CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report/ Environmental Impact Statement

REVISED DRAFT EIR/ SUPPLEMENTAL DRAFT EIS

Fresno to Bakersfield

Executive Summary

July 2012

CALIFORNIA
High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

Fresno to Bakersfield High-Speed Train Section Revised Draft Environmental Impact Report Supplemental Draft Environmental Impact Statement

Summary

Prepared by:

California High-Speed Rail Authority
770 L Street, Suite 800
Sacramento, CA 95814
Contact: Mr. Mark McLoughlin
916-956-8731

USDOT Federal Railroad Administration
1200 New Jersey Avenue SE MS-20
Washington, DC 20590
Contact: Mr. David Valenstein
202-493-6381

Cooperating Agency:
U.S. Army Corps of Engineers
650 Capitol Mall, Suite 5-200
Sacramento, CA 95814
Contact: Mr. Zachary Simmons
916-557-6746

July 2012

California High-Speed Rail Authority and Federal Railroad Administration. 2012. *Fresno to Bakersfield Section California High-Speed Train (HST) Revised Draft Project Environmental Impact Report / Supplemental Draft Environmental Impact Statement (EIR/EIS)*. Volume I: Report. Sacramento, CA, and Washington, DC.

S.0 Summary

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, has responsibility for planning, designing, constructing, and operating the California High-Speed Train (HST). Its mandate is to develop a high-speed rail system coordinating with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

High-Speed Train System

The system that includes the HST guideways, structures, stations, traction-powered substations, and maintenance facilities.

The California High-Speed Train System (HST System) will provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. Figure S-1 shows this system. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train-control systems, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

The Authority plans two phases. Phase 1[1] will connect San Francisco to Los Angeles/Anaheim via the Pacheco Pass and the Central Valley with a mandated express travel time of 2 hours and 40 minutes or less. Phase 2 will connect the Central Valley to the state's capital, Sacramento, and will extend the system from Los Angeles to San Diego.

The Fresno to Bakersfield HST Section, shown on Figure S-2, is a critical Phase 1 link connecting to the Merced to Fresno and Bay Area HST sections to the north and the Bakersfield to Palmdale and Palmdale to Los Angeles HST sections to the south. The Fresno to Bakersfield Section includes HST stations in the cities of Fresno and Bakersfield and a third potential station in the vicinity of Hanford (the Kings/Tulare Regional Station–East Alternative or the Kings/Tulare Regional Station–West Alternative) that would serve the Hanford, Visalia, and Tulare area. The Fresno and Bakersfield stations are this section's beginning and ending points, or project termini.

Because the Fresno to Bakersfield Section alignment alternatives do not converge until they reach Oswell Street, the environmental analysis presented in this Revised Draft EIR/Supplemental Draft EIS extends through Bakersfield to Oswell Street. The environmental analysis has been carried to Oswell Street to inform decision makers of the potential effects to East Bakersfield resulting from the selection of an alternative alignment through the Bakersfield Metropolitan Area.

There are five alternative heavy maintenance facility (HMF) sites being considered in the Fresno to Bakersfield Section. The HMF would support the assembly, testing, commissioning, and acceptance of high-speed train vehicles (rolling stock) prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular system operation and assembly of new rolling stock. One HMF is required for the HST System, and it would be located in the Central Valley in either the Merced to Fresno Section or the Fresno to Bakersfield Section.

[1] Phase 1 would be built in stages dependent on funding availability.

Figure S-1
California HST System initial study corridors

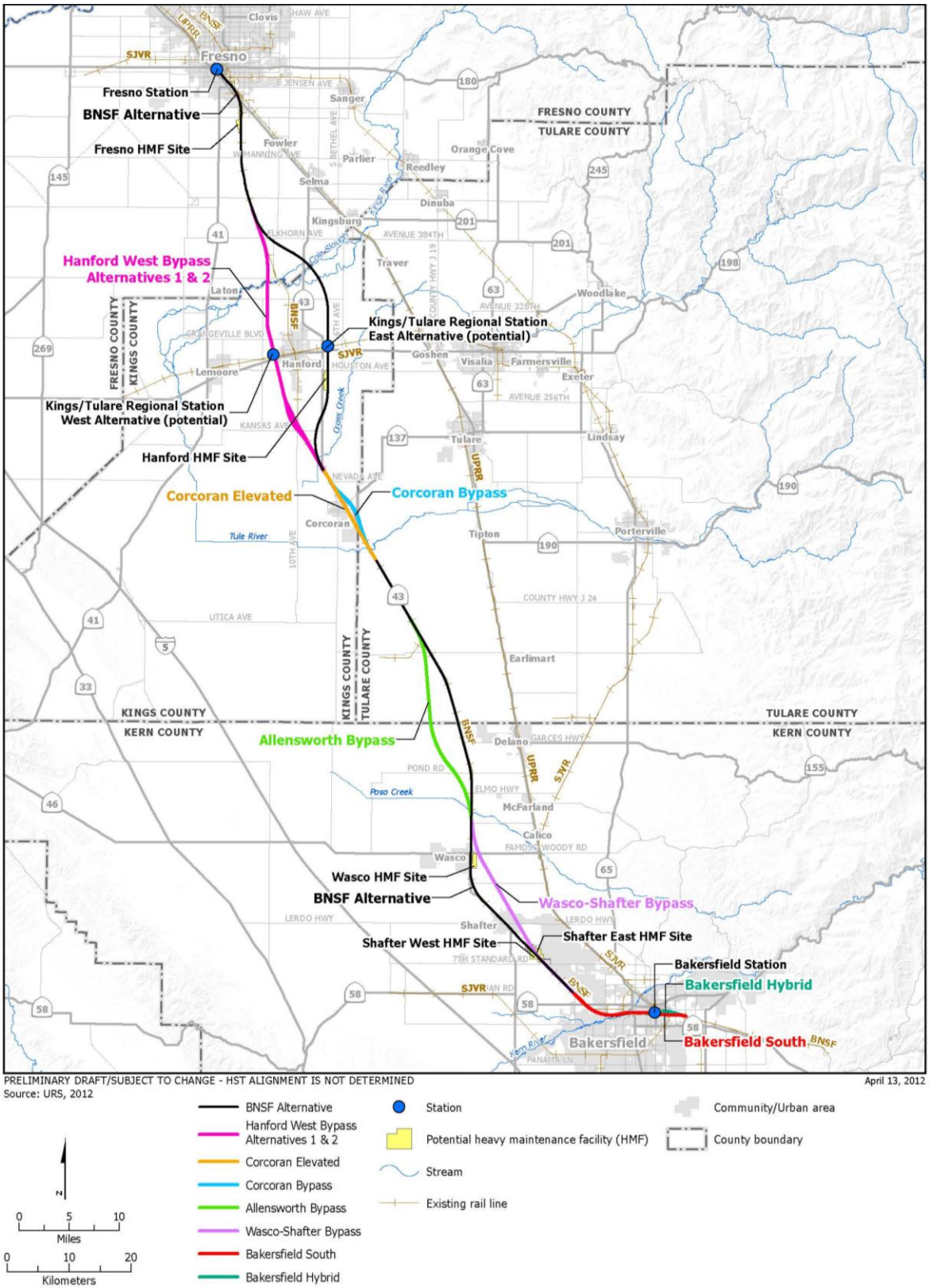

Figure S-2
Fresno to Bakersfield Section project alternatives

S.2 Tiered Environmental Review: Final Statewide Program EIR/EIS and Fresno to Bakersfield Section Project EIR/EIS

The Council on Environmental Quality provides for National Environmental Policy Act (NEPA) decision-making through a phased process. This process is referred to as *tiered* decision making. This phased decision-making process provides for a broad-level programmatic decision at the first tier, with a first-tier EIS, to be followed by more specific decisions at the second-tier, with one or more second-tier EISs. The NEPA tiering process allows for incremental decision-making for large projects that would be too extensive and cumbersome to analyze in a traditional project EIS. The California Environmental Quality Act (CEQA) also encourages tiering and also provides for first-tier and second-tier EIRs.

The Fresno to Bakersfield Section EIR/EIS is a second-tier EIR/EIS that tiers off two first-tier, program EIR/EIS documents, and provides project-level information for decision-making on this portion of the HST System. The 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS* (Statewide Program EIR/EIS) (Authority and FRA 2005) provided a first-tier analysis of the general effects of implementing the HST System across two-thirds of the state. The 2008 *Bay Area to Central Valley HST Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008), and the Authority's 2010 Revised Final Program EIR (Authority 2010) for the Bay Area to Central Valley HST, were also first-tier and programmatic, but focused on the Bay Area to Central Valley region. These first-tier EIR/EIS documents provided the Federal Railroad Administration (FRA) and the Authority with the environmental analysis necessary for the evaluation of the overall HST System, and for making broad decisions about general high-speed train alignments and station locations for further study in second-tier EIR/EISs. These documents are available on the Authority's website: www.cahighspeedrail.ca.gov. The Fresno to Bakersfield Section EIR/EIS analyzes the environmental impacts and benefits of implementing the high-speed train in the more geographically limited area between Fresno and Bakersfield, and is based on more detailed project planning and engineering. The analysis therefore builds on the earlier decisions and program EIR/EISs, and provides more site-specific and detailed analysis.

The Authority and FRA circulated the Draft EIR/EIS for the Fresno to Bakersfield Section to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, and interested individuals for 60 days from August 15 to October 13, 2011. Because of substantive comments received during the public and agency review of the Draft EIR/EIS, the Authority decided to reintroduce two alternative alignments west of Hanford (the Hanford West Bypass 1 and 2 Alternatives) that would be consistent with the preferred alternative identified in the Statewide Program EIR/EIS, and another alternative in Bakersfield (Bakersfield Hybrid Alternative) that would minimize impacts to residential and community facilities in the Bakersfield Metropolitan Area.

After evaluating the proposed addition of the Hanford West Bypass 1 and 2 and Bakersfield Hybrid alternatives and the refinements being considered for the other Fresno to Bakersfield alternatives, the Authority determined, pursuant to Section 15088.5 of the CEQA Guidelines, that it was necessary to prepare and circulate a Revised Draft EIR to analyze the potential environmental impacts that might result from the new alternatives and the refinements to the other alternatives. Pursuant to 40 CFR 1502.9, the FRA also determined that these changes to the project alternatives made it necessary to prepare a Supplemental Draft EIS. Therefore, the Authority and FRA, in cooperation with the U.S. Army Corps of Engineers (USACE), prepared this Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement for the Fresno to Bakersfield Section.

S.3 Issues Raised during the Scoping Process

The Authority held five public scoping meetings between March 18 and March 26, 2009, in the Fresno to Bakersfield Section project corridor, with a total of 400 people attending the five meetings. Scoping helps determine the focus and content of an EIR/EIS. The Authority and FRA received a total of 188 comments from individuals and organizations, as well as comments from 33 agencies, on the proposed project. Major issues identified as a result of scoping follow.

- Visual impacts of the project in general, stations, elevated track, glare.
- HST emissions, particularly dust and its effects on agriculture.
- Conversion of agricultural land to nonagricultural uses.
- Compliance with the Williamson Act.
- Impacts on farm operations.
- Impacts on low-income and minority communities.
- Impacts on community cohesion.
- Fiscal impacts on the state and local jurisdictions.
- Construction impacts.
- System safety with regard to derailments.
- Growth-inducing effects of new transportation system in the San Joaquin Valley.
- Water resource impacts.
- Harm to historic structures.
- Hazardous materials impacts.
- Electromagnetic field impacts on humans and animals.
- Impacts on special-status species and their habitats.
- Noise impacts.
- Transportation impacts: crossings, blocked roads, blocked intersections, congestion if the HST is not implemented.
- Impacts on Amtrak.
- Global warming effects if the HST is not implemented.

S.4 Purpose of and Need for the HST System and the Fresno to Bakersfield Section

S.4.1 Purpose of the HST System

The purpose of the California HST System is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of the state, and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

S.4.2 Purpose of the Fresno to Bakersfield Section

The purpose of this project is to implement the Fresno to Bakersfield Section of the California HST System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the south San Joaquin Valley and connects the northern and southern portions of the system.

S.4.3 Objectives for the HST System Statewide and within the Central San Joaquin Valley Region

The Authority has responded to its mandate to plan, build, and operate an HST System that is coordinated with California's existing transportation network by adopting the following objectives and policies for the proposed HST System:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by current transportation systems, and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020 and generate revenues in excess of operations and maintenance costs.
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled for intercity trips.

The approximately 114-mile-long Fresno to Bakersfield Section is an essential part of the statewide HST System. As part of the Central Valley section of the HST System, it would provide Fresno, Visalia, Tulare, Hanford, and Bakersfield access to a new transportation mode, and would contribute to increased mobility throughout California. This section will connect the south San Joaquin Valley region to the rest of the statewide HST System via Fresno, Kings, Tulare, and Kern counties (see Figure S-1).

S.4.4 Need for the HST System Statewide and within the South San Joaquin Valley Region

The need for an HST system exists statewide, with regional areas contributing to this need. The Fresno to Bakersfield Section is an essential component of the statewide HST System.

The capacity of California's intercity transportation system, including the south San Joaquin Valley region, is insufficient to meet existing and future travel demands, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The current transportation system has not kept pace with the increase in population, economic activity, and tourism within the state, including that in the south San Joaquin Valley region. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions might

be impractical or are constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between the southern San Joaquin Valley, the Bay Area, Sacramento, and Southern California relates to the following issues:

- Future growth in demand for intercity travel, including the growth in demand within the south San Joaquin Valley region.
- Capacity constraints that will result in increasing congestion and travel delays, including those in the south San Joaquin Valley region.
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including the south San Joaquin Valley region.
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state, including the south San Joaquin Valley region.
- Poor and deteriorating air quality and pressure on natural resources and agricultural lands as a result of expanded highways and airports and urban development pressures, including those within the south San Joaquin Valley region.

Geographically, the Fresno to Bakersfield Section is located in the center of California. This region significantly contributes to the statewide need for a new intercity transportation service that would connect it with the major population and economic centers and to other regions of the state. The major population, economic, and political centers are located on the coasts of Northern and Southern California and in the Sacramento Valley.

S.5 Alternatives

This section summarizes the alternatives evaluated in the Fresno to Bakersfield Section Project Revised Draft EIR/Supplemental Draft EIS. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005), the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), public and agency input from the scoping process, extensive local and agency involvement during Technical Working Group[2] (TWG) meetings, other stakeholder meetings, and public and agency comments on the Draft EIR/EIS provided input to the Authority in developing these alternatives.

The track alignment, stations, and heavy maintenance facility (HMF) have been through an alternatives analysis screening process, which considered the effects of the alternatives on the social, natural, and built environment. The screening was performed in collaboration with teams for the adjacent Merced to Fresno Section where the Fresno to Bakersfield and Merced to Fresno sections overlap. In addition to the HST alternatives, a No Project Alternative and HMF alternatives were studied.

S.5.1 No Project Alternative

The No Project Alternative is the basis for comparison of the HST alternatives. The No Project Alternative represents the state's transportation system (highway, air, bus, conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently projected in regional transportation plans (RTPs), have identified funds for implementation, and are expected to be in place by 2035, as well as any major planned land use changes. The entire

[2] Technical Working Groups were composed of senior staff from county and city public works, planning, economic development, and administrative departments.

San Joaquin Valley is projected to grow at a rate higher than any other region in California. The four counties—Fresno, Kings, Tulare, and Kern—are projected to continue to grow at an average of about 3% per year. By 2035, the four-county study area will grow from a 2010 population of 2,397,451 to 4,127,624 for a net increase of 1,730,173 people, or 72%. Accommodating this new population will require land and necessitate the construction of new infrastructure, including roadways, electric power generation, water and wastewater facilities, sewer, schools, hospitals, and commercial and industrial facilities. To support this growth, development would consume an estimated 173,000 acres because, according to current planning trends, these counties would develop at a density of approximately 10 persons per acre (see Section 2.4.1, No Project Description, for justification).

S.5.2 Fresno to Bakersfield Section High-Speed Train Alternatives

This Revised DEIR/Supplemental DEIS evaluates nine HST alternatives: the BNSF, the Hanford West Bypass 1, the Hanford West Bypass 2, the Corcoran Elevated, the Corcoran Bypass, the Allensworth Bypass, the Wasco-Shafter Bypass, the Bakersfield South, and the Bakersfield Hybrid. Figure S-2 shows the nine alternatives carried forward in this Revised DEIR / Supplemental EIS. They would extend between and include the proposed Downtown Fresno and Downtown Bakersfield stations, with a potential Kings/Tulare Regional Station to the east of Hanford on the BNSF Alternative (the Kings/Tulare Regional Station–East Alternative) or to the west of Hanford on either the Hanford West Bypass 1 or the Hanford West Bypass 2 alternatives (the Kings/Tulare Regional Station–West Alternative). The estimated trip time between the Fresno and Bakersfield stations would be approximately 40 minutes. The three stations would see a mix of stopping trains and through trains; the number of trains would peak after the system has been built out. Scenarios were developed to take into account various levels of ridership that could occur. In 2035 for the high ridership scenario, the full system would see four trains per hour stop at each of the Fresno, potential Kings/Tulare Regional, and Bakersfield stations in each direction at the peak, and six trains run through. At the off-peak, the same number of stops would be made, but the through trains would decrease to three per hour.

The BNSF Alternative is a single continuous alignment that extends from the northern end of the Fresno station tracks to the southern end of the Bakersfield station tracks. It begins in Downtown Fresno on the west side of the Union Pacific Railroad (UPRR) tracks, proceeds south through Fresno adjacent to the UPRR tracks, crossing under East Jensen Avenue and then over Golden State Boulevard and State Route (SR) 99 as it curves south to join the BNSF Railway. The BNSF Alternative diverges from the BNSF Railway north of the Kings River and travels east of the City of Hanford before rejoining the BNSF Railway on its western side, north of the City of Corcoran. From there, the BNSF Alternative follows the BNSF Railway south through Corcoran, Wasco, and Shafter into the Bakersfield Metropolitan Area where it generally follows the BNSF Railway corridor through Bakersfield to the Bakersfield Station.

