

3.19 Cumulative Impacts

Since publication of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS), the following substantive changes have been made to this section:

- A section was added to Section 3.19.2.1, Federal, regarding the Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts. Footnotes were added regarding FRA's Environmental Procedures and the updated Council on Environmental Quality (CEQ) regulations issued after release of the Draft EIR/EIS.
- Analysis about the Diridon design variant (DDV) and tunnel design variant (TDV), which was included in Section 3.20 in the Draft EIR/EIS, has been incorporated into this Final EIR/EIS in Section 3.19.5.1, Resource Study Area; Section 3.19.6.1, Transportation; Section 3.19.6.2, Air Quality and Greenhouses Gases, including Tables 3.19-1 through 3.19-5; Section 3.19.6.3, Noise and Vibration, including Tables 3.19-6 and 3.19-7; Section 3.19.6.6, Biological and Aquatic Resources; and Section 3.19.6.11, Socioeconomics and Communities.
- Section 3.19.6.1 was updated to include the effects of the Downtown West Mixed-Use Plan (Google Project). A cross-reference to Section 3.2, Transportation, was added.
- Emissions generated by light-duty gasoline-powered vehicles used during construction have been remodeled to include the effects of the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. Section 3.19.6.2 was updated to reference new mitigation measures AQ-MM#1 and AQ-MM#2 and to delete reference to Draft EIR/EIS mitigation measure AQ-MM#2, which was removed from the Final EIR/EIS due to the impact of the SAFE Vehicles Rule. With this Rule, none of the project alternatives would exceed Monterey Bay Air Resources District's (MBARD) coarse particulate matter (PM₁₀) threshold.
- In addition, the status of passenger service expansion projects, total amortized greenhouse gas (GHG) construction emissions for the project, and a cross-reference to Volume 2, Appendix 3.3-A, *San Jose to Merced Project Section Air Quality and Greenhouse Gases Technical Report*, were corrected in Section 3.19.6.2. The highest annual and daily emissions from construction of any of the project alternatives were updated in Table 3.19-5.
- Noise impacts were updated to reflect inclusion of the Google Project as well as the DDV and the TDV in Section 3.19.6.3.
- Section 3.19.6.5, Public Utilities and Energy, was updated to include the Google Project and the Panoche Valley Solar Farm Project. It was also updated to state that planned development projects would be required to comply with local policies within the RSA and that certain cumulative projects would include private wastewater collection networks and on-site wastewater treatment facilities to accommodate their demand.
- Section 3.19.6.6 was revised to update the conservation areas identified in Santa Clara, Merced, and San Benito Counties. Several properties were collectively referred to as the "Soap Lake Properties" in the Draft EIR/EIS but have now been listed individually. Silacci was renamed to Bloomfield; Halperin Conservation Easement, Pajaro Ranch, and Tulare Meadows were added to Santa Clara County; and Soap Lake Ranch Easement was added to San Benito County.
- Revisions to Section 3.19.6.6 were made to incorporate changes included in the *San Jose to Merced Project Section Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement, Biological Resources Analysis* and in response to public comments on that document.
- Section 3.19.6.7, Hydrology and Water Resources, was updated with a minor correction to a description of the groundwater RSA. It was also updated to correct the status of the San Luis Reservoir Low Point Improvement Project, the Upper Llagas Creek Flood Protection Project, the South County Regional Wastewater Authority Maintenance Building, linear road and

highway projects that could affect waterbodies in the cumulative RSA, and transportation projects that could result in direct impacts on waterbodies or otherwise generate pollutants.

- Status of cumulative transportation and cumulative nontransportation projects, including the Google Project, was updated in the following sections: Section 3.19.6.8, Geology, Soils, Seismicity, and Paleontological Resources; Section 3.19.6.10, Safety and Security; Section 3.19.6.11; Section 3.19.6.12, Station Planning, Land Use, and Development; Section 3.19.6.13, Agricultural Farmland; Section 3.19.6.14, Parks, Recreation, and Open Space; Section 3.19.6.15, Aesthetics and Visual Resources; and Section 3.19.6.16, Cultural Resources.
- The CEQA conclusion in Section 3.19.6.14 was updated to state that, during construction, the project in combination with planned projects in the cumulative RSA would result in cumulative impacts related to construction noise and visual changes that would be reduced with implementation of project impact avoidance and minimization features (IAMF) and mitigation measures to address construction impacts associated with other development projects.
- Where appropriate, the verb “would,” when used specifically to describe IAMFs or mitigation measures, as well as their directly related activities, was changed to “will,” indicating their integration into project design.

3.19.1 Introduction

This section analyzes the potential contribution of the San Jose to Central Valley Wye Project Extent (project or project extent) alternatives to cumulative impacts, and defines the regional context appropriate for each resource area, including adjacent project sections of the high-speed rail (HSR) system.

3.19.2 Laws, Regulations, and Orders

This section summarizes federal and state laws and regulations relevant to the cumulative impact analysis; there are no recent regional or local laws, regulations, or plans pertaining to cumulative impacts.

3.19.2.1 Federal

National Environmental Policy Act (42 U.S.C. § 4321 et seq.; 40 C.F.R. Parts 1500–1508)

Pursuant to the National Environmental Policy Act (NEPA) and CEQ regulations, a lead agency must consider cumulative impacts in addition to direct and indirect impacts. The CEQ regulations define a *cumulative impact* as an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 Code of Federal Regulations [C.F.R.] § 1508.7).^{1,2}

The CEQ guidance document *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) recommends that a cumulative impact analysis include the following steps in scoping those impacts worthy of analysis in an EIS:

- Step 1: Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

¹ The Council on Environmental Quality issued new regulations on July 14, 2020, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Parts 1500-1508. However, this project initiated NEPA before the effective date and is not subject to the new regulations, relying on the 1978 regulations as they existed prior to September 14, 2020. All subsequent citations to Council on Environmental Quality regulations in this environmental document refer to the 1978 regulations, pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 Fed. Reg. 43340.

² While this EIR/EIS was being prepared, FRA adopted new NEPA compliance regulations (23 C.F.R. 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 C.F.R. 771.109(a)(4). Because this EIR/EIS was initiated prior to that date, it remains subject to FRA’s Environmental Procedures rather than the Part 771 regulations.

- Step 2: Establish the geographic scope for the analysis.
- Step 3: Establish the timeframe for the analysis.
- Step 4: Identify other actions affecting the resources, ecosystems, and human communities of concern.

The guidance notes that “scoping is the key to analyzing cumulative impacts; it provides the best opportunity for identifying important cumulative impacts issues, setting appropriate boundaries for analysis, and identifying relevant past, present, and future actions. Scoping allows the NEPA practitioner to ‘count what counts.’” In this way, the cumulative analysis is focused on those cumulative impacts to which the project alternatives could contribute.

Federal Railroad Administration, Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

On May 26, 1999, FRA released *Procedures for Considering Environmental Impacts* (FRA 1999). These FRA procedures supplement the Council on Environmental Quality Regulations (40 C.F.R. Part 1500 et seq.) and describe the FRA’s process for assessing the environmental impacts of actions and legislation proposed by the agency and for the preparation of associated documents (42 U.S. Code 4321 et seq.). The FRA *Procedures for Considering Environmental Impacts* states that “the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4.” These FRA procedures state that an EIS should consider possible cumulative impacts.

National Historic Preservation Act (36 C.F.R. § 800)

The regulations implementing Section 106 of the National Historic Preservation Act (NHPA) acknowledge that a project’s adverse effects include any that are reasonably foreseeable, even if they may occur later in time, are farther removed in distance, or are cumulative.

Clean Water Act (33 U.S.C. § 1251 et seq.)

Section 404 of the Clean Water Act (CWA) requires the assessment of potential cumulative impacts on jurisdictional waters of the U.S., including special aquatic sites, protected by Section 404, that are under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA).

Federal Endangered Species Act (15 U.S.C. § 1531 et seq.)

The federal Endangered Species Act (FESA), Section 7, defines cumulative impacts as those effects of future state or private activities not involving federal activities that are reasonably certain to occur within the action area that is subject to consultation with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), or both.

3.19.2.2 State

California Environmental Quality Act (Cal. Code Regs., tit. 14, § 15000 et seq.)

The CEQA defines cumulative impacts as two or more individual impacts that, when evaluated together, are considerable or compound or increase other environmental impacts (CEQA Guidelines § 15355). Under CEQA, when a project would contribute to a cumulatively significant impact, an EIR must discuss whether the project’s incremental effect is cumulatively considerable. *Cumulatively considerable* means that the project’s incremental effect is significant when viewed in the context of past, present, and reasonably probable future projects.

Like the approach under NEPA, the CEQA Guidelines provide that cumulative impact analyses should focus on *significant* cumulative impacts to which a project would contribute and the magnitude of the project’s contribution.

When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR must briefly indicate why the cumulative impact is not significant and is not discussed in further detail. The lead agency must identify facts and analysis supporting the lead agency's conclusion that the cumulative impact is less than significant (CEQA Guidelines § 15130(a)(2)).

