3.19 Cumulative Impacts

This section presents an analysis of the cumulative effects of implementing the HST alternatives in combination with other past, present, and reasonably foreseeable future projects that may result in environmental impacts similar to those discussed in this EIR/EIS. The focus of this cumulative impacts analysis is on the Fresno to Bakersfield Section of the HST system and the regional context appropriate for each resource area. For a discussion of the impacts of implementing the California HST System in its entirety, see the 2005 Statewide Program EIR/EIS for the HST system (Authority and FRA 2005). For a discussion of the impacts of implementing the HST system in the San Francisco Bay Area to Central Valley region, see the *Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS)* (Authority and FRA [2008] 2010). The cumulative impacts of the HST system as a whole are summarized under each resource topic below.

3.19.1 Introduction

A. LAWS, REGULATIONS, AND ORDERS

National Environmental Policy Act

Under NEPA, a cumulative impact is the impact on the environment that results from the combination of incremental impacts of the action and other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), entity, or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time (40 CFR 1508.7). A cumulative impact includes the combined effect on a natural resource, ecosystem, or human community that is attributable to past, present, or reasonably foreseeable future activities or actions of federal, nonfederal, public, and private entities. Cumulative impacts may include the effects of natural processes and events, depending on the specific resource. Accordingly, there may be different levels of cumulative impacts on different environmental resources.

California Environmental Quality Act

Under CEQA, an EIR must discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project in combination with other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from the combination of individually minor but collectively significant projects over a period of time (State CEQA Guidelines Section 15355).

B. METHODS

The following steps helped determine the contribution of the HST alternatives to cumulative impacts, if any, for each resource:

- Review the impacts of the proposed project for each resource area. In those instances where the project would have a beneficial effect, consider this in conjunction with any adverse effects to the resource and proposed mitigation.

- Compile a list and description, as well as environmental impact information for past, present, and reasonably foreseeable projects and relevant plans for consideration of cumulative impacts. Check for such projects in regional transportation plans (RTP); regional transportation improvement plans (RTIP); local long-range transportation plans; local land use, general, and specific plans; interviews with local and regional planning agencies; and recent environmental documents for other large-scale projects near HST alternatives.

- Reasonably foreseeable future projects are those that are likely to occur and will add to the cumulative impact on a particular resource. Generally, projects are reasonably foreseeable under the following conditions:

  - Applications for project entitlements or construction are pending with a government agency.
  - The project is included in an agency's budget or capital improvement program.
  - The project is a foreseeable future phase of an existing project.
  - The project would likely occur within the 2035 planning horizon for the HST project.

- Define the study area for the cumulative effects for each resource.

- Identify the resource areas where the proposed project and projects that are occurring or that are likely (reasonably foreseeable) to occur could, together, cause a cumulative effect.

- Determine whether the proposed project's incremental contribution to the cumulative impacts for each resource area is cumulatively considerable.

- Identify reasonable, feasible options for avoiding or mitigating the project's contribution to significant cumulative impacts.

3.19.2 Cumulative Projects and Growth Forecasts

This section discusses the historical context of the study area and how development trends in the past have influenced the environmental character of the study area. This section also discusses projected development trends and describes how future urbanization will change the character of the study area to the year 2035. The cumulative project list (see Section 3.19.2[C]) includes projects identified in municipal capital improvement programs and other long-range plans or in the permitting/entitlement process.

A. HISTORICAL CONTEXT OF PROJECT AREA

This section provides an overview of the history of cultural development in Fresno, Kings, Tulare, and Kern counties from the Spanish Period (1769 to 1822), through the Gold Rush period and the development of railroads that brought new settlers to this area (see *Fresno to Bakersfield Section: Archaeological Survey Technical Report* [Authority and FRA 2011]). The combination of vast expanses of irrigable land and a mild climate greatly influenced land use and development patterns in the southern San Joaquin Valley. This setting attracted pioneering irrigation and railroad systems that proved to be two major factors that drove development of the built environment in the Fresno to Bakersfield corridor, an area that was otherwise sparsely inhabited during the historic era prior to California statehood. The Gold Rush also stimulated economic development and settlement, and it was the combined influence of irrigated agriculture (developed as early as the 1850s), and the arrival of the first railroad in the 1870s that profoundly re-shaped the existing largely unpopulated valley. Residential development and increasing urbanization followed, which was accelerated by the development of the state highway system beginning in the mid-1900s. The state highway system started in the early 1900s and continues to influence development in the region. SR 99 is located east of the Fresno to Bakersfield Section of the California HST System. SR 99 provided a four-lane expressway

between Sacramento and Los Angeles in the 1950s. I-5, the second major north-south freeway through the Central Valley, was completed in the 1970s and is farther to the west.

B. PROJECTED GROWTH TRENDS

As discussed in Chapter 2, projections show that the San Joaquin Valley will grow at a higher rate than any other region in California. General plans and other planning documents for cities and counties in the region project the locations and types of growth likely to occur under build-out of the plans. Projections also show that Fresno, Kings, Tulare, and Kern counties will continue to grow an average of 2.9% per year. By 2035, the study area will grow to a population of 4.2 million, which is a net increase of 1.7 million people and 360,000 new jobs. This increase could result in approximately 175,800 acres in new development to support the increased population. Accommodating this new population will require land and the construction of new residential areas, roadways, electric power generation facilities, utilities, schools, and hospitals, and commercial and industrial facilities. The combined environmental influence of these future changes in conjunction with the HST alternatives is referred to as the "cumulative condition" for 2035.

The Cumulative Project List discussed in the following section identifies the known projects that will become a part of the cumulative condition.

C. CUMULATIVE PROJECT LIST

Appendix 3.19-A provides detailed information about the present and reasonably foreseeable development projects and plans, and Appendix 3.19-B provides detailed information about transportation projects considered in the cumulative condition. These lists include projects that will accommodate the 2035 study area population. The lists represent a small number of the projects that are planned to be constructed within the study area from now through 2035. This is because permits and other entitlements required for the approval of private projects generally present only a snapshot of development activity over the next 3 or 4 years, although this timeframe may expand somewhat because of construction delays caused by the recent recession.

Section 3.18, Regional Growth, describes induced growth and indirect effects from growth; the cumulative impacts associated with future projects as well as regional growth are also identified.

Major Foreseeable Projects

Tables 3.19-1 through 3.19-10 list major development projects and plans, by jurisdiction for the study area counties and cities. The tables include mixed-use developments planned for the near term and general plan updates to accommodate long-term development and urbanization, including the conversion of agricultural land anticipated to occur with the growth in population. The project lists also include more than 120 roadway improvements ranging from restriping roads to create additional lanes and interchange and capacity expansions (see Appendix 3.19-B for detailed list of transportation projects). The amount of available environmental information varies for these projects. However, all of these projects require environmental approvals.

Table 3.19-1
Fresno County Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Fresno Veterans Home (1-4) Laton Community Plan Update (1-22)	• Air quality reduction • Land use change • Noise increases • Traffic generation
Southeast Fresno Community College (1-10)	• Air quality reduction • Agricultural resource losses • Archaeological/Historic resources • Biology resources and wildlife • Land use change • Noise increase • Traffic generation • Socioeconomics impacts
Jesse Morrow Mountain Mine & Reclamation Project (1-14)	• Air quality reduction • Biological resource losses, wetlands, wildlife, vegetation • Noise increases • Traffic generation
Kings River Sand and Gravel Quarry Project (1-16)	• Air quality reduction • Agricultural resource losses • Noise increases • Traffic generation • Visual resources
Central Valley Transportation Center Project (1-18)	• Air quality reduction • Noise increases • Traffic generation
Transportation projects 27 projects including road widening, interchange construction, bridge replacement/construction, and rail infrastructure construction projects	• Biological resource losses • Increased demand for construction materials and workers • Linear construction impacts through all Land use changes • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A. Transportation projects are shown in Appendix 3.19-B.

[b.] Table includes projects within the unincorporated county as well as incorporated cities

Table 3.19-2
City of Fresno Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Roeding Regional Park and Fresno Chaffee Zoo Facility Master Plans (Including Rotary Playland and Storyland) (2-2)	• Archaeological-Historic resources • Traffic modifications • Noise increase
City of Fresno 3-Million-Gallon Water Storage Tank (2-4)	• Visual change • Community division
C.A.R.T.S. Trucking Yard (2-7)	• Visual change • Air quality reduction • Noise increase • Traffic generation
Transportation projects 21 projects, including road widening, interchange construction, and bridge replacement/construction	• Community division • Safety and security concerns • Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the respective map and project number shown in Appendix 3.19-A. Transportation projects are shown in Appendix 3.19-B.
[b.] Potential cumulative effects are not listed for the Fulton Corridor Specific Plan (2-3), Downtown Community Plan (2-5), and the Southeast Growth Area (2-6) because the plans/environmental review are in progress, as of January 2011.

Table 3.19-3
Kings County Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Garner Basin (3-2)	• Land use change
Transportation projects Four projects including street widening and construction of rail projects	• Biological resource losses • Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A. Transportation projects are shown in Appendix 3.19-B.
[b.] Table includes projects within the unincorporated county as well as incorporated cities, excluding the cities of Hanford and Corcoran.

Table 3.19-4
City of Hanford Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Villagio Project (3-1)	• Air quality reduction • Agricultural resource losses • Land use change • Noise increases • Traffic generation
Live Oak Master Plan/Live Oak Residential Project (3-3)	• Air quality reduction • Agricultural resource losses • Land use change • Noise increases • Traffic generation
Transportation projects Nine projects including road resurfacing, street widening, and interchange improvements	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A.
[b.] Transportation projects are shown in Appendix 3.19-B.

Table 3.19-5
City of Corcoran Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
City of Corcoran Police Station (3-5)	• Noise increases • Traffic generation
Transportation projects Five projects including street realignment, intersection upgrade, and construction of rail projects	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A.
[b.] Transportation projects are shown in Appendix 3.19-B.

Table 3.19-6
Tulare County Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Yokohl Ranch (4-1)	• Agricultural resource losses • Air quality reduction • Land use change • Traffic generation
Bosman Dairy (PSP 07-022) (4-21) Dykstra Dairy (4-20) Hynes Dairy Establishment (4-12) Pinheiro Dairy Environmental Report (4-23)	• Air quality reduction • Agricultural land changes
Tulare District Hospital Expansion - Phase 1 (4-14) Tulare Protein Harvesting and Processing Plant (4-16) UC Davis South Valley Animal Health Laboratory (4-19)	• Air quality reduction • Agricultural resource losses • Noise increases • Traffic generation
South I Street Industrial Park Specific Plan (4-15)	• Air quality reduction • Agricultural resource losses • Land use change • Noise increases • Traffic generation • Visual changes
Tulare Motorsports Complex (4-18)	• Air quality reduction • Agricultural resource losses • Noise increases • Traffic generation • Visual changes
Transportation projects 14 projects including road widening, new road construction, bridge replacement/construction, and interchange improvements	• Biological resource losses • Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A.
[b.] Transportation projects are shown in Appendix 3.19-B.Table includes projects within the unincorporated county as well as incorporated cities.
[c.] Potential cumulative effects are not listed for the Goshen Community Plan Update (4-28), Tipton Community Plan Update (4-29), and Earlimart Community Plan Update (4-30) because the plans/environmental reviews are in progress, as of January 2011.