The additional eight alternative alignments diverge from the BNSF Alternative at various locations between Fresno and Bakersfield. The Hanford West Bypass 1 and 2 alternatives diverge from the BNSF Alternative at approximately East Conejo Avenue; both alternatives pass the city of Hanford to the west and rejoin the BNSF Alternative at SR 43 north of the city of Corcoran. These two alternatives are similar to the preferred alternative in the Statewide Program EIR/EIS. The Hanford West Bypass 1 and 2 alternatives are on the same alignment from north to south until about Jackson Avenue, where the Hanford West Bypass 1 Alternative curves farther to the west to join with the BNSF Alternative north of the city of Corcoran. The Hanford West Bypass 2 Alternative remains on a more southeasterly route to join with either the Corcoran Elevated Alternative or the Corcoran Bypass Alternative. The Corcoran Elevated Alternative would be the same as the corresponding segment of the BNSF Alternative except that it would pass through the city of Corcoran on the eastern side of the BNSF Railway right-of-way on an elevated structure. The Corcoran Bypass Alternative would diverge from the BNSF Alternative at

approximately Nevada Avenue and swing east of Corcoran, rejoining the BNSF Alternative at Avenue 136 south of Corcoran. The Allensworth Bypass Alternative would diverge from the BNSF Alternative at Avenue 84 in Tulare County and swing west of Allensworth State Historic Park, rejoining the BNSF Alternative at Elmo Highway in Kern County. The Wasco-Shafter Bypass Alternative would diverge from the BNSF Alternative between Taussig Avenue and Zachary Avenue, bypassing Wasco and Shafter to the east, and rejoin the BNSF Alternative at 7th Standard Road. The Bakersfield South Alternative parallels the BNSF Alternative from Rosedale Highway (SR 58) to Chester Avenue at varying distances to the north. The alternative then curves south, and parallels California Avenue to its terminus at the southern end of the Bakersfield station tracks. The Bakersfield Hybrid Alternative would roughly follow the Bakersfield South Alternative alignment from Hageman Road to the Bakersfield station, it would then swing north of the BNSF Alternative alignment through East Bakersfield to Oswell Street.

S.5.3 Station Area Development

The presence of an HST would provide tremendous opportunities to revitalize the downtowns of Fresno and Bakersfield through urban design; diversity of higher density mixed use development; and improved transit, bike, and pedestrian connectivity. The higher densities in the station areas would result in higher levels of transit and the stations could become major transit hubs. The presence of the stations would also attract office development to the downtown areas because of the improved access to the larger markets of Los Angeles and the Bay Area, and the stations could become 24-hour destinations as more commercial businesses are attracted to the area. In addition, residential growth would be expected as a result of increases in retail, nightlife, and improved multimodal connectivity, which could lessen the desire of residents to commute to Los Angeles or the Bay Area (Authority and FRA 2008).

The cities of Fresno and Bakersfield are updating their general plans to reflect the addition of an HST station in their downtown areas. Both downtowns are poised to become strong activity centers with the addition of the HST. The projected growth for this region is approximately an additional 1.7 million persons by 2035, with comparable growth in employment even before adding the HST to the Central Valley. The project is estimated to bring 8,400 and 9,200 daily passengers to Fresno and Bakersfield, respectively, and, when combined with the projected growth for the valley, would result in an abundance of people in the downtown areas. The HST would provide a catalyst to concentrate the investment created by population growth at the urban centers that provide interregional connectivity with other metropolitan centers. The Fresno and Bakersfield HST stations would be compatible with local zoning for higher density development and would build upon existing activity centers. The station areas and the surrounding regions would realize beneficial effects, including increased employment, recreation, and community cohesion. No incompatible changes in land use patterns or intensities are anticipated with these urban stations.

The Kings/Tulare Regional Station is one of the few stations in the California HST System that is not proposed in a downtown urban area. The two alternative sites for this station were selected to serve residents in the Lemoore/Hanford, Visalia, and Tulare areas. The Kings/Tulare Regional Station–East Alternative is immediately east of the City of Hanford's primary sphere of influence and is adjacent to the intersection of SR 198 and SR 43 on the BNSF Alternative Alignment. These two highways would provide access to the station for shuttle bus service from the communities in the area. The Kings/Tulare Regional Station–West Alternative is situated between the city of Hanford and the unincorporated community of Armona on the Hanford West Bypass 1 and 2 alternatives. SR 198 would provide access to the station for shuttle bus service from the communities in the region. Of the two sites considered for this regional station, the Kings/Tulare Regional Station–East Alternative has the larger population within a 20-mile area. The 2007 population within the 20-mile catchment area for the Kings/Tulare Regional Station–East

Alternative was 424,700; the population in this area is projected to increase to 683,300 people by 2030 (Authority 2007).

The Hanford and Kings County land use designations and zoning for the station sites are mostly compatible with an HST station. For the Kings/Tulare Regional Station–East Alternative, the site is zoned as light industrial by Kings County and the station would be compatible with this zoning; however the surrounding land is currently in agricultural production, and Hanford wishes to direct future growth toward the west side of the city instead of the east side. The Authority would work with the city and county to develop a station area plan that protects agricultural use of the lands between Hanford and Visalia. This would include limiting parking spaces at the Kings/Tulare Regional Station and providing additional parking, as appropriate, at transit centers in the cities served by the station. The Authority would also acquire agricultural conservation easements in the vicinity of the station as part of mitigation for project impacts to agricultural land. The Kings/Tulare Regional Station–West Alternative site is a mixture of industrial and agricultural lands that are located within the growth corridor for the City of Hanford, and the station would be partially consistent with the land use designations and zoning. The Kings/Tulare Regional Station–West Alternative is in a more suitable location than the Kings/Tulare Regional Station–East Alternative for allowing future growth to occur around the station, much like the Fresno and Bakersfield HST stations. Unlike the Kings/Tulare Regional Station–East Alternative, the Kings/Tulare Regional Station–West Alternative would not require the Authority to develop a plan to protect agricultural lands.

S.5.4 Heavy Maintenance Facility

The Fresno to Bakersfield Section may include an HMF centrally located on the main north-south line of the HST System to support delivery, testing, and commissioning on the network's first completed segment. The HMF concept plan indicates that the site should encompass approximately 154 acres to accommodate guideways, maintenance shops, parking, administrative offices, roadways, power substation, and storage areas.

The HMF would perform the following functions:

- Trainset assembly.
- Testing and commissioning.
- Train storage.
- Inspection.
- Maintenance.
- Retrofitting.
- Overhaul.

HST Heavy Maintenance Facility

The California HST HMF would support the assembly, testing, commissioning, and acceptance of high-speed rolling stock prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular operation of the system and activation of new rolling stock as it is delivered.

This Revised Draft EIR/Supplemental Draft EIS evaluates five HMF site alternatives (refer to Chapter 2, Alternatives) that are shown on Figure S-2:

- Fresno Works–Fresno HMF Site: Located within the southern limits of the city and county of Fresno next to the BNSF Railway right-of-way between SR 99 and Adams Avenue.
- Kings County–Hanford HMF Site: Located southeast of the City of Hanford, adjacent to and east of SR 43, between Houston and Idaho avenues.
- Kern Council of Governments–Wasco HMF Site: Located east of the City of Wasco between SR 46 and Filburn Street.

- Kern Council of Governments–Shafter East HMF Site: Located in the City of Shafter on the eastern side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.
- Kern Council of Governments–Shafter West HMF Site: Located in the City of Shafter on the western side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.

S.6 Measures to Avoid and Minimize Impacts

The HST project includes alternatives and design features to avoid and minimize impacts. Project design incorporates the following measures:

- Follows existing transportation corridors to the extent feasible
- Uses shared right-of-way when feasible.
- Narrowed footprint with elevated or retained cut profile.
- Spans water crossings where practical
- Includes passages for wildlife movement.
- Avoids sensitive environmental resources to the extent practical.

S.7 No Project Alternative Impacts

Projected growth and conversion of land to urbanized uses associated with the No Project Alternative are anticipated to have the greatest environmental effect in the study area over the 2010 to 2035 planning period.

Based on the California Department of Finance estimates (2010), which reported that these four counties recorded an average of 3.2 persons per dwelling unit and the preferred residential densities adopted in the San Joaquin Valley Blueprint (ranging from 5.3 units/acre in Tulare County to 8 units/acre in Fresno and Kern counties), it would take about 86,100 acres of land to accommodate future housing. However, this land consumption estimate does not take into account related commercial, transportation, and supporting infrastructure such as parks, water treatment, and medical facilities. With necessary supporting infrastructure, including commercial, office, transportation, parks, and schools, a typical density for an area similar to the San Joaquin Valley would result in 8 to 10 people per acre of land development[3] (US 36 AADEIS, CDOT 2006). Under this scenario, the total four-county growth projections are for approximately 173,000 acres of land development. Additionally, this development is anticipated to follow current patterns dispersed along the edges of city growth boundaries and into unincorporated areas along highways.

Although the Blueprint is not enforceable on cities and counties within the San Joaquin Valley, it is expected to be the basis for the 2014 Regional Transportation Plans/Sustainable Communities Plans that are required under SB 375 (2010). These plans will direct transportation investment and regional housing needs allocations, and influence land use patterns, in a manner that will reduce greenhouse gas emissions for automobiles and light trucks to meet ARB targets for 2020 and 2035. Meeting these targets will, by necessity, require strategies and investments that will reduce VMT. This, in turn, is expected to result in Regional Transportation Plans/Sustainable Communities Plans that support higher-density, compact development patterns.

[3] In Denver, the Colorado Department of Transportation studied the land use density as part of the preparation for the US 36 Project Alternative Analysis/EIS (2006). The study conducted a GIS analysis of 50 years of land use trends based on historical aerial photos digitized, and then measured actual census data to determine that the gross use of an acre of land supported an average of 10 persons.

An increase in population and employment creates an increasing need to travel between destinations. The regional measure for growth in travel is the amount of VMT during a year's timeframe. Between 2010 and 2035, VMT is projected to increase by 16% in Fresno County and 67% in Kern County; during this time period, VMT is expected to decrease by 5% in Tulare County and 23% in Kings County. Based on estimates by Cambridge Systematics and Caltrans (2009), the four-county region is projected to increase from almost 62 million to 80 million miles traveled per day in 2035. This increase would require an estimated 796,000 gallons of petroleum per day in the Fresno to Bakersfield region alone (Bureau of Transportation Statistics 2010).

The conversion of vacant and agricultural land for development will affect and change the character of many of the environmental resources in the study area.

Increasingly stringent federal and state emission control requirements and the replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basin-wide air pollution emissions under the No Project Alternative and air quality would improve. Noise would stay at a similar level because local general plans and noise and vibration ordinances are in place to ensure that standards are met.

Future conditions from increased development would likely result in the additional use of electricity and radio frequency (RF) communications that would increase the generation of electromagnetic fields (EMFs) and electromagnetic interference (EMI) in the area. Demand for energy would also increase at a level commensurate with population growth under the No Project Alternative, which would require additional generation and transmission capacity. As stated above, daily VMT in Fresno, Kings, Tulare, and Kern counties would increase, requiring additional demand for petroleum.

Existing trends affecting biological resources are expected to continue or worsen, including habitat loss from development, mortality from vehicle strikes, habitat degradation from pollution (e.g., polluted runoff from stormwater, inadvertent spills of hazardous materials), and noise and dust from development. Effects of the current built environment on hydrology and water resources would continue, including effects from continued operation of existing highways, airports, and railways.

Vehicle Miles Traveled (VMT)

A transportation planning term that measures the extent of motor vehicle operation. Specifically, VMT measures the total number of miles traveled by a vehicle in a specific area over a given period of time.

A consequence of the No Project Alternative would be that the project vicinity would not include the higher-density, transit-oriented development planned around proposed urban HST stations, and the continuation of low-density development might be more likely. This development pattern would increase impervious ground area and an associated increase in stormwater runoff in the urban fringe. Additionally, increases in traffic in Fresno and Kern counties would degrade water quality because of increased pollutants in stormwater from vehicles on roadways. Infrastructure and development projects could cause water or wind erosion, loss of valuable topsoil, and constraints on the potential for oil and gas resource development.

Current trends for accidents related to hazardous materials and wastes would continue with operation of commercial and industrial facilities or during transport of these goods. Under the No Project Alternative, safety and security in the study area would follow current trends. Increased vehicular traffic volumes in Fresno and Kern counties over the next 25 years would be expected to result in increased traffic accidents; however, with planned roadway improvements, it is expected that existing accident trends in the study area would continue into the future. Counties and cities have the financial mechanisms in place to meet service level goals for emergency responders with the population growth planned for the study area. For these reasons, no adverse or significant impacts on accident prevention or emergency response are anticipated.

The No Project Alternative would not have the community benefits associated with the HST project: reduction of traffic congestion on highways and major roadways and improved mobility and access to jobs, educational opportunities, and recreational resources. To the extent the net increase in housing units and industrial space in the region occurs in incorporated cities, it would be consistent with adopted general plans and policies, which aim to strengthen socioeconomic conditions in existing communities and improve neighborhood amenities, potentially benefiting community cohesion. Emergency response times and access would likely be enhanced from transportation improvements but challenged by dispersed development. The planned projects comprising the No Project Alternative would require acquisition of land and may result in displacement of residences and/or businesses, resulting in some economic benefits as well as potential fiscal and employment losses as a result of relocations. Planned transportation improvements would be made to rail, highway, airport, and transit systems, and commercial and residential development projects would occur throughout the region, which as a whole has substantial numbers of communities of concern. As a result, these planned projects may disproportionately affect minority and/or low-income populations.

As described above, the No Project Alternative would result in up to 173,000 acres of land for future housing and necessary supporting infrastructure. While some infill development could occur without the HST to act as a catalyst, absent an economic incentive, particularly with the demise of redevelopment, little TOD development is likely to be attracted to the downtown areas of Fresno and Bakersfield with the No Project Alternative. As an example, newly planned residential development proposed in the four counties would primarily be located on currently undeveloped land. Isolated development and roadway transportation projects would not provide the same opportunities for redevelopment within the downtown areas of Fresno and Bakersfield as would the development of HST stations. Overall, the No Project Alternative would not be as strong a catalyst in supporting the development envisioned in these general plans and other planning documents as would the HST alternatives.

Growth would occur on agricultural lands under the No Project Alternative. The eight San Joaquin Valley counties that participated in the San Joaquin Valley Blueprint planning process developed a forecast of farmland conversion to nonagricultural uses by 2050 based on current development patterns. Given continuation of these patterns, 327,000 acres of farmland would be converted by 2050 (San Joaquin Valley Blueprint 2009). Because of the extent and quality of farmland in these counties, most of this growth is likely to occur on Important Farmlands[4]. Most development in the southern San Joaquin Valley that is currently being planned or permitted is located in the vicinity of urban centers and/or along SR 99. Most of this development would take place on currently unincorporated county land that is largely classified as Prime Farmland[5]. A total of approximately 5,100 acres of farmland would be converted to nonagricultural uses by development planned or permitted within 2 miles of the Fresno to Bakersfield Section alternatives by 2035.

The No Project Alternative would not cause or accelerate substantial physical deterioration of parks, recreation, and open space resources. Continuing the pattern of converting farmland to development, the No Project Alternative would increase the loss of rural views while resulting in limited improvement to the generally moderate to moderately low visual quality in proposed redevelopment areas.

Under the No Project Alternative, cultural resources would continue to be affected in the San Joaquin Valley urban areas through the development of land resulting from growth. Changes in

[4] Important Farmland is Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance identified by the California Department of Conservation.

[5] Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods.

land use, and ground disturbance associated with other transportation infrastructure improvements will occur with the expansion of existing highways to accommodate the state's growing population. Adverse effects on eligible resources could result in the loss of historic properties.

Fresno and Bakersfield land use plans encourage infill and higher-density development in urban areas and concentration of uses around transit corridors to provide more modal choices for residents and workers. The San Joaquin Valley Blueprint identifies the HST as a critical element in meeting the goal of increased urban densification, and the No Project Alternative would conflict with this goal. Under the No Project Alternative, cities would have a more difficult time reducing low-density sprawl and encouraging higher-density development, and fewer modal choices would be available.

Construction of planned development and transportation projects, including the expansion of SR 99, would generate short-term construction employment in the region and a small number of long-term permanent jobs to maintain new and expanded facilities. Under the No Project Alternative, fewer business and employment opportunities would exist in comparison to the HST alternatives. Employment growth would continue to follow existing patterns and would attract fewer of the higher-wage jobs in the financial, insurance, and real estate sectors than would occur under the HST alternatives.

S.8 HST Alternatives Evaluation

The following section provides an overview of the effects, including benefits common to all HST alternatives and proposed mitigation, and compares differences between the impacts and costs of the eight alternative alignments and the HMF alternatives. Table S-1 provides a high-level comparison of key design features associated with each of the alternative alignments being carried forward. This section then presents discussions of the impacts that differentiate the alternatives (and proposed mitigation measures) and the HMF alternatives (and proposed mitigation measures), as well as cost estimates for each alternative.

Table S-1
Design Features of Alternatives Carried Forward[a]

Design Option	BNSF	Hanford West Bypass 1		Hanford West Bypass 2		Corcoran Elevated	Corcoran Bypass	Allensworth Bypass	Wasco-Shafter Bypass	Bakersfield South	Bakersfield Hybrid
		At-Grade	Below-Grade	At-Grade	Below-Grade						
Total Length[b] (linear miles)	117	28(30)	28(30)	28(30)	28(30)	10(10)	10(10)	21(21)	21(22)	12(12)	12(12)
At-grade Profile[b] (linear miles)	87	24(24)	21(24)	22(24)	19(24)	3(5)	6(5)	18(19)	18(15)	3(3)	3(3)
Elevated Profile[b] (linear miles) (including Retained Fill)	30	4(6)	4(6)	6(6)	6(6)	7(5)	4(5)	3(2)	3(7)	9(9)	9(9)
Below-grade Profile[b] (linear miles)	0.1	0(0)	3(0)	0(0)	3(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Number of Straddle Bents	62	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	71(62)	34(62)
Number of Railroad Crossings	9	1(1)	1(1)	1(1)	1(1)	8(1)	1(1)	1(1)	1(1)	3(2)	3(2)
Number of Major Water Crossings	7	3(4)	3(4)	3(4)	3(4)	0(0)	2(2)	0(0)	1(1)	1(1)	1(1)
Number of Road Crossings	188	29(34)	29(34)	29(34)	29(34)	11(10)	12(10)	9(9)	30(22)	48(56)	54(56)
Approximate Number of Roadway Closures[c]	45	5(6)	5(6)	5(6)	5(6)	2(2)	7(2)	3(3)	18(4)	3(5)	10(5)
Number of Roadway Overcrossings and Undercrossings	53	20(20)	20(20)	18(20)	18(20)	2(2)	4(2)	4(5)	8(8)	1(1)	1(1)

Notes:

[a] For comparison, equivalent numbers for the corresponding segment of the BNSF Alternative are presented in parenthesis.