3.19.3 Methods for Evaluating Impacts

The Authority followed the steps listed below to determine the contribution of the project alternatives, if any, to cumulative impacts for each resource:

1. Define the RSA for the cumulative impacts for each resource topic.
2. Compile a list and description of, as well as environmental impact information for, planned projects and relevant plans for consideration of cumulative impacts. Check for such projects in adopted plans such as regional transportation plans (RTP), regional transportation improvement plans, 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 the project alternatives. Planned projects in this analysis are those that are likely to occur and would add to the impacts on a particular resource. Generally, projects are considered in the analysis if they are part of an adopted plan as described in this section or fall under any of 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 reasonably foreseeable future phase of an existing project.
 - The project is reasonably foreseeable to occur within the 2040 planning horizon for the HSR system.
3. Identify and evaluate the cumulative impacts of the planned projects, including the San Jose to Central Valley Wye project, that make up the cumulative condition for each resource topic. Determine as part of this evaluation whether there is a cumulative impact.
4. Determine whether the incremental contribution of the project to the cumulative impacts for each resource area is cumulatively considerable under CEQA. "Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CEQA Guidelines § 15355). The cumulative discussion will only include direct or indirect impacts found to result from one or more project alternatives; if no impact would result, there is no need to evaluate other projects' similar actions.
5. Identify reasonable, feasible options for avoiding or mitigating the project alternatives' considerable contribution to cumulative impacts.

The specific resource evaluations in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, form the basis for analyzing the cumulative impacts of each resource. The cumulative analysis includes all resources considered in Chapter 3, (i.e., Sections 3.2, Transportation, through 3.17, Cultural Resources).³ Where applicable, the cumulative impacts analyses note impacts to which the project alternatives would not contribute and explains the rationale.

3.19.4 Cumulative Projects and Growth Forecasts

This section discusses the historical context of the project and how development trends in the past have influenced the environmental character of the area. This section also discusses

³ Section 3.18, Regional Growth, describes induced growth and indirect effects from growth. That section also identifies cumulative impacts associated with regional growth and future projects; therefore, the regional growth analysis is not repeated in this section.

projected development trends and describes how future urbanization is anticipated to change the character of the project vicinity.

3.19.4.1 Historical Context of Project

Section 5.2.3 of the *San Jose to Merced Project Section Archeological Survey Report* (Authority 2019) provides an overview of the history of cultural development in Santa Clara, San Benito, and Merced Counties from the Spanish period (1769–1822) through the Gold Rush period and the development of railroads that brought settlers to this area. At the start of the American Period (1848 to present), the discovery of gold in 1848 at Sutter’s Mill near Sacramento enticed thousands of settlers and immigrants to pour into the state, mostly in northern urban areas such as San Francisco and mining locales in the Sierra Nevada foothills. During the Gold Rush years of the 1850s and 1860s, immigrants dispersed throughout the “Mother Lode” mining region adjacent to the southern Sacramento Valley and the northern San Joaquin Valley. Many enterprising individuals and businesses met the miners’ increasing demand for food and supplies, boosting the establishment of farms, ranches, and small towns along navigable waterways and tributaries in the Central Valley. The cattle business and grain farming were particularly suited to the region’s soils and climate, and in the 1870s, the valley became the center of California’s wheat belt. It was not until after the Central Pacific Railroad constructed its Southern Pacific line through the San Joaquin Valley in 1870 that the regional population and economy grew significantly. The railroad connected the valley to Sacramento and San Francisco and revolutionized the transportation network, passenger travel, and the ability of farmers and ranchers to sell their goods to distant markets. The railroad established stops and sidings along the tracks, forming the basis for settlement and the growth of local farms and ranches, small communities, and later urban centers.

Between the arrival of the Transcontinental Railroad and the end of World War I (circa 1870–1920), the southern Santa Clara County and western San Joaquin Valley regions experienced community and settlement expansion, agricultural diversification and industrialization, and innovations in both transportation and water management. In this period the South Bay cities of Santa Clara and San Jose became firmly tied economically and politically to the San Francisco metropolitan area, while the southern Santa Clara Valley and the west side of the San Joaquin Valley developed as more rural, agricultural landscapes.

San Jose and the Northern Santa Clara Valley

The urban areas in Santa Clara County experienced rapid civic growth, continued subdivision of large land tracts that supported neighborhood and small farm developments, innovations in agriculture and manufacturing technologies, the establishment of technological research and development facilities, and the development of railways between 1870 and 1920. During the interwar period, urbanization associated with growing research technology and manufacturing industries displaced agriculture in the northern valley. Hewlett and Packard, two Stanford University students, developed electronic test equipment in Palo Alto in the late 1930s. Other electronics and digital technology corporations, such as General Electric and IBM, were attracted to the expanding business community of Palo Alto and the Santa Clara Valley. This business community was established around Stanford University and the military contracts available at Moffett Field, resulting in the “Silicon Valley” (Archives & Architecture 2012; Kyle 2011). Since then, other firms such as eBay, Apple, Google, Adobe, and Intel have made Silicon Valley into a globally recognized center of digital technology industries. San Jose’s population was approximately 60,000 in 1930. Between 1950 and 1969, the population of San Jose grew from approximately 92,000 to 495,000, largely as a result of increased growth in employment in the electronic and digital industry in Silicon Valley. The population of the city has continued to grow and neared 900,000 residents by 2000. At the turn of the 21st century, the population of Santa Clara County had surpassed 1,600,000 (Archives & Architecture 2012).

Gilroy and the Southern Santa Clara Valley

The southern Santa Clara Valley between Coyote and Gilroy was held by a small number of landowners until the late 19th and early 20th centuries. Communities such as San Martin, Morgan

Hill, and Gilroy developed around roadhouses and family ranches into civic centers of the region's rangeland agricultural economy. By the end of the 19th century, Gilroy had developed into the south county's largest civic, commercial, and residential center. Located at the crossroads of the Pacheco Pass route and both Monterey Road and the Southern Pacific Railroad (SPRR), the town was geographically poised to benefit from 20th-century transportation and agribusiness developments.

Wine production was one of the notable enterprises during the early part of the 20th century. From 1901 to 1905, northern Santa Clara County suffered an infestation of phylloxera that destroyed thousands of acres of vines. The San Martin area, which had not seen widespread cultivation, remained free of the pest and had ideal growing conditions. In 1905, a cooperative of several Santa Clara Valley vintners planted 200 acres of vines, with the first harvest taking place in 1908. That same year the group incorporated as the San Martin Wine Company (Dill Design Group 2003).

By the early 20th century, fruit and other agricultural production dominated the economy of Gilroy and its surrounding area (Dill Design Group 2003). Around this same time, auto-oriented businesses proliferated along Monterey Road in response to increasing automobile traffic. Roadside diners, stores, hotels, and other attractions thrived. Coyote remained a popular stopping point for decades between San Jose and Hollister. In 1983, Monterey Road was rerouted past the southern valley towns, and the automobile-based service economy collapsed. However, in the last decades of the 20th century and into the 21st, high-tech industries and residential subdivision have resulted in steady growth in the communities of Morgan Hill and Coyote, while Gilroy and San Martin have experienced slower growth and have remained more agricultural in character.

Los Banos and Western Merced County

Western Merced County's late-19th-century economy was focused on farming and cattle and sheep ranching, which continued to flourish in the arid climate west of the San Joaquin River. Settlers were attracted by Central Valley cattle-ranching operations headquartered at Los Banos. Volta was established in 1890 by the Volta Improvement Company along the SPRR line through western Merced County.

The area experienced conversion to current agricultural uses in the late 1700s and early 1800s, resulting in a general deterioration of the natural environment. This is manifested in widespread impacts such as groundwater overdraft and related land subsidence, elimination or degradation of wetlands by filling and draining or disposal of irrigation wastewater, and the loss of biological diversity and habitat (Borchers and Carpenter 2014). The San Joaquin Valley was flood-prone before development began on a large scale in the 1800s; the physical risk of flooding has increased when viewed in the context of its potential to disrupt human activities such as agricultural activities. During the early 20th century, farmers on the west side of Merced County and the San Joaquin Valley often combined small dairy herds with dry-farmed crops such as alfalfa, pinto beans, tomatoes, and sometimes cotton. Modest almond orchards were also introduced. Fewer crops were cultivated on the far western side of the valley over the course of the 20th century, but they continued to be grown to the east, on irrigated lands between present-day Interstate (I-) 5 and the San Joaquin River, including along Henry Miller Road north of Los Banos. While orchardists in the area often grew peaches and apricots during the mid-20th century, shifts in prices led many to cultivate almond orchards beginning in the 1970s. Farmers also currently produce tomatoes, cotton, melons, and corn on the irrigated lands northwest, north, and northeast of the Los Banos city limits (Sawyer 2010).