Table 3.19-7
Kern County Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Smyrna Solar (5-3)	• Air quality reduction Biological resource losses
DelPD 54, Map 81 (5-13) PD #6, Map 101-23 Rosedale & Renfro, LP (5-14) Bakersfield Land Investment by McIntosh and Associates (5-16)	• Air quality reduction • Agricultural resource losses • Land use change • Noise increases • Traffic generation
Wastewater Treatment Plant (WWTP); Centrifuge Project (Project); Clean Water State Revolving Fund (CWSRF) No. C-06-5063-110 (5-7)	• Air quality reduction • Noise increases • Traffic generation
Shafter-Wasco Sanitary Landfill Permit Revision (GPA 8, CUP 1, Map 78, Ag Preserve No. 8 Exclusion) (5-8)	• Agricultural land loss • Air quality reduction • Land use change • Noise increases • Traffic generation
Clean Fuels Project by Big West California, LLC (5-9)	• Air quality reduction • Biological resource losses • Hazardous materials • Traffic generation
Meadows Field (new airport terminal and runway expansion) (5-10)	• Air quality reduction • Noise increases
CUP 27, Map 101; M&B Land Development (5-12)	• Air quality reduction • Noise increases • Traffic generation
Transportation Projects 12 projects including road widening, interchange improvements, new road construction projects, and rail infrastructure construction projects	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A.
[b.] Transportation projects are shown in Appendix 3.19-B.
[c.] Table includes projects within the unincorporated county as well as incorporated cities, excluding the cities of Wasco, Shafter, and Bakersfield.

Table 3.19-8
City of Wasco Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Wasco Rose City Enterprise Zone (6-1)	• Agricultural land changes • Air quality reduction Land use change • Traffic generation • Visual changes
Transportation projects 9 projects including pavement reconstruction, sidewalk improvements, curb installation, and road reconstruction projects	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown
Notes: [a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A. [b.] Transportation projects are shown in Appendix 3.19-B.	

Table 3.19-9
City of Shafter Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Heritage Ranch Specific Plan (6-4) Orchard Park Specific Plan (6-3)	• Agricultural resource loss • Air quality reduction • Land use changes • Noise increase • Traffic generation • Visual changes • Parks and recreation impacts
Transportation projects 11 projects including highway reconstruction and surfacing, sidewalk replacement, and pavement improvement projects	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown
Notes: [a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A. [b.] Transportation projects are shown in Appendix 3.19-B.	

Table 3.19-10
City of Bakersfield Major Foreseeable Projects

Project (Map ID)	Potential Cumulative Effect
Rosedale Ranch Project (7-2)	• Air quality reduction • Land use change • Noise increases • Traffic generation • Visual change
CUP #08-1795 (7-3)	• Air quality reduction • Land use change • Noise increases • Traffic generation
Bakersfield Commons (7-4)	• Air quality reduction • Biological resource losses • Noise increases • Traffic generation • Visual changes
California State University Bakersfield Baseball Facility Improvements (7-5)	• Air quality reduction • Traffic generation
Mill Creek Linear Park Plan (7-7)	• Air quality reduction • Community division • Land use change • Noise increases • Traffic generation • Visual changes
Old Town Kern-Pioneer Redevelopment Project (7-8) The Canyons: Bakersfield, CA (7-9)	• Air quality reduction • Land use change • Noise increases • Traffic generation • Visual changes
Transportation Projects 14 projects including road widening, interchange construction, road resurface and reconstruction, and bridge repair projects	• Increased demand for construction materials and workers • Linear construction impacts through all land uses • Operational impacts are generally unknown

Notes:
[a.] Map ID corresponds to the map and project number as shown in Appendix 3.19-A.
[b.] Transportation projects are shown in Appendix 3.19-B.

3.19.3 Analysis of Cumulative Impacts

The cumulative impacts discussion for each resource area considers the resource-specific study area, the condition of the resource, cumulative effects with the project, and the contribution of the HST alternatives to the cumulative effects. The No Project Alternative, which is described in

detail in Chapter 2 and briefly below, is referenced below for comparison purposes, as appropriate.

A. NO PROJECT ALTERNATIVE

As described in Chapter 2, the No Project Alternative considers the effects of growth planned for the region as well as existing and planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the Fresno to Bakersfield project area through the 2035 time horizon. The No Project Alternative is the future condition in which the construction, operation, and maintenance of the HST project do not occur.

The four counties of Fresno, Kings, Tulare, and Kern are projected to continue to grow at an average of 2.9% per year. Despite the current economic downturn, which may temporarily slow growth, by 2035 projections show over 1.7 million new inhabitants and 360,000 new jobs in this area. Projected growth and conversion of land to urban uses associated with the No Project Alternative is anticipated to have the greatest environmental effect in the study area over the 2010 to 2035 planning period.

B. HIGH-SPEED TRAIN ALTERNATIVES

This section compares the cumulative effects of the HST alternatives. In most cases, the HST alternatives contribute a small incremental impact to the past, present, and reasonably foreseeable project impacts. As analyzed in Section 3.18, Regional Growth, the project would result in a 2% to 3% population and 3% employment increase compared to the No Project Alternative. Over the 25-year planning horizon, these increments are cumulatively considerable in some areas and provide beneficial effects in others. However, compared to the No Project Alternative, the project would potentially improve the future environmental condition, because of the benefits afforded by transit-oriented development (TOD), reduced automobile travel, reduced air pollutant emissions, and the economic activity generated.

At this level of analysis, the differences in the cumulative impacts under the HST alternatives are minor, with no apparent discriminators among the alternatives, unless otherwise noted in the text below. As such, the cumulative analysis considers the environmental condition of the study area with and without the HST alternatives and their cumulative effect with other past, present, and reasonably foreseeable future projects.

Transportation

The study area for the transportation cumulative analysis includes Fresno, Kings, Tulare, and Kern counties. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.2, Transportation.

Construction

Construction effects may be compounded if other planned projects listed in Appendix 3.19-A and Appendix 3.19-B occur at the same time as the HST alternatives, contributing to incrementally more delays in traffic and detours for travel within the region. However, coordination and construction phasing would reduce these temporary effects. During design and construction of the HST alternatives, the Authority and FRA would implement measures to reduce any associated delays on transportation. Therefore, the cumulative effect of project construction on travel delay would be negligible under NEPA and less than significant under CEQA.

Near and Long-Term Operations

Because the transportation analysis is regional, the analysis presented in Section 3.2, Transportation, has already addressed cumulative transportation impacts. The No Project Alternative would result in approximately 79.9 million VMT daily in the study area by 2035; implementation of the HST alternatives would be expected to result in a reduction in VMT of approximately 8 million, or 10%, within Fresno, Kings, Tulare, and Kern counties. Highway improvements planned in the study area would not reduce daily VMT but would help to reduce future congestion in some areas. Cumulatively, the HST action alternatives and highway improvements would reduce congestion, reduce travel delays, and stimulate economic growth as a result of improvements in mobility for the study area population. Offering a broad range of transportation modes improves accessibility to the state's urban centers from the Central Valley beyond what would occur by only widening freeways.

At the local level, the HST project in conjunction with other planned projects in the three stations areas would result in significant cumulative impacts due to increased traffic associated with people traveling to and from stations, as described in Section 3.2, Transportation. By 2035, the No Project Alternative would result in unacceptable LOS (E or F) at 82 of the 180 intersections and 15 of the 100 roadway segments within the three station study areas. Implementation of the HST alternatives would be expected to reduce already unacceptable LOS by 4 seconds or more at 39 intersections and increase the v/c ratio on 3 roadway segments by 2035, including 11 intersections and 2 roadway segments where LOS would be reduced from acceptable levels to unacceptable levels. Project contributions to already unacceptable conditions, as well as the reduction of acceptable conditions to unacceptable levels, would be considered a moderate effect under NEPA and a significant impact under CEQA.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, implementation of the HST system as a whole could benefit intercity highways. The HST system could also increase local traffic near some HST stations, such as the Transbay Transit Center (San Francisco to San Jose HST Section) and Buena Vista Station Area (Palmdale to Los Angeles HST Section), resulting in decreases in level of service.

Summary of NEPA/CEQA Impacts

The regional cumulative impact of the HST alternatives would be beneficial under NEPA and CEQA because the HST would take passenger vehicles off the road. However, 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 LOS D. This would be a moderate cumulative effect under NEPA and a significant cumulative 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. The contribution of the HST alternatives to the cumulative impact to local traffic would be moderate under NEPA and cumulatively considerable under CEQA.

Mitigation Measures

With implementation of the mitigation measures for transportation that are provided in Section 3.2.6, which would reduce potential impacts, the contribution of the HST alternatives to cumulative local transportation impacts would be moderate under NEPA and less than cumulatively considerable under CEQA.

Air Quality and Global Climate Change

The study area for cumulative air quality and greenhouse gas emissions impacts is the San Joaquin Valley Air Basin (SJVAB). The SJVAB is in federal nonattainment for ozone and $PM_{2.5}$, federal maintenance for PM_{10} and CO (urban portion of Fresno and Kern County only), and state nonattainment for ozone, PM_{10}, and $PM_{2.5}$. As a result, the area is subject to stringent emissions requirements for ozone precursors (VOC/NO_x) and particulate matter. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.3, Air Quality and Global Climate Change.

Transportation projects under the No Project Alternative in fiscally constrained regional transportation plans and other local factors were modeled at the regional level and were shown to be consistent with transportation conformity requirements. The transportation conformity analysis takes into account cumulative impacts on the region.

Construction

The SJVAPCD has adopted a cumulative threshold of significance of 10 tons per year for ozone precursors (ROG and NO_x) and 15 tons per year for PM_{10} and $PM_{2.5}$ (see Table 3.3-3). Construction emissions of these pollutants associated with the HST alternatives would exceed these thresholds, even with mitigation. Although construction emissions would be temporary, they would contribute to air quality degradation and impede the region's ability to attain air quality standards. In addition, past, present and reasonably foreseeable projects would have significant VOC, NO_X, PM_{10} and $PM_{2.5}$ emissions. Because these projects would be constructed during the same timeframe as the HST alternatives, there would be a substantial air quality effect under NEPA and a significant impact under CEQA.

Near and Long-term Operations

Long-term operational emissions associated with growth and development in the Fresno, Tulare, and Kern counties are expected to exceed the SJVAPCD CEQA significance thresholds. Long-term operational emissions in Kings County are anticipated to be less than significant. On a regional scale, past, present, and foreseeable projects would contribute to congestion associated with long-term growth and worsen air quality. Although there would be significant cumulative impacts in the region, the HST alternatives would help the region attain air quality standards and plans by reducing the amount of regional traffic and providing an alternative mode of transportation. Operation of the project would not exceed the SJVAPCD cumulative thresholds of significance for ozone precursors. Because the operation of the HST alternatives would help the region attain air quality standards, the HST alternatives' contribution to the cumulative impact would be less than cumulatively considerable.

Regulatory agencies continue to pass more stringent greenhouse gas (GHG) emission standards with the goal of reducing the amount of pollutant emissions in the atmosphere. While many of these regulations have not yet been implemented, they are anticipated to be in effect prior to the project planning horizon of 2035. Even with these regulatory reductions, the expected growth in the region would result in significant cumulative increases in GHG emissions. There is also a possibility that the HST alternatives' demand for electricity would result in indirect GHG emissions impacts from power generation facilities. However, the HST alternatives would decrease GHG emissions by reducing vehicle and aircraft trips as described in Section 3.3, Air Quality and Global Climate Change. This reduction in GHG emissions would more than offset the increase in GHG emissions associated with project facilities. Therefore, the HST alternatives would result in a net decrease in GHG emissions and would have a cumulatively beneficial effect on global climate change.