[b] Lengths shown are based on equivalent dual-track alignments. For example, the length of single-track elevated structure will be divided by a factor of 2 to convert to dual-track equivalents.

[c] Includes public and private road closures.

S.8.1 HST Benefits

Of the 8,400 daily riders who would board the HST at the Downtown Fresno Station in 2035, approximately 84% would have otherwise taken an automobile trip to their destination. Overall, the HST project would reduce daily VMT by 11% in Fresno County, 15% in Kings County, 5% in Tulare County, and 10% in Kern County, resulting in the benefits of decreased fuel consumption, decreased congestion, improved travel time, and reductions in air pollution emissions. The HST also would reduce the demand and substitute for commercial air travel within California.

Although the HST project would increase electricity consumption compared to the No Project Alternative, the HST project would reduce vehicle and air travel miles with corresponding reductions in fuel consumption and air emissions, for a substantial net reduction in emissions. In addition, the State of California requires that an increasing fraction (33% by 2020) of the electricity generated for the state's power portfolio come from renewable energy sources. As such, the emissions generated for powering the HST System are expected to be lower in the future than the estimates included in this Revised Draft EIR/Supplemental Draft EIS. The Authority has adopted a policy goal to purchase all HST System power from renewable energy sources, which would result in a greater overall reduction in emissions from the HST project.

The HST stations in Fresno and Bakersfield would have the benefit of encouraging high-density, transit-oriented development in these cities, and would reduce the attractiveness of development on the edges of planned urban areas (i.e., urban sprawl) in these cities. The Kings/Tulare Regional Station alternatives are located outside of the urban center of Hanford in unincorporated Kings County. These station sites are on the urban fringe of the City of Hanford, and land uses surrounding the sites are predominantly agriculture and low-density residential development. Kings County and the City of Hanford envision the lands on the east side of Hanford to remain predominantly in agricultural use. The long-range vision for land use on the west side of Hanford is predominantly low-density residential development. The Authority would work with the City of Hanford and Kings County to develop plans to protect land from urban development around the alternative Kings/Tulare Regional Station sites, including acquisition of agricultural conservation easements in the station vicinity, to the extent practical when dependent upon willing sellers, and limiting parking at the station to promote the use of transit between the station and local communities.

The HST project could improve water quality in Fresno and Kern counties compared with the No Project Alternative because of decreased VMT and the encouragement of transit-oriented development, which in turn would reduce non-point source pollutants through trip reduction and increased density. The HST project may induce slight population and employment growth throughout the region, including growth in the communities that would not have an HST station. Indirect impacts would increase employment opportunities and economic vitality throughout the region, a result not likely under the No Project Alternative. Under current city and county general plans, communities in the region have adopted urban growth boundaries to accommodate growth beyond the 2035 planning horizon, including any growth induced by the HST project. HST-induced growth would, therefore, not require farmland conversion beyond what is currently planned for conversion. Generally, low-income and minority populations reside throughout the Fresno-to-Bakersfield corridor; therefore, benefits such as improved mobility, air quality, and employment would accrue to these low-income and minority populations because they compose such a large percentage in the region.

The analysis of all HST alternatives determined that by applying required federal and state regulations and engineering criteria standards, the operation of the project would not have substantial effects on public utilities and energy; geology, soils, and seismicity; hazardous materials and wastes; hydrology and water resources.

S.8.2 Adverse Effects Common to All HST Alternatives

The following potentially significant impacts would occur with all HST alternatives. The impact analysis takes into account design features and the implementation of regulatory requirements, both of which would reduce impacts from implementing the project prior to application of mitigation measures.

Tables S-2 and S-3 show the differences among the alternatives, along with the associated mitigation measures for these impacts. Section S.8.3, Comparison of Alternatives, describes these differences.

- **Transportation:** The project would grade-separate many existing at-grade crossings of the BNSF Railway between Fresno and Bakersfield, benefiting traffic safety and circulation. Project operation would increase traffic congestion at numerous intersections around the Fresno, potential Kings/Tulare Regional, and Bakersfield stations. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation measures for operational impacts include a wide variety of roadway improvements including restriping, installation of signals, modification of signal timing, and roadway widening. Following mitigation, the traffic effects at all intersections would have a negligible effect under NEPA, and the impact would be less than significant under CEQA. However, effects on the local circulation would occur in the congested areas of the cities of Fresno and Bakersfield from the extension of the duration of peak periods of congestion, the effect on would be considered substantial under NEPA. All HST alternatives would result in permanent road closures. The Authority would provide suitable access for property owners affected by these road closures; therefore, the effect of road closures would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

  Potential construction-related cumulative impacts on transportation would be similar for all HST alternatives. All of the alternatives require similar construction techniques, including temporary road closures and delays, but at different locations; avoidance and minimization measures to reduce these delays would be applicable to all alternatives. The cumulative effect of project construction on travel delay would have negligible intensity under NEPA, and is not cumulatively considerable under CEQA.

  Potential operations-related cumulative impacts on transportation would be similar for all HST alternatives because of the regional nature of the analysis and because benefits would be realized at a regional level. Specific local impacts, such as road closures and crossings, would also be similar because all HST alternatives affect similar transportation facilities. At a local level, the project in combination with other past, present, and reasonably foreseeable projects would decrease the level of service on some roadway segments and at intersections in the vicinity of HST stations—contributing to operating conditions below level of service D. This effect would have substantial intensity under NEPA and it would be a cumulatively considerable impact under CEQA because the project traffic and regional traffic in future years would cause a measureable and perceptible worsening of roadway segments and intersections operating below LOS D conditions.

- **Air Quality and Global Climate Change:** The San Joaquin Valley does not meet National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) for ozone and particulate matter (particles) less than 2.5 micrometers (PM2.5), and does not meet CAAQS for particulate matter (particles) less than 10 micrometers (PM10). Fresno and Bakersfield are maintenance areas under NAAQS for carbon monoxide (CO. Project construction for all HST alternatives would result in substantial emissions of ozone precursors (volatile organic compounds [VOC] and nitrogen oxides [NOx]), and CO. Project construction for all HST alternatives would also conflict with regional attainment plans and exceed CEQA

significance thresholds for VOC and NOx, PM10, and PM2.5. Construction also may expose residences, preschools, schools, daycare centers, and hospitals (sensitive receptors) to substantial pollutant concentrations resulting from concrete batch plant operations as well as 2 schools within 1,400 feet of the Bakersfield Station construction area to localized toxic air contaminant (TAC) concentrations.

Construction of reasonably foreseeable future projects in the SJVAB would be a significant cumulative air quality impact under NEPA and CEQA because the basin is not in attainment for ozone, PM_{10}, and $PM_{2.5}$ and construction of any project causes emissions of ozone precursors (NOx and VOCs) and particulates. The SJVAPCD has developed plans to help bring concentrations of these pollutants into attainment; however, the HST construction emissions were not included in these plans. Because the unmitigated construction emissions for the Fresno to Bakersfield Section would exceed the SJVAPCD thresholds for NO_x, VOC, PM_{10}, and $PM_{2.5}$, the air quality effect would have substantial intensity under NEPA. Since the SJVAPCD attainment plans for these pollutants do not account for project construction emissions, this would be a significant cumulative impact under NEPA. The project would also have a cumulatively considerable contribution to the air quality impact associated with reasonably foreseeable projects in the SJVAB.

Project operations for all HST alternatives would result in a net benefit to air quality because the HST project would result in lower mobile source air toxics (MSATs), greenhouse gas (GHG), VOC, NOx, CO, PM10, and PM2.5 emissions compared with the No Project Alternative. There would be no CO or PM hot spots during project operations. Additionally, the project operations would lead to only localized dust impacts up to 10 feet from the train, which would become negligible beyond this distance. Operation of the HMF at all HMF sites (Figure S-2) could expose sensitive receptors within 1,300 feet to substantial toxic air contaminant concentrations and lead to potential exceedances of NAAQS and CAAQS. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation of this operational impact includes locating emission sources within the HMF property away from possible sensitive receptors and using best industry practices or alternative equipment to reduce emissions. The air quality effect for toxics of HMF emissions at all HMF sites would be negligible under NEPA, and the impact would be less than significant under CEQA following mitigation. However, the air quality effects for PM2.5 concentrations at all HMF sites would remain substantial under NEPA and the impacts for PM10 and PM2.5 would remain significant under CEQA.

All HST alternatives would have similar potential cumulative impacts on air quality. Construction of the Fresno to Bakersfield alignment combined with the construction of the Merced to Fresno alignment would increase regional pollutant emissions and would exceed the San Joaquin Valley Air Pollution Control District CEQA thresholds. The operation of the HST alternatives would reduce regional VMT and consequently reduce ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions. Therefore, on the whole, the operation of the HST alternatives would have a beneficial impact under NEPA and a less than cumulatively considerable contribution under CEQA. Because the HST alternatives would result in a net reduction in CO_2 emissions, the project effects on greenhouse gas emissions would have a cumulative beneficial contribution under NEPA and a less than cumulatively considerable contribution under CEQA.

- **Noise and Vibration:** All HST alternatives would create noise impacts during construction. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation for these impacts includes noise monitoring during construction and requiring the contractor to implement one or more noise control measures to meet noise limits. The Authority will mitigate temporary impacts; therefore, the effects of construction noise would have negligible intensity under NEPA, and the impacts would be less than significant under CEQA.

Building damage from construction vibration is only anticipated from impact pile driving very close to buildings. Damage from construction vibration is not anticipated if pile driving takes place more than 25 to 50 feet from buildings, or if alternative methods such as push driving or augur installation can be used. Mitigation includes preconstruction surveys to document the existing condition of buildings located within 50 feet of pile installation and using methods other than a hammer to install piles close to buildings that could be damaged by vibration. Impacts of construction vibration are expected to have negligible intensity under NEPA and impacts would be less than significant under CEQA.

All HST alternatives would create operational noise and vibration impacts. Slab track was assumed to be 3 decibels louder than ballast and tie track; therefore, slab track would have a greater impact. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation for operational noise and vibration includes the installation of sound barriers, implementation of noise and vibration mitigation guidelines, vehicle noise specification, special trackwork at crossovers and turnouts, and additional noise analysis during final design. In some locations, operational noise impacts would have substantial intensity under NEPA, and impacts would be significant under CEQA, but where fully mitigated, the effect would be negligible under NEPA, and impacts would be less than significant under CEQA. If mitigation is not feasible, operational vibration could continue to have substantial intensity under NEPA, and impacts could remain significant under CEQA.

All HST alternatives would have similar potential cumulative impacts on noise and vibration. The cumulative noise and vibration impacts of the HST alternatives and other past, present, and reasonably foreseeable projects during construction would have substantial intensity under NEPA and would not be cumulatively considerable under CEQA because noise control measures and compliance with existing noise regulations would reduce potential noise impacts. Operations-related impacts of the HST alternatives would have substantial intensity under NEPA and be cumulatively considerable under CEQA because the noise associated with the increased traffic and the number and length of additional freight trains anticipated in the region would cause the anticipated noise exposure at sensitive receivers to range up to 28 dBA L_{dn} above projected 2035 noise levels.

- **EMF/EMI:** Under all HST alternatives, HST workers with implanted medical devices would be adversely affected by exposure to EMF at electrical facilities, such as traction power facilities. By implementing a safety program that would educate such workers to EMF hazards and exclude them from entering any facility with electrical equipment that could endanger them. This would make the intensity of EMF effects to workers negligible under NEPA, and the impact would be less than significant under CEQA. The Bakersfield South and Bakersfield Hybrid alternatives could cause electromagnetic interference with medical equipment at three potentially sensitive receptors adjacent to Mercy Hospital in Bakersfield. This impact would be mitigated through design provisions to prevent interference, such as establishing RF-resistant walls around sensitive equipment or installing RF filters in sensitive equipment. Following mitigation, the effect of the EMI would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

  There are no cumulative impacts related to electromagnetic fields (EMFs) and electromagnetic interference (EMI) because none of the identified past, present, or reasonably foreseeable projects have EMF impacts. There would be no cumulatively considerable impacts from any of the HST alternatives.

- **Public Utilities and Energy:** For all alternatives, project construction would conflict with existing underground and aboveground utilities and could result in scheduled service interruptions. Construction activities would also generate solid and hazardous waste through

the demolition of existing roads and buildings. With advanced notice of utility interruption and adequate capacity at landfills, utility interruptions and increased waste generation would have negligible intensity under NEPA, and impacts would be less than significant under CEQA. The Hanford West Bypass 1 Alternative would affect two electrical substations, and the Hanford West Bypass 2 Alternative would affect one electrical substation. The intensity of this effect would be moderate under NEPA, and the impact would be significant under CEQA. Mitigation to reconfigure or relocate electrical substations to adjacent parcels would decrease the effect to negligible intensity under NEPA, and decrease impacts to less than significant under CEQA.

The alternative alignments for the Fresno to Bakersfield Section cross electrical transmission lines that can be tapped at the HST right-of-way to provide power for this section of the HST System. However, power providers may need to reconstruct or reconductor (i.e., replace power lines on existing poles) these transmission lines. The environmental review and mitigation of these reconstruction or reconductoring activities would be done by the power provider.

Potential cumulative impacts on public utilities and energy would be similar for all HST alternatives, with the exception of potential construction-related cumulative impacts on electrical infrastructure and energy, which would be greatest for the Hanford West Bypass 1 and 2 Alternatives because construction of either of those alternatives would require relocation of two existing electrical substations. The cumulative impact of the HST alternatives and other past, present, and other reasonably foreseeable projects on public utilities and energy during construction and operation would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

- **Biological Resources and Wetlands:** Construction of the HST alternatives could introduce noxious weeds; would directly and indirectly effect species that are rare or protected under state and/or federal law (special-status species), including plants, wildlife, and remove suitable habitat that has the potential to support special-status species; convert substantial acreage of native habitat including annual grasslands, alkali desert scrub, and riparian areas; reduce the functionality of wildlife corridors and linkages; and trim or remove trees protected by local ordinances. Operation of the project would permanently impact suitable habitat for special-status plant and wildlife species; permanently impact special-status plant communities and jurisdictional waters; impact U.S. Fish and Wildlife Service (USFWS) recovery plans for threatened or endangered species; impact the Allensworth Ecological Reserve; remove protected trees; and reduce the functionality of wildlife movement corridors and linkages.

  Construction and project period common mitigation measures that avoid and/or minimize impacts on all biological resources and wetlands include monitoring, worker awareness training, weed control, implementing a biological resources management plan, implementing a restoration and revegetation plan, identification of environmentally sensitive areas and environmentally restricted areas, installation and use of approved fencing, and compliance reporting. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Construction period mitigation measures to avoid or minimize impacts on biological resources include mapping special-status plants species and communities to avoid, protocol and/or preconstruction surveys of special-status wildlife species, construction timing, and implementation of resource specific guidelines and/or restoration of habitats and monitoring. Mitigation for impacts during project operation include coordinating with the regulatory agencies (i.e., USFWS, U.S Army Corps of Engineers [USACE], California Department of Fish and Game [CDFG]); compensating for impacts on special-status plant species and plant communities; compensating for impacts on special-status wildlife species; implementing agency-approved guidelines and a habitat mitigation

and monitoring plan; and compensating for impacts on jurisdictional waters. Following mitigation, only the project-related reduction in the functionality of wildlife movement corridors and habitat linkages would continue to have a substantial intensity under NEPA, and a significant impact under CEQA. Remaining impacts would have negligible intensity under NEPA and the impacts would be less than significant under CEQA.

When comparing HST Alternatives, only the Allensworth Bypass Alternative and the corresponding segment of the BNSF Alternative would have substantial differences in potential cumulative impacts on biological resources. The BNSF Alternative would have a greater potential for cumulative impacts on biological resources, including high quality jurisdictional waters (i.e., vernal pools), the Allensworth Ecological Reserve, and wildlife movement corridors, than the Allensworth Bypass Alternative. Other HST alternatives would have cumulative biological resource impacts similar to those of the corresponding segment of the BNSF Alternative. All of the HST alternatives in combination with other past, present, and foreseeable projects would have a cumulative effect on plant and wildlife habitats, habitats of concern, including jurisdictional waters, and wildlife movement corridors. The cumulative effect of the HST alternatives would have substantial intensity under NEPA and a cumulatively considerable contribution under CEQA on biological resources because of the scale of these impacts.

- **Hazardous Materials and Wastes:** Construction of all HST alternatives could result in accidents or spills of hazardous materials and wastes that could affect PEC sites, which would result in temporary hazards to schools. During project construction, the handling of extremely hazardous materials within 0.25 mile of a school would be avoided by requiring that contractors not use extremely hazardous substances or a mixture thereof in a quantity equal to or greater than the state threshold quantity (Health and Safety Code Section 25532) within 0.25 mile of a school. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. With this mitigation, the effect of the use of hazardous materials and wastes would have a negligible intensity under NEPA, and impacts would be less than significant under CEQA.