3.19.4.2 Projected Growth Trends

As discussed in Chapter 2, Alternatives, projections show that under the No Project Alternative, the regional population would grow at a faster rate than the statewide average. General plans and other planning documents for cities and counties in the region project the locations and types of growth likely to occur under buildout of the plans. Population growth in Santa Clara, San Benito, and Merced Counties is projected to continue at an annual average growth rate of 0.8 percent,

1.6 percent, and 1.5 percent, respectively, with an estimated population increase for all three counties totaling 2,804,790 people by 2040 (CDOF 2014, 2016). This population growth will translate into continued conversion of currently undeveloped or agricultural lands to residential, small business, and light industrial uses, plus the transportation infrastructure needed to support added development. The exception is the Pacheco Pass Subsection, which is not expected to experience urban development because of the mountainous terrain and because of existing land use protections and general plan designations in the area.

The relevant adopted general plans for the counties and incorporated areas promote relatively dense urban development between San Jose and Gilroy in an area of active small farms known as Coyote Valley. Urban development would continue to result in the conversion of natural and agricultural land, especially for future housing and associated development consistent with the general plans of the area. Under the cumulative condition, traffic in urban areas would increase; the demand for energy and water would increase; the amount of impervious surfaces would increase, affecting the quality and amount of stormwater runoff; and demand for public facilities and parks would increase due to population growth. In more rural and agricultural areas, ambient noise levels would increase, habitat for wildlife would become less available, the land available for agricultural production would decrease, and the visual character of many locations would change from rural to urban.

3.19.4.3 Cumulative Project Lists and Regional Projections

In addition to considering general plan projections identified for Santa Clara, San Benito, and Merced Counties and the Cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos, the cumulative impacts analysis also considers an expanded list of planned development projects provided in Volume 2, Appendix 3.19-A and Appendix 3.19-B. Appendix 3.19-A provides detailed information about planned development projects and plans, and Appendix 3.19-B provides similarly detailed information about transportation projects considered in this cumulative impact analysis.

Appendix 3.19-A includes a series of tables listing major capital or new development projects by jurisdiction for the counties and cities in the cumulative RSAs, including large-scale planning efforts through the region; county and city general plan updates to accommodate long-term development and urbanization; and smaller-scale mixed-use, residential, agricultural-industrial, and commercial developments planned through 2040. In summary, more than 80 projects and plans have been identified for Santa Clara, San Benito, and Merced Counties and the cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos.

Projects listed in Appendix 3.19-B reflect consideration of adjacent HSR project sections and applicable state and local projects and plans, identified primarily in RTPs and general plan transportation elements. The Authority reviewed these plans to identify planned and programmed transportation improvements considered in the cumulative setting and relevant impact analyses. Funded and programmed improvements on the intercity highway network are based on financially constrained RTPs⁴ developed by regional transportation planning agencies; these projects include more than 100 transportation improvements in Santa Clara, San Benito, and Merced Counties and the cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos.

3.19.5 Organization of the Cumulative Impacts Analysis

The analysis considers potential short-term, long-term, and indirect impacts from adopted plans, concurrent construction activities, and planned and projected development and transportation projects listed in Appendices 3.19-A and 3.19-B. Transportation projects include the adjacent HSR project sections (i.e., the entire Merced to Fresno Project Section, the adjacent San Francisco to San Jose Project Section, and the Central Valley Wye).

⁴ Plans are constrained by the amount of revenue the planning agencies expect to be available.

3.19.5.1 Resource Study Area

The cumulative analysis for each resource topic includes a discussion of the cumulative RSA relevant to that resource. This discussion describes similarities and differences between the cumulative RSA and the noncumulative RSA(s) for that resource as described in the relevant resource section in Chapter 3. With respect to the potential contribution to the cumulative condition from the electrical power transmission network upgrades, the cumulative RSA is expanded accordingly for relevant resource areas. The RSAs used for the cumulative analysis are at least 1,000 feet from the project. The maximum DDV alignment change under Alternative 4 would be approximately 37 feet, so all relevant cumulative projects are already accounted for in the analysis of Alternative 4 without the DDV. The TDV would not change construction or operational locations, so no additional cumulative projects need to be included in the cumulative analysis.

3.19.5.2 Cumulative Condition

The combined environmental influence of the past, present, and future changes described in Section 3.19.4, Cumulative Projects and Growth Forecasts, and Appendices 3.19-A and 3.19-B (including adjacent HSR project sections and the project alternatives) is referred to as the *cumulative condition* through 2040.

The potential for cumulative impacts is evaluated assuming incorporation of the Authority's relevant IAMF (Chapter 2 and Appendix 2-E, Project Impact Avoidance and Minimization Features), and with application of mitigation measures identified for the project alternatives in the individual resource analyses in Chapter 3 (i.e., Sections 3.2 through 3.17). In addition to including IAMFs and mitigation measures, the project alternatives' design and footprints have been refined during the environmental planning process to avoid or minimize impacts while meeting the project purpose and objectives. Where appropriate, additional feasible mitigation measures are proposed to reduce the contribution of the project alternatives to specific cumulative impacts.

The cumulative impacts analysis considers whether the cumulative condition could result in a *cumulative impact* for each resource. Each cumulative condition analysis includes a conclusion of whether past, present, and future projects (also referred to as *cumulative projects*) (listed in Volume 2, Appendices 3.19-A and 3.19-B) in combination with the project alternatives would result in a significant cumulative impact on a particular resource. If it is determined that there could be cumulative impacts, then an analysis, presented in the subsection titled "Contribution of the Project Alternatives," determines whether the incremental contributions of the project alternatives to the identified cumulative impacts would be *cumulatively considerable* (defined in the next subsection). If no significant cumulative impact was identified, the Contribution of the Project Alternatives subsection has been omitted for that resource.

3.19.5.3 Contribution of the Project Alternatives

If a cumulative impact was identified for a resource in the Cumulative Condition, then the analysts determined whether the project alternatives' incremental contribution would be cumulatively considerable. If the incremental effect of the project alternatives is found to be *cumulatively considerable*, the discussion identifies notable differences among alternatives, if any. The analysis then describes additional feasible mitigation measures beyond those already identified, if available, to address the contribution of the project alternatives to a cumulative impact.⁵

Through the planning horizon of 2040, the contributions of the project alternatives to cumulative impacts would be cumulatively considerable in some resource areas and would reduce a potential cumulative impact in others, as described in the resource-specific sections.

⁵ This analysis is included to comply with CEQA, which requires a determination as to whether cumulative impacts are "cumulatively considerable." See Section 3.19.2.2, State, for further information.

3.19.5.4 CEQA Conclusion

The analysis concludes with a determination of CEQA significance for each resource topic where it is applicable. This conclusion specifically identifies whether the project, in combination with cumulative projects in the cumulative RSA, would result in a significant cumulative impact under CEQA and whether the contribution of the project alternatives, after any applicable mitigation, would be cumulatively considerable.

3.19.6 Cumulative Impacts Analysis

3.19.6.1 Transportation

As discussed in Section 3.2, Transportation, traffic congestion or delay is not considered a CEQA impact per the changes in CEQA resulting from Senate Bill 743 and the subsequent updated CEQA guidelines issued in December 2018. Accordingly, cumulative congestion or delay is also not considered a CEQA impact. The discussion in this section concerning traffic congestion or delay is for NEPA analysis purposes only.

Resource Study Area

The cumulative RSA for transportation is the area encompassing Santa Clara, San Benito, and Merced Counties and is larger than the RSAs described in Table 3.2-1 in Section 3.2. Section 3.2 defined the project-level RSA as the major roadway, transit, pedestrian, bicycle, and freight rail facilities that would be affected by changes resulting from the project. The cumulative RSA was selected to develop a broad, regional context for cumulative transportation effects and to capture transportation-related effects associated with the construction and operations of the HSR project combined with relevant past, present, and future projects affecting transportation infrastructure and conditions in the RSA.

Cumulative Condition

Past development patterns have resulted in increased distances between jobs, housing, and transit, influencing where people live, how far they travel, and how they choose to travel. In response, planning agencies have worked to increase densities in already highly urbanized areas, such as San Jose, including the areas surrounding the San Jose Diridon Station. This growth in urbanized areas has resulted in level of service (LOS) failures throughout the cumulative RSA that have been identified through annual systemwide monitoring of peak hour conditions on regional routes of significance. These existing LOS failures throughout the cumulative RSA include peak hour LOS F conditions on U.S. Highway (US) 101, State Route (SR) 237, I-880, I-280, I-680, SR 17, SR 85, and SR 87 in Santa Clara County; SR 156, SR 25, and US 101 in San Benito County; and SR 152 in Merced County. The overall growth trends in the cumulative RSA are anticipated to continue. Traffic volumes on roadways in the cumulative RSA are expected to increase because of planned and future development activities (Appendix 3.19-A). This growth would result in additional stress on the transportation network, affecting existing roadways, highways, transit, nonmotorized facilities, and freight rail.

Vehicle Miles Traveled

In 2015, Santa Clara County estimated total annual vehicle miles traveled (VMT) ranged between 10.283 and 10.312 billion miles, estimated interregional VMT in San Benito County ranged between 613 and 620 million miles, and estimated interregional VMT in Merced County ranged between 1.217 and 1.239 billion miles. By 2040, cumulative growth would result in total annual VMT in Santa Clara County rising to 13.201 billion miles, but the annual Plus Project VMT would be 12.972 billion miles. By 2040, cumulative growth would result in interregional San Benito County VMT rising to 846 million miles, but the annual Plus Project VMT would be 676 million miles. By 2040, cumulative growth would result in interregional Merced County VMT rising to 1.842 billion miles, but the annual Plus Project VMT would be 1.642 billion miles.