Cumulative carbon monoxide impacts are accounted for in the CO hotspot analysis, presented in Section 3.3 (Air Quality and Global Climate Change). The CALINE4 air dispersion modeling evaluation indicated that the HST alternatives would cause a less than significant impact for CO emissions. Therefore, project CO effects would be cumulative negligible under NEPA, and the cumulative impacts would be less than significant.

Operations at the HMF may emit Hazardous Air Pollutants (HAPs) on a local scale. No other past, present, or foreseeable future projects would contribute to HAPs emissions. Therefore, there is no cumulative effect of HAPs emissions.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole would have less than significant impacts on air quality. The HST system would reduce vehicle miles traveled and result in systemwide air quality benefits. Temporary short-term emissions increases associated with construction activities and localized air pollution increases associated with traffic near proposed HST stations would be substantially reduced by mitigation strategies and design practices.

The HST system would result in beneficial impacts related to GHGs and global climate change. Any additional carbon entering the atmosphere, whether by emissions from the system itself, indirect emissions from electrical power generation, or by removal of carbon sequestering plants (included agricultural crops), would be more than offset by the beneficial reduction of carbon resulting from the project due to a reduction in automobile vehicle miles traveled (mobile sources) and reduction in the number of airplane trips.

Summary of NEPA/CEQA Impacts

The construction-related cumulative effects of the HST alternatives and other past, present, and reasonably foreseeable projects on air quality would be substantial under NEPA and result in a significant cumulative impact under CEQA because construction of the HST alternatives would increase regional pollutant emissions and would exceed the SJVAPCD CEQA thresholds.

Cumulative air quality effects during operations from the build-out of the projects envisioned by the general plans would be substantial under NEPA and the air quality impact would be significant under CEQA. However, operation of the HST alternatives would reduce regional VMT and consequently reduce ROG, NO_x, and PM_{10} emissions. Therefore, operation of the HST alternatives would reduce regional emissions and have a cumulative air quality benefit.

Increased GHG emissions from past, present, and foreseeable projects in the region would result in significant cumulative effects on global climate change under NEPA and a significant cumulative impact under CEQA. The HST alternatives would result in a net reduction in CO_2 emissions; therefore, the project would have a cumulative beneficial effect on global climate change.

Mitigation

With implementation of mitigation measures for air quality provided in Section 3.3.6, cumulative impacts on air quality during construction would remain substantial under NEPA and significant and unavoidable under CEQA.

Noise and Vibration

The study area for the cumulative analysis of noise and vibration is 7,500 feet on either side of the centerline of HST alternatives. This area was selected because the HST system could increase noise within this area. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.4, Noise and Vibration.

Construction

Construction of the HST alternatives in conjunction with other past, present, and reasonably foreseeable projects would result in noise and vibration effects that would be limited in duration. It is likely that multiple projects would be under construction at the same time in the cities of Fresno and Bakersfield, but construction on these projects would typically occur during daytime hours or with the addition of noise control measures and would be temporary. Potential vibration impacts could result from pile driving conducted close to buildings; however, impacts would be reduced through mitigation. Further, construction of the HST alternatives would be coordinated with other adjacent construction projects to avoid concurrent vibration impacts. Therefore, during construction cumulative noise and vibration impacts of the HST alternatives and other past, present, and reasonably foreseeable projects would be moderate under NEPA and less than significant under CEQA.

Near and Long-term Operation

The HST system would create long-term noise and vibration impacts from the introduction of a new transportation system. As described in Section 3.4, Noise and Vibration, existing ambient noise levels at the measurement sites in the study area range from 45 to 84 dBA L_{dn}. Traffic volumes from past, present, and reasonably foreseeable future roadway projects in combination with traffic related to the HST alternatives are projected to increase noise between 0 and 7 dBA L_{dn} at noise-sensitive receivers between 2010 and 2035. Anticipated increases in the number and length of freight trains would result in a maximum increase of 3 dBA L_{dn} in future railroad noise exposure at these noise-sensitive receivers. The HST alternatives would generate noise level increases ranging from 0 dBA to 28 dBA L_{dn} above projected 2035 noise levels. These noise increases would have a substantial effect under NEPA and a significant impact under CEQA.

What is a sensitive receiver?

A sensitive receiver for noise includes schools, churches, residences, hospitals, and libraries.

The HST system as a whole could have a potentially significant impact on noise and vibration. As described in the 2005 Final Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system would create construction-related short-term noise impacts. The HST system would also create long-term noise impacts from the introduction of a new transportation system, including potential vibration impacts. On the other hand, the HST system would also result in benefits from long-term noise reduction due to the construction of separated grade crossings, such as the grade crossings proposed along the Caltrain corridor from San Francisco to San Jose.

Summary of NEPA/CEQA Impacts

The cumulative noise and vibration impacts of the HST alternatives and other past, present, and reasonably foreseeable projects during construction would be moderate under NEPA and less than significant under CEQA because noise control measures and compliance with existing noise regulations would reduce potential noise impacts. Cumulative noise impacts during operations would have a substantial effect under NEPA and a significant impact under CEQA due to noise associated with increased traffic and the number and length of additional freight trains anticipated in the region. The HST alternatives would have a substantial effect under NEPA and a cumulatively considerable contribution under CEQA on operation-related impacts because of the anticipated noise exposure at sensitive receivers ranging up to 28 dBA L_{dn} above projected 2035 noise levels.

Mitigation

To minimize the potential cumulative effects of overlapping construction activities within the same area, HST activities would be coordinated with other nearby, concurrent construction projects to the extent feasible. This may reduce cumulative construction noise impacts.

Even with implementation of mitigation measures for noise and vibration provided in Section 3.4.6 and the measures identified above, cumulative effects of noise would remain moderate under NEPA and have a significant and unavoidable impact under CEQA.

Electromagnetic Fields and Electromagnetic Interference

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.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole could have potentially significant direct and indirect EMF and EMI impacts. However, with mitigation, these impacts would be anticipated to be reduced to less than significant levels. Additionally, as described in Section 3.5, Electromagnetic Fields and Electromagnetic Interference, potential project-related impacts of the HST alternatives could be reduced to less than significant levels with implementation of mitigation.

Public Utilities and Energy

The cumulative study area for public utilities and energy encompasses Fresno, Kings, Tulare, and Kern counties. With the projected 2035 population and employment growth in the Central Valley, there would be an increased demand for utilities and energy. Many of the planned and potential projects in the area reflect this increased growth, including numerous subdivisions and commercial developments. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.6, Public Utilities and Energy.

Construction

Utilities

Construction of the HST alternatives, along with past, present, and reasonably foreseeable projects, may require the temporary shutdown of utility lines to safely move or extend these lines. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. Because of the short duration of the planned interruptions and the interruption notification procedures, there would be a negligible cumulative effect to utilities under NEPA and a less than significant impact under CEQA.

Electrical Infrastructure and Energy

The construction of the HST alternatives along with other past, present, and reasonably foreseeable projects would result in temporary increases in demand for energy. However, these incremental increases in demand would be anticipated to be served by existing facilities and would not require the construction of additional energy-related infrastructure. No cumulative construction-related energy effects would result.

Water Infrastructure and Resources

Construction activities use water to prepare concrete, increase the water content of soil to optimize compaction, control dust, and re-seed disturbed areas. The construction of the HST alternatives, in addition to other past, present, and reasonably foreseeable projects within the

project area, would result in incremental temporary increases in demand for water. This increase in demand would not be anticipated to require construction or expansion of water treatment facilities and not require new or expanded water entitlements.

Solid Waste/Recycling Facilities

Construction of the HST alternatives, together with past, present, and reasonably foreseeable projects, would result in contributions of solid waste and debris to regional landfills. Many of the non-hazardous solid waste landfills currently serving the study area are expected to reach their planned capacity prior to the year 2035. However, State regulations require local governments to manage solid waste re-use and disposal. Based on these requirements, additional landfill capacity will be developed in the region in time to serve the construction of the cumulative projects. Therefore, the projects developed under the cumulative condition would have a negligible effect under NEPA and a less than cumulatively considerable contribution under CEQA on solid waste/recycling.

Near and Long-Term Operation

Utilities

Operation of the HST alternatives together with past, present, and reasonably foreseeable projects would have a negligible cumulative impact on the following types of utilities: telecommunications, natural gas, and petroleum.

Because the HST system as a whole would be located predominantly within existing transportation corridors, the potential system-wide effects on utility operations would be reduced. In locations where a proposed HST alignment would intersect or be in close proximity to existing corridors or facilities, the proposed HST design would substantially limit impacts on utilities. Because the proposed HST system would not contribute significantly to statewide population growth, it is not expected to result in a significant increase in demand for public utility services, and thus, viewed on a system-wide basis it would have a negligible effect on these services under NEPA and a less than significant impact under CEQA, as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS.

Electrical Infrastructure and Energy

As described in Section 3.18, Regional Growth, by 2035, approximately 578,000 new households could be added to the study area under the No Project Alternative. Assuming an annual consumption of 11,040 kilowatt hours per household (DOE 2008), 6,380 MW of new power would be required in the study area. Residential development projects, as well as associated commercial and industrial development are required to apply for permits and undergo environmental review to ensure that the electricity demands of the project can be met. In addition, electricity providers perform regular demand projections that incorporate demand for planned development. New transmission and distribution lines would need to be built, or existing facilities would need to be upgraded to serve the increased demand. Other than solar energy development projects planned in Kern County, there are no major electrical infrastructure projects identified on the list of reasonably foreseeable projects.

The electrical demand for the propulsion of the trains, the operation of the trains at terminal stations, and in storage depots and maintenance facilities, etc., has been conservatively estimated by the project's engineers to be 8 GWh per day. However, the HST alternatives would use less energy per capita than an airplane service, which would provide only 25% of the passenger-carrying capacity of the HST; therefore the HST alternatives are cumulatively beneficial to energy conservation.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole would have a significant impact on statewide electricity demand. However, because the HST system is a more energy-efficient mode of transportation than travel by aircraft or car, as described above, the system would result in an overall reduction in total energy consumption (combined electric power demand and oil consumption). Construction-related energy consumption of the statewide HST system would result in non-recoverable energy costs; however, these costs would be recovered by the project's energy savings. With mitigation, the HST system would have a negligible effect on energy under NEPA and a less than significant impact under CEQA.

Water Infrastructure and Resources

The addition of 577,946 households under the No Project Alternative would require 7.4 billion gallons of potable water each year, assuming 127,400 gallons for each household annually (American Water Works Association 2010). Commercial and industrial development would also generate increased water demand which would be projected by water providers and approved through a permitting process. Proportionate increases in wastewater treatment would also be required. As with many communities throughout California, more conservation measures would be required to reduce water demand during multiple years of drought. However, due to the anticipated population growth and economic expansion, demand for water would be expected to continue to grow and despite conservation measures, would result in increased competition for the limited resource. Therefore, the cumulative effect on water resources would be substantial under NEPA and result in a significant cumulative impact under CEQA.