  Potential cumulative impacts on hazardous materials and wastes would be similar among all HST alternatives during both construction and HST operation. Compliance with regulatory requirements for hazardous materials would minimize the risk of releases and exposure to hazards and would reduce potential impacts from projects constructed and operated under the cumulative condition. Therefore, the cumulative impacts on hazardous materials of the HST alternatives and past, present, and reasonably foreseeable projects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

- **Safety and Security:** All HST alternatives could increase demand for local emergency responders around the stations due to station activity and associated redevelopment and economic activity. This could increase response times and require new or physically altered government facilities that might impact the environment. This effect would have a potentially moderate intensity under NEPA, and a significant impact under CEQA. As mitigation, emergency response to station and HMF incidents would be monitored, and if determined that the HST project does result in increased demand, a fair share impact fee to local service providers would be negotiated, reducing effects to negligible intensity under NEPA, and impacts to less than significant under CEQA.

  Potential cumulative impacts on safety and security would be similar for all HST alternatives. Because construction of the HST alternatives would only contribute a temporary increase in emergency response times and, as part of the project design, the Authority would develop a construction transportation plan with local jurisdictions to minimize project effects on emergency response times, the project's contribution to cumulative safety and security

impacts would be negligible under NEPA and would not be cumulatively considerable under CEQA.

Past, present, and foreseeable projects would increase demand on emergency services as a result of projected population increases. The HST alternatives would increase the number of people at station locations, cumulatively contributing to this demand on emergency services. Because development projects are required to pay impact fees that support capital costs for new or expanded government facilities and the design and operation of the HST minimizes the need for emergency services, there would be a negligible cumulative effect under NEPA and less than significant cumulative impact under CEQA on emergency services.

- **Socioeconomics, Communities, and Environmental Justice:** The BNSF Alternative would result in the division of existing communities east of Hanford, south of Shafter, and in the Bakersfield Northwest and Northeast districts. The Corcoran Bypass Alternative would result in the displacement of a small community of northeast of Corcoran. The Bakersfield South and Bakersfield Hybrid alternative would also result in the division of existing communities in the Bakersfield Northwest and Northeast districts. All HST alternatives would result in displacement impacts on community facilities, housing, and businesses. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation measures include consultation with the affected parties before land acquisition to assess potential opportunities to reconfigure land use and buildings and/or relocate affected parties, as necessary, to minimize disruption. After mitigation, the effect of community division with the BNSF Alternative and the Bakersfield South and Bakersfield Hybrid alternatives would continue to have substantial intensity under NEPA, and impacts would remain significant under CEQA.

  Construction the BNSF Alternative would affect the Central and Edison districts in the city of Fresno and construction of the BNSF, Bakersfield South, and Bakersfield Hybrid alternatives would affect the Central Bakersfield district. Simultaneous construction of the HST project in combination with other foreseeable projects would result in temporary increases in traffic, changes in traffic patterns, changes in access to community facilities, and construction noise and dust. The cumulative effect of project construction in combination with other foreseeable projects would have substantial intensity and the project contribution to this impact would be cumulatively considerable under CEQA.

  Operation of the HST alternatives in conjunction with other planned projects would result in large increases in the number of jobs and spending within the Fresno to Bakersfield Section. Combined with the anticipated new homes, roads, and infrastructure that are projected under the cumulative impact scenario, the economic benefits would be cumulatively substantial.

- **Station Planning, Land Use, and Development:** All nine project alignment alternatives would result in permanent conversion of land in other uses to transportation-related uses. Regardless of the alignment alternative selected for the project, approximately 30% of the land that would be permanently used for the HST tracks and supporting facilities (e.g., traction power and communication systems) is currently in similar uses (i.e., rights-of-way and transportation) or is vacant land; 60% is in agricultural uses; and about 10% is in residential, commercial, and industrial uses.

  Although the project would require acquisition of land that is not currently in transportation uses, it would not change existing adjacent land uses except possibly at the Kings/Tulare Regional Station alternative sites. The HST tracks and supporting facilities would not inhibit continuation of existing uses on adjacent lands, nor would they induce growth. Therefore, the project effect on land use would have moderate intensity under NEPA.

For about 31 miles the BNSF Alternative is not adjacent to existing railroad tracks, resulting in a change in the intensity of land use that is incompatible with adjacent land uses. The Corcoran Bypass, Allensworth Bypass, and Wasco-Shafter Bypass cross lands used for agriculture. These alternatives would substantially increase the intensity of the use of the land and would not be compatible with adjacent land uses. The Kings/Tulare Regional Station alternatives would also be located on land used primarily for agriculture. Conversion of this land would substantially change the intensity and pattern of land uses, and would be incompatible with adjacent land uses. For these reasons, the land use impact of the project would be significant under CEQA.

Construction of projects under the cumulative condition would result in temporary impacts related to increases in noise levels, dust, traffic congestion, visual changes, disruption of access to properties and neighborhoods, and use of land for construction staging. The HST alternatives would contribute to these impacts on land uses adjacent to the project and would also affect lands used for construction staging. Although these impacts to existing land uses would be temporary in duration and areas used for staging may be returned to their previous uses after construction is complete, the increased levels of noises, dust, and degradation of visual quality would result in substantial cumulative land use impacts under NEPA, and significant cumulative impacts under CEQA. The HST alternatives' contribution to would be substantial under NEPA and cumulatively considerable under CEQA.

The HST alternatives would result in the permanent conversion of land to transportation uses, which in many locations would be incompatible with existing land uses. Although the amount of land affected by the conversion of uses under the HST alternatives would be a relatively small percent of the four-county study area (approximately 4,000 acres, or less than 0.01%), there is the potential for significant land use incompatibilities to occur.

Overall, the cumulative condition would result in substantial land use impacts under NEPA and significant land use impacts under CEQA because of changes in land use that could result from implementation of the HST alternatives. The HST alternatives' contribution to this impact would be substantial under NEPA, and cumulatively considerable under CEQA.

- **Agricultural Lands:** Construction and operation of all alternatives would result in permanent conversion of agricultural land to nonagricultural use. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation of this impact includes preservation of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland and creation of a farmland consolidation program to sell non-economic remnant parcels to neighboring landowners. Because farmland cannot be replaced, the effect would continue to have substantial intensity under NEPA, and the impact would be significant under CEQA following mitigation.

  Potential construction-related cumulative impacts on agricultural lands would be similar for all HST alternatives. Important Farmland would be leased for temporary use as laydown areas, staging areas, and concrete prefabrication yards during construction of the HST alternatives. Construction of other past, present, and reasonably foreseeable projects could also result in the temporary conversion of farmland for construction-related uses. This land would be restored and returned to agricultural use after construction is completed. Therefore, cumulative construction impacts on farmland would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

  Continuation of current development patterns could result in the conversion of up to an additional 327,000 acres of farmland (San Joaquin Valley Regional Planning Agencies 2009). The project's contribution to the loss of farmland would be cumulatively considerable under

any HST alternative. The cumulative effect of conversion of farmland to nonagricultural uses would have substantial intensity under NEPA.

- **Parks, Recreation, and Open Space:** Construction impacts from the BNSF Alternative would include noise impacts to Father Wyatt Park and McMurtrey Aquatic Center, temporary closure of facilities in the Kern River Parkway and the Mill Creek Linear Park, and noise impacts to Bakersfield High School. The Corcoran Bypass Alternative would avoid impacts to Father Wyatt Park, and the Bakersfield South and Bakersfield Hybrid alternative would avoid impacts to Bakersfield High School. The BNSF Alternative, Bakersfield South, and Bakersfield Hybrid alternatives would affect the Kern River Parkway and Mill Creek Linear Park. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. After mitigation, the effect on Bakersfield High School would continue to have substantial intensity under NEPA, and the impacts would remain significant under CEQA.

  Operation of all HST alternatives would affect the Amtrak playground in Bakersfield by increasing usage. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation will include financial compensation for increased maintenance requirements; this mitigation would result in a decrease in the intensity of the effects on the Amtrak playground to negligible under NEPA, and a decrease in impacts to less than significant under CEQA. Both the Colonel Allensworth State Historic Park and the Allensworth Ecological Reserve would also be affected by project operations if the BNSF Alternative is implemented. After mitigation, the effect on Colonel Allensworth State Historic Park could continue to have substantial intensity under NEPA, and impacts would remain significant under CEQA with the BNSF Alternative. Both the BNSF Alternative and the Corcoran Elevated Alternative would impact Father Wyatt Park in Corcoran with Noise and visual impacts. After mitigation, the effects on Father Wyatt Park would have effects of negligible intensity and impacts would be less than significant.

- **Aesthetics and Visual Resources:** All HST alternatives would cause visual disturbance during construction including new sources of light and glare, and visual nuisance. All HST facilities, including sound barriers, would affect visual quality throughout the length of the project. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation measures to reduce these impacts include minimizing clearing, preserving existing vegetation, using screens where possible, incorporating design criteria for elevated and station elements that can adapt to local context, planting trees along edges of the right-of-way adjacent to residential areas, installing landscape treatments along HST overcrossings and retained fill elements, designing noise barriers in consideration of visual quality, and screening of traction power system facilities. Following mitigation, views would continue to be blocked by some sound barriers and visual quality would be reduced in Bakersfield by HST elevated structures. These impacts would continue to have substantial intensity under NEPA, and would remain significant under CEQA.

  Development of cumulative projects in the vicinity of the Fresno to Bakersfield Section would result in construction activities that would create temporary visual changes from demolition, vegetation removal, construction staging areas, construction lighting, and general construction activities. While these cumulative projects would likely be constructed at various time periods and separated visually throughout the area, they could in some cases have overlapping construction schedules and be located in close proximity. The cumulative visual effect would have moderate intensity under NEPA. Because construction would be short-term, this impact would not be significant under NEPA. The project contribution to construction-related visual impacts would be cumulatively considerable under CEQA.

The cumulative development projects identified in the San Joaquin Valley Rural/Agricultural landscape could strongly reduce the visual quality within the study area on an individual project basis, as a result of changes to the landscape that accompany the large-scale conversion of agricultural lands to urban uses. The HST alternatives would contribute to such impacts through introducing prominent visual features, such as at-grade or elevated structures, contact power systems, soundwalls, associated road overcrossing structures, and other features that could cause a decline in visual quality. Therefore, the HST alternatives' contribution to cumulative impacts would have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

- **Cultural and Paleontological Resources:** All HST alternatives have the potential to cause impacts on historic properties (Section 106) and historic resources (CEQA) representing both archaeological and architectural resources, and areas of high paleontological sensitivity. HST alternatives would affect historically significant architectural resources. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation for these impacts includes implementing a resource treatment plan for prehistoric and historic resources developed in coordination with the California State Historic Preservation Officer as well as complying with the mitigation framework outlined in the Section 106 Programmatic Agreement for cultural resources protection that has been developed for this project. For paleontological resources, the mitigation includes implementing a paleontological resources monitoring and mitigation plan, and halting construction if paleontological resources are found until they can be evaluated and recorded, as appropriate. Following mitigation, effects to some historic properties would have substantial intensity under NEPA, and impacts would be significant under CEQA.

  Potential cumulative impacts on archaeological and paleontological resources would be similar for all HST alternatives. Potential cumulative impacts on historical architectural resources would be greatest for the BNSF Alternative and the Hanford West Bypass 1 and 2 Alternatives; the other HST alternatives would have generally similar cumulative historical architectural resource impacts.

  Continued urbanization and development projected under the cumulative condition could result in exposure and disruption of archaeological and paleontological resources and traditional cultural properties, and removal or damage to historic architectural resources. Therefore, the cumulative impact of the project and other past, present, and reasonably foreseeable projects on cultural resources would have substantial intensity under NEPA and the project contribution to this impact would be cumulative considerable under CEQA.

S.8.3 Comparison of HST Alignment Alternatives

The BNSF Alternative is a single continuous alignment from Fresno to Bakersfield. The additional eight alternative alignments considered in this Revised Draft EIR/Supplemental Draft EIS deviate from the BNSF Alternative for portions of the route. There are 72 possible combinations of these alternatives to make a continuous alignment from Fresno to Bakersfield.

Table S-2 at the end of the summary lists those impacts that differentiate each of the 72 project alignment alternatives. There are other environmental impacts associated with the alignment alternatives that are not listed in Table S-2 because they are of similar magnitude among the alternatives and therefore do not provide a means of differentiating between alternatives. Table S-3 at the end of the summary lists all substantial and significant project impacts.

Many regulations require standard measures to avoid and minimize environmental impacts. The Authority will comply with these regulations, and therefore these measures are not summarized here. Table S-3 at the end of the summary presents all of the mitigation measures proposed for

the project. In addition, the Authority will strive to avoid and minimize impacts further as design progresses.

The eight base alternatives that deviate from the BNSF Alternative were developed to reduce the environmental impacts of the HST project. The principal benefits and impacts of these alternatives relative to the BNSF Alternative are discussed below.

The Hanford West Bypass 1 and 2 alternatives would run to the west of the City of Hanford. These alternatives would result in the conversion of fewer acres of agricultural lands to nonagricultural uses and fewer impacts to Williamson Act lands than the BNSF Alternative. Because these alternative alignments would pass close to the communities of Grangeville and Armona, slightly more housing and business displacements and a larger number of sensitive noise receivers would be significantly impacted under these alternatives than under the BNSF Alternative. Also, these alternatives would affect a larger number of historically significant cultural resources than the BNSF Alternative.

The Corcoran Elevated Alternative would have impacts similar to those of the corresponding segment of the BNSF Alternative, since both of these alignments follow the same general corridor through the City of Corcoran. The Corcoran Elevated Alternative would result in fewer residential and business displacements than the BNSF Alternative, and would be less disruptive of the roadway network in Corcoran. The Corcoran Elevated Alternative would result in noise impacts on more sensitive receivers (e.g., residences, schools) than the BNSF Alternative and would have a greater visual impact on residents of the community than the BNSF Alternative.

The Corcoran Bypass Alternative avoids the City of Corcoran, deviating from the BNSF Railway. The Corcoran Bypass Alternative would have fewer noise impacts on sensitive receivers, affect fewer low-income and minority communities, cause less community disruption, and result in fewer business displacements than the BNSF Alternative. The Corcoran Bypass Alternative would result in a smaller loss in property tax revenues, a greater loss in agricultural sales, conversion of more agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative.

The BNSF Alternative would require the acquisition of property from Allensworth State Historic Park and the Allensworth Ecological Reserve. This alternative would also cause visual and noise impacts on the park. The Allensworth Bypass Alternative would avoid these impacts and reduce the acreage of jurisdictional waters permanently affected by the project. However, the Allensworth Bypass Alternative would have a greater property tax revenue reduction, cause more agricultural business impacts, convert more acres of farmland to nonagricultural uses, and affect more acres of Williamson Act land than the BNSF Alternative.

The Wasco-Shafter Bypass Alternative avoids the communities of Wasco and Shafter, while the BNSF Alternative goes through these communities adjacent to the BNSF Railway. The Wasco-Shafter Bypass Alternative would have fewer noise impacts, affect fewer acres of waters of the United States, affect fewer low-income and minority communities, cause less community disruption, and result in fewer residential and business displacements than the BNSF Alternative. The Wasco-Shafter Bypass Alternative would result in a greater loss in agricultural sales, more conversion of agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative.

The Bakersfield South and Bakersfield Hybrid alternatives would also have impacts similar to those of the corresponding segment of the BNSF Alternative, since these two alternatives are relatively close to the BNSF Alternative as they cross through metropolitan Bakersfield. Noise associated with the HST on the Bakersfield South Alternative would affect more sensitive receptors than the corresponding segment of the BNSF Alternative. Noise associated with the

HST on the Bakersfield Hybrid Alternative would affect fewer sensitive receptors than the Bakersfield South Alternative and the corresponding segment of the BNSF Alternative. The Bakersfield South and Bakersfield Hybrid alternatives would have EMI impacts on medical equipment in Mercy Hospital. Unlike the BNSF Alternative, the Bakersfield South and Bakersfield Hybrid alternatives would not encroach on the campus of Bakersfield High School. The Bakersfield South Alternative would have fewer associated residential and business relocations and have a smaller property and sales tax revenue reduction than the corresponding section of the BNSF Alternative. The Bakersfield Hybrid Alternative would displace substantially fewer residential units than either the BNSF or Bakersfield South alternatives, particularly in the Northeastern district of Bakersfield. The Bakersfield Hybrid Alternative would have fewer commercial/business displacements than the BNSF Alternative, but greater commercial/business displacements than the Bakersfield South Alternative because it traverses an area of commercial land uses adjacent to the Edison Highway in East Bakersfield. The loss in property and sales tax revenue with the Bakersfield Hybrid Alternative would be similar to the Bakersfield South Alternative. A greater number of religious facilities would be displaced with the Bakersfield South Alternative than the BNSF Alternative, and fewer religious facilities would be displaced by the Bakersfield Hybrid Alternative than the BNSF and Bakersfield South alternatives. The Bakersfield South Alternative would cross through the Mill Creek Redevelopment Area between the Amtrak Station and California Avenue. The BNSF and Bakersfield Hybrid alternatives would be located north of this redevelopment area.

S.8.4 Comparison of HST Stations

The stations analyzed in this Project EIR/EIS include two stations in the city of Fresno, two stations in the vicinity of the city of Hanford, and three stations in the city of Bakersfield. Except for the two stations in Fresno, all of the station alternatives are associated with a specific alternative alignment.

Impacts for the Fresno station alternatives would be similar. Both stations would affect a historic structure on the National Register of Historic Places. Other effects include noise that would be mitigated, as well as temporary impacts on businesses and transportation circulation during construction. The city of Fresno's Transportation Master Plan includes relocating the city's transit center across from the Downtown Fresno HST Station and specifies that the Mariposa Street Station Alternative would better serve the planned transit improvements for the downtown area. Because of the city's planning and the orientation of the Downtown Fresno City Center, the Mariposa Street Station Alternative offers substantially more opportunities for transit-oriented development.