Roadways, Freeways, and Intersections

The planned transportation projects listed in Appendix 3.19-B, including roadway improvements as well as roadway changes associated with construction of any of the HSR project alternatives, would provide additional transportation network capacity in the cumulative RSA. However, these projects would not adequately meet cumulative increases in transportation demand.

Transportation improvements include Bay Area Rapid Transit (BART), the SR 152 Los Banos Bypass, and various roadway improvements in Merced County.

In the long term, planned improvements to major roadways in the cumulative RSA are anticipated to increase the capacity of the existing network by constructing new facilities, improving existing facilities, improving safety, and reducing congestion levels. While all four project alternatives would contribute to an increase in traffic delay because of road closures during construction and contribute to an increase in traffic around stations during operations, HSR operations would provide an overall long-term regional reduction in traffic volumes. Taken together, the planned transportation projects including the HSR project would result in regional improvement to transportation circulation and access. Nevertheless, while these planned transportation improvements would alleviate a portion of the transportation network deficiencies or failures, the RTPs recognize that traffic and congestion levels will continue to outpace the transportation network's ability to serve the demand. This effect would be most pronounced in the urbanized areas around San Jose, Morgan Hill, and Gilroy because of the scale of continued growth anticipated in these areas. Minimal growth is anticipated in the Pacheco Pass area because of the undeveloped character of the mountainous terrain combined with land use and growth restrictions. The growth anticipated in Merced County would be distributed across a broad geographic area; thus, growth would affect a larger region but effects on any given intersection or roadway segment would be less than in the urbanized areas west of the Pacheco Pass.

Cumulative projects would create new, temporary closures of and modifications to some regionally significant roadways and would generate indirect impacts related to transportation, such as increased congestion on US 101. Such projects could include the US 101 Express Lanes, BART Silicon Valley Extension, bus rapid transit (BRT) projects in San Jose, and various interchange improvement projects on US 101. Under Alternatives 1, 2, and 3, Monterey Road would be narrowed, resulting in temporary delays and permanent changes to the roadway network that would contribute to degradation of service. Alternative 4 would not entail narrowing Monterey Road, but there would be temporary delays caused by temporary detours and closures associated with construction; there would be no permanent changes to the roadway network in the Monterey Corridor Subsection. Construction activities of the HSR project and other cumulative projects would have multiple-year construction timeframes, leading to potentially overlapping construction periods and locations. The designs of these projects would be consistent with regional and local land use plans and regulatory standards; moreover, they would incorporate traffic management plans and procedures for alternate routes during road closures as well as the protection of freight and passenger rail operations. The Authority's contractor will prepare a construction safety transportation management plan (SS-IAMF#1) in collaboration with local jurisdictions to maintain emergency vehicle access during construction. The Authority's contractor will also develop a construction transportation plan (CTP) (TR-IAMF#2) that will establish procedures for implementing temporary road and lane closures as well as coordination efforts between the construction contractor and local jurisdictions to minimize conflicts and maintain pedestrian, bicycle, and transit access. The closures and modifications of significant roadways caused by construction of any of the alternatives in combination with other cumulative projects would result in a significant cumulative effect on transportation from the delays and degradation of existing transportation networks.

Although the project would lower the number of vehicles on major roadways in the RSA, in the long term the transportation network is not expected to keep pace with demand even with the project's regional reduction in VMT. At certain localized intersections, the project would exacerbate traffic congestion and delays.

Parking

The BART Extension to downtown San Jose would displace up to 715 parking spaces adjacent to the San Jose Diridon Station and the SAP Center during construction. According to the final parking requirements associated with the May 25, 2021, approval of the Google Project and an agreement between the City of San Jose, Sharks Sports and Entertainment, and Google, there are approximately 2,850 available parking spaces on property that will be redeveloped as part of the project, and the developer and the City anticipate replacement of that parking and the development of at least 1,150 additional spaces, for a total of 4,000 publicly-accessible parking spaces at full buildout, all within one-third mile of the south entrance to the SAP Center. Of those spaces, at least 85 percent (3,400 spaces) would be available for SAP Center event use (City of San Jose 2021a). According to presentation material associated with the May 2021 approval of the Google Project, the project will result in a net increase of at least 350 parking spaces available for SAP Center event use (City of San Jose 2021b). In addition, according to Sharks Sports & Entertainment, there may be other development east of SR 87 and north of West Julian Street (other than the Google Project development) that may affect additional existing parking used by SAP patrons (SSE 2020).

As described in Section 3.2, project construction would temporarily displace parking in certain areas at and adjacent to the San Jose Diridon Station (all alternatives) and the Downtown Gilroy Station (Alternatives 1, 2, and 4). Displacements at the San Jose Diridon Station would include parking used for special events at the SAP Center. Project features will minimize temporary effects on parking through identification of employee parking locations (TR-IAMF#2), off-street parking for construction-related vehicles (TR-IAMF#3), and replacement on a 1:1 basis for temporary displacement of special event parking at the SAP Center (TR-IAMF#8). Environmental effects of Alternative 4 without the DDV would be increased due to the DDV relative to SAP Center event parking because the DDV would displace more parking spaces in the SAP parking lot. Accordingly, the project's contribution to cumulative impacts related to SAP Center event parking would be slightly greater with the DDV compared to Alternative 4 without the DDV.

Some of the currently available areas identified in Section 3.2 for potential interim construction replacement parking during HSR construction, including potential parking areas near Montgomery Street and San Fernando Street and Montgomery Street and Park Avenue locations, are proposed for development by the recently approved Google Project. The Google Project may also affect the potential interim parking area at Montgomery and West St. John Street. Thus, the availability of these locations will depend on the timing of HSR project construction as well as the Google Project construction. As noted above, Google, as a condition of approval and a settlement with the Sharks Sports and Entertainment, has committed to a net increase in available parking spaces for SAP Center events. The Authority will work with the City of San Jose, Google, the SAP Center, and potentially other partners to ensure that any parking spaces temporarily displaced by the HSR project will be replaced on a 1:1 basis during construction, including potential use of parking shuttles from remote lots if adjacent lots are not available for any reason at the time of HSR project construction. In either case, the Authority will be able to provide replacement for temporarily displaced parking spaces used for the SAP Center during construction on a 1:1 basis.

As described in Section 3.2, existing station parking spaces displaced permanently would be replaced 1:1 with new parking areas at Cahill and Park Streets and at Stockton and Alameda Streets. If the Google Project proposed development in the SAP Center parking lot area is not realized, then the project would displace some existing SAP Center parking lot spaces, and they would be replaced through either a parking area north of Julian Street at the corner of Julian Street and Montgomery Street (Alternatives 1, 2, and 3) or through a parking structure north of the SAP Center in the northern part of the existing SAP Center parking lot (Alternative 4). If the Google Project proposed development is realized in the SAP Center parking lot, then the Google Project would account for displacement of parking spaces in the SAP Center parking lot through its plans, which include a requirement to result overall in a net increase in parking available to the SAP Center by 350 spaces, and the HSR project would not include an additional parking area

north of Julian Street. In either case, there would not be a permanent loss of parking spaces available to the SAP Center.

As described in Section 3.2, the BART Extension and the Peninsula Corridor Electrification Project (PCEP) would also increase transit access to the San Jose Diridon Station and the SAP Center, in turn increasing transit mode share for the SAP Center users.

As discussed in Section 3.2, increased parking demands caused by HSR riders at the San Jose Diridon Station (all alternatives) would be accommodated through existing parking facilities, project parking facilities, and the offsetting effects of increased transit service (including the BART Extension and the PCEP) to the station so that station user and SAP Center parking demands can be met without secondary environmental or socioeconomic effects.

Adequate event parking capacity for the SAP Center would be available with implementation of the HSR project because the HSR project would replace all permanently lost spaces on a 1:1 basis, and other planned transit improvements would help provide more transit options for event attendees, thus reducing parking demand. The approved Google Project would maintain and increase the available parking spaces for the SAP Center. It is possible that other future development projects may affect parking availability. Since the HSR project would replace all of the parking spaces that it would displace permanently on a 1:1 basis and the HSR project provides another way (in addition to BART, Caltrain, and Santa Clara Valley Transportation Authority) to access the SAP Center without using a car, the HSR project would not meaningfully contribute to the cumulative parking effects for the SAP Center. Resolving other projects' effects on parking for the SAP Center is a matter for the City of San Jose, other development proponents, and the SAP Center to resolve similar to the resolution of parking between the City of San Jose, the SAP Center, and Google regarding the Downtown West development.

Project parking demands at the Downtown Gilroy Station (Alternatives 1, 2, and 4) and the East Gilroy Station (Alternative 3) would be met by proposed station parking.

Transit

The delays resulting from construction of any of the HSR project alternatives, in combination with projected growth, would result in delays on roadways for bus service. The project would include intersection improvements and prioritization equipment for bus transit to reduce impacts on bus transit. However, because the transportation network is not expected to keep pace with demand, there would be a significant cumulative impact on bus service because of increased vehicle congestion.