As described in Section 3.6, Public Utilities and Energy, operation of the HST would require small volumes of water for the proposed HST stations and HMF. The single largest use of water for the project would be wash water for train cleaning. Most of this water would be recycled. For these reasons, the incremental increase in demand from the HST alternatives would have a less than cumulatively considerable contribution to water resource impacts.

For the HST system as a whole, the extension of infrastructure and provision of water and wastewater services would have negligible impacts under NEPA and less than significant impacts under CEQA. For example, in the Merced to Fresno Section, the proposed stations and HMF facilities would not result in significant increases in water demand or significant impacts related to the provision of water or wastewater infrastructure.

Solid Waste/Recycling Facilities

Operations of the HST alternatives, together with past, present, and reasonably foreseeable projects, would result in the generation of solid waste and debris. As described above, although many of the non-hazardous solid waste landfills currently serving the study area are expected to reach their planned capacity prior to the year 2035, based on State regulations, additional landfill capacity will be developed in the region within the timeframe to serve the projects developed under the cumulative condition. Therefore, the operations of projects under the cumulative condition would have a negligible effect under NEPA and a less than cumulatively considerable contribution under CEQA on solid waste/recycling.

For the HST system as a whole, the operation of the HMFs and stations would generate relatively small volumes of solid waste and would not place a substantial demand on landfill capacity. For example, the waste generated in the San Francisco to San Jose Section would be landfilled in a facility with sufficient permitted capacity to accommodate the project's solid waste disposal needs, and the implementation of that HST section is not anticipated to result in significant solid waste impacts. In addition, HST system construction waste would be reused to the degree

feasible. Therefore, the HST system would have a negligible effect on solid waste/recycling facilities under NEPA and a less than significant impact under CEQA.

Summary of NEPA/CEQA Impacts

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 be negligible under NEPA and less than significant under CEQA.

Mitigation

As described in Section 3.6, Public Utilities and Energy, no mitigation measures are required.

Biological Resources

The study area for the biological resources cumulative impacts analysis considers the habitats and features of the Tulare Basin. For wetlands, the study area includes the Upper Dry, Upper Kaweah, Upper Tule, Upper Deer-Upper White, Upper Poso, and Middle Kern-Upper Tehachapi-Grapevine subbasins within the Tulare-Buena Vista lakes watershed (HUC 18030003–18030009, USDA/NRCS). The Tulare Basin includes Fresno, Kern, Kings, Madera, San Luis Obispo, and Tulare counties (EPA 2010). The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.7, Biological Resources.

Historically, the Tulare Basin was a vast, ecologically rich landscape that contained a diverse assemblage of habitats covering over 2.5 million acres. The basin supported abundant terrestrial and aquatic wildlife and plant species. The major rivers and creeks that emptied into the basin (i.e., Kings, Tule, Kaweah, White, and Kern rivers and Cross and Poso creeks) directly fed large seasonal lakes (Tulare, Buena Vista, Kern, and Goose lakes). After European settlement, the natural landscape was converted into agricultural land, rural residential areas, and urban areas, which has reduced and fragmented the available wildlife habitat and limited the movement of wildlife between the remaining habitat areas. Also, growth in the metropolitan areas of Fresno and Bakersfield has substantially increased human population and disturbance to the surrounding natural communities.

Construction

Special-Status Plant and Wildlife Species

Construction of the HST alternatives in combination with other past, present, and reasonably foreseeable projects would result in significant cumulative impacts on special-status plant and wildlife species within the Tulare Basin. Special-status plant species include little mouse tail, heartscale and other special-status plant species that have potential to occur in the project footprint. Special-status wildlife species include, but are not limited to, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, western spadefoot, blunt-nosed leopard lizard, Swainson's hawk, western burrowing owl, Tipton kangaroo rat, and San Joaquin kit fox. Construction activities may result in the "take" of individuals in the form of mortality, injury, or harassment due to trampling, noise, dust, motion disturbance or temporary destruction and degradation of suitable habitat. Because the HST alternatives are the largest foreseeable projects in the area, they would contribute considerably to cumulative impacts on special-status plant and wildlife species. However, laws such as the federal ESA, the MBTA, and CESA provide for the protection of these resources and will help to minimize or prevent impacts on special-status species and their habitats. Therefore, it is unlikely that cumulative impacts would result in the loss of a special-status species population.

Habitats of Concern

Habitats of concern within the Tulare Basin would be subject to significant cumulative impacts due to the construction of the HST alternatives in combination with other past, present, and foreseeable projects. Impacts may include the destruction or degradation of special-status plant communities, critical habitat, or other conservation areas; the placement of fill or increased erosion, siltation, and runoff in jurisdictional waters (i.e., seasonal wetlands, vernal pools); and the removal or modification of protected trees (i.e., native oaks). The HST alternatives would have a considerable contribution to the cumulative impacts on habitats of concern, with the exception of critical habitat and habitat conservation plan areas because the HST alternatives would not significantly affect these areas. Implementation of federal and state regulations governing work in habitats of concern, including those described in Section 3.7.2, would minimize impacts on these areas.

Wildlife Movement Corridors

Construction of the HST alternatives as well as other past, present, and foreseeable projects would result in significant cumulative impacts on wildlife movement corridors within the Tulare Basin. Past projects have significantly degraded the ability for wildlife to freely move across natural habitats present in the Tulare Basin. The Kings River, St. John's Creek-Cross Creek, Highway 43-Garces Highway, Deer Creek-Sand Ridge, Poso Creek, and Kern River linkages would be further degraded and fragmented by construction of the HST Alternatives and other present and foreseeable projects in the Tulare Basin. Construction impacts could include the disruption of animal movement due to the placement of barriers or increased lighting, noise, motion, and startle effects. Due to their large and linear nature, the HST alternatives would have a considerable contribution to the cumulative impacts on wildlife movement corridors compared to other foreseeable projects.

Near and Long-Term Operation

Special-Status Plant and Wildlife Species

In addition to construction impacts, special-status plant and wildlife species may be subject to significant cumulative impacts resulting from the near- and long-term operation of the HST alternatives and other past, present, and foreseeable projects. Potential impacts to species, including those described above under construction, include permanent habitat loss, habitat fragmentation, introduction of invasive species, and harassment due to increased noise and human disturbance. These impacts would be minimized through the application of protective laws and regulations.

Habitats of Concern

The operation of the HST alternatives in combination with other past, present, and foreseeable projects would result in significant cumulative impacts on habitats of concern within the Tulare Basin. Operational impacts could include permanent fragmentation, degradation, or conversion of habitats of concern. The HST alternatives would contribute considerably to these impacts due to the large scale of the project. These impacts would be minimized through the implementation of the laws and regulations that protect these habitats.

Wildlife Movement Corridors

Wildlife movement corridors may experience significant cumulative impacts as a result of operation of the HST alternatives and past, present, and other foreseeable projects in the Tulare Basin. Past projects have significantly degraded the ability for wildlife to freely move across natural habitats, such as those identified above under construction, and would be further limit

wildlife movement during the operation of the HST Alternatives and other present and foreseeable projects in the Tulare Basin. Impacts could include the permanent blockage of corridors and/or linkages and disruption of wildlife due to increased lighting, noise, and motion. The HST alternatives are linear, span a large area, and would, therefore, contribute considerably to cumulative impacts.

The HST system as a whole would have significant impacts on sensitive biological resources and wetlands. Segments of the HST system that would be located in new corridors could result in disturbance of sensitive habitats, as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS. The HST system could also pose a significant barrier to the movement of wildlife in areas where it severs wildlife movement corridors, such as those in the East Bay to Central Valley and the San Jose to Central Valley corridors.

Summary of NEPA/CEQA Impacts

The cumulative construction and operation effects on biological resources would be substantial under NEPA and the impact would be significant under CEQA because of the potential impacts on plant and wildlife habitats and on wildlife corridors. The HST alternatives would have a cumulatively substantial contribution to impacts on biological resources, resulting in loss of habitat for special-status species, disruption of wildlife migratory corridors, and loss of habitats of concern.

Mitigation

With the implementation of mitigation measures for biological resources provided in Section 3.7, Biological Resources and Wetlands, to avoid, minimize, and compensate for impacts, the HST alternatives would have a less than cumulatively considerable effect on biological resources.

Hydrology and Water Resources

The cumulative impact study area for hydrology and water resources is approximately defined by the city of Fresno to the north, the city of Bakersfield to the south, the California Aqueduct to the west, and the Sierra Nevada foothills to the east. The cumulative impact study area includes the HST alternatives and upstream and downstream reaches of streams and rivers that cross through the study area.

The study area for the cumulative floodplain evaluation consists of the 100-year floodplains crossed by the HST alternatives and the land adjacent to these floodplains. The South Valley Floor watershed defines the boundaries of the cumulative impact analysis for surface water. The study area for cumulative impacts on groundwater is the five groundwater subbasins crossed by the HST alternatives.

The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.8, Hydrology and Water Resources.

Construction

Construction of the HST alternatives, in conjunction with construction activities associated with other past, present, and reasonably foreseeable projects, could alter existing drainage patterns by modifying watercourses and redirecting stormwater runoff. Projects developed under the cumulative condition that are located in undeveloped areas could have the greatest impacts. However, the HST alternatives and cumulative projects would be subject to regulations and permits required by the Central Valley Regional Water Quality Control Board to mitigate construction impacts on water quality. Therefore, potential cumulative construction impacts would be reduced, and cumulative impacts would be less than significant.

Near and Long-Term Operation

Operation of the HST alternatives, in conjunction with other past, present, and reasonably foreseeable future projects would result in land use changes that affect surface and groundwater hydrology. The increased area of impervious surfaces would cause changes in runoff patterns, surface water, and groundwater.

The project in conjunction with other planned projects would result in changes to hydrology and to the connectivity of natural watercourses, including floodways, where the projects cross watercourses. However, potential cumulative impacts would be reduced because projects are subject to project-level environmental analysis and permits, such as compliance with the State Water Resources Control Board Construction General Permit (2009-0009 DWQ) and Title 23 of the California Code of Regulations. Project-level analysis would identify and analyze, and avoid, minimize, or mitigate potential impacts on the hydrology and connectivity of natural watercourses, to the extent feasible.

The past, present, and reasonably foreseeable projects would result in changes to existing onsite drainage patterns and could result in increased stormwater runoff from an increase in impervious surface area. Conversion of vacant undeveloped land to accommodate the population by 2035 would result in new areas of impervious surface. Similarly, the HST alternatives are anticipated to add impervious surfaces from structures and from parking facilities at the Fresno, Kings/Tulare Regional, and Bakersfield HST stations and the HMF. Guideway construction materials and soil compaction below the guideway would also inhibit infiltration. However, new developments, including the HST alternatives, would comply with stormwater control ordinances, mitigating changes to drainage patterns and increases in impervious surfaces, as well as to potential impacts on water quality that could result from the projects. Overall, the project in conjunction with other planned projects would result in a negligible reduction in the amount of groundwater available for use in the study area due to increases in impervious surface area and reductions in infiltration.