The Kings/Tulare Regional Station–East Alternative is associated with the BNSF Alternative Alignment. The Kings/Tulare Regional Station–West Alternative is associated with the Hanford West Bypass 1 and 2 alternative alignments. The Kings/Tulare Regional Station–West may be located either at-grade or below-grade. The Kings/Tulare Regional Station–East would result in the conversion of more Important Farmland to nonagricultural use than the Kings/Tulare Regional Station–West. The Kings/Tulare Regional Station–West would displace more residences and commercial properties than the Kings/Tulare Regional Station–East. The at-grade option for the Kings/Tulare Regional Station–West would have greater noise and visual impacts than the below-grade option.

Each of the three alignment alternatives in Bakersfield would have slightly different station configurations, but all three station alternatives are located within a few hundred feet of each other in Downtown Bakersfield near the existing Amtrak station. All three alternatives would have similar impacts.

S.8.5 Comparison of HMF Alternative Sites

As indicated above, five alternative sites were evaluated for an HMF along the Fresno to Bakersfield Section. Table S-4 at the end of the summary provides a comparison of impacts associated with these five sites.

S.8.6 Capital Cost

Table S-2 at the end of the summary provides a cost estimate in 2010 dollars for each of the 72 alignment alternatives. All of these estimates use the Fresno Mariposa Street Station Alternative. Although the estimated cost for the Fresno station at Mariposa Street and Kern Street would be the same, construction of the station at Kern Street would be $27 million more than a station at Fresno Street because of increased track, site work, electric traction work, and design costs.

The HMF sites would all contain the same facilities to provide maintenance services for the HST System. The HMF at any of the sites would cost about $620 million, based on conceptual site and functional layouts for the facilities.

S.9 Section 4(f)/Section 6(f)

S.9.1 Section 4(f)

Under Section 4(f) of 49 United States Code (U.S.C.) 303, an operating agency of the U.S. Department of Transportation may not approve a project that uses properties protected under this section of the law unless there are no prudent or feasible alternatives and the project includes all possible planning to minimize harm to such properties. Properties protected under Section 4(f) are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

The following historic properties protected under Section 4(f) would incur a use regardless of which alternatives were selected: the Friant-Kern Canal and the Washington Irrigated Colony Historic Rural Landscape, including two of its contributing properties (the Washington Colony Canal and the North Branch of Oleander Canal).

Depending on whether the BNSF Alternative or the Hanford West Bypass 1 and 2 alternatives were implemented, some Section 4(f) resources would incur a use. Were the BNSF Alternative to be implemented in locations where it parallels the Hanford West Bypass alternatives, one Section 4(f) resource, the Peoples Ditch, would incur a use. Were the Hanford West Bypass 1 Alternative to be implemented, four Section 4(f) resources would incur a use: the Last Chance Ditch, 13148 Grangeville Boulevard, 9860 13th Avenue, and 11029 Kent Avenue. Were the Hanford West Bypass 2 to be implemented, three Section 4(f) resources would incur a use: the Last Chance Ditch, 13148 Grangeville Boulevard, and 9860 13th Avenue.

Implementation of the BNSF Alternative would result in a Section 4(f) use of Colonel Allensworth State Historic Park and the Allensworth Ecological Reserve. These uses could be avoided with implementation of the Allensworth Bypass Alternative.

Implementation of the BNSF Alternative, the Bakersfield South Alternative, or the Bakersfield Hybrid Alternative would result in a Section 4(f) use to the Friant-Kern Canal regardless of which alternative were selected. However, the BNSF Alternative would also result in the use of an additional Section 4(f) property: 2509 E. California Avenue.

S.9.2 Section 6(f)

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund (LWCF) Act. These properties also cannot be used for transportation project unless there is no prudent or feasible alternative, and their use must be fully mitigated to the satisfaction of the National Park Service and the local jurisdiction administering the recreation resource. Funds from a 1994 LWCF development grant to the California Department of Parks and Recreation were used for new recreational facilities at Colonel Allensworth State Historic Park/Allensworth Historic District. Therefore, this park is considered a 6(f) property. The BNSF Alternative Alignment would require conversion of approximately 1.7 acres of the park. Section 6(f) impacts on the park would be avoided with implementation of the Allensworth Bypass Alternative.

S.10 Areas of Controversy

Based on the scoping meetings and public outreach efforts throughout the environmental review process, the following are known areas of controversy:

- Selection of the preferred HST alternative.
- Impacts on special-status plants and wildlife and wildlife habitat preserves.
- Impacts on corridor communities (including noise, visual quality impacts, loss of community character and cohesion, and right-of-way acquisition).
- Impacts on farmlands (including severance of farmlands, loss of productive farmland, and loss of agricultural enterprises).
- Trade-offs between corridor communities and agricultural lands.

S.11 Next Steps in the Environmental Process

The Authority and FRA are circulating the Revised Draft EIR/Supplemental Draft EIS to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, interested individuals, and the public. The document also is available at the Authority offices, public libraries in the study area, and on the Authority's website. The following discussion outlines the next steps in the environmental process, from public and agency comment on the Revised Draft EIR/Supplemental Draft EIS to construction and operation.

S.11.1 Public and Agency Comment

The Revised Draft EIR/Supplemental Draft EIS will be circulated for a 60-day comment period, which will include public hearings. Information about the schedule of public hearings is available on the Authority's website at www.cahighspeedrail.ca.gov.

S.11.2 Identification of Preferred Alternative

After considering public and agency comments, the Authority and FRA will identify a preferred alignment alternative, site for each station, and a preferred HMF facility alternative from among the HMF alternatives. The Authority and FRA will prepare a Fresno to Bakersfield Section Final EIR/EIS that will include responses to comments and a description of the preferred alternative and proposed mitigation.

S.11.2.1 FRA Decision-Making

On completion of the environmental process with publication of the Fresno to Bakersfield Section Final EIR/EIS, the FRA expects to issue a Record of Decision (ROD) for compliance with NEPA. The ROD will describe the project and alternatives considered, describe the selected alternative; make environmental findings and determinations with regard to air quality conformity,

Endangered Species Act, Section 106, Section 4(f), and environmental justice; and require mitigation measures. Issuance of the ROD is a prerequisite for any federal funding or approvals.

S.11.2.2 U.S. Army Corps of Engineers decision-making

The Fresno to Bakersfield Section of the HST System will require a permit from the USACE under Section 404 of the Clean Water Act and Section 14 of the Rivers and Harbors Act (33 U.S.C. 408). The USACE is using the Fresno to Bakersfield Section EIR/EIS to integrate the procedural and substantive requirements of NEPA and its permitting responsibilities (including EPA's 404(b)(1) Guidelines) to provide a single document that streamlines and enables informed decision-making by the USACE, including but not limited to, adoption of the EIS, issuance of necessary RODs, Section 404 permit decisions, and Section 408 permit decisions (as applicable) for alteration/modification of completed federal flood risk management facilities and any associated operation and maintenance, and real estate permissions or instruments (as applicable).

S.11.2.3 California High-Speed Rail Authority Decision-making

After completion of the environmental process, the Authority will consider whether to certify the Final EIR/EIS for compliance with CEQA. Once the Authority certifies the Final EIR/EIS, it can approve the project and make related CEQA decisions (findings, mitigation plan, and potential statement of overriding considerations). The required CEQA findings prepared for each significant effect will be one of the following:

- Changes or alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR.
- Changes or alternatives are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or HST alternatives identified in the Final EIR.

If the Authority proceeds with approval of the project, the Authority would file a Notice of Determination (NOD) that describes the project and whether the project will have a significant effect on the environment. If the Authority approves a project that will result in the occurrence of significant effects identified in the Final EIR but not avoided or substantially lessened, CEQA requires the preparation of a Statement of Overriding Considerations which provides specific reasons to support the project, including economic, legal, social, technological, or other benefits of the proposed project that outweigh unavoidable adverse environmental effects. If such a statement is prepared, the Authority's NOD will reference the statement.

For purposes of this Fresno to Bakersfield Section EIR/EIS, project approval would include selection of a north/south alignment alternative and selection of station locations. The Authority anticipates identifying a preferred HMF facility site from among the HMF alternative sites examined in this document. The Authority is also considering HMF facility alternative sites as part of the Merced to Fresno Section EIR/EIS, and anticipates identifying a preferred HMF facility site from among the alternatives in that EIR/EIS. A final decision on the HMF facility location is anticipated to occur at a date later than the decisions on the north/south alignments and stations, and based on the Authority's consideration of the preferred HMF alternative sites from both the Fresno to Bakersfield and Merced to Fresno sections.

S.11.2.4 Project Implementation

After the issuance of the FRA's ROD and the Authority's NOD, the Authority would complete final design, obtain construction permits, and acquire property before construction, as shown below.

Fresno to Bakersfield HST Milestone Schedule

August 2011	Public release of Draft EIR/EIS
July 2012	Public release of Revised Draft EIR/Supplemental Draft EIS
January 2013	Final EIR/EIS published
March 2013	Notice of Determination and Record of Decision
2011 through 2013	Final design/permitting
Spring 2013	Property acquisition begins
2013	Construction begins
2019	Operation begins (Testing)

This page intentionally left blank

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 1A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Project Costs																																				
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)	7,613	7,540	7,515	7,196	7,570	7,251	7,528	7,313	7,617	7,621	7,455	7,240	7,544	7,548	7,162	7,459	7,463	7,244	7,248	7,166	7,170	7,430	7,215	7,519	7,523	7,137	7,434	7,438	7,219	7,223	6,944	7,145	7,111	6,896	7,200	7,443
Transportation and Traffic																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																																				
Project Impacts																																				
TR #12: Total number of permanent road closures.	45	44	43	49	44	50	45	59	43	50	44	58	42	49	58	42	49	56	63	56	63	43	57	41	48	57	41	48	55	62	55	62	49	63	47	54
Air Quality and Global Climate Change																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for air quality and global climate change.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for air quality and global climate change.																																				
Noise and Vibration																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																																				
Project Impacts																																				
N&V #3: Number of severe operational noise impacts to sensitive receivers.	4,507	4,561	4,612	4,270	4,538	4,196	4,493	3,406	4,929	3,371	4,547	3,460	4,983	3,425	3,446	4,969	3,411	3,882	2,324	3,868	2,310	4,598	3,511	5,034	3,476	3,497	5,020	3,462	3,933	2,375	3,919	2,361	4,256	3,169	4,692	3,134
N&V #5: Number of operational vibration impacts to sensitive receivers.	40	36	49	47	51	49	38	37	40	60	34	33	36	56	31	34	54	33	53	31	51	47	46	49	69	44	47	67	46	66	44	64	45	44	47	67
Electromagnetic Fields and Electromagnetic Interference																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																																				
Project Impacts																																				
EMF/EMI #5: Impacts to sensitive medical devices or imaging equipment.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Public Utilities and Energy																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																																				
Project Impacts																																				
PU&E #8: Potential Conflicts with Electrical Facilities	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 1B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Project Costs																																				
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)	7,174	7,115	7,358	6,900	6,904	6,822	6,826	7,485	7,270	7,574	7,578	6,983	7,489	7,493	7,274	7,278	7,196	7,120	7,166	6,951	7,255	7,259	6,873	7,170	7,174	6,955	6,959	6,877	6,881	7,235	7,176	7,536	7,162	7,243	7,317	7,321
Transportation and Traffic																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																																				
Project Impacts																																				
TR #12: Total number of permanent road closures.	63	47	54	61	68	61	68	44	58	42	49	58	42	49	56	63	56	63	50	64	48	55	64	48	55	62	69	62	69	59	43	50	57	64	57	64
Air Quality and Global Climate Change																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for air quality and global climate change.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for air quality and global climate change.																																				
Noise and Vibration																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																																				
Project Impacts																																				
N&V #3: Number of severe operational noise impacts to sensitive receivers.	3,155	4,678	3,120	3,591	2,033	3,577	2,019	4,524	3,437	4,960	3,402	3,423	4,946	3,388	3,859	2,301	3,845	2,287	4,182	3,095	4,618	3,060	3,081	4,604	3,046	3,517	1,959	3,503	1,945	3,392	4,915	3,357	3,814	2,256	3,828	2,270
N&V #5: Number of operational vibration impacts to sensitive receivers.	42	45	65	44	64	42	62	49	48	51	71	46	49	69	48	68	46	66	47	46	49	69	44	47	67	46	66	44	64	35	38	58	35	55	37	57
Electromagnetic Fields and Electromagnetic Interference																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																																				
Project Impacts																																				
EMF/EMI #5: Impacts to sensitive medical devices or imaging equipment.	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Public Utilities and Energy																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																																				
Project Impacts																																				
PU&E #8: Potential Conflicts with Electrical Facilities	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 2A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Biological Resources and Wetlands																																				
Construction Impacts																																				
Special-Status Plants																																				
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.	213	227	230	230	214	213	276	222	211	213	290	237	225	227	300	288	290	235	236	298	300	293	240	228	230	303	291	293	238	240	301	303	293	239	228	230
Special-Status Wildlife Species																																				
BIO #2 through BIO #6: Number of acres temporarily impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	1,312	907	1,022	1,032	1,336	1,346	1,343	1,254	1,312	1,322	938	849	907	917	880	938	948	849	859	880	890	1,053	964	1,022	1,032	995	1,053	1,063	964	974	995	1,005	1,063	974	1,032	1,042
Special-Status Plant Communities																																				
BIO #7: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.	215	229	232	232	216	216	278	224	218	213	292	239	232	228	301	295	290	242	237	305	300	295	242	236	231	305	298	294	245	240	308	303	295	242	235	231
Jurisdictional Waters																																				
BIO #8: Number of acres directly and indirectly temporarily impacted that contain jurisdictional waters.	13	14	14	18	13	17	14	12	13	13	15	12	14	14	14	15	15	12	12	13	13	15	13	14	14	14	15	15	12	12	14	13	19	17	18	18

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 2B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Biological Resources and Wetlands																																				
Construction Impacts																																				
Special-Status Plants																																				
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.	302	291	293	237	239	301	302	277	223	212	214	286	275	277	221	223	285	286	276	223	211	213	286	275	276	221	223	284	286	285	274	276	284	285	220	222
Special-Status Wildlife Species																																				
BIO #2 through BIO #6: Number of acres temporarily impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	1,005	1,063	1,073	974	984	1,005	1,015	1,367	1,278	1,336	1,346	1,309	1,367	1,377	1,278	1,288	1,309	1,319	1,377	1,288	1,346	1,356	1,319	1,377	1,387	1,288	1,298	1,319	1,329	1,285	1,343	1,353	1,285	1,295	1,254	1,264
Special-Status Plant Communities																																				
BIO #7: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.	304	298	293	245	240	308	303	279	225	219	214	288	282	277	229	224	291	287	278	225	219	214	288	282	277	228	224	291	286	287	281	276	290	286	228	223
Jurisdictional Waters																																				
BIO #8: Number of acres directly and indirectly temporarily impacted that contain jurisdictional waters.	18	19	19	17	17	18	18	14	12	13	13	13	14	14	11	11	13	13	19	16	17	17	17	18	18	16	16	17	17	13	14	14	13	13	11	11

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 3A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Conservation Areas																																				
BIO #9: Number of acres temporarily impacted that are located in USFWS recovery plans.	643	643	646	683	646	683	794	650	647	652	794	650	647	652	801	798	803	654	660	805	811	797	654	650	656	805	801	807	658	663	808	814	833	690	686	692
Protected Trees																																				
BIO #10: Number of acres disturbed that support protected trees.	94	102	101	106	93	98	94	94	101	96	102	102	109	104	102	109	104	109	104	109	104	101	101	108	103	101	108	103	108	103	108	103	106	106	113	108
Project Impacts																																				
Special-Status Plant Species																																				
BIO #12: Number of acres impacted that has potential to support special-status plant species.	225	246	287	278	258	249	222	240	227	225	243	262	248	247	258	245	243	263	262	260	259	283	302	289	287	298	285	284	304	302	300	299	275	293	280	278
Special-Status Wildlife Species																																				
BIO #13 through BIO #17: Number of acres impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	3,063	2,902	2,738	2,719	2,931	2,912	3,087	2,979	3,004	3,010	2,926	2,818	2,843	2,849	2,841	2,867	2,873	2,759	2,765	2,783	2,789	2,762	2,654	2,679	2,685	2,677	2,703	2,709	2,595	2,601	2,619	2,625	2,743	2,635	2,660	2,666
BIO #18: Number of acres disturbed that supports special-status plant communities and riparian areas.	247	261	296	287	280	271	232	262	246	245	246	276	260	259	262	246	245	275	274	261	260	282	311	296	295	297	281	280	311	310	297	296	273	302	287	286

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 3B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Conservation Areas																																				
BIO #9: Number of acres temporarily impacted that are located in USFWS recovery plans.	841	837	843	694	700	845	850	797	654	650	656	805	801	807	658	663	808	814	833	690	686	692	841	837	843	694	700	845	850	801	798	803	805	811	654	660
Protected Trees																																				
BIO #10: Number of acres disturbed that support protected trees.	106	113	108	113	108	113	108	93	93	100	95	93	100	95	100	95	100	95	98	98	105	100	98	105	100	105	100	105	100	94	101	96	101	96	101	96
Project Impacts																																				
Special-Status Plant Species																																				
BIO #12: Number of acres impacted that has potential to support special-status plant species.	290	276	275	295	293	292	290	255	273	260	259	270	257	255	275	274	272	270	246	265	251	250	261	248	246	266	265	263	262	237	224	222	239	237	242	240
Special-Status Wildlife Species																																				
BIO #13 through BIO #17: Number of acres impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	2,658	2,684	2,690	2,576	2,582	2,600	2,606	2,955	2,847	2,872	2,878	2,870	2,896	2,902	2,788	2,794	2,812	2,818	2,936	2,828	2,853	2,859	2,851	2,877	2,883	2,769	2,775	2,793	2,799	3,002	3,028	3,034	2,944	2,950	2,920	2,926
BIO #18: Number of acres disturbed that supports special-status plant communities and riparian areas.	288	272	272	302	301	288	287	265	295	279	278	281	265	264	294	293	280	279	257	286	270	269	272	256	255	285	284	271	270	247	232	231	247	246	261	260