Construction of any of the HSR project alternatives and other development and transportation projects would create new, temporary closures of and modifications to some regionally significant roadways and would generate indirect impacts related to transportation, such as increased congestion on US 101. Such projects could include the US 101 Express Lanes, BART Silicon Valley Extension, BRT projects in San Jose, and various interchange improvement projects on US 101. Under Alternatives 1, 2, and 3, Monterey Road would be narrowed, resulting in temporary delays and permanent changes to the roadway network that would contribute to degradation of service (Alternative 4 would not result in narrowing of Monterey Road, but would result in increased gate down time during operations). Construction activities for the HSR project and other cumulative projects would have multiple-year construction timeframes, leading to potentially overlapping construction periods and locations. The design of these projects would be consistent with regional and local land use plans and regulatory standards; moreover, they would incorporate traffic management plans and procedures for alternate routes during road closures.

HSR operations would not impede station capacity for Santa Clara Valley Transportation Authority bus service because HSR stations would include facilities providing bus access to service the increased number of station users.

Recognizing the potential for transportation impacts to result from concurrent construction projects, the HSR contractor will prepare a CTP (TR-IAMF#2) to allow traffic flow to continue during construction. The CTP will include coordination between the construction contractor and

local jurisdictions to minimize conflicts and maintain transit access. The Authority will also implement TR-MM#2 to reduce the project impacts on bus transit operations during construction. This mitigation measure will improve bus transit operations on Monterey Road and in the San Jose Diridon Station and the Gilroy station areas by installing transit signal priority at key intersections.

However, the closures and modifications of significant roadways during construction resulting from Alternatives 1, 2 and 3 in combination with the traffic generated by other present and planned land use projects would have a significant cumulative impact on bus transit caused by the delays and degradation of existing transportation networks.

Nonmotorized Travel

Construction of any of the HSR project alternatives in combination with cumulative projects would result in temporary closure or removal of pedestrian facilities, bicycle lanes, and paths, limiting bicycle and pedestrian access in the areas of closure. For the HSR project, the contractor will prepare a CTP (TR-IAMF#2) and a traffic control plan to address maintenance of pedestrian and bicycle access during construction activities (TR-IAMF#4 and TR-IAMF#5). Safety for pedestrians, bicycles, and vulnerable populations would be prioritized over motor vehicle access in a manner to encourage maximum potential access for nonmotorized modes. Local access programs, such as Safe Routes to Schools, would be maintained or enhanced. Access to community facilities would be maintained or enhanced. The traffic control plan would include signage to alert pedestrians to the construction zone, traffic control methods, traffic speed limits, provisions for safe pedestrian and bicycle passage or convenient detours, and safe pedestrian access to local businesses and residences. Access to existing transit facilities, including Caltrain stations, will be maintained throughout project construction (TR-IAMF#11). Upon completion of construction, all pedestrian facilities and bicycle lanes would be restored. Similar requirements would be applied to other transportation projects, like the BART project. With implementation of these construction controls, cumulative impacts on nonmotorized travel would be less than significant.

Operations of cumulative projects would result in increased nonmotorized trips around the station areas. The planned station area facilities would be designed to accommodate forecast volumes of nonmotorized traffic. To maintain pedestrian and bicycle access, all new and replaced facilities would be designed with specifications for vehicle lanes, passenger loading zones, sidewalks, crosswalks, bike lanes, trails, bus stops, parking, and intersection controls. These features would address how pedestrian and bicycle accessibility would be provided and maintained across the HSR corridor, to and from stations, and on station property. Station designs would incorporate best practice multimodal design standards and guidance from the American Association of State Highway and Transportation Officials, the National Association of City Transportation Officials, and the Institute of Transportation Engineers. Furthermore, some cumulative projects, such as the Google Project, would incorporate design improvements to the existing pedestrian and bicycle circulation network that would enhance transit access and ridership. Thus, cumulative development would not materially decrease the performance or safety of pedestrian and bicycle facilities, lanes, and paths, and would have a less-than-significant cumulative impact.

Passenger and Freight Rail Service

Population, employment, and economic activity in Santa Clara, San Benito, and Merced Counties will increase through 2040. Development projects to accommodate projected population and economic growth, including shopping centers, industrial parks, transportation projects, and residential developments, as well as potential growth in goods movement activity would result in increased demands for passenger rail service and transport of freight by rail.

Rail service in the Caltrain corridor between Scott Boulevard and Tamien Station would increase due to planned passenger rail improvement projects and expected freight service expansion. Altamont Corridor Express (ACE) is planning to increase service to San Jose from 8 to 20 trains per day. Capitol Corridor is planning to increase service to San Jose from 14 to 30 trains per day. The Transportation Agency for Monterey County (TAMC) is planning to initiate service from

Monterey County to San Jose of 4 trains per day, increasing to 12 trains per day in the future. There has also been early planning to reintroduce Amtrak Coast Daylight service up to four trains per day operating from southern California to northern California (overlapping between Gilroy and San Jose with the project extent). Although the exact amount of freight rail transport in the future is difficult to predict, analysts assumed that freight would increase in the future at a rate of 3.5 percent per year, rounded up to 4 percent (Caltrans 2014).⁶

During construction of HSR and other projects affecting the rail corridor, the combination of increased passenger rail service, potentially increased freight rail service, and construction of other projects like BART and HSR would result in increased delays to expanded passenger and freight rail service.⁷ During project construction, the contractor will use “shoofly” tracks to allow other trains to bypass construction areas, repair any structural damage to freight or public railways that may occur during the construction period, and return any damaged sections to their original structural condition (TR-IAMF#9). Even with these measures, there will be a significant temporary cumulative impact on passenger rail and freight service because construction of HSR and other projects (like BART) will disrupt or interfere with expanded passenger and freight operations during track closures or other construction activities. Implementation of Mitigation Measure TR-MM#3 will minimize potential delays of passenger and freight rail service caused by localized closures to hours or days, reducing the project’s contribution to this impact.

Under Alternative 1, HSR and Caltrain would share tracks north of I-880. Under Alternatives 2 and 3, HSR would not share tracks with Caltrain. Under Alternative 4, HSR and Caltrain would share tracks from Scott Boulevard to Gilroy. Since there are no other rail services that would share tracks with HSR and Caltrain, HSR effects on existing Caltrain passenger service is considered a project effect, not a cumulative effect, and is accordingly analyzed in Section 3.2.

HSR operations would have no cumulative effect on rail capacity for ACE, Capitol Corridor, Amtrak, or TAMC because these other services will all use mainline track (MT) 1, which will be separate from the blended tracks used by HSR and Caltrain. There are no existing or cumulative passenger rail operations north of control point (CP) Coast other than Caltrain.⁸

HSR operations would have no cumulative effect on freight rail capacity south of CP Coast as freight service uses MT1 south of CP Coast; MT1 is separate from both the dedicated tracks to be used by HSR and the blended tracks to be used by HSR and Caltrain. North of CP Coast, Alternatives 1 and 4 would share tracks with freight operations, increasing constraints on freight during peak hours of operation.⁹ This compression of freight service hours would result in changes in freight operations and inconvenience to operators, but freight operations could be maintained overall. Diversion of freight from rail to other modes of transport is not likely to occur and thus secondary impacts related to air quality, GHG emissions, noise, or traffic congestion are not likely either. Consequently, cumulative impacts on freight rail service would be less than significant because freight rail service would be accommodated in the Caltrain and UPRR corridors, allowing freight rail to continue to service customers.

Contribution of the Project Alternatives

Vehicle Miles Traveled

By 2040, the project would reduce total annual Santa Clara County VMT by 230 million miles, interregional San Benito County VMT by 170 million miles, and interregional Merced County VMT by 200 million miles. This reduction in VMT would be the same under all four project alternatives,

⁶ This is an informal rate that freight operators, such as UPRR, often cite.

⁷ Because PCEP construction would be completed prior to HSR construction, the construction periods for PCEP and HSR would not overlap, but BART construction is expected to overlap with HSR construction.

⁸ There has been initial planning for potential Dumbarton Rail Corridor service, but this potential service is not currently funded nor has it completed environmental review and thus is considered speculative at this time.

⁹ As explained in Section 3.2, Transportation, some existing freight service commences in the early evening and thus overlaps with the latter part of the evening peak period.

as ridership and trip diversion associated with all would be the same. The project would lower cumulative VMT compared to No Project conditions, resulting in a beneficial impact.

Roadways, Freeways, and Intersections

Construction and operations of the HSR project would contribute to cumulative effects on the transportation network from reductions in VMT (all alternatives); increased traffic levels in the station areas (all alternatives); changes in traffic circulation on major roadways (Alternatives 1, 2, and 3); and increased congestion at certain intersections adjacent to at-grade crossings as a result of increased gate-down time (Alternative 4).