Reasonably foreseeable future projects could result in impacts on flooding if the projects are within a Special Flood Hazard Area (SFHA), such as projects associated with the Laton Community Plan Update, the Self-Help Enterprises project, and the Delano Marketplace project. Similar impacts would result from operation of the HST alternatives where the alignments would cross SFHAs. However, potential cumulative impacts would be reduced because projects in SFHAs are subject to project-level environmental analysis, standards, and permits (prepared by project proponents). Project-level analyses would identify and analyze, and avoid, minimize, or mitigate potential impacts on floodplains, to the extent feasible.

The HST system as a whole with implementation of mitigation measures would have less than significant hydrology and water quality impacts. The construction of the HST system predominantly in existing transportation corridors would reduce the potential for adverse effects to water resources, and engineering and design practices would further reduce potential adverse impacts, as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS.

Irrigation Distribution System

Under the No Project Alternative, an estimated 5,100 acres of farmland would be converted to urban uses within 2 miles of the Fresno to Bakersfield HST Section right-of-way by 2035. This would reduce the water demand in those urbanized areas because agricultural uses require more water than required by domestic uses. Implementation of the HST alternatives could result in the additional conversion of approximately up to 2,481 acres of Important Farmland to non-agricultural uses. Under the cumulative condition, implementation of the HST alternatives, along

with other past, present and reasonably foreseeable projects would result in a decrease in water consumption for irrigation, which would be a beneficial impact.

Water Quality

Preservation of water quality is anticipated to be an increasing challenge by 2035 under the No Project Alternative. The HST alternatives, together with the past, present, and foreseeable projects identified for the study area, would potentially create new sources of runoff pollution that would contribute to significant cumulative impacts. Development under the cumulative condition could increase the amount of impervious surfaces and thereby increase runoff. Potential future uses could increase pollution of stormwater runoff by introducing new activities in the area. However, similar to the HST alternatives, other projects would be subject to regulations and permits required by the Central Valley Regional Water Quality Control Board to mitigate impacts on water quality. Therefore, potential cumulative impacts would be reduced. These regulations are in place to make sure that new developments and infrastructure projects do not result in water quality standard violations.

Summary of NEPA/CEQA Impacts

Potential construction and operations impacts under the cumulative condition resulting from changes to drainage, impervious surfaces, stormwater runoff, and water quality would be reduced through compliance with permits and the state and regional water quality control boards' requirements, as described above. Therefore, the cumulative impact of the HST alternatives and other past, present, and reasonably foreseeable future projects on hydrology and water resources would be negligible under NEPA and less than significant under CEQA.

Mitigation

Implement the measures for hydrology and water resources provided in Section 3.8, Hydrology and Water Resources, to minimize project impacts, thereby reducing cumulative impacts.

Geology, Soils, and Seismicity

The study area for the cumulative analysis of geology, soils, and seismicity is the San Joaquin Valley region, because impacts (e.g., erosion and sedimentation) would affect areas around the region, and some seismic impacts (e.g., a large earthquake) originating in other areas of the region could affect the project footprint. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.9, Geology, Soils, and Seismicity.

Construction

Because of the flat topography, generally competent soils, and groundwater typically at depths of 50 feet or more, only a limited number of environmental consequences relative to geology, soils, and seismicity are possible during construction. The risk areas are generally located near streams and river crossings where soils tend to be softer and groundwater is often closer to the ground surface. Under the No Project Alternative and the cumulative condition, impacts on geology, soils, and seismicity would be primarily moderated with implementation of standard engineering design measures and BMPs during construction. Construction impacts would be location-specific; cumulative effects would be negligible under NEPA and impacts would be less than significant under CEQA.

Construction of facilities and infrastructure under the No Project Alternative and for any of the HST alternatives would require aggregate, concrete, and steel reinforcement. When considered in total, there would be a large demand for these and other construction materials. However, it is anticipated that sufficient materials are available to meet this demand.

Near and Long-Term Operation

Geologic, soil, and seismic hazards exist in the study area and new development would expose people and structures to these conditions. For example, development of the HST alternatives in conjunction with other planned projects would incrementally increase the number of people and structures potentially subject to a seismic event. Structural components of the HST alternatives and the past, present, and reasonably foreseeable projects would be designed to meet or exceed engineering design requirements for railways, highways, and buildings.

Seismically induced dam failure could result in flooding in large areas of the south San Joaquin Valley (see Section 3.9, Geology, Soils, and Seismicity). The past, present, and reasonably foreseeable future projects could increase the number of people exposed to this flood risk. However, effects from seismic-induced ground motion, including such secondary seismic hazards as liquefaction and other seismically induced ground failure, are expected to be negligible under NEPA and less than significant under CEQA with implementation of standard design measures.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole could have potentially significant impacts on geology and soils, which could be mitigated to less than significant levels with implementation of mitigation. Potentially significant impacts related to slope stability (in areas susceptible to slope failure) as well as impacts related to subsidence (if other concurrent construction projects in the area dewater from the same drainage basin) could occur. For example, areas with difficult excavations and potential slope stability concerns include the Patterson Pass and UPRR alignment segments crossings of the Diablo Range.

Summary of NEPA/CEQA Impacts

Potential geology, soils, and seismicity impacts from projects constructed and operated under the cumulative condition would be reduced through implementation of standard engineering design measures and BMPs. Therefore, the cumulative effects of the HST alternatives and other past, present, and reasonably foreseeable future projects on the geologic, soil, and seismic conditions during construction and operation would be negligible under NEPA, and the impact would be less than significant under CEQA.

Mitigation

As described in Section 3.9, Geology, Soils, and Seismicity, no mitigation measures are required. The project design would incorporate standard engineering design measures and BMPs during construction and operation of the project to address project impacts that could contribute to cumulative impacts. The measures are based upon federal and state regulations and on the Statewide Program EIR/EIS (Authority and FRA 2005) listed in Section 3.9.6.

For cumulative impacts related to the depletion of aggregate supplies and building materials, the HST project will coordinate with other projects that are under construction at the same time to create opportunities to reuse excavated soil and demolition debris among the projects.

Hazardous Materials and Wastes

The study area for the cumulative analysis of hazardous materials and waste extends 1 mile on either side of the alternative alignments and encompasses the potential station and heavy maintenance facility areas where project impacts from hazardous materials would be greatest. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.10, Hazardous Materials and Wastes.

Historically, the Fresno to Bakersfield Corridor has had numerous industrial and agricultural zones, large industrial and agricultural facilities, major transportation routes, and distribution systems including petroleum pipelines. The lack of regulation regarding hazardous material transport, use, and disposal before the RCRA was enacted resulted in areas of environmental contamination. Documentation of these hazardous waste sites, regulatory oversight, and clean-up efforts began in the early 1980s under CERCLA. Enterprises that use, store, transport, or dispose of reportable quantities of hazardous materials or petroleum products are now required to comply with federal, state, and local regulations for safe handling of these materials and are designed to minimize the risk of exposure or release of hazardous materials.

Construction

Construction of the HST alternatives and past, present, and reasonably foreseeable projects would temporarily increase the regional transportation, use, storage, and disposal of hazardous materials and petroleum products (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals). This increase would contribute incrementally to the regional transportation, use, storage, and disposal of hazardous materials. While hazardous materials handling may increase during construction, compliance with regulations would reduce potential cumulative effects to negligible levels under NEPA and less than significant levels from CEQA.

Near and Long-Term Operation

By 2035, the population in the counties of Fresno, Kings, Tulare, and Kern anticipated to increase by approximately 73%. Under the No-Project Alternative the increased population in the region would contribute incrementally to the transport, storage, use, and disposal of hazardous substances within the Fresno to Bakersfield corridor. Households, industrial sites, and agricultural operations use hazardous materials and generate hazardous waste.

The HST alternatives, including the HMF sites, would incrementally increase use of hazardous materials because the facilities would use, store, and dispose of small quantities of hazardous materials and petroleum products on a regular basis. Project operations would comply with regulatory requirements to minimize the risk of exposure to or release of hazardous materials. Together with past, present, and reasonably foreseeable projects, there would not be a cumulative hazards impact. Additionally, development of future projects and the HST alternatives could result in the incidental improvement in environmental quality because of the discovery and required remediation of existing soil and water contamination.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole would have less than significant impacts on hazardous materials and waste with implementation of mitigation measures. While hazardous materials may be unearthed during project construction, such as at the Diridon station site (San Francisco to San Jose HST Section), any hazardous wastes encountered through ground-disturbing activities during construction would be handled and disposed of in accordance with regulatory requirements.

Summary of NEPA/CEQA Impacts

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 resulting from the HST alternatives and past, present, and reasonably foreseeable projects would have a negligible effect under NEPA and a less than significant impact under CEQA on hazardous materials and wastes.

Mitigation

Numerous laws and regulations govern the transport, storage, use, and disposal of hazardous materials, as described in Section 3.10, Hazardous Materials and Wastes. During project design, construction, and operation, the project will follow regulations and implement measures to reduce impacts resulting from the use of hazardous materials, generation of hazardous wastes, and potential disturbance of hazardous waste sites. No mitigation is required.

Safety and Security

The study area for the cumulative analysis of safety and security includes the transportation system and fire protection, law enforcement, and other emergency response service areas in Fresno, Kings, Tulare, and Kern counties and the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield. This study area allows a review of other projects under the No Project Alternative that would affect emergency response and evacuation routes because of impacts on roadway connectivity and emergency service providers. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.11, Safety and Security.

Construction

The HST alternatives would be located in mostly rural areas with small- to medium-size populations in the urban centers. In rural areas, longer emergency response times would result from low-density road networks; barriers formed by the UPRR, SR 99, SR 198, SR 43, and BNSF rights-of-way; and fewer fire stations with lower staffing levels.

Under the No Project Alternative, the number of construction workers required to meet the needs of the growing population in 2035 would result in an increased demand for emergency response services. However, most of this development would occur over time, thus allowing local agencies to plan for the increased demand and reduce the impact. Combining the highway projects under the cumulative condition with the construction of any of the HST alternatives would require several thousand construction workers per year from the surrounding communities during the HST construction period. The increase in construction population would temporarily increase the need for fire protection, law enforcement, and other emergency response services. If all planned transportation projects are built simultaneously, emergency services may be overburdened, especially if current budget challenges persist. However, many of the other planned projects are currently on hold because of the economy, which postpones the need for some of the construction workers. Construction of the project may occur prior to construction of many of the other projects, effectively mitigating the cumulative impact on emergency services. Construction workers must follow strict OSHA and safety practices, thus reducing the demand on emergency services.

With or without the HST alternatives, budget cuts would continue to reduce staff and close fire stations in some areas of the corridor. In 2009, the City of Fresno reported its lowest crime rate since the 1970s (City of Fresno Police Department 2011). On the other hand, per capita crime rates in Bakersfield have increased slightly over the past three years (Federal Bureau of Investigation 2006, 2007, 2008, 2009). Accommodating the population growth expected by 2035 would result in a cumulative increase in demand for fire protection, law enforcement, and other emergency response services. A large number of residential projects, many of which include commercial components, would substantially increase the population in Kern County, and to a lesser extent, the populations of Fresno, Kings, and Tulare counties. The additional long-term demand could be difficult to accommodate in Kern County without additional funding for fire protection and law enforcement agencies. This would be a moderate safety effect under NEPA and a significant impact under CEQA.