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 4A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Jurisdictional Waters																																				
BIO #19: Number of acres directly and indirectly impacted that contain jurisdictional waters	474	462	481	467	476	463	412	463	460	460	400	451	448	448	389	386	386	437	437	375	375	419	470	467	467	408	405	405	456	456	394	394	405	456	453	453
Conservation Areas																																				
BIO #20: Number of acres that would disturb portions of recovery plans.	997	997	890	876	890	876	994	993	940	953	994	993	940	953	990	937	950	936	949	933	946	887	886	833	847	883	830	843	830	843	826	839	873	873	819	833
BIO #21: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	14	14	14	14	14	14	0	14	14	14	0	14	14	14	0	0	0	14	14	0	0	0	14	14	14	0	0	0	14	14	0	0	0	14	14	14
Protected Trees																																				
BIO #22: Number of acres disturbed that support protected trees.	149	159	153	151	143	141	146	183	172	171	156	193	182	181	190	179	178	216	215	213	212	150	187	176	175	184	173	172	210	209	207	206	148	185	174	173
Hydrology and Water Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																																				
Geology, Soils, and Seismicity																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																																				
Hazardous Materials and Wastes																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for Hazardous Materials and Wastes.																																				
HMW #4: Temporary Hazardous Material and Waste Activities in the Proximity of Schools	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Impacts - There are no significant differentiating project impacts between alternatives for Hazardous Materials and Wastes.																																				
Safety and Security																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for safety and security.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for safety and security.																																				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 4B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Jurisdictional Waters																																				
BIO #19: Number of acres directly and indirectly impacted that contain jurisdictional waters	394	391	391	442	442	380	380	414	465	462	462	403	400	400	451	451	389	389	400	452	449	449	389	386	386	438	438	375	375	401	397	398	387	387	449	449
Conservation Areas																																				
BIO #20: Number of acres that would disturb portions of recovery plans.	869	816	829	816	829	812	826	887	886	833	847	883	830	843	830	843	826	839	873	873	819	833	869	816	829	816	829	812	826	990	937	950	933	946	936	949
BIO #21: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	0	0	0	14	14	0	0	0	14	14	14	0	0	0	14	14	0	0	0	14	14	14	0	0	0	14	14	0	0	0	0	0	0	0	14	14
Protected Trees																																				
BIO #22: Number of acres disturbed that support protected trees.	182	171	170	208	207	205	204	140	177	166	165	174	163	162	200	199	197	196	138	175	164	163	172	161	160	198	197	195	194	180	169	168	203	202	206	205
Hydrology and Water Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																																				
Geology, Soils, and Seismicity																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																																				
Hazardous Materials and Wastes																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for Hazardous Materials and Wastes.																																				
HMW #4: Temporary Hazardous Material and Waste Activities in the Proximity of Schools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Project Impacts - There are no significant differentiating project impacts between alternatives for Hazardous Materials and Wastes.																																				
Safety and Security																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for safety and security.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for safety and security.																																				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 5A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Socioeconomics, Communities, and Environmental Justice																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for socioeconomics, communities, and environmental justice.																																				
Project Impacts																																				
SO #7: Division of existing community Ponderosa Road/Edna Way northeast of Hanford and the Newark Avenue vicinity northeast of Corcoran.	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
SO #7: Displacement of Bakersfield High School's Industrial Arts building.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No
SO #7: Displacement of the Mercado Latino Tianguis.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
SO #7: Displacement Bakersfield Homeless Shelter and associated facilities and programs.	No	No	No	No	No	No	No	No	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes
SO #7: Displacement of Mercy Hospital medical complex facilities.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
SO #7: Displacement of religious facilities.	6	6	6	6	6	6	6	6	5	3	6	6	5	3	6	5	3	5	3	5	3	6	6	5	3	6	5	3	5	3	5	3	6	6	5	3
Estimated number of housing units displaced in EJ areas	451	441	390	418	402	430	442	446	458	372	432	436	448	362	427	439	353	443	357	434	348	381	385	397	311	376	388	302	392	306	383	297	409	413	425	339
Station Planning, Land Use, and Development																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																																				
LU #2: Substantial change in intensity of land use incompatible with adjacent land uses.	3,947	3,803	3,650	3,667	3,809	3,826	3,850	3,792	3,884	3,877	3,706	3,648	3,740	3,733	3,551	3,643	3,636	3,585	3,578	3,488	3,481	3,553	3,495	3,587	3,580	3,398	3,490	3,483	3,432	3,425	3,335	3,328	3,570	3,512	3,604	3,597

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 5B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Socioeconomics, Communities, and Environmental Justice																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for socioeconomics, communities, and environmental justice.																																				
Project Impacts																																				
SO #7: Division of existing community Ponderosa Road/Edna Way northeast of Hanford and the Newark Avenue vicinity northeast of Corcoran.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SO #7: Displacement of Bakersfield High School's Industrial Arts building.	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
SO #7: Displacement of the Mercado Latino Tianguis.	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
SO #7: Displacement Bakersfield Homeless Shelter and associated facilities and programs.	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	No	Yes
SO #7: Displacement of Mercy Hospital medical complex facilities.	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
SO #7: Displacement of religious facilities.	6	5	3	5	3	5	3	6	6	5	3	6	5	3	5	3	5	3	6	6	5	3	6	5	3	5	3	5	3	6	5	3	5	3	5	3
Estimated number of housing units displaced in EJ areas	404	416	330	420	334	411	325	393	397	409	323	388	400	314	404	318	395	309	421	425	437	351	416	428	342	432	346	444	358	437	449	363	444	358	453	367
Station Planning, Land Use, and Development																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																																				
LU #2: Substantial change in intensity of land use incompatible with adjacent land uses.	3,415	3,507	3,500	3,449	3,442	3,352	3,345	3,712	3,654	3,746	3,739	3,557	3,649	3,642	3,591	3,584	3,494	3,487	3,729	3,671	3,763	3,756	3,574	3,666	3,659	3,608	3,601	3,511	3,504	3,695	3,787	3,780	3,632	3,625	3,729	3,722

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 6A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Agricultural Lands																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																																				
Project Impacts																																				
AG #4: Number of acres of agricultural land converted to nonagricultural use.	3,102	2,869	2,670	2,749	2,947	3,026	3,020	3,086	3,102	3,102	2,787	2,853	2,869	2,869	2,771	2,787	2,787	2,853	2,853	2,771	2,771	2,588	2,654	2,670	2,670	2,572	2,588	2,588	2,654	2,654	2,572	2,572	2,667	2,733	2,749	2,749
AG #5: Number of acres of agricultural parcels split creating parcels too small to economically farm.	533	459	427	449	516	538	483	551	533	533	409	477	459	459	427	409	409	477	477	427	427	377	445	427	427	395	377	377	445	445	395	395	399	467	449	449
Parks, Recreation, and Open Space																																				
Construction Impacts																																				
PK #3: Activities would create noise to some areas of Bakersfield High School.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
PK #1: Activities would create noise and visual impacts to McMurtrey Aquatic Center.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
PK #1: Activities would create noise and closure portions of the Bakersfield Amtrak Station Playground.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No
Project Impacts																																				
PK#4: Impacts would increase noise, acquire land and introduce a modern feature not consistent with historic atmosphere of Allensworth State Historic Park.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 6B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Agricultural Lands																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																																				
Project Impacts																																				
AG #1: Number of acres of agricultural land converted to nonagricultural use.	2,651	2,667	2,667	2,733	2,733	2,651	2,651	2,865	2,931	2,947	2,947	2,849	2,865	2,865	2,931	2,931	2,849	2,849	2,944	3,010	3,026	3,026	2,928	2,944	2,944	3,010	3,010	2,928	2,928	3,004	3,020	3,020	3,004	3,004	3,086	3,086
AG #2: Number of acres of agricultural parcels split creating parcels too small to economically farm.	417	399	399	467	467	417	417	466	534	516	516	484	466	466	534	534	484	484	488	556	538	538	506	488	488	556	556	501	501	501	483	483	501	501	551	551
Parks, Recreation, and Open Space																																				
Construction Impacts																																				
PK #1: Activities would create noise to some areas of Bakersfield High School.	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
PK #1: Activities would create noise to McMurtrey Aquatic Center.	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
PK #1: Activities would create noise and closure portions of the Bakersfield Amtrak Station Playground.	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Project Impacts																																				
PK #4: Impacts would increase noise, acquire land and introduce a modern feature not consistent with historic atmosphere of Allensworth State Historic Park.	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 7A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
PK #4: Impacts to Father Wyatt Park would increase noise and degrade visual quality.	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
PK #4: Impacts to the McMurtery Aquatic Center would create increase noise.	No	No	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
PK #4: Increased noise impacts would occur to the Bakersfield Amtrak Station Playground.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No
PK #4: Impacts to Bakersfield High School would increase noise and degrade visual quality.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No
Aesthetics and Visual Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for aesthetics and visual resources.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for aesthetics and visual resources.																																				
Cultural and Paleontological Resources																																				
Construction Impacts																																				
Impact CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	3	3	3	3	3	3	4	3	3	3	4	3	3	3	4	4	4	3	3	4	4	4	3	3	3	4	4	4	3	3	4	4	4	3	3	3
CUL #2: Effect on historically significant built-environment resources.	21	23	23	23	21	21	20	19	18	19	22	21	20	21	20	19	20	18	19	17	18	22	21	20	21	20	19	20	18	19	17	18	22	21	20	21
Project Impacts - There are no significant differentiating project impacts between alternatives for cultural and paleontological resources.																																				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 7B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
PK #4: Impacts to Father Wyatt Park would increase noise and degrade visual quality.	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
PK #4: Impacts to the McMurtery Aquatic Center would create increase	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
PK #4: Increased noise impacts would occur to the Bakersfield Amtrak Station Playground.	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
PK #4: Impacts to Bakersfield High School would increase noise and degrade visual quality.	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Aesthetics and Visual Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for aesthetics and visual resources.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for aesthetics and visual resources.																																				
Cultural and Paleontological Resources																																				
Construction Impacts																																				
CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	4	4	4	3	3	4	4	4	3	3	3	4	4	4	3	3	4	4	4	3	3	3	4	4	4	3	3	4	4	4	4	4	4	4	3	3
CUL #2: Effect on historically significant built-environment resources.	20	19	20	18	19	17	18	20	19	18	19	18	17	18	16	17	15	16	20	19	18	19	18	17	18	16	17	15	16	18	17	18	15	16	16	17
Project Impacts - There are no significant differentiating project impacts between alternatives for cultural and paleontological resources.																																				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 8A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Regional Growth																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for regional growth.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for regional growth.																																				
Cumulative Impacts																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for cumulative impacts.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for cumulative impacts.																																				

Alternative Names – 72 Total Options
1. BNSF
2. BNSF – HW Bypass 1
3. BNSF – HW Bypass 2 – Corcoran Elevated
4. BNSF – HW Bypass 2 – Corcoran Bypass
5. BNSF – Corcoran Elevated
6. BNSF – Corcoran Bypass
7. BNSF – Allensworth Bypass
8. BNSF – Wasco Shafter Bypass
9. BNSF – Bakersfield South
10. BNSF – Bakersfield Hybrid
11. BNSF – HW Bypass 1 – Allensworth Bypass
12. BNSF – HW Bypass 1 – Wasco Shafter Bypass
13. BNSF – HW Bypass 1 – Bakersfield South
14. BNSF – HW Bypass 1 – Bakersfield Hybrid
15. BNSF – HW Bypass 1 – Allensworth Bypass – Wasco Shafter Bypass
16. BNSF – HW Bypass 1 – Allensworth Bypass – Bakersfield South
17. BNSF – HW Bypass 1 – Allensworth Bypass – Bakersfield Hybrid
18. BNSF – HW Bypass 1 - Wasco Shafter Bypass – Bakersfield South
19. BNSF – HW Bypass 1 - Wasco Shafter Bypass – Bakersfield Hybrid
20. BNSF – HW Bypass 1 - Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South
21. BNSF – HW Bypass 1 - Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
22. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass
23. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass
24. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield South
25. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield Hybrid
26. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass
27. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield South
28. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid
29. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield South
30. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid
31. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
32. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
33. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass
34. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass
35. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield South
36. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield Hybrid
37. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass –Wasco Shafter Bypass
38. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Bakersfield South
39. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Bakersfield Hybrid
40. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield South
41. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
42. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
43. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
44. BNSF – Corcoran Elevated – Allensworth Bypass
45. BNSF – Corcoran Elevated – Wasco Shafter Bypass
46. BNSF – Corcoran Elevated – Bakersfield South
47. BNSF – Corcoran Elevated – Bakersfield Hybrid
48. BNSF – Corcoran Elevated - Allensworth Bypass – Wasco Shafter Bypass
49. BNSF – Corcoran Elevated - Allensworth Bypass – Bakersfield South
50. BNSF – Corcoran Elevated - Allensworth Bypass – Bakersfield Hybrid
51. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield South
52. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid
53. BNSF – Corcoran Elevated - Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
54. BNSF – Corcoran Elevated - Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
55. BNSF – Corcoran Bypass – Allensworth Bypass
56. BNSF – Corcoran Bypass – Wasco Shafter Bypass
57. BNSF – Corcoran Bypass – Bakersfield South
58. BNSF – Corcoran Bypass – Bakersfield Hybrid
59. BNSF – Corcoran Bypass - Allensworth Bypass – Wasco Shafter Bypass
60. BNSF – Corcoran Bypass - Allensworth Bypass – Bakersfield South
61. BNSF – Corcoran Bypass - Allensworth Bypass – Bakersfield Hybrid
62. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield South
63. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
64. BNSF – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
65. BNSF – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
66. BNSF – Allensworth Bypass – Wasco Shafter Bypass
67. BNSF – Allensworth Bypass – Bakersfield South
68. BNSF – Allensworth Bypass – Bakersfield Hybrid
69. BNSF – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South
70. BNSF – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
71. BNSF – Wasco Shafter Bypass – Bakersfield South
72. BNSF – Wasco Shafter Bypass – Bakersfield Hybrid

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 8B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Regional Growth																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for regional growth.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for regional growth.																																				
Cumulative Impacts																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for cumulative impacts.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for cumulative impacts.																																				

Alternative Names – 72 Total Options
1. BNSF
2. BNSF – HW Bypass 1
3. BNSF – HW Bypass 2 – Corcoran Elevated
4. BNSF – HW Bypass 2 – Corcoran Bypass
5. BNSF – Corcoran Elevated
6. BNSF – Corcoran Bypass
7. BNSF – Allensworth Bypass
8. BNSF – Wasco Shafter Bypass
9. BNSF – Bakersfield South
10. BNSF – Bakersfield Hybrid
11. BNSF – HW Bypass 1 – Allensworth Bypass
12. BNSF – HW Bypass 1 – Wasco Shafter Bypass
13. BNSF – HW Bypass 1 – Bakersfield South
14. BNSF – HW Bypass 1 – Bakersfield Hybrid
15. BNSF – HW Bypass 1 – Allensworth Bypass – Wasco Shafter Bypass
16. BNSF – HW Bypass 1 – Allensworth Bypass – Bakersfield South
17. BNSF – HW Bypass 1 – Allensworth Bypass – Bakersfield Hybrid
18. BNSF – HW Bypass 1 - Wasco Shafter Bypass – Bakersfield South
19. BNSF – HW Bypass 1 - Wasco Shafter Bypass – Bakersfield Hybrid
20. BNSF – HW Bypass 1 - Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South
21. BNSF – HW Bypass 1 - Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
22. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass
23. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass
24. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield South
25. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield Hybrid
26. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass
27. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield South
28. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid
29. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield South
30. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid
31. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
32. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
33. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass
34. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass
35. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield South
36. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield Hybrid
37. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass –Wasco Shafter Bypass
38. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Bakersfield South
39. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Bakersfield Hybrid
40. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield South
41. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
42. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
43. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
44. BNSF – Corcoran Elevated – Allensworth Bypass
45. BNSF – Corcoran Elevated – Wasco Shafter Bypass
46. BNSF – Corcoran Elevated – Bakersfield South
47. BNSF – Corcoran Elevated – Bakersfield Hybrid
48. BNSF – Corcoran Elevated - Allensworth Bypass – Wasco Shafter Bypass
49. BNSF – Corcoran Elevated - Allensworth Bypass – Bakersfield South
50. BNSF – Corcoran Elevated - Allensworth Bypass – Bakersfield Hybrid
51. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield South
52. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid
53. BNSF – Corcoran Elevated - Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
54. BNSF – Corcoran Elevated - Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
55. BNSF – Corcoran Bypass – Allensworth Bypass
56. BNSF – Corcoran Bypass – Wasco Shafter Bypass
57. BNSF – Corcoran Bypass – Bakersfield South
58. BNSF – Corcoran Bypass – Bakersfield Hybrid
59. BNSF – Corcoran Bypass - Allensworth Bypass – Wasco Shafter Bypass
60. BNSF – Corcoran Bypass - Allensworth Bypass – Bakersfield South
61. BNSF – Corcoran Bypass - Allensworth Bypass – Bakersfield Hybrid
62. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield South
63. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
64. BNSF – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South
65. BNSF – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid
66. BNSF – Allensworth Bypass – Wasco Shafter Bypass
67. BNSF – Allensworth Bypass – Bakersfield South
68. BNSF – Allensworth Bypass – Bakersfield Hybrid
69. BNSF – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South
70. BNSF – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid
71. BNSF – Wasco Shafter Bypass – Bakersfield South
72. BNSF – Wasco Shafter Bypass – Bakersfield Hybrid