Roadway closures and construction traffic associated with construction of the San Jose Diridon and Gilroy Stations would result in temporary effects on traffic networks. Station-related construction effects in the San Jose Diridon Station Approach Subsection would be similar under all four project alternatives. In the Morgan Hill and Gilroy Subsection, the effects would be more substantial under Alternatives 1, 2, and 4 than under Alternative 3 because Alternative 3 would entail construction of the East Gilroy Station in the generally undeveloped area of east Gilroy. Construction of Alternatives 1, 2, and 3 would require road closures, including the narrowing of Monterey Road. The Monterey Road modifications would lead to shifts in traffic patterns onto other roadways and freeway segments on and around Monterey Road, leading to further delays and LOS failures. Alternative 4 would have the least construction effects on and around Monterey Road as it would not narrow the roadway.

Although project operations would result in a reduction in VMT in the cumulative RSA, there would continue to be isolated localized increases in traffic levels in the San Jose Diridon and Gilroy Station areas during operations. The addition of project-related local station traffic would degrade the LOS at multiple intersections close to the San Jose Diridon Station (all alternatives) and at the downtown Gilroy Station (Alternatives 1, 2, and 4). Alternatives 1, 2, and 3 would contribute to cumulative operational effects on intersections and two freeway segments influenced by the narrowing of Monterey Road. Alternative 4 would contribute to cumulative intersection delays due to increased gate-down time at existing at-grade crossings in downtown San Jose, along the Monterey Corridor, and in Morgan Hill and Gilroy.

Alternatives 1, 2, and 3 would have similar contributions to cumulative traffic effects from San Jose to Morgan Hill, while Alternative 4 would have greater contributions in downtown San Jose, fewer contributions along the Monterey Corridor and greater contributions in Morgan Hill. Alternatives 1 and 2 would have similar contributions to cumulative traffic effects in downtown Gilroy due to station traffic, while Alternative 4 would have greater contributions due to the addition of gate-down time effects along with station traffic, and Alternative 3 would have far lower contributions to downtown Gilroy cumulative traffic effects.

Potential mitigation that could reduce congestion or delay at affected intersections or freeway segments has been identified in TR-MM#1. However, because traffic congestion/delay is not a CEQA impact and because implementation of mitigation measures is not mandatory under NEPA, this mitigation is not assumed to be implemented. Rather, implementation would be at the discretion of the lead agency. Thus, assuming this mitigation is not implemented, the project (all alternatives) would contribute to cumulative effects.

Parking

The BART Extension to downtown San Jose would displace up to 715 parking spaces adjacent to the San Jose Diridon Station and the SAP Center during construction. As described in Section 3.2, project features will minimize temporary effects on parking through identification of employee parking locations (TR-IAMF#2), off-street parking for construction-related vehicles (TR-IAMF#3), and replacement on a 1:1 basis for temporary displacement of special event parking at the SAP Center (TR-IAMF#8).

As discussed in Section 3.2, the project includes construction of replacement parking at a 1:1 ratio, so there would be no permanent reduction of available parking at these locations and no contribution to any parking deficits. While the project would result in increased parking demands

caused by HSR riders at the San Jose Diridon Station (all alternatives), those demands, along with the loss of parking resulting from the BART Extension, would be accommodated through existing parking facilities, project parking facilities, the offsetting effects of increased transit service (including the BART Extension and the PCEP), and access to transit service to the station so that station user and SAP Center parking demands can be met without secondary environmental or socioeconomic effects.

As noted above, the Google Project would provide a net increase in available parking for the SAP Center and would not contribute to any parking deficits for the SAP Center, but it is possible that other future development projects nearby may affect parking availability for the SAP Center. While the HSR project would result in increased demand for parking due to HSR riders, the project would also offset some of that demand by providing an alternative travel mode to the SAP Center (in addition to the BART Extension project); thus, given the magnitude of the project's parking demand and the offsetting effects of transit, the project is not expected to contribute in a considerable way to any additional construction of off-site parking venues (that might have significant secondary environmental effects) or socioeconomic effects.

Transit

All alternatives would have temporary contributions to cumulative impacts on bus transit services during construction due to temporary traffic detours and roadway closures. Construction of Alternatives 1, 2, and 3 would entail the narrowing of Monterey Road, which would lead to shifts in traffic patterns onto other roadways and freeway segments on and around Monterey Road, contributing to cumulative traffic impacts. Alternative 4 would avoid construction-period contributions to this impact associated with the narrowing of Monterey Road and Alternative 4 would not have substantial road closures that would substantially affect bus transit operations during construction. The Authority would also implement TR-MM#2 to reduce the project impacts on bus transit operations during construction. This mitigation measure will improve bus transit operations on Monterey Road and in the San Jose Diridon Station and the Gilroy station areas by installing transit signal priority at key intersections. With this mitigation, Alternative 4 would have a less than considerable contribution but Alternatives 1, 2 and 3 would still have considerable contributions in areas of substantive road closures.

All four alternatives would contribute to cumulative bus transit impacts during operations, because of station traffic in the San Jose Diridon Station area. Alternatives 1, 2, and 3 would also contribute to bus transit impacts along the Monterey Corridor through the narrowing of Monterey Road, while Alternative 4 would contribute to bus transit impacts because of increased gate down time along the Monterey Corridor and in Morgan Hill. Alternatives 1, 2, and 4 would contribute to bus transit impacts in downtown Gilroy because of Gilroy Station traffic. The Authority would implement TR-MM#2 to reduce the project impacts on bus transit operations during operations. The installation of transit signal priority with TR-MM#2 would improve operations at affected intersections for bus transit services during operations on Monterey Road and in the San Jose Diridon Station and the Gilroy station areas by installing transit signal priority at key intersections. With this mitigation, all alternatives would have less than considerable contributions to cumulative bus transit delays during operations.

Passenger and Freight Rail Service

Construction of any of the project alternatives would cause temporary disruptions of passenger and freight rail service. During project construction, there would be temporary periods of service disruption when connecting existing tracks to new tracks. Where feasible, the contractor would schedule any necessary track closures during nights and weekends to minimize disruption to passenger rail service, but nighttime closures would affect freight service. Service disruptions, when they occur, would last several hours to several days. The Authority, Caltrain, other passenger railroads, and the freight railroads would work together to build the project in a manner consistent with the agreements negotiated by the Authority's contractor during the final design process, allowing each entity to conduct its relevant activities in a manner that would avoid and minimize impacts on passenger and freight rail operations. Implementation of Mitigation Measure

TR-MM#3 will minimize potential delays of passenger and freight rail service caused by localized closures to hours or days, reducing the project's contribution to this impact.

CEQA Conclusion

During construction and operations, the project alternatives would result in additional traffic, roadway narrowing, and increased gate-down time at at-grade crossings that would contribute to increased cumulative localized traffic congestion and delay at certain intersections and certain freeway segments, depending on alternative. However, traffic congestion and delay are not considered impacts under CEQA. Therefore, CEQA does not require mitigation.

The project would contribute to increased cumulative delays on bus transit services throughout the corridor, affecting the performance of bus operations. Project features and mitigation measures, including signal priority equipment for buses, will reduce the project's impacts on these resources during construction and operation for all alternatives. However, even with mitigation, Alternatives 1, 2 and 3 will contribute considerably to cumulative bus transit delays during construction at areas of substantial road closures. For Alternative 4, project mitigation will reduce the project's contribution to the significant cumulative impact and its contribution to cumulative impacts would not be cumulatively considerable.

For passenger and freight rail service, implementation of Mitigation Measure TR-MM#3 will minimize potential delays of passenger and freight rail service during construction to a less-than-considerable level. Operationally, cumulative impacts on passenger and freight rail capacity, service, and operations would be less than significant; consequently, the project alternatives' contributions to cumulative impacts would not be cumulatively considerable.

3.19.6.2 Air Quality and Greenhouse Gases

As described in Section 3.3, Air Quality and Greenhouse Gases, the evaluation of regional air quality at the air basin level and global climate change at the global level is an inherently cumulative approach because criteria pollutant and GHG emissions, once emitted, mix into the atmosphere and affect a larger area than any individual project site. Thus, the regional air quality and global GHG analysis does not consider individual planned projects in the vicinity of the project. Rather, it uses the same thresholds as the project-level thresholds developed by the Bay Area Air Quality Management District (BAAQMD), MBARD, and San Joaquin Valley Air Pollution Control District (SJVAPCD), which are based on projections of future development compared to existing conditions. Criteria pollutant emissions that exceed air quality thresholds under modeled conditions are considered to reflect the cumulative impacts resulting from contributors within the air basins. Exceedance of project-level thresholds indicates that there would be both a project-level and a cumulative impact.

The evaluation of localized air quality impacts from receptor exposure to diesel particulate matter (DPM) and criteria pollutant concentrations considers both project-level and cumulative thresholds, depending on location. As discussed further in this analysis, exceedances of SJVAPCD's and MBARD's project-level cancer and noncancer thresholds constitute a significant cumulative impact. Thus, individual cumulative projects in the vicinity of construction and operational activities in the SJVAPCD and MBARD are not considered, consistent with air district guidance (Siong 2011; Frisbey 2017). The health risk assessment (HRA) in the BAAQMD compares the project's incremental DPM risk and cumulative DPM risks from sources within 1,000 feet of the project to the BAAQMD's cumulative risk thresholds. With respect to localized carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂) concentrations, the analysis adds the increase in project-generated pollutant concentrations to existing cumulative concentrations to estimate the total ambient air pollutant concentration for comparison with the ambient air quality standards, which are cumulative standards. Because existing concentrations of particulate matter (PM) in most of the RSA already exceed the ambient air quality standards, the analysis compares only the incremental project increase in PM concentrations to the applicable significant impact levels (SIL) in these locations.