Under the No Project Alternative, planned roadway projects would improve the network connectivity, reduce congestion, and cumulatively benefit fire protection, law enforcement, and other emergency services through better response times and access. However, even with the transportation improvements planned for SR 99 and the urban areas along SR 99, Caltrans operating standards would not be met in some urban areas in 2035. Non-urban areas would operate at a level of service of D or better (Caltrans 2009). With implementation of the HST alternatives, the project would negligibly contribute to increased response times by emergency services during construction, because of roadway improvements that include overpasses and crossings approximately every 2 miles within the rural areas of the Fresno to Bakersfield Section. The HST alternatives and other past, present, and reasonably foreseeable projects would be anticipated to result in beneficial effects for the emergency response capability within the study area.

In Fresno, project construction would require temporary closure of five major streets in the downtown area (Stanislaus, Tuolumne, Fresno, Tulare, and Ventura streets). This could cause a cumulative increase in traffic congestion with other roadway projects planned for SR 99 and SR 41 in the central Fresno area. This congestion could increase response times by emergency services during construction, which would have a moderate effect on safety under NEPA and a significant impact under CEQA.

Some project alternatives could affect a private airstrip. Similarly, planned future projects could encroach on airports and private airstrips. It is unlikely that future development projects would affect municipal airports because land management plans limit development near those airports.

Near and Long-term Operations

Increased travel safety would be a cumulative benefit with the HST alternatives and highway safety improvement projects. Both would improve overall safety in regional travel. The HST alternatives would provide a transportation option that is safe during inclement weather. In addition, the HST alternatives would reduce emergency response times by constructing new grade separations for the BNSF tracks and by reducing the volume of traffic on state highways. (Some long-distance travelers would use the HST system instead of driving.)

The HST system as a whole could result in less than significant impacts on safety and security, with implementation of mitigation measures, and would not be cumulatively considerable. Overall, the system could result in greater safety and security with installation of grade separations at roadway crossings. For example, roadway separations along the Caltrain Corridor (San Francisco to San Jose Section) would improve safety in the study area. In other sections of the HST system, construction could result in traffic detours and longer emergency response times (e.g., at various locations along the Merced to Fresno Section), and peak short-term demand for emergency services would increase during construction (Fresno to Bakersfield Section); such impacts could be mitigated to less than significant.

Summary of NEPA/CEQA Impacts

The construction-related cumulative effects of the HST alternatives and other past, present, and reasonably foreseeable projects on safety and security would be moderate under NEPA and significant under CEQA. Construction would increase long-term demand for fire and police services and could increase emergency response times due to temporary closure of major streets in Fresno. The HST alternatives would have moderate contribution under NEPA and a cumulatively considerable contribution under CEQA.

Travel safety would increase during operation of projects under the cumulative condition, as both the HST alternatives and highway improvement projects would result in the construction of grade separations and could be anticipated to improve safety during inclement weather and reduce

traffic on highways. Therefore, the cumulative condition would result in beneficial operations impacts.

Mitigation

Mitigation involves coordinating with city and county law enforcement agencies and fire departments through the Fire and Life Safety Program regarding the adequacy of services for planned growth in the cities and counties and the anticipated temporary population increase in the number of construction workers. The Fire and Life Safety Committee could consider strategies, such as concentrating housing for construction workers in other areas of the corridor, to reduce the impact on Fresno County emergency services.

Project construction would be coordinated with local jurisdictions where road closures would be required to ensure that emergency response services are not disrupted. This would reduce the effects of project construction on safety to a negligible level under NEPA, and the impact would be less than significant under CEQA.

Socioeconomics, Communities, and Environmental Justice

The study area for the socioeconomics, communities, and environmental justice cumulative impacts analysis includes the cities of Fresno, Corcoran, Wasco, Shafter, and Bakersfield, and the unincorporated areas of Fresno, Kings, Tulare, and Kern counties in the immediate vicinity of the Fresno to Bakersfield HST alternative alignments. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.12, Socioeconomics, Communities, and Environmental Justice. Environmental justice and socioeconomics are considered under NEPA but not under CEQA.

Construction

Division and/or Disruption of Community

Construction of projects in the vicinity of the Fresno to Bakersfield Section would not contribute to cumulative impacts on communities, with the possible exception of (1) the Central and Edison districts in the city of Fresno and (2) the Central Bakersfield district. Both of these potential cumulative impacts are discussed below.

The widening of Ventura Boulevard, the construction of a 3-million-gallon water storage tank, and the reconstruction of the SR 99 Monterey Bridge are all planned within 1 mile of each other in the Central and Edison districts of Fresno. Although the projects themselves would not displace any residents or divide or impact the community's character, if the projects were constructed simultaneously with the HST, there would be the potential for temporary increases in traffic, changes in traffic patterns, changes in access to community facilities, and construction noise and dust. As such, construction activities can hinder access and interaction among neighborhoods because of increased congestion, detours, and lane or road closures. If construction of the HST system in this area coincided with construction of the other projects, the HST alternatives would make a considerable contribution to this impact.

The Mill Creek Linear Park Plan project in the Central District of Bakersfield is a mixed-use development that would contribute to an effort to revitalize Downtown Bakersfield. The project would add 115 housing units to the area and would not divide the community. The development is anticipated to improve the character of the community by providing new recreational resources for the residents. Construction of the Mill Creek Linear Park Plan project may result in temporary increases in noise, air pollution and traffic during construction. If construction of the HST system in this area coincided with construction of the other projects, the HST alternatives would make a considerable contribution to this impact.

Economic

The study area is within the California Central Valley, which is known for its agricultural production. Although the agricultural sector is not the largest employer, it accounts for one in six jobs. The largest employers are the service and government sectors, which together account for 50% of all industry jobs in the study area. Unemployment rates in the study area are typically higher than those for the state, and they are among the highest in the state. As of October 2010, unemployment rates were 15.7%, 15.0%, 15.9% and 14.4%, respectively, for Fresno, Kings, Tulare, and Kern counties (CEDD 2010).

Under the No Project Alternative, numerous planned and potential projects would be necessary to accommodate the population growth by 2035. The growth would result in a cumulative economic impact, especially with respect to employment and unemployment rates. Because the construction schedule and the workforce required during construction and operation of the project have not been fully developed, cumulative economic impacts cannot be identified or quantified at this time. However, areas that are projected to experience 64% growth over a 25-year planning period anticipate a boom condition. The addition of large construction projects, such as the proposed HST alternatives, would cumulatively stimulate local economies.

Environmental Justice

Populations within the two community areas discussed above are ethnically diverse, with high percentages of minority and low-income persons. Construction impacts, as described in Division and/or Disruption of Community, Air Quality and Global Climate Change, and Noise and Vibration above, could result in disproportionately high and adverse impacts to these minority and low-income communities if construction of the HST system coincided with construction of other present and reasonably foreseeable projects affecting these communities. Therefore, cumulative environmental justice impacts would be substantial under NEPA.

Near and Long-Term Operation

Division and/or Disruption of Community

Transportation projects can bisect neighborhoods and reduce community cohesion. In the case of the existing railways in the study area, they are not a barrier to communities as typically these communities have developed around these existing railways. While the HST alternatives could lead to community impacts, as discussed in Section 3.12 Socioeconomics, Communities and Environmental Justice, the operation of the proposed HST would not make a considerable cumulative contribution to this potential impact.

The HST system as a whole would result in significant impacts associated with community and neighborhood cohesion and substantial effects associated with property loss. These impacts and effects could occur in areas of the HST system that are not located within existing railroad rights-of-way due to the creation of new transportation corridors, as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS. For example, during construction, the HST system could result in impacts on community cohesion in the city and county of Fresno and the city of Bakersfield.

Economic

Operation of the HST alternatives in conjunction with other planned projects would drive 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, the economic benefits would be cumulatively substantial. Most businesses that would relocate under any of the HST alternatives would continue to benefit from the improved economy.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the construction and operation of the HST system would have beneficial impacts on tax revenues and employment.

Environmental Justice

Populations along the majority of the Fresno to Bakersfield Section are ethnically diverse, with high percentages of minority and low-income persons. Any cumulative impacts in these areas (both negative and beneficial) would disproportionately impact minority and low-income communities, particularly in the urban areas surrounding the HST stations.

Implementation of the HST system as a whole is not expected to result in disproportionately high and adverse effects on minority or low-income populations, as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS. Systemwide, adverse effects on communities of concern would not be appreciably more severe or greater in magnitude than the adverse effects on populations that are not communities of concern.

Summary of NEPA/CEQA Impacts

For the purposes of this EIR/EIS, environmental justice and socioeconomics are considered under NEPA but not under CEQA. Cumulative impacts on environmental justice populations would be substantial under NEPA, and the HST alternatives would have a cumulatively considerable contribution to these impacts in urban areas. As described above, under Division and/or Disruption of Community, the HST alternatives and other past, present, and reasonably foreseeable projects would have a substantial impact under NEPA and a significant impact under CEQA on the Central and Edison districts in the city of Fresno and the Central Bakersfield district. However, the aggregate beneficial economic impacts resulting from construction and operation of the project in conjunction with other planned projects, including the other sections of the HST system, would be substantial under NEPA.

The HST alternatives would have a substantial contribution under NEPA and a cumulatively considerable contribution under CEQA.

Mitigation

As noted in Section 3.12, Socioeconomics, Communities, and Environmental Justice, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, fully compensates for any property acquisition, including housing of last resort. In addition, the Authority will coordinate with the City and County of Fresno and with the City of Bakersfield to phase the timing of construction of the HST alternatives to avoid cumulative construction impacts on these communities.

The contribution of the HST alternatives to cumulative impacts related to division and/or disruption of communities would be negligible under NEPA and less than significant under CEQA with the implementation of the mitigation measures identified in this document along with planning to limit concurrent construction of the HST with other projects in the communities noted above.

Station Planning, Land Use, and Development

The study area for the station planning and land use cumulative impacts analysis includes Fresno, Kings, Tulare, and Kern counties. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.13, Station Planning, Land Use, and Development.

Construction

Construction of the HST alternatives would require the acquisition of property and conversion of existing land uses to a transportation public right-of-way. This would reduce the amount of available land for development. The HST alternatives and other reasonably foreseeable future projects in the study area would result in cumulatively significant impacts from land use conversion. However, the amount of land that would be acquired by the HST alternatives constitutes a small portion (0. 01%) of the total residential, commercial, and public land that would be required to accommodate the projected 2035 population. Therefore, the HST alternatives' contribution to this cumulative impact would be less than cumulatively considerable, and overall would be beneficial as an economic driver for densification in urban centers around the stations.

Near- and Long-Term Operation

Changes in transportation systems can influence nearby land uses either directly through acquisition or indirectly by providing new or improved access. Under the cumulative condition and the No Project Alternative, roadway improvements addressed in the regional transportation plans would reduce congestion and shorten travel times. This has historically encouraged longer commutes and sprawling development. Because these projects are constrained by RTPs, the projects are in conformance with existing planning documents. Future development projects under the No Project Alternative and the cumulative condition are anticipated to be implemented in compliance with local zoning and land use plans.

By 2035, the No Project Alternative and cumulative condition are projected to increase population growth in the counties of Fresno, Kings, Tulare, and Kern by 73%. The No Project Alternative would require up to 175,800 acres of development to accommodate the 2035 population. Development of this land would likely occur on the outer fringes of existing cities in Fresno, Kings, Tulare, and Kern counties, which would result in significant cumulative land use impacts, particularly to agricultural lands located adjacent to more urbanized areas. Although the HST stations are anticipated to generate TOD, which would result in more compact and efficient development, the amount of land within the influence of the HST stations would be relatively minor. This benefit may initially be modest compared to the projected 175,800 acres of development; however, the HST may be the economic driver for increased densification over years to come. Providing an important link to other economic centers makes the HST stations a focus area for economic investment and changes in land use patterns. Local land use planning agencies support an increase in density around the Fresno and Bakersfield station areas, and to some extent the Kings/Tulare HST station areas.

