing the ROW to avoid injury and mortality of individuals from vehicle or train strikes.

*San Joaquin kit fox*

The project may result in effects to habitat suitable for the kit fox in natural, agricultural, and urban habitats where the alignment traverses the southern San Joaquin Valley from Bakersfield to the Tehachapi foothills (Section 1 and Section 2). Of the 2,586 acres of modeled habitat in the project footprint, kit fox are reasonably certain to occur in approximately 776 acres of suitable habitat that will be temporarily disturbed or permanently lost due to construction of the proposed action. This habitat corresponds to areas where kit fox populations are known to persist, including in Bakersfield, or are intermittently present and where adverse effects are likely to occur. The remaining 1,810 acres of modeled habitat are areas where kit fox populations appear to be absent, are only infrequently observed, or are associated with active agriculture where kit fox are not expected to den and the likelihood of occurrence is low. Changes in kit fox behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

Construction activities may result in reduction, degradation, fill, pollution, or conversion of suitable kit fox habitat. Habitat loss and/or modification may result in additional effects, including the loss of potential denning habitat, restriction of dispersal/movement, and reduction of prey availability. Some individuals may forage closer to conspecifics, resulting in less prey being available in the region and increased exposure to predatory species, such as coyotes, domestic dogs, raccoons, and skunks. As a result, mortality of kit foxes may increase due to predation, competitive exclusion, and disease transmission. A long-term effect of habitat loss or modification may include a reduced survival rate for pups, juvenile, and adult kit fox.

Increased human disturbance, heavy equipment operation, and associated noise, lights, and dust generated by construction may disrupt natural foraging and breeding activities and migratory patterns. Increased disturbances may result in den abandonment, stress-related reduced fecundity, reduced foraging efficiency, and increased flight response, which lead to increased energy expenditure and difficulty in providing food to young, possibly leading to loss of young. Kit foxes may be displaced into adjacent habitat and may experience increased intra- and interspecific competition for food, mates, and breeding sites.

Injury or mortality may occur if the kit fox is present and/or occupying dens within the project footprint while vehicles and construction equipment are in operation and/or ground disturbance is occurring. Entrapment may occur if there are open excavations at a depth that prevent kit foxes from escaping on their own or if individuals are present in pipes, culverts, or similar structures

when they are manipulated during construction (e.g., moved, covered). The placement of temporary barriers (e.g., temporary fencing), construction staging areas, increased vehicular traffic, or construction laydown within natural lands and known linkages may affect the ability of kit fox to move freely and utilize the project footprint for foraging and denning.

Construction of the proposed action may result in changes in long-term habitat connectivity for the kit fox. The action area passes through agricultural lands that are generally not suitable for denning and foraging; however, these areas support dispersal between more suitable habitat areas. The linear nature of the project and the use of permanent access restricted fencing may limit the ability of kit fox to move throughout the region. At-grade portions of the proposed action will restrict kit fox movement. This may affect individual viability by increasing the energetic costs and risks of activities, including mate selection, genetic exchange between dispersed populations, breeding success, hunting, and colonization of new habitats.

During O&M, injury or mortality of kit fox may result if individuals get through the security fencing and are struck by trains or maintenance vehicles and equipment. This could include vehicles traveling on unfenced maintenance access roads to and from the fenced facility. O&M-level noise, light, and vibration from the train traveling on the tracks, including from nighttime train operations, from security lighting around facilities, and from routine maintenance and repair activities, may disturb kit foxes and result in behavioral changes to individuals residing near the project. Such disturbances may disrupt or displace kit foxes, disrupting normal breeding and foraging behaviors and/or causing them to abandon dens. Routine maintenance activities could include application of herbicides and pesticides to reduce weeds and nuisance animals that may lead to on-going reduction of prey availability in proximity to the alignment. These effects may result in reduced survival of pups, juveniles, and adults.

The loss of potential refugia due to the presence of the HSR infrastructure may increase kit fox vulnerability to predators. O&M activities may result in increased predator presence if trash is allowed to accumulate along the track. O&M of the facility may result in an increase in mortality if kit foxes become trapped by predators (e.g., coyotes, domestic/wild dogs) at the wildlife crossings, and/or while traveling parallel to the rail line looking for crossing opportunities.

The Authority has proposed general and kit fox-specific conservation measures to avoid and minimize effects on the kit fox from the proposed action, including but not limited to pre-construction surveys, biological monitors, entrapment avoidance measures, wildlife crossings , avoidance of nighttime light disturbance, den exclusion areas and den excavation measures. Security fencing will be designed to exclude the species from accessing the ROW to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the kit fox will be restored to pre-disturbance conditions following construction and large contiguous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the kit fox will also be implemented for temporary and permanent impacts to suitable habitat. The proposed action includes a combination of tunnels, elevated structures, and at-grade tracks through kit fox habitat. Where tracks are on elevated structures or in tunnels, wildlife movement will not be impeded. Wildlife crossing structures are proposed throughout the alignment to allow for species migration and dispersal.