Resource Study Area

The cumulative RSA for regional air quality effects is the San Francisco Bay Area Air Basin (SFBAAB), North Central Coast Air Basin (NCCAB), and San Joaquin Valley Air Basin (SJVAB). Consistent with the project-level GHG analysis described in Section 3.3, the cumulative RSA for global climate change effects is the state and global atmosphere. The cumulative RSA for localized DPM risks and criteria pollutant concentrations is the construction footprint for each project alternative plus all areas within 1,000 feet of the project footprint.

Cumulative Condition

Air Quality

Regional Impacts

Construction-Related Criteria Pollutants

The SFBAAB and SJVAB are in nonattainment status for the California ambient air quality standards (CAAQS) and national ambient air quality standards (NAAQS) for multiple pollutants as a result of the emissions from past and present projects. The NCCAB currently attains all standards. Table 3.3-7 in Section 3.3, Air Quality and Greenhouse Gases, shows the attainment status of each air basin. Construction and operations of future projects, including HSR, would further contribute to nonattainment of the CAAQS and NAAQS in the SFBAAB and SJVAB. Project features will minimize the potential for the violation of air quality standards in all three air basins, as well as contribution to an existing or projected air quality standard violation in the SFBAAB and SJVAB (AQ-IAMF#1 through AQ-IAMF#6). Furthermore, the Authority will implement additional on-site fugitive dust controls (AQ-MM#1), require and prioritize vehicles and off-road equipment use zero emission or near-zero emission technology (AQ-MM#2), and purchase offsets for reactive organic gases (ROG), nitrogen oxides (NO_x), and PM emissions in the BAAQMD and SJVAPCD, as applicable (AQ-MM#3 and AQ-MM#4).

Operations-Related Criteria Pollutants

Operation of future projects, including the project alternatives, would contribute further to nonattainment of the NAAQS and CAAQS in the SFBAAB and SJVAB. Emission reductions achieved during project operations, however, would help improve regional air quality and cumulative air quality conditions, as discussed further in the following subsections.

Local Impacts

Emissions analysis at the local level entails evaluating whether there would be concentrations of certain criteria pollutants—DPM and fine particulate matter (PM_{2.5}) exhaust—that could affect sensitive receptors within 1,000 feet of construction areas. For CO, NO₂, and SO₂, violations of the CAAQS or NAAQS indicate that there would be both a project-level and a cumulative localized criteria pollutant impact. Existing concentrations of PM₁₀ and PM_{2.5} in most of the RSA already exceed the ambient air quality standards. In these areas, project-generated PM₁₀ and PM_{2.5} in excess of the SIL would result in a significant project-level and cumulative impact. Likewise, exceedances of the SJVAPCD's and MBARD's project-level cancer and noncancer thresholds would constitute a significant cumulative impact. In the SFBAAB, violations of the BAAQMD's cumulative health risk thresholds, which consider DPM sources within 1,000 feet of the project, would constitute a cumulative DPM impact. A discussion of criteria pollutants, construction-related DPM, operations-related CO hot spots, operations-related DPM, and combined construction- and operations-related DPM follows.

Construction-Related Criteria Pollutants

As disclosed in the discussion of Impact AQ#5 in Section 3.3, there are areas throughout the RSA where background concentrations already exceed the PM_{2.5} and PM₁₀ CAAQS and NAAQS. Construction and operations of future projects, including HSR, would increase PM₁₀ and PM_{2.5} emissions, further contributing to existing violations of ambient air quality standards and potentially leading to new violations in areas currently in attainment. Construction of any of the project alternatives would also increase localized NO₂ concentrations above existing levels,

potentially contributing to new violations of the NO₂ NAAQS and CAAQS. Project features will collectively reduce localized criteria pollutant emissions. Specifically, the project will minimize impacts associated with fugitive dust emissions through implementation of a dust control plan and best management practices (BMP) at new concrete batch plants (AQ-IAMF#1, AQ-IAMF#6). Exhaust-related pollutants will be minimized through use of renewable diesel, Tier 4 off-road engines, and model year 2010 or newer on-road engines (AQ-IAMF#3, AQ-IAMF#4, AQ-IAMF#5). Nevertheless, future projects, including HSR, would contribute to existing or create new violations of the PM_{2.5}, PM₁₀, and NO₂ CAAQS and NAAQS, and therefore would result in localized cumulative impacts.

Construction-Related DPM and PM_{2.5} Exhaust

Multiple existing sources and future planned actions located within 1,000 feet of the relocated freight sections and HSR stations would contribute to a cumulative impact for DPM and PM_{2.5} exhaust:

- **Existing sources of DPM and PM_{2.5}**—Multiple stationary, rail, and roadway sources are currently located along the alignment.
- **Planned land use development**—Land use development in the region would increase traffic levels and result in increased vehicle-related emissions along roadways, although, over time, state and federal regulations would reduce the allowed emission rates for new vehicles. Planned development may also generate additional DPM from emergency generators and truck loading bays, as well as DPM during construction of near-term improvements.
- **Future passenger service expansion**—There are proposals from the TAMC to expand passenger train service from Salinas to Gilroy, from the Capitol Corridor Joint Powers Authority to expand existing service between San Jose and Sacramento, and from the San Joaquin Regional Rail Commission to expand existing ACE service from Stockton and Merced to San Jose. In addition, Facebook and San Mateo Transit District are exploring Dumbarton Rail Corridor service, which in the past has included potential service from the East Bay to San Jose, and there have been proposals to add Amtrak Coast Daylight service from Los Angeles to San Francisco. TAMC's Monterey County Rail Extension project and Capitol Corridor's Extension to Salinas have completed environmental review and are funded to start initial service. Environmental compliance for improvements necessary to facilitate expanded Capitol Corridor or Dumbarton Rail service to San Jose has not been completed and funding has not yet been obtained, so those projects are not included in the cumulative analysis. Plans and funding for the Coast Daylight service are uncertain, so it has likewise been excluded from the cumulative analysis.
- **Freight rail service expansion**—Freight rail service may also expand in the future as the economy expands. The exact amount of freight rail transport is difficult to predict. Freight levels depend not only on the overall level of economic activity but also on the specific demand for bulk and oversize commodities that dominate freight carried by rail. As a conservative assessment, analysts assumed that freight would increase in the future at a rate of 3.5 percent per annum (PCJPB 2015) rounded up to 4 percent. This rate is an informal rate that freight operators, such as UPRR, often cite.

A quantitative HRA has not been conducted to estimate future DPM-related health risks to nearby sensitive receptors from cumulative land use development because construction and operations details are not available, and those projects would be responsible for analyzing their contributions. The cumulative HRA, therefore, focuses on ambient concentrations from stationary, rail, and roadway sources.

A cumulative HRA was performed for portions of project construction located within the BAAQMD, consistent with local APCD requirements. As noted above, current MBARD and SJVAPCD guidance calls for evaluating the potential risks from all project emission sources. Emission sources outside the project footprint should not be included in the cumulative assessment. If the project assessment demonstrates that potential health impacts are less than significant, one could conclude that the project would have a less than cumulatively significant

impact (Siong 2011; Frisbey 2017). As disclosed in the discussion of Impact AQ#6 in Section 3.3, project construction in the NCCAB and SJVAB would not exceed the MBARD's or SJVAPCD's project-level health risk thresholds or result in a cumulative impact.

The BAAQMD has developed Google Earth and geographic information system (GIS) files that identify source-specific health risks throughout the SFBAAB. The Authority used these files to screen the HSR alignment to select one area per subsection to analyze cumulative health risks. Note that in some locations, two areas were analyzed to capture the greatest ambient cancer risk and PM_{2.5} concentration, because these conditions occur at different locations. Total cumulative health risks at the representative locations in each subsection were calculated by adding the sources of background health risks to the health risk and hazard impacts of project construction. Table 3.19-1 shows the maximum cumulative cancer risk, chronic health hazard, and PM_{2.5} concentrations at representative locations in the subsections for each alternative. Refer to Volume 2, Appendix 3.3-A for more detailed modeling information.