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Transportation		
Construction Impacts		
There are no significant construction impacts for transportation and traffic.	Transportation and traffic avoidance and minimization measures 1 through 10.	N/A
Project Impacts		
TR #12: Loss of Property Access as a Result of Road Closures.	**TR MM#1:** Access Maintenance for Property Owners.	Less than significant
TR #13: HST Station Area Roadway Impacts.	**TR MM#8:** Add New Lanes to Roadway.	Less than significant
TR #13: HST Station Area Intersection Impacts.	**TR MM#3:** Add Signal to Intersection to Improve LOS/Operation. **TR MM#4:** Restripe Intersections. **TR MM#5:** Revise Signal Cycle Length. **TR MM#6:** Widen Approaches to Intersections. **TR MM#7:** Add Exclusive Turn Lanes to Intersections.	Less than significant
TR #14: HMF Site Roadway Impacts.	**TR MM#8:** Add New Lanes to Roadway.	Less than significant
TR #14: HMF Site Intersection Impacts.	**TR MM#3:** Add Signal to Intersection to Improve LOS/Operation. **TR MM#4:** Restripe Intersections. **TR MM#5:** Revise Signal Cycle Length. **TR MM#6:** Widen Approaches to Intersections. **TR MM#7:** Add Exclusive Turn Lanes to Intersections.	Less than significant
TR #15: City of Corcoran Road Network Impacts.	**TR MM#3:** Add Signal to Intersection to Improve LOS/Operation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Air Quality and Global Climate Change		
Construction Impacts		
AQ #1: Construction would exceed the CEQA emissions thresholds for VOCs, NOx and PM_{10} and $PM_{2.5}$. Therefore, it could potentially cause violations of NO_2, O_3 and PM_{10} and $PM_{2.5}$ air quality standards or contribute substantially to NO_2, O_3 and PM_{10} and $PM_{2.5}$existing or projected air quality violations.	**AQ-MM #1:** Reduce criteria exhaust emissions from construction equipment. **AQ-MM #2:** Reduce criteria exhaust emissions from on-road construction equipment. **AQ-MM #4:** Offset emissions through the VERA program.	Less than significant
AQ #2: Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOC, NOx PM10 and PM2.5. Therefore, it would conflict with the 1-hour Ozone Attainment Plan, the 8-hour Ozone Attainment Plan and the PM_{10} and $PM_{2.5}$ Attainment Plans.	**AQ-MM #1:** Reduce criteria exhaust emissions from construction equipment. **AQ-MM #2:** Reduce criteria exhaust emissions from on-road construction equipment. **AQ-MM #4:** Offset emissions through the VERA program.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AQ #3: Material hauling outside the SJVAB would exceed CEQA emission thresholds for NOx in the BAAQMD, Mojave Desert AQMD, and the South Coast AQMD for certain hauling scenarios.	**AQ-MM #2:** Reduce criteria exhaust emissions from on-road construction equipment. **AQ-MM#5**: Purchase offsets for emissions associated with hauling ballast material in Mojave Desert AQMD,BAAQMD and the South Coast AQMD.	Less than significant
AQ#7: Construction of the HST stations could expose sensitive receptors at schools to TAC pollutant concentrations.	**AQ-MM#8:** Reduce the Potential Impact of Air Toxics at Schools around Bakersfield Station.	Less than significant
AQ # 8: Construction of the alignment may expose sensitive receptors to temporary substantial pollutant concentrations from concrete batch plants.	**AQ-MM #3:** Reduce the potential impact of concrete batch plants.	Less than significant
Project Impacts		
AQ #15: Operation of the HMF/MOWF may cause the total PM_{10} and $PM_{2.5}$ ambient concentrations exceed CAAQS due to the existing exceedances in the area.	**AQ-MM #7:** Reduce the potential impact of stationary sources.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AQ #16: Operation of all the HMF sites may expose sensitive receptors to substantial TAC pollutant concentrations.	**AQ-MM #6:** Reduce the potential impact of toxics. **AQ-MM #7:** Reduce the potential impact of stationary sources.	Significant
Noise and Vibration		
Construction Impacts		
N&V #1: Construction noise	**N&V-MM#1:** Construction noise mitigation measures.	Less than significant
N&V #2: Construction vibration	**N&V-MM#2:** Construction vibration mitigation measures.	Less than significant
Project Impacts		
N&V #3: Moderate and severe noise impacts from project operation to sensitive receptors.	**N&V-MM #3**: Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines **N&V-MM #4**: Vehicle noise specification **N&V-MM #5**: Special trackwork at crossovers and turnouts **N&V-MM #6**: Additional noise analysis following final design	Significant in some locations; less than significant where fully mitigated
N&V #5: Impacts from project vibration.	**N&V-MM #8:** Implement project vibration mitigation.	Potentially significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Electromagnetic Fields and Electromagnetic Interference		
Construction Impacts		
There are no significant construction impacts for electromagnetic fields and electromagnetic interference.	No mitigation required	N/A
Project Impacts		
EMF/EMI #5: Impacts to sensitive equipment (medical devices or imaging equipment) from EMI.	**EMF/EMI-MM #1:** Protect sensitive equipment.	Less than significant
Public Utilities and Energy		
Construction Impacts		
There are no significant construction impacts for public utilities and energy.	No mitigation required	N/A
Project Impacts		
PUE#8: Conflict with an electrical substation	**PUE-MM#1:** Reconfigure or relocate substation **AG-MM#1:** Preserve the total amount of Important Farmland	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Biological Resources and Wetlands		
Construction Impacts		
Special-Status Plants		
BIO #1: Construction would directly or indirectly impact suitable habitat that has potential to support special-status plant species.	**Bio-MM #16:** Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #17:** Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species **Bio-MM #53:** Compensate for Impacts on Special-Status Plant Species.	Less than significant
Special-Status Wildlife Species		
BIO #2: Construction would disturb suitable habitat that has potential to support special-status invertebrate species.	**Bio-MM#18:** Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna. **Bio-MM#19:** Seasonal Vernal Pool Work Restriction. **Bio-MM#20:** Implement and Monitor Vernal Pool Protection. **Bio-MM#21:** Implement Conservation Guidelines for the Valley Elderberry Longhorn Beetle. **Bio-MM#47:** Restore Temporary Riparian Impacts. **Bio-MM#48:** Restore Temporary Impacts on Jurisdictional Waters. **Bio-MM#49:** Monitor Construction Activities within Jurisdictional Waters. **Bio-MM#54:** Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp. **Bio-MM#55:** Implement Conservation Guidelines during project operation for Valley Elderberry Longhorn Beetle. **Bio-MM#61:** Compensate for Permanent Riparian Impacts. **Bio-MM#62:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. **Bio-MM#65:** Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #2: Construction would disturb the suitable habitat that has potential to support special-status reptiles and amphibian species.	**Bio-MM #22**: Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species **Bio-MM #23:** Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation **Bio-MM #24:** Conduct Preconstruction Surveys for California Tiger Salamander **Bio-MM #25:** Implement Avoidance and Minimization Measures for California Tiger Salamander **Bio-MM #26**: Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #27**: Conduct Preconstruction Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #28**: Blunt-Nosed Leopard Lizard Avoidance **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #56:** Compensate for Impacts on California Tiger Salamander **Bio-MM #57:** Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant
BIO #2: Construction would disturb suitable habitat that has potential to support nesting special-status bird species (including raptors).	**Bio-MM #29**: Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds **Bio-MM #30**: Conduct Preconstruction Surveys and Monitoring for Raptors **Bio-MM #31:** Raptor Protection on Power Lines **Bio-MM #32:** Conduct Preconstruction Surveys for Swainson's Hawks **Bio-MM #33**: Swainson's Hawk Nest Avoidance and Monitoring **Bio-MM #34:** Monitor Removal of Nest Trees for Swainson's Hawks **Bio-MM #35:** Conduct Protocol Surveys for Burrowing Owls **Bio-MM #36:** Burrowing Owl Avoidance and Minimization **Bio-MM #59:** Compensate for Loss of Swainson's Hawk Nesting Trees **Bio-MM #60:** Compensate for Loss of Burrowing Owl**:** **Bio-MM #68:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO#2: Construction would disturb suitable habitat that has the potential to support special-status mammal species.	**Bio-MM #37:** Conduct Preconstruction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #38:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #39:** Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat **Bio-MM #40:** Conduct Preconstruction Surveys for Special-Status Bat Species **Bio-MM #41:** Bat Avoidance and Relocation **Bio-MM #42:** Bat Exclusion and Deterrence **Bio-MM #43:** Conduct Preconstruction Surveys for American Badger and Ringtail **Bio-MM #44:** American Badger and Ringtail Avoidance **Bio-MM #45:** Conduct Preconstruction Surveys for San Joaquin Kit Fox **Bio-MM #46:** Minimize Impacts on San Joaquin Kit Fox **Bio-MM #51:** Wildlife Corridor Crossing Structure (Implementation) **Bio-MM #52:** Install Wildlife Fencing **Bio-MM #60:** Compensate for Destruction of Natal Dens **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Special-Status Plant Communities		
BIO #3: Number of acres disturbed that supports special-status plant communities and riparian areas.	**Bio-MM #16**: Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #53:** Compensate for Impacts on Special-Status Plant Species **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant
Jurisdictional Waters		
BIO #3: Number of acres directly and indirectly impacted that contain jurisdictional waters.	**Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Conservation Areas		
BIO #3: Number of acres located in USFWS recovery plans.	**Bio-MM #16:** Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #17:** Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species **Bio-MM #18:** Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna **Bio-MM #19**: Seasonal Vernal Pool Work Restriction **Bio-MM #20**: Implement and Monitor Vernal Pool Protection **Bio-MM #21**: Implement Conservation Guidelines for the Valley Elderberry Longhorn Beetle **Bio-MM #22:** Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species **Bio-MM #23:** Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation **Bio-MM #24:** Conduct Preconstruction Surveys for California Tiger Salamander **BIO-MM #25:** Implement Avoidance and Minimization Measures for California Tiger Salamander **Bio-MM #26**: Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #27**: Conduct Preconstruction Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #28**: Blunt-Nosed Leopard Lizard Avoidance **Bio-MM #29**: Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds **Bio-MM #30**: Conduct Preconstruction Surveys and Monitoring for Raptors **Bio-MM #31:** Raptor Protection on Power Lines **Bio-MM #32:** Conduct Preconstruction Surveys for Swainson's Hawks **Bio-MM #33**: Swainson's Hawk Nest Avoidance and Monitoring **Bio-MM #34:** Monitor Removal of Nest Trees for Swainson's Hawks **Bio-MM #35:** Conduct Protocol Surveys for Burrowing Owls **Bio-MM #36:** Burrowing Owl Avoidance and Minimization **Bio-MM #37:** Conduct Preconstruction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #38:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #39:** Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat **Bio-MM #40:** Conduct Preconstruction Surveys for Special-Status Bat Species **Bio-MM #41:** Bat Avoidance and Relocation **Bio-MM #42:** Bat Exclusion and Deterrence	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
	Bio-MM #43: Conduct Preconstruction Surveys for American Badger and Ringtail **Bio-MM #44:** American Badger and Ringtail Avoidance **Bio-MM #45:** Conduct Preconstruction Surveys for San Joaquin Kit Fox **Bio-MM #46:** Minimize Impacts on San Joaquin Kit Fox **Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #50:** Mitigation and Monitoring of Protected Trees **Bio-MM #51:** Install Wildlife Fencing **Bio-MM #52:** Construction in Wildlife Movement Corridors **Bio-MM #53:** Compensate for Impacts on Special-Status Plant Species **Bio-MM #54:** Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp **Bio-MM #55:** Implement Conservation Guidelines During Project Operation for Valley Elderberry Longhorn Beetle **Bio-MM #56:** Compensate for Impacts on California Tiger Salamander **Bio-MM #57:** Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel **Bio-MM #58:** Compensate for Loss of Swainson's Hawk Nesting Trees **Bio-MM #59:** Compensate for Loss of Burrowing Owl **Bio-MM #60:** Compensate for Destruction of Natal Dens **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #64:** Compensate for Impacts to Protected Trees	
Protected Trees		
BIO #3: Construction of the HST alternatives would disturb protected trees.	**Bio-MM #50:** Monitoring of protected trees. **Bio-MM #64:** Compensate for impacts to protected trees. **Bio-MM #65:** Offsite habitat restoration, enhancement and preservation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
Special-Status Plant Species		
BIO #5: Number of acres impacted that has potential to support special-status plant species.	**Bio-MM #16**: Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #17**: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species **Bio-MM #53:** Compensate for Impacts on Special-Status Plant Species	Less than significant
Special-Status Wildlife Species		
BIO #6: Impacts would permanently impact suitable habitat that has the potential to support special-status invertebrate species.	**Bio-MM #18:** Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna **Bio-MM #19:** Seasonal Vernal Pool Work Restriction **Bio-MM #20**: Implement and Monitor Vernal Pool Protection **Bio-MM #21**: Implement Conservation Guidelines for the Valley Elderberry Longhorn Beetle **Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #54:** Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp **Bio-MM #55:** Implement Conservation Guidelines During Project Operation for Valley Elderberry Longhorn Beetle **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #6: Impacts would permanently impact suitable habitat that has the potential to support special-status reptiles and amphibian species.	**Bio-MM #22**: Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species **Bio-MM #23:** Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation **Bio-MM #24:** Conduct Preconstruction Surveys for California Tiger Salamander **Bio-MM #25:** Implement Avoidance and Minimization Measures for California Tiger Salamander **Bio-MM #26:** Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #27**: Conduct Preconstruction Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #28:** Blunt-Nosed Leopard Lizard Avoidance **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #56:** Compensate for Impacts on California Tiger Salamander **Bio-MM #57:** Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant
BIO #6: Impacts would permanently impact suitable habitat that has the potential to support special-status bird species (including raptors).	**Bio-MM #29**: Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds **Bio-MM #30:** Conduct Preconstruction Surveys and Monitoring for Raptors **Bio-MM #31:** Raptor Protection on Power Lines **Bio-MM #32:** Conduct Preconstruction Surveys for Swainson's Hawks **Bio-MM #33**: Swainson's Hawk Nest Avoidance and Monitoring **Bio-MM #34:** Monitor Removal of Nest Trees for Swainson's Hawks **Bio-MM #35:** Conduct Protocol Surveys for Burrowing Owls **Bio-MM #36:** Burrowing Owl Avoidance and Minimization **Bio-MM #55:** Compensate for Loss of Swainson's Hawk Nesting Trees **Bio-MM #59:** Compensate for Loss of Burrowing Owl **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #6: Impacts would permanently impact suitable habitat that has the potential to support special-status mammal species.	**Bio-MM#37**: Conduct Preconstruction Surveys for Nelson's Antelope Squirrel Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse. **Bio-MM#38:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse. **Bio-MM#39:** Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat. **Bio-MM#40:** Conduct Preconstruction Surveys for Special-Status Bat Species. **Bio-MM#41:** Bat Avoidance and Relocation. **Bio-MM#42:** Bat Exclusion and Deterrence. **Bio-MM#43:** Conduct Preconstruction Surveys for American Badger and Ringtail. **Bio-MM#44:** American Badger and Ringtail Avoidance. **Bio-MM#45:** Conduct Preconstruction Surveys for San Joaquin Kit Fox. **Bio-MM#46:** Minimize Impacts on San Joaquin Kit Fox. **Bio-MM#51:** Install Wildlife Fencing. **Bio-MM#52:** Construction in Wildlife Movement Corridors. **Bio-MM#60:** Compensate for Destruction of Natal Dens. **Bio-MM#65:** Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
Special-Status Plant Communities		
BIO #7: Number of acres disturbed that supports special-status plant communities and riparian areas.	**Bio-MM #16**: Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #51:** Compensate for Impacts on Special-Status Plant Species **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65**: Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Jurisdictional Waters		
BIO #7: Number of acres directly and indirectly impacted that contain jurisdictional waters	**Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #65:** Offsite Habitat Restoration, Enhancement, and Preservation	Less than significant
Conservation Areas		
BIO #7: Number of acres that would disturb portions of recovery plans.	**Bio-MM #16:** Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities **Bio-MM #17:** Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species **Bio-MM #18:** Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna **Bio-MM #19**: Seasonal Vernal Pool Work Restriction **Bio-MM #20:** Implement and Monitor Vernal Pool Protection **Bio-MM #21:** Implement Conservation Guidelines for the Valley Elderberry Longhorn Beetle **Bio-MM #22:** Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species **Bio-MM #23:** Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation **Bio-MM #24:** Conduct Preconstruction Surveys for California Tiger Salamander **Bio-MM #25:** Implement Avoidance and Minimization Measures for California Tiger Salamander **Bio-MM #26:** Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #27**: Conduct Preconstruction Surveys for Blunt-Nosed Leopard Lizard **Bio-MM #28**: Blunt-Nosed Leopard Lizard Avoidance **Bio-MM #29**: Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds **Bio-MM #30:** Conduct Preconstruction Surveys and Monitoring for Raptors **Bio-MM #31:** Raptor Protection on Power Lines **Bio-MM #32:** Conduct Preconstruction Surveys for Swainson's Hawks **Bio-MM #33:** Swainson's Hawk Nest Avoidance and Monitoring **Bio-MM #34:** Monitor Removal of Nest Trees for Swainson's Hawks **Bio-MM #35:** Conduct Protocol Surveys for Burrowing Owls **Bio-MM #36:** Burrowing Owl Avoidance and Minimization **Bio-MM #37:** Conduct Preconstruction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat,	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
	Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #38:** Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse **Bio-MM #39:** Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat **Bio-MM #40:** Conduct Preconstruction Surveys for Special-Status Bat Species **Bio-MM #41:** Bat Avoidance and Relocation **Bio-MM #42:** Bat Exclusion and Deterrence **Bio-MM #43:** Conduct Preconstruction Surveys for American Badger and Ringtail **Bio-MM #44:** American Badger and Ringtail Avoidance **Bio-MM #45:** Conduct Preconstruction Surveys for San Joaquin Kit Fox **Bio-MM #46:** Minimize Impacts on San Joaquin Kit Fox **Bio-MM #47:** Restore Temporary Riparian Impacts **Bio-MM #48:** Restore Temporary Impacts on Jurisdictional Waters **Bio-MM #49:** Monitor Construction Activities within Jurisdictional Waters **Bio-MM #50:** Mitigation and Monitoring of Protected Trees **Bio-MM #51:** Install Wildlife Fencing **Bio-MM #52:** Construction in Wildlife Movement Corridors **Bio-MM #53:** Compensate for Impacts on Special-Status Plant Species **Bio-MM #54:** Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp **Bio-MM #55:** Implement Conservation Guidelines During Project Operation for Valley Elderberry Longhorn Beetle **Bio-MM #56:** Compensate for Impacts on California Tiger Salamander **Bio-MM #57:** Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel **Bio-MM #58:** Compensate for Loss of Swainson's Hawk Nesting Trees **Bio-MM #59:** Compensate for Loss of Burrowing Owl **Bio-MM #60:** Compensate for Destruction of Natal Dens **Bio-MM #61:** Compensate for Permanent Riparian Impacts **Bio-MM #62:** Prepare and Implement a Habitat Mitigation and Monitoring Plan **Bio-MM #63:** Compensate for Permanent and Temporary Impacts on Jurisdictional Waters **Bio-MM #64:** Compensate for Impacts to Protected Trees	