Compensatory Habitat

The Authority is proposing to provide compensatory habitat as part of the proposed action. This compensatory habitat mitigation is intended to offset the effect on the species of the proposed project’s anticipated incidental take, resulting from the permanent and temporary loss, modification, and/or degradation of habitat described above. The compensatory habitat proposed

will be in the form of placing conservation easements with long-term management plans on compensatory mitigation sites and the purchase of habitat compensation credits at a Service-approved mitigation site or conservation bank.

The amount of suitable habitat for each species that will be impacted, and where adverse effects are reasonability certain to occur, is as follows:

- mallow – 818 acres
- cactus – 2,821 acres
- sunburst – 75 acres
- moth – 53 acres
- lizard – 382 acres
- tortoise – 738 acres
- vireo – 24 acres
- kangaroo rat – 244 acres
- kit fox – 306 acres

Kit fox compensation acreage quantification includes only the non-urban suitable habitat areas outside the city of Bakersfield that will be temporarily disturbed or permanently lost. Impacts to urban habitat within the city of Bakersfield where kit fox is known to occur are not included as replacement of impacted urban habitat is not feasible.

The Authority will provide compensatory mitigation for impacts to suitable habitat for each species per the above acreages. However, upon design finalization of each CP and completion of the pre-construction habitat assessment surveys, the amount of compensatory mitigation may be adjusted downward based on revised estimated impacts to species' suitable habitat, if needed, for each Work Area.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat mitigation will offset the loss of habitat and may contribute to other recovery efforts for the species.

**Cumulative Effects**

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area.

**Conclusion**

After reviewing the current status of the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox; the environmental baseline for the action area; the effects of the proposed action; and the cumulative effects, it is the Service's biological opinion that the construction of the Bakersfield to Palmdale Project Section, as proposed, is not likely to jeopardize the continued existence of these species. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not result in precluding recovery or appreciably reducing the likelihood of survival of these species based on the following:

1) The Conservation Measures are designed to avoid or minimize and offset adverse impacts to these species and their suitable habitat.
2) Project activities that will result in temporary and permanent impacts to suitable habitat only occur on a small percentage of such habitat within the action area and throughout the full range of these species, and as such, would be unlikely to reduce landscape-scale habitat functionality.
3) Protection of habitats within the compensatory mitigation sites would preserve and restore suitable habitat in the same recovery areas (as applicable) affected by constructing and operating the Preferred Alternative of the Bakersfield to Palmdale Project Section.
4) For the lizard, the tortoise, the kangaroo rat, and the kit fox, the Authority has proposed to install dedicated wildlife crossings and other structures to reduce the project's effects to connectivity among populations of these species.

**INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be undertaken by the Authority so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Authority has a continuing duty to regulate the activity covered by this incidental take statement. If the Authority (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Authority must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

**Amount or Extent of Take**

*Blunt-nosed leopard lizard, Tipton's kangaroo rat, and Kern primrose sphinx moth*

The Service anticipates that incidental take of blunt-nosed leopard lizard, Tipton kangaroo rat, and Kern primrose sphinx moth will be difficult to detect due to their life history and ecology and because the number of individuals within the project action area is unknown. Specifically, blunt-nosed leopard lizards and sphinx moth can be difficult to locate due to their cryptic appearance and finding a dead or injured individual during project execution is unlikely due to their relatively small size. Tipton kangaroo rats are also nocturnal which may result in some harm, harassment, and mortality being unobservable. Losses of blunt-nosed leopard lizard, Tipton kangaroo rat, and Kern primrose sphinx moth may also be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in their habitat, or additional environmental disturbances. Therefore, the amount of habitat for these species that will be impacted as a result of the proposed project will be used as a surrogate for quantifying take. The Service anticipates that all individuals within 382 acres of suitable habitat for the blunt-nosed leopard lizard, within 244 acres of suitable habitat for the Tipton's kangaroo rat, and within 53 acres for the Kern primrose sphinx moth could be subject to injury, mortality, harm, or harassment as a result of the proposed project.

*Desert Tortoise*

The Service anticipates the incidental take of all desert tortoises in the action area during the construction and O&M of the project. We anticipate that most large desert tortoises (>180 millimeters mean carapace length) will be captured and moved out of harm's way as the form of take. Large desert tortoises that are not detected during construction and O&M activities may be killed or wounded. Because of the difficulty in finding small desert tortoises, we expect that most of these individuals are likely to be killed or wounded during these activities.