The HST system as a whole could contribute to potentially significant impacts associated with sensitive land uses—including land uses in the Fresno to Bakersfield Section study area—as described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS. Where the HST system would be located in new rail corridor in residential areas and parks, or require widening of existing corridors in residential and commercial business areas, it could have a cumulatively considerable contribution to impacts on neighborhoods and communities. Where the alignment would be located within existing transportation right-of-way, such as in the San Francisco to San Jose and the Oakland to San Jose corridors, it would be highly compatible with existing land uses. In areas such as the East Bay to Central Valley, the HST alignments would have moderate land use compatibility due to the mix of land uses, including agricultural and residential lands. Implementation of segments of the HST system in new transportation corridors, such as the San Jose to Central Valley corridor, would have the greatest land use incompatibilities.

Summary of NEPA/CEQA Impacts

The cumulative impact of past, present and reasonably foreseeable future projects on land use planning during construction and operation would be significant under NEPA and significant under CEQA because of the conversion of land uses required to accommodate new development. However, the HST alternatives would not contribute to this cumulative impact and would, overall, be beneficial by creating densification around HST stations. Therefore, the HST alternatives' contribution to cumulative land use impacts would be negligible under NEPA and less than cumulatively considerable under CEQA.

Mitigation

Other than conforming to applicable local zoning and land use planning requirements, as described in Section 3.13, Station Planning, Land Use, and Development, no mitigation measures are required for the HST alternatives.

Agricultural Lands

The cumulative impact study area for agricultural lands includes Fresno, Kings, Tulare, and Kern counties. These counties have been, and continue to be, important agricultural areas in California. Fresno, Kern, Tulare, and Kings counties rank first, second, third, and eighth, respectively, among California's top agricultural counties, as measured by the gross value of agricultural production (CDFA 2010). Farming and related agricultural industries are major employers in these counties and are vital to their economies. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.14, Agricultural Lands.

Construction Impacts

Approximately 1,569 to 1,591 acres of 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. It is anticipated that this land would be restored and returned to agricultural use after construction is completed. Therefore, cumulative construction impacts on farmland would be negligible under NEPA and less than significant under CEQA.

Near- and Long-term Operations

Under the No Project Alternative, approximately 1% of the Important Farmland and Grazing Land was converted to nonagricultural uses in Fresno, Kings, Tulare, and Kern counties between 2000 and 2006. This trend is expected to continue in the future because more urbanization would continue to occur under the No Project Alternative. Reasonably foreseeable projects within 2 miles of the alternative alignments would convert approximately 5,130 acres of farmland and grazing land to nonagricultural uses by 2035. The eight San Joaquin Valley counties that participated in the San Joaquin Valley Blueprint planning process developed a scenario for conversion of farmland to nonagricultural uses by 2050 based on current land-use development patterns. Given continuation of these patterns, 327,000 acres of farmland would be converted by 2050.

Although conversion to urban uses in many cases is consistent with local plans and policies that identify areas for planned future growth, loss of Important Farmland would be cumulatively considerable under any HST alternative, which would require the acquisition of up to approximately 2,192 to 2,333 acres of farmland. Conversion of farmland to nonagricultural uses is considered a cumulatively substantial effect under NEPA and a significant impact under CEQA. The HST alternatives would have a cumulatively considerable contribution to this impact.

The HST alternatives and other past, present, and reasonably foreseeable projects would have a less than significant cumulative impact related to Williamson Act conflicts. The majority of these cumulative projects are not under active Williamson Act contracts because they are within city spheres of influence and are planned for urbanization. Outside the sphere of influence of local jurisdictions, Williamson Act protections discourage the early conversion of agricultural lands.

As described in the 2005 Statewide Program EIR/EIS and 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole could have a significant impact on agricultural lands, therefore contributing to a cumulatively significant impact. Impacts would result from direct conversion of agricultural lands to transportation uses, as well as indirect loss resulting from division of agricultural parcels. Impacts would be greatest in the Central Valley, such as along the Merced to Bakersfield Section, and least in the urbanized corridors, such as the San Francisco to San Jose Section.

Summary of NEPA/CEQA Impacts

The HST alternatives and other past, present, and reasonably foreseeable future projects would result in a substantial cumulative effect to agricultural lands under NEPA and a significant impact under CEQA from the conversion of farmland to nonagricultural uses and the resulting loss of Important Farmland. The HST alternatives' contribution to cumulative impacts would be substantial under NEPA and cumulatively considerable under CEQA because it would result in the loss of approximately 2,192 to 2,333 acres of farmland.

Mitigation

With implementation of mitigation measures provided in Section 3.14, Agricultural Lands, cumulative impacts would be reduced. However, the loss of farmland cannot be replaced; therefore, HST alternatives contribution to cumulative agricultural impacts would remain substantial and cumulatively considerable under NEPA and CEQA respectively.

Parks, Recreation, and Open Space

The study area for the parks, recreation, and open space cumulative impacts analysis includes the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, Bakersfield, and Fresno, Kings, Tulare, and Kern counties. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.15, Parks, Recreation, and Open Space.

Construction

Construction of the HST alternatives and other past, present and reasonably foreseeable future projects in the study area could result in cumulative impacts to parks and recreation areas. Construction of projects under the cumulative condition that are located in close proximity to parks could generate noise, changes to visual character, and temporary park closures that could result in substantial effects under NEPA and cumulatively considerable impacts under CEQA.

Construction of the HST alternatives would have potential significant impacts on parks and recreation resources, such as the Kern River Parkway, resulting from closure of some park areas during construction. The cumulative impact of this project with other transportation projects in the vicinity could result in potential cumulative impacts from noise and visual changes to the Kern River Parkway and may impact the trail in the park. Significant impacts would also occur to the proposed Orchard Park and recreation areas associated with Bakersfield High School from construction noise. Therefore, the HST alternatives' contribution to cumulative construction-related park impacts would be substantial under NEPA and significant under CEQA.

Near and Long-term Operations

Under the No Project Alternative, demand for and use of parks and recreation facilities are projected to continue to increase in proportion to the population growth of the study area. To maintain the current quality of life, all of the communities will need to increase parkland to serve the population forecast for 2035. Based on the National Recreation and Park Association standards (Lancaster 1990) guidance for parkland to accommodate the 2035 population increase of 1.79 million people in the four-county region, approximately 17,900 acres of new parkland would be required. It is anticipated that the developers of new residential projects would be required to donate parkland as a condition of the entitlement process. This proportional increase in new parkland would mitigate the impact of new populations on existing parkland.

As described in Section 3.15, Parks, Recreation, and Open Space, the HST alternatives would have potential operational impacts on parks and recreation resources. The HST alternatives would require the permanent acquisition of up to approximately 10.8 acres, depending on the alternative selected. However, all HST alternatives' impacts on parks would be mitigated, including replacing park property or providing financial compensation to the jurisdictions for replacement park property. Park land replacement may be required in conjunction with the development of other planned projects, and therefore other future projects are not anticipated to result in cumulative impacts. Mixed-use development projects, residential projects, industrial projects, and other activities associated with the foreseeable projects and 2035 cumulative conditions are not anticipated to involve the acquisition of parkland.

Because of the HST connections to major economic centers, the HST alternatives could result in an increase in population and a corresponding increase in the demand for park and recreation facilities in communities with HST facilities. This increase is insignificant compared to the projected population growth without the HST alternatives (Authority and FRA [2008] 2010)and the developers of new TOD projects would be required to contribute park facilities as part of the entitlement process. However, the playground at the Bakersfield Amtrak Station would be significantly impacted from increased use. This impact would be mitigated through the provision of additional maintenance funds.

The BNSF Alternatives would result in significant impacts on Allensworth State Historic Park due to the introduction of a modern feature inconsistent with the historic atmosphere of the park. The Wasco-Shafter Bypass would bisect the proposed Orchard Park and would have a significant impact on the character of the park. While other cumulative projects would generally not be located in proximity to existing or proposed parks and would not contribute to cumulative impacts, the HST alternatives would contribute to significant cumulative impacts. The HST alternatives would have a considerable contribution to park impacts.

The HST system could have significant impacts on parks, recreation and open space. The Statewide EIR identified measures to reduce these impacts but could not conclude that these impacts would be reduced to a level of less than cumulatively significant. Therefore, the HST system would result in a cumulatively significant impact on parks, recreation, and open space.

Summary of NEPA/CEQA Impacts

Increased demand for parks associated with the population growth under the cumulative condition could result in park degradation and require the construction of additional park facilities. Construction and operations of projects under the cumulative condition could also result in changes in the character of existing and proposed parks. Therefore, the cumulative impact of the HST alternatives and other past, present, and reasonably foreseeable future projects on parkland would be substantial under NEPA and significant under CEQA. Construction and operations of the HST alternatives could result in short-term and long-term changes in park

character. Therefore, the HST alternatives' contribution to cumulative impacts would be substantial under NEPA and cumulatively considerable under CEQA.

Mitigation

With implementation of the mitigation measures for parks, recreation, and open space provided in Section 3.15, Parks, Recreation, and Open Space, impacts would be reduced, but would remain substantial and significant. The HST alternatives' contribution to cumulative impacts would remain substantial under NEPA and cumulatively considerable under CEQA.

Aesthetics and Visual Quality

The Fresno to Bakersfield Section of the HST system is located on mostly flat terrain, and includes agricultural and urbanized areas. The most significant visual resources in the project vicinity (identified by using aerial and satellite maps, site surveys, and a review of policy documents) include parks and historically significant sites in the central areas of the cities of Fresno and Bakersfield; historic town centers in Corcoran, Wasco, and Shafter; orchards and open field crops in the rural San Joaquin Valley; the natural riparian character of Kings River, Tule River, Cross Creek, and Poso Creek; and views of the Sierra Nevada Mountains and the Greenhorn and Tehachapi Mountains.

The study area for aesthetics and visual resources is the project's viewshed (i.e., the area that could potentially have views of the project features and the area potentially viewed from the project). In the agricultural areas, the corridor is visible in relatively long-distance views, whereas in urbanized areas, views toward the corridor are relatively close and are often obstructed by buildings and trees. Therefore, accounting for the existing terrain, predominant uses, and proposed elevated parts, the potential viewshed for the Fresno to Bakersfield Section is within 0.25 mile of the alignment centerline of the proposed HST alignment in urbanized areas, including all of Fresno and Bakersfield. In open landscape areas it is within 0.5 mile of the alignment centerline. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.16, Aesthetics and Visual Quality.

Construction

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. However, it is assumed that these projects would be constructed at various time periods and would be separated visually throughout the area. In addition, these activities would be subject to measures to reduce their contribution to cumulative impacts on communities. Therefore, there would be no cumulative construction impacts on aesthetics and visual quality.