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #7: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	**PC-MM #1:** Compensation for staging in park property for construction. **PP-MM #1:** Acquisition of park property.	Less than significant
Protected Trees		
BIO #7: Impacts would permanently affect protected trees.	**Bio-MM #50:** Monitoring of protected trees. **Bio-MM #64:** Compensate for impacts to protected trees. **Bio-MM #65:** Offsite habitat restoration, enhancement and preservation.	Less than significant
Wildlife Movement Corridors		
BIO #8: Impacts would permanently reduce the functionality of wildlife movement corridors and habitat linkages.	**Bio-MM #51:** Install Wildlife Fencing **Bio-MM #52:** Construction in Wildlife Movement Corridors	Significant
Hydrology and Water Resources		
Construction Impacts		
There are no construction impacts for hydrology and water quality.	No mitigation required	N/A
Project Impacts		
There are no project impacts for hydrology and water quality.	No mitigation required	N/A
Geology, Soils, and Seismicity		
Construction Impacts		
There are no construction impacts for geology, soils, and seismicity.	No mitigation required	N/A
Project Impacts		
There are no project impacts for geology, soils, and seismicity.	No mitigation required	N/A
Hazardous Materials and Wastes		

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Construction Impacts		
HMW #4: Temporary hazardous material and waste activities in proximity of schools (within 0.25 mile of a school)	**HMW-MM#1:** Limit use of extremely hazardous materials near schools during construction.	Less than significant
Project Impacts		
There are no project impacts for Hazardous Materials and Wastes.	No mitigation required	N/A
Safety and Security		
Construction Impacts		
There are no significant construction impacts for safety and security.	No mitigation required	N/A
Project Impacts		
S&S #10: Increased demand for fire, rescue, and emergency services at stations and HMF	**S&S-MM #1:** Monitor response of local fire, rescue, and emergency service providers to incidents at stations and the HMF and provide a fair share cost of service.	Less than significant
Socioeconomics, Communities, and Environmental Justice		
Construction Impacts		
There are no construction impacts for socioeconomics, communities, and environmental justice.	No mitigation required	N/A

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
SO #7: Division of existing community. Ponderosa Rd./Edna Way, northeast of Hanford and the Newark Ave. vicinity northeast of Corcoran. Displacement of residents of small tightly knit communities.	**SO-MM #1:** Implement measures to reduce impacts associated with the division of existing communities in the unincorporated areas northeast of Hanford and Corcoran.	Significant
SO #7: Division of existing community in the Bakersfield Northeast District.	**SO-MM #2:** Implement measures to reduce impacts associated with the division of existing communities in the Bakersfield Northeast District.	Significant
SO #7: Division of existing community in the Bakersfield Northwest District.	**SO-MM #3:** Implement measures to reduce impacts associated with the division of existing communities in the Bakersfield Northwest District.	Significant
SO #7: Displacement of Bakersfield High School's Industrial Arts building.	**SO-MM #4:** Implement measures to reduce impacts associated with the displacement of Bakersfield High School facilities.	Less than significant
SO #7: Displacement of the Mercado Latino Tianguis.	**SO-MM #4:** Implement measures to reduce impacts associated with the displacement of the Mercado Latino Tianguis.	Less than significant
SO #6: Displacement of the Fresno Rescue Mission, Bakersfield Homeless Shelter associated facilities.	**SO-MM #4:** Implement measures to reduce impacts associated with the displacement of the Fresno Rescue Mission, Bakersfield Homeless Shelter and associated facilities.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
SO #7: Displacement of Mercy Hospital medical complex facilities.	**SO-MM #4:** Implement measures to reduce impacts associated with the displacement of Mercy Hospital medical facilities.	Less than significant
SO #7: Displacement of religious facilities.	**SO-MM #64** Implement measures to reduce impacts associated with the displacement of religious facilities.	Less than significant
SO #7: Displacement of government facilities—Bakersfield public works office/corporation yard and Kern Mental Health office—as well as parking associated with the Bakersfield Convention Center and temporary construction use of Owens Intermediate School parking area.	**SO-MM#4:** Implement measures to reduce impacts associated with the displacement of facilities.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Station Planning, Land Use, and Development		
Construction Impacts		
LU #1: Temporary and intermittent disruption of access to some properties, temporarily inconvenience nearby residents, and temporarily change the intensity of agricultural operations on some lands	**Construction Management Plan** (see Section 3.12.7, Socioeconomics, Communities, and Environmental Justice) **Dust Control Measures** (see Section 3.3.8, Air Quality and Global Climate Change) **AQ-MM#1:** Reduce Criteria Exhaust Emissions from Construction Equipment **AQ-MM#2:** Reduce Criteria Exhaust Emissions from On-Road Construction Equipment **AQ-MM#3:** Reduce the Potential Impact of Concrete Batch Plants; **AQ-MM#4**: Offset Emissions through the VERA Program **N&V-MM#1:** Construction Noise Mitigation Measures **N&V-MM#2:** Construction Vibration Mitigation Measures **AVR-MM#1a:** Minimize Visual Disruption from Construction Activities **AVR-MM#1b:** Minimize Light Disturbance during Construction	Less than significant
Project Impacts		
LU #2: A substantial change in intensity of land use incompatible with adjacent land uses.	**AG-MM#1:** Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
LU #3: Some unplanned changes in the use of existing adjacent land, regardless of the amount of parking provided at the station.	**AG-MM#1:** Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
LU #4: The HMF would change the pattern and intensity of land uses in the vicinity of the HMF, resulting in uses incompatible with adjacent agricultural uses.	**AG-MM#1:** Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
LU #5: Indirect changes to adjacent lands at the Kings/Tulare Regional Station sites would substantially change the pattern and intensity of land use in a way that would be incompatible with adjacent land uses.	**AG-MM#1:** Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
Agricultural Lands		
Construction Impacts		
There are no significant construction impacts for agricultural lands.	No mitigation required	N/A
Project Impacts		
AG #4: Permanent conversion of agricultural land to nonagricultural use.	**AG-MM #1:** Preserve the total amount of prime farmland, farmland of statewide importance, farmland of local importance, and unique farmland.	Significant
AG#6: Effects on Land under Williamson Act or FSZ Contracts, Local Zoning, or Conservation Easement Lands.	**AG-MM #1:** Preserve the total amount of prime farmland, farmland of statewide importance, farmland of local importance, and unique farmland.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Parks, Recreation, and Open Space		
Construction Impacts		
PK#1: Common Aesthetics and Visual Quality Impacts. For all alternatives, construction activities would cause visual impacts to park, recreation, and open space resources.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#1a and AVR-MM#1b**	Less than significant
PK #1: Construction activities would create noise at Father Wyatt Park.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. **N&V-MM#1 and N&V-MM#2**	Less than significant
PK #1: Construction activities would create closures of some areas of Kern River Parkway, including bike and equestrian facilities.	**PC-MM #1:** Compensation for staging in and temporary closures of park property during construction.	Less than significant
PK #1: Construction activities would create noise at the McMurtrey Aquatic Center.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. **N&V-MM#1 and N&V-MM#2**	Less than significant
PK#1 Construction activities would create closures of some areas of park facilities and increase noise exposure at the Mill Creek Linear Park.	**PC-MM #1:** Compensation for staging in and temporary closures of park property during construction. Mitigation Measures as outlined in Section 3.4, Noise and Vibration. **N&V-MM#1 and N&V-MM#2**	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK #1: Construction activities would create noise at Bakersfield High School.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. **N&V-MM#1 and N&V-MM#2**	Less than significant
Project Impacts		
PK #2: The project would require the acquisition of approximately 1.7 acres of Colonel Allensworth State Historic Park.	**PP-MM#1:** Acquisition of Park Property. **PP-MM#2:** Avoidance of Colonel Allensworth State Historic Park.	Less than significant
PK#2 Allensworth Ecological Reserve. The BNSF Alternative would require the acquisition of approximately 7.3 acres of parkland.	**PP-MM#1:** Acquisition of Park Property.	Less than significant
PK#4 Father Wyatt Park. HST operation activities for the Corcoran Elevated Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3**	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Father Wyatt Park. HST operation for the BNSF Alternative would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f.**	Significant
PK#4 Colonel Allensworth State Historic Park. The BNSF Alternative would introduce a modern feature not consistent with the historic atmosphere of the park.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f,** and Section 3.17, Cultural and Paleontological Resources.	Significant
PK#4 Colonel Allensworth State Historic Park. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant
PK#4 Kern River Parkway. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Kern River Parkway. HST operation for the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f,** and Section 3.17, Cultural and Paleontological Resources.	Significant
PK#4 McMurtrey Aquatic Center. HST operation of the Bakersfield South, and Bakersfield Hybrid Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant
PK#4 Mill Creek Linear Park. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Mill Creek Linear Park. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f,** and Section 3.17, Cultural and Paleontological Resources.	Significant
PK#4 Bakersfield Amtrak Station Playground. Bakersfield Station Alternatives would create an increase in use that would result in physical deterioration; HST operation of the BNSF Alternative would increase noise exposure.	**Park Project (PP)-MM#3:** Collect Additional Maintenance Funds. Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant
PK#4 Bakersfield Amtrak Station Playground. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f,** and Section 3.17, Cultural and Paleontological Resources.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Bakersfield High School. HST operation for the BNSF Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: **N&V-MM#3.**	Less than significant
PK#4 Bakersfield High School. HST operation for the BNSF Alternative would substantially degrade the existing visual setting of the recreation facilities.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: **AVR-MM#2a – #2f,** and Section 3.17, Cultural and Paleontological Resources.	Significant
Aesthetics and Visual Resources		
Construction Impacts		
AVR #1a: Visual disturbance during construction.	**AVR-MM #1a:** Minimize visual disruption during construction activities.	Less than significant
AVR 1b: Nighttime lighting during construction.	**AVR-MM #1b:** Minimize light disturbance during construction.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
AVR 2a: Lower visual quality in the Central Fresno Landscape Unit.	**AVR-MM #2a:** Minimize Light Disturbance **AVR-MM #2b**: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2c**: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs **AVR-MM #2d**: Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e**: Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Less than significant
AVR 2b: Lower visual quality in the Rural Valley/Agricultural Landscape Unit.	**AVR-MM #2a:** Minimize Light Disturbance **AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context (Kings/Tulare Regional Station **AVR-MM #2c:** Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs **AVR-MM #2d**: Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate **AVR-MM #2g:** Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST **AVR-MM #2h**: Provide Sound Barrier Treatments **AVR-MM #2i:** Screen Traction Power Distribution Stations and HMF	Significant
AVR #2c: Lower visual quality in Corcoran, Wasco, Shafter, and Allensworth State Historic Park Landscape Units.	**AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2c:** Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate **AVR-MM #2g:** Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST **AVR-MM #2h:** Provide Sound Barrier Treatments	Significant (BNSF, Corcoran Elevated, Corcoran Bypass, Wasco-Shafter Bypass) Less than significant (Allensworth Bypass)

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
)**AVR #2d:** Lower visual quality in the Rosedale, Kern River, and Central Bakersfield Landscape Units.	**AVR-MM #2a:** Minimize Light Disturbance **AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2c:** Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e**: Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2h:** Provide Sound Barrier Treatments	Significant
AVR #2e: The HST project would create a new source of substantial light and glare.	**AVR-MM #2a:** Minimize Light Disturbance	Less than significant
AVR #2f: TPSS would alter visual character or block views.	**AVR-MM #2i:** Screen Traction Power Distribution Stations and HMF	Less than significant
AVR #2g: Lower visual quality due to HMF alternatives.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #1b:** Minimize Light Disturbance during Construction **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST	
AVR #2h: Noise wall would block views.	**AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2c:** Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2g:** Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST **AVR-MM #2h:** Provide Sound Barrier Treatments	Significant
AVR #2i: Lower visual quality at Bakersfield High School.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AVR #2j: Lower visual quality at Owens Middle School.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e**: Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Significant
AVR #2k: Lower visual quality at College of the Sequoias.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Less than significant
AVR #2l: Lower visual quality at Our Lady of Guadalupe School.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #2b:** Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e**: Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Significant
AVR #2m: Lower visual quality at Bethel Christian School.	**AVR-MM #1a:** Minimize Visual Disruption from Construction Activities **AVR-MM #2a:** Minimize Light Disturbance **AVR-MM #2d:** Screen Elevated Guideways Adjacent to Residential Areas **AVR-MM #2e:** Replant Unused Portions of Lands Acquired for the HST **AVR-MM #2f:** Provide Offsite Landscape Screening Where Appropriate	Significant
Cultural and Paleontological Resources		
Construction Impacts		
CUL #1: Potential Adverse Effects on Archaeological Resources Caused by Construction Activities	**Cul-MM#1**: Comply with the Stipulations regarding the Treatment of Archaeological Resources in the Section 106 Programmatic Agreement **CUL-MM #2**: Conduct Archaeological Training **CUL-MM #3:** Halt Work in the Event of an Archaeological Discovery **CUL-MM #4:** Plan an Intentional Site Burial Preservation in Place **CUL-MM #5:** Conduct Preconstruction Geoarchaeological Testing in Proximity to CA-KER-2507	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
CUL #2: Potential Adverse Effects on Historic Architectural Resources.	**CUL-MM #6:** Avoid Adverse Construction Vibration Effects **CUL-MM #8:** Avoid Historic Architectural Resources at Fresno Works–Fresno Heavy Maintenance Facility Site **CUL-MM #16:** Plan Repair of Inadvertent Damage	Less than significant
	CUL-MM #7: Develop Protection and Stabilization Measures **CUL-MM #9:** Minimize Adverse Effects through Relocation of Historic Structures **CUL-MM #10:** Minimize Adverse Operational Noise Effects **CUL-MM #11**: Prepare and Submit NRHP Nominations **CUL-MM #12:** Prepare and Submit CRHR Nominations **CUL-MM #13:** Prepare and Submit Historic American Building Survey (HABS) / Historic American Engineering Record (HAER) / Historic American Landscape Survey (HALS) Documentation **CUL-MM #14:** Prepare Historic Structure Reports **CUL-MM #15:** Prepare Interpretive Exhibits	Significant and unavoidable
CUL #3: Potential Adverse Effects on Paleontological Resources.	**CUL-MM #17:** Engage paleontological resources specialist to direct monitoring during construction. **CUL-MM #18:** Prepare and implement a Paleontological Resource Monitoring and Mitigation Plan (PRMMP). **CUL-MM #19:** Halt construction when paleontological resources are found.	Less than significant
Project Impacts		
CUL #5: Effect on historically significant built-environment resources during operation.	No mitigation required	N/A

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Regional Growth		
Construction Impacts		
There are no construction impacts for regional growth.	No mitigation required	N/A
Project Impacts		
There are no significant project impacts for regional growth.	No mitigation required	N/A

Acronyms:
CEQA = California Environmental Quality Act
CRHR = California Register of Historical Resources
HABS = Historic American Buildings Survey
HAER = Historic American Engineering Record
HALS = Historic American Landscapes Survey
HST = high-speed train
NRHP = National Register of Historic Places

Cumulative Impacts – There are no unique mitigation measures for cumulative impacts. Cumulative impacts are discussed in Section 3.19.

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation
	Fresno Works–Fresno	Kings County–Hanford	Kern Council of Governments–				
			Wasco	Shafter East	Shafter West		
Transportation							
Project Impacts							
TR #12: Number of HMF site roadway impacts.	0	1	0	0	0	**TR-MM #8:** Add new lanes to roadway.	Less than significant
TR #12: Number of HMF site intersection impacts.	2	2	2	1	1	**TR-MM #3 through TR-MM #7**	Less than significant
Noise and Vibration							
Project Impacts							
N&V #3: Number of sensitive receivers impacted by HMF operational noise.	100	6	327	6	8	**N&V-MM#3 through N&V-MM#6**	Potentially significant
Biological Resources and Wetlands							
Project Impacts							
Bio #2 and #6: Impacts to areas that have potential to support special-status wildlife species	Yes	Yes	Yes	Yes	Yes	**Bio-MM#18 through Bio-MM#49, Bio-MM#51 through Bio-MM#61, Bio-MM#63, Bio-MM#65**	Less than significant
Bio #3 and #7: Impacts to jurisdictional waters.	Yes	Yes	Yes	Yes	No	**Bio-MM#47 through Bio-MM#49, Bio-MM#61 through Bio–MM#63, Bio-MM#65**	Less than Significant
Bio #3 and #7: Impacts to a recovery plan.	No	No	Yes	No	No	**Bio-MM#16 through Bio-MM#65.**	Less than significant
Bio #3 and #7: Impacts to protected trees.	Yes	No	No	No	No	**Bio-MM#50, Bio-MM#64, Bio-MM#65**	Less than significant

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation
	Fresno Works–Fresno	Kings County–Hanford	Kern Council of Governments–				
			Wasco	Shafter East	Shafter West		
Agricultural Lands							
Project Impacts							
AG #4: Permanent conversion of agricultural land to nonagricultural use. Operation of the project would affect Important Farmland by converting to nonagricultural uses.	471 acres impacted	518 acres impacted	445 acres impacted	576 acres impacted	522 acres impacted	**AG-MM#1:** Preserve the total amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant and unavoidable
Aesthetics and Visual Resources							
Project Impacts							
AVR #2: Lower visual quality due to HMF alternatives.	Yes	Yes	Yes	Yes	Yes	**AVR-MM #1:** Minimize visual disruption during construction. **AVR-MM #2:** Require integration, landscaping and treatment for sound walls and elevated structures.	Less than significant

Acronyms:
CEQA = California Environmental Quality Act
HMF = heavy-maintenance facility

This page intentionally left blank