For the purposes of our analysis, we estimate that approximately 5 large desert tortoises reside within the approximately 738 acres of the action area where desert tortoise may occur. We expect that we have overestimated the number of large individuals that are present. We are unable to state precisely how many desert tortoises are present within the action area for several reasons. Desert tortoises are cryptic (i.e., individuals spend much of their lives underground or concealed under shrubs), they are inactive in years of low rainfall, and their numbers and distribution within the action area may have changed since the surveys were completed because of hatchings, deaths, immigration, and emigration. The numbers of hatchlings and eggs are even more difficult to quantify because of their small size, the location of eggs underground, and the fact that their numbers vary depending on the season; that is, at one time of the year, eggs are present but they become hatchlings later in the year.

Construction and O&M activities are likely to kill or wound few large desert tortoises because our prior experience is that the proposed avoidance and minimization measures will be effective. However, occasionally even large desert tortoises remain undetected by project personnel (i.e., Designated Biologists, Biological Monitors, construction and O&M workers) and could be killed or wounded as a result of project activities. Project personnel are likely to detect and move out of harm's way some of the small desert tortoises that occur in the action area; they are unlikely to detect eggs.

Because the Authority is not likely to find every dead or wounded desert tortoise in the action area, the number of dead or wounded individuals that are found likely will be a subset of the number that are killed or wounded. For this reason, we will consider that the Authority has exceeded the amount or extent of take if project activities kill or injure more than 2 large desert

tortoises. We used large desert tortoises to establish this amount or extent of take because small desert tortoises are difficult to find and the method by which we calculate their abundance contains more assumptions and therefore more potential for variation than does our method for predicting the number of large desert tortoises.

*Least Bell's vireo*

The Service anticipates that all least Bell's vireo individuals within the 24 acres of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

*San Joaquin kit fox*

The Service anticipates that incidental take of the San Joaquin kit fox will be difficult to detect due to their shy nature which may cause harmed or harassed individuals to avoid human activity. Also, the species is nocturnal, which may result in some harm being unobservable. There is a risk of harm and injury as a result of the proposed construction activities and the permanent and the temporary loss / degradation of suitable habitat. Therefore, the Service anticipates that all San Joaquin kit fox within the 776 acres that will be disturbed by the project will be subject to incidental take in the form of harm, injury, or harassment. The Service does not anticipate direct lethal take of San Joaquin kit fox as a result of the proposed project based on project design features and the proposed conservation measures.

Upon implementation of the Reasonable and Prudent Measures, these levels of incidental take associated with the Bakersfield to Palmdale Project Section in the form of harm, harassment, capture, injury, and death of the blunt-nosed leopard lizard and the Tipton's kangaroo rat caused by habitat loss and construction and O&M activities will become exempt from the prohibitions described under section 9 of the Act.

**Effect of the Take**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, or the kit fox.

**Reasonable and Prudent Measures**

All necessary and appropriate measures to avoid or minimize effects on the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox resulting from implementation of the Bakersfield to Palmdale Project Section have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the mallow, the cactus, the sunburst, the moth, the lizard, the tortoise, the vireo, the kangaroo rat, and the kit fox:

1) All conservation measures, as described here in the Project Description section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

**Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Authority must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1) The Authority will include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the project.
2) The Authority will require that all personnel associated with this project are made aware of the conservation measures and the responsibility to implement them fully.
3) For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Authority will provide a precise accounting of the total acreage of habitat impacted to the Service on a monthly and annual basis as described in the reporting section of the project description.
4) In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Authority will adhere to the reporting requirements described in the project description. The Authority and Service will coordinate annually at a minimum to discuss the project and determine if any adjustments need to be made to the annual limit, the description of covered actions, or any other portion of the project.
5) Because it is likely that the Authority will not begin construction on the proposed project for a number of years, the Authority will confer with the Service no less than one year before the start of project construction to assess any changes to the project, the species baseline in the action area, and potential changes to the effects from the project on listed species. This process will ensure that the assessment of impacts and proposed avoidance and minimization measures within this opinion are still accurate and reflect existing conditions on the ground.

**Salvage and Disposition of Individuals:**

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the San Joaquin Valley Division Supervisor at the SFWO at (916) 414-6544.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) The Authority should continue to work with the Service to assist us in meeting the goals of the *Recovery Plan for Upland Species of the San Joaquin Valley*.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

## REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the California High-Speed Rail System: Bakersfield to Palmdale Project Section. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;
2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or
4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Justin Sloan, Senior Wildlife Biologist, at justin_sloan@fws.gov or (559) 221-1828 or Patricia Cole, Supervisor, San Joaquin Valley Division, at patricia_cole@fws.gov or (916) 414-6544, or the letterhead address.

Sincerely,

Michael Fris
Field Supervisor

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