All HST alternatives would substantially affect the Fresno and Bakersfield downtown areas during construction. The BNSF Alternative would also affect the downtown areas of Corcoran, Wasco, and Shafter, and the Colonel Allensworth State Historic Park. However, mitigation measures would reduce these impacts to less than significant. Most of the staging sites would be located adjacent to the proposed HST alignment in areas that are generally rural or industrial in nature. Equipment and earthmoving activities are not visually intrusive in these types of settings. In urban areas, staging areas would be largest at the HST stations. Both HST stations would be adjacent to the BNSF right-of-way where adjacent land uses are accustomed to freight and industrial movements. Construction activities would cease after completion; therefore, impacts from these activities are considered temporary. Although potentially significant in some instances, with recommended mitigation, construction activities would be negligible under NEPA and reduced to less than significant levels under CEQA, and the HST alternatives would not contribute to a cumulative impact.

Near and Long-term Operation

Planned projects in the study area in the city of Fresno include the Fresno freight rail alignment project, the widening of Ventura Boulevard, a new 3-million-gallon storage tank, the SR 99 Monterey Bridge replacement project, the C.A.R.T.S. Trucking Yard, and the SR 99 Cedar/North Avenue interchange upgrade. The HST system would be at-grade in the vicinity of these projects. The HST alternatives and other past, present, and reasonably foreseeable future projects would each contribute incrementally to visual impacts on the surrounding viewshed. The overall change in visual character due to these projects would not be substantial because of the existing industrial/transportation infrastructure in the area. The HST alternatives and these other projects would contribute to an intensification of these impacts, but not adversely change the overall visual character or quality of the visual setting. Also, cumulative visual impacts would be localized and would not contribute to impacts on more visually sensitive areas or receivers outside of the corridor. The cumulative visual impact in the city of Fresno would be negligible under NEPA and less than significant under CEQA.

The City of Corcoran is proposing the construction of a new police station. This project would be located near the HST alternatives, but together with the HST alternatives would not be large enough in size to contribute to a cumulative impact in the city of Corcoran.

The City of Wasco is proposing an enterprise zone for the development of a 328-acre industrial park and a 1,053-acre commercial area. The BNSF Alternative Alignment would run near or within this area, and would be elevated. The HST alternatives, in conjunction with the enterprise zone, would reduce the visual character and quality within the area. The cumulative visual impacts of the project and other proposed development within this area would be significant because they would cumulatively change the appearance of the landscape from open agricultural land to an urbanized setting, substantially lowering the visual quality of the enterprise zone. The HST facilities would have a cumulative contribution to this significant impact.

The Wasco-Shafter Bypass Alternative would pass through the proposed residential and commercial development associated with the Orchard Park Specific Plan in Shafter (City of Shafter 2006). On this alternative alignment, the HST would become a prominent visual feature in the planning area that may not be visually compatible with future development. Mitigation of this impact would require major alteration of the proposed layout of the specific plan and substantial landscape screening at the right-of-way.

The Rosedale Ranch project near Bakersfield proposes 1,655 acres of residential, commercial, institutional, and light industrial land uses within the area of effect of the BNSF Alternative Alignment, which would abut the western boundary of the development and be elevated in this area. The development of Rosedale Ranch in combination with the HST alternatives would contribute considerably to the alteration of the landscape from a rural, open agricultural character to an urban/industrial/infrastructure character in this part of the alignment. Similarly, the elevated project segment would pass a proposed asphalt and concrete recycling facility, which also is likely to have elevated structures. This proximity would exacerbate the impacts of the HST alternatives on the visual character and the quality of the views from adjoining residences in Rosedale, as identified and discussed in Section 3.16, Aesthetics and Visual Quality.

In Rosedale/Greenacres, the Bakersfield Commons project proposes a 255-acre mixed-use development in the vicinity of the HST alternatives and Coffee Road. The Bakersfield Commons project would consist of 1.4 million square feet of retail and theater uses, 2 million square feet of commercial space, and over 400 residential units. Cumulative visual impacts on residents in the community of Rosedale from the HST alternatives and this development would be potentially substantial, because the HST alternatives would be adjacent to sensitive future residential viewers, and the HST alignment is not included in the Bakersfield Commons Specific Plan. In

addition, the proposed Bakersfield Commons development would exacerbate the substantial impacts of the HST guideways on adjoining, existing residential viewers along Windsong Street and Brimhall Road.

Two additional mixed-use projects, Mill Creek Linear Park and the Old Town Kern Redevelopment Project, are proposed near the proposed location of the HST station in Downtown Bakersfield. The cumulative impact of the mixed-use projects and the HST alternatives would result in beneficial impacts on a visually blighted industrial area. The proposed HST station is anticipated to have beneficial visual impacts on these surroundings, which would be further improved by the two proposed redevelopment projects—each of which would result in substantial visual improvements to industrial areas of very low visual quality.

As described in the 2005 Statewide Program EIR/EIS and 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole could have a potentially significant impact on aesthetics. The HST system would create short-term construction-related visual changes and long-term visual changes from the introduction of 700 to 750 miles of a new transportation system that would be visible along many major highways and rail corridors in the state. For example the loss of mature trees within the HST system footprint in several cities on the San Francisco peninsula would result in substantial changes in visual character. Changes in highly scenic areas, such as scenic open space and mountainous areas, would be also significant. For example, the potential stations at Pleasanton (I-680/Bernal Road), Pleasanton (BART), Livermore (I-580), Livermore (I-580 Greenville Road), Tracy (Downtown), Tracy (ACE), Union City (Shinn), and San Jose (Diridon) in the San Francisco to San Jose Section could have significant visual impacts.

Summary of NEPA/CEQA Impacts

Projects developed under the cumulative condition could significantly reduce the visual character within the study area, resulting from changes to the landscape including the conversion of agricultural lands to urbanized lands. These changes could reduce the visual quality of such areas. Therefore, the cumulative impact of the HST alternatives and other past, present, and reasonably foreseeable future projects on aesthetics and visual quality would be significant under NEPA and significant under CEQA. The HST alternatives would contribute to such impacts through introducing prominent visual features, such as elevated structures, or introducing industrial/infrastructure types of uses that could result in considerable alteration of the landscape. Therefore, the HST alternatives' contribution to cumulative impacts would be significant under NEPA and cumulatively considerable under CEQA.

Mitigation

Even with implementation of the mitigation measures provided in Section 3.16.6, Aesthetics and Visual Quality, to mitigate landscape appearance in Wasco, the Orchard Park Specific Plan area, the Rosedale Ranch project area, and the Bakersfield Commons project area, cumulative impacts would remain significant until landscape screening matures in 10 years, or longer. The HST alternatives' contribution to cumulative impacts would remain substantial under NEPA and cumulatively considerable under CEQA until landscape screening matures.

Cultural and Paleontological Resources

The geographic study area for the cumulative impact analysis for cultural resources was identified as the area of potential effects for both archaeological and architectural resources as well as the entire four-county area (i.e., Fresno, Kings, Tulare, and Kern counties), where other transportation projects are proposed as part of the cumulative condition. The geographic extent used for the cumulative analysis of paleontological resources consisted of the entire south San

Joaquin Valley. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.17, Cultural and Paleontological Resources.

Based on existing inventories, as well as the culture history of the area, the Southern San Joaquin Valley Region (i.e., the Tulare and Buena Vista Lake areas) contains many known archaeological and paleontological resources that may be affected by development of the cumulative projects, including the HST alternatives. In addition, it is assumed that currently unidentified resources are also present within the study area. Because the importance of such resources cannot be determined at this time, the significance of cumulative impacts to archaeological and paleontological resources cannot be determined for projects developed under the cumulative condition.

Construction

Prehistoric and historic archaeological sites are affected during project construction activities. Prehistoric sites are common in riverbank and floodplain areas, and burial sites are sometimes encountered during ground-disturbing activities. It is likely that known and unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities associated with the HST alternatives and other past, present, and reasonably foreseeable projects. Significant and unavoidable losses of unique archaeological resources (as defined in Public Resources Code Section 21083.2) or a historical resource (as defined in Section 21083.2 of CEQA and Section 15064.5 of the state CEQA guidelines) could occur if excavation exposes archaeological deposits that cannot be removed or recovered (e.g., under levees) or if recovery would not be sufficient to prevent the loss of significant cultural resources.

Near- and Long-term Operation

Under the No Project Alternative and the cumulative condition, cultural resources would continue to be affected in the Central Valley urban areas by the conversion of land use between 2010 and 2035 due to growth, changes in land use, and ground disturbance. Adverse effects on eligible resources could result in the neglect, abandonment, or removal of historic properties. A given project is not likely to be able to avoid or mitigate an impact to a less than significant level, especially in the case of a large-acreage project or a project that requires major ground disturbance (e.g., those projects listed in Appendix 3.19-A and Appendix 3.19-B). Changes in the urban areas will likely result in further unearthing of sensitive archaeological resources, disturbance of traditional cultural properties, disturbance and possible damage to paleontological resources, and removal of or changes to the historic character and settings of historic resources. The importance of potential archaeological and paleontological resources cannot be determined at this time, and therefore, the cumulative impact to such resources cannot be determined.

However, the HST alternatives could result in significant unavoidable impacts to historic resources as described in Section 3.17, Cultural and Paleontological Resources. Therefore, the cumulative impacts to cultural resource would be significant under NEPA and considerable under CEQA.

Future growth under the No Project Alternative and the cumulative condition would result in urbanization of land that is outside of existing urbanized areas but within identified urban spheres of influence. Historical architectural resources could also be damaged during construction or require removal from areas in and around the study area. Also, historic architectural resources may be affected during operation by the introduction of noise and vibration or by the effect of operation on a resource's setting. Furthermore, local projects and the secondary effects of redevelopment pressures around the HST stations would potentially result in the removal of historic buildings in Downtown Fresno and Downtown Bakersfield. If these resources meet the

definition of a historical resource or a historic resource (as defined in Section 106, 36 CFR 800), their modification or destruction would be significant. Although mitigation measures would be implemented to reduce the effects on potentially significant cultural resources, significant impacts could still occur.

As described in the 2005 Statewide Program EIR/EIS and the 2008 Bay Area to Central Valley Program EIR/EIS, the HST system as a whole could have a potentially significant impact on archaeological resources, historical structures, and paleontological resources. Potential impacts would likely occur in areas that cross formations with paleontological sensitivity, such as the Colma Formation (San Francisco to San Jose Section), and in areas where the HST system alignments use existing rail corridors, as these corridors and potential station locations in urban centers typically are surrounded by historical structures and districts, such as the potential station locations in Redwood City, Palo Alto, and Mountain View.

Summary of NEPA/CEQA 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 be significant under NEPA and significant under CEQA. Construction and operation of the HST alternatives could contribute to similar impacts. Therefore, the HST alternatives' contribution to impacts would be significant under NEPA and cumulatively considerable under CEQA.

Mitigation

Mitigation would involve minimizing cumulative impacts on cultural resources by adhering to federal, state, and local regulations and by providing guidance on the treatment of significant properties (as defined in CEQA Section 106 and regional evaluation criteria). Implementation of the mitigation measures for cultural resources discussed in Section 3.17.6 would minimize impacts, thereby reducing cumulative impacts. Even with implementation of the mitigation measures for cultural resources provided in Section 3.17.6, the cumulative impacts would remain significant under NEPA, and significant and unavoidable under CEQA. The HST alternatives' contribution would remain significant under NEPA and cumulatively considerable under CEQA.

This page intentionally left blank