Table 3.19-1 Cumulative Cancer and Noncancer Health Risks from Construction in the Bay Area Air Quality Management District

Subsection/ Source	Cancer (per million)				Chronic Hazard Index (unitless)				PM _{2.5} (µg/m ³)			
	Alternative											
	1	2	3	4	1	2	3	4	1	2	3	4
San Jose Diridon Station Approach												
Ambient risk	51	51	51	51	<1	<1	<1	<1	51.6	51.6	51.6	51.6
HSR construction ¹	4	4	4	4	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Total	54	54	54	54	<1	<1	<1	<1	<u>51.6*</u>	<u>51.6*</u>	<u>51.6*</u>	<u>51.6*</u>
Monterey Corridor												
Ambient risk	198	198	198	198	<1	<1	<1	<1	16.8	16.8	16.8	16.8
HSR construction ¹	5	5	5	5	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Total	<u>203*</u>	<u>203*</u>	<u>203*</u>	<u>203*</u>	<1	<1	<1	<1	<u>16.8*</u>	<u>16.8*</u>	<u>16.8*</u>	<u>16.8*</u>
Morgan Hill and Gilroy												
Ambient risk	68	68	156	68	<1	<1	1	<1	0.4	29.6	0.8	29.6
HSR construction ¹	3	5	9	5	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Total	71	73	<u>166*</u>	73	<1	<1	1	<1	0.4	<u>29.6*</u>	<u>0.8*</u>	<u>29.6*</u>
Pacheco Pass												
Ambient risk	<1	<1	<1	<1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
HSR construction ¹	1	1	1	1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Total	1	1	1	1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Threshold²	100	100	100	100	10	10	10	10	0.8	0.8	0.8	0.8

¹ Presents the maximum health risk from HSR construction. The amount of construction effort for the design variants would be approximately the same as the alternatives without the DDV and TDV and thus the amount of construction period TAC emissions would be approximately the same. Under Alternative 4 with the DDV, the DDV would be constructed closer to a few sensitive receptors east of the construction area north of the SAP Center. However, these receptors are farther from the construction footprint than the maximally impacted receptor under Alternative 4 without the DDV, which is shown in this table. As discussed in the text, these risks do not exceed BAAQMD's project-level thresholds.

² BAAQMD has adopted both project- and cumulative-level thresholds for health risks. BAAQMD's cumulative thresholds are used in this analysis. Exceedances of BAAQMD's cumulative thresholds are shown in underline with an asterisk (*).

PM_{2.5} = particulate matter 2.5 microns or less in diameter
 µg/m³ = micrograms per cubic meter

As shown in Table 3.19-1, existing ambient cancer risk at the representative locations in the Monterey Corridor and Morgan Hill and Gilroy (Alternative 3 only) Subsections are significant because of the contributions of past and present projects. Existing ambient PM_{2.5} concentrations at the representative locations in the San Jose to Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections are also significant. Emissions from existing and future projects, including HSR construction, would result in a significant cumulative impact in these subsections. Ambient existing cancer risk and PM_{2.5} concentrations are not significant in the Pacheco Pass Subsection.

Operations-Related CO Hot-Spots

Background traffic volumes will increase because of future growth and new development projects in the RSA, as discussed earlier in this analysis. Additionally, project operations would attract additional motor vehicles to new and expanded transit stations within the RSA. While additional traffic associated with the project alternatives and other existing and future projects may increase CO concentrations, cumulative CO effects would not occur because the additional traffic created by the project in conjunction with background traffic volumes would not result in CO concentrations in excess of the NAAQS or CAAQS and therefore would not result in a significant cumulative impact (see Table 3.3-24 in Section 3.3).

Operations-Related DPM and PM_{2.5} Exhaust

The project alternatives would reposition existing tracks used by UPRR freight trains. Redistributing or moving existing freight traffic would result in increased DPM concentrations at certain receptor locations and in corresponding decreases at other locations. The BAAQMD’s Google Earth and GIS files were used to screen the relocated freight alignment and select one area per relocated freight section to analyze cumulative health risks. The selected areas were chosen based on their proximity to residential receptors and the freight alignment, as well as overall density of existing sources. These areas represent the most severely affected receptor locations, or the receptors that would experience the highest potential health risk. Total cumulative health risks at the representative location in each freight section were calculated by adding the background health risk sources to the health risk and hazard impacts for the relocated freight service.

Table 3.19-2 shows cumulative cancer risk, chronic health hazard, and PM_{2.5} concentrations at representative locations along the relocated freight sections.

Table 3.19-2 Cumulative Cancer and Noncancer Health Risks from Freight Relocation

General Location	Cancer (per million)	Chronic Hazard Index (unitless)	PM2.5 (µg/m3)
Near Monterey Road and Blanchard Road (Alternatives 1 through 3)			
Ambient risk	34	<1	0.3
Incremental project contribution ¹	(4)	<0	<0.0
Total	30	<1	0.3
Between Monterey Road and Crowner Avenue (Alternatives 1 through 3)			
Ambient risk	14	<1	0.1
Incremental project contribution ¹	<0	<0	<0.0
Total	14	<1	0.1
Near Monterey Road and California Avenue (Alternatives 1 through 3)			
Ambient risk	25	<1	0.1
Incremental project contribution ¹	1	<0	<0.0
Total	26	<1	0.1

General Location	Cancer (per million)	Chronic Hazard Index (unitless)	PM2.5 (µg/m3)
Near Monterey Road and Ronan Avenue (Alternatives 1 through 3)			
Ambient risk	17	<1	0.3
Incremental project contribution ¹	<0	<0	<0.0
Total	16	<1	0.3
Near Monterey Road and Leavesley Road (Alternatives 1 through 3)			
Ambient risk	14	<1	3.3
Incremental project contribution ¹	<0	<0	<0.0
Total	15	<1	<u>3.3*</u>
Near Monterey Road and 1st Street (Alternatives 1 through 3)			
Ambient risk	15	<1	0.2
Incremental project contribution ¹	2	<0	<0.0
Total	16	<1	0.2
Near Monterey Road and W 10th Street (Alternatives 1 through 3)			
Ambient risk	4	<1	<0.1
Incremental project contribution ¹	1	<0	<0.0
Total	5	<1	<0.1
Near Pacheco Court and Frazier Lake Road (Alternative 3 only)			
Ambient risk	<1	<1	<0.1
Incremental project contribution ¹	5	<0	<0.0
Total	5	<1	<0.1
Near Chestnut Street and Asbury Street (Alternative 4 only)			
Ambient risk	100	<1	51.7
Increment Project Contribution ¹	(17)	<0	<0.0
Total	83	<1	<u>51.7*</u>
Near Harrison Street and Fuller Ave (Alternative 4 only)			
Ambient risk	61	<1	0.8
Incremental project contribution ¹	(4)	<0	<0.0
Total	57	<1	<u>0.8*</u>
Near Cross Way and Northern Road (Alternative 4 only)			
Ambient risk	94	<1	2.4
Incremental project contribution ¹	(2)	<0	<0.0
Total	96	<1	<u>2.4*</u>
End of Promme Court (Alternative 4 only)			
Ambient risk	39	<1	0.5
Incremental project contribution ¹	(3)	<0	<0.0

General Location	Cancer (per million)	Chronic Hazard Index (unitless)	PM2.5 (µg/m3)
Total	35	<1	0.5
Near Prindiville Road and Urshan Way (Alternative 4 only)			
Ambient risk	31	<1	0.3
Incremental project contribution ¹	(1)	<0	<0.0
Total	30	<1	0.3
Near Madrone Ave and Dougherty Ave (Alternative 4 only)			
Ambient risk	14	<1	0.1
Incremental project contribution ¹	<0	<0	<0.0
Total	14	<1	0.1
Near Butterfield Blvd and E Dunne Ave (Alternative 4 only)			
Ambient Risk	12	<1	0.2
Incremental project contribution ¹	(1)	<0	<0.0
Total	11	<1	0.2
End of Sister City Way (Alternative 4 only)			
Ambient risk	4	<1	1.2
Incremental project contribution ¹	(1)	<0	<0.0
Total	4	<1	1.2
Near Garlic Farms Dr and Travel Park Cir (Alternative 4 only)			
Ambient risk	22	<1	0.1
Incremental project contribution ¹	0	<0	<0.0
Total	22	<1	<0.1
Near Bolsa Rd (Alternative 4 only)			
Ambient risk	3	<1	0.1
Incremental project contribution ¹	<0	<0	<0.0
Total	3	<1	<0.1
Near West Julian St and North Montgomery St (Alternative 4 only)²			
Ambient risk	100	<1	0.6
Increment project contribution ¹	(13)	<0	<0.0
Total	87	<1	0.6
Threshold²	100	10	0.8

¹ Presents the maximum incremental contribution from the relocated freight service, relative to existing conditions. There would be no changes in operational emissions or locations with the TDV.

² The track shift near West Julian Street and North Montgomery Street would only occur under Alternative 4 with the DDV.

³ BAAQMD has adopted both project- and cumulative-level thresholds for health risks. BAAQMD's cumulative thresholds are used in this analysis. (Parentheses) indicate negative values

Exceedances of BAAQMD's cumulative thresholds are shown in underline with an asterisk (*).

PM_{2.5} = particulate matter 2.5 microns or less in diameter

µg/m³ = micrograms per cubic meter

< = less than

The San Jose Diridon and Gilroy Stations and the MOWF would have emergency generators for use in the event of a power outage. The MOWF would also use diesel-powered off-road equipment, vehicles, and locomotives to support maintenance and repair activities. The new East Gilroy Station would serve diesel-powered buses.¹⁰ Table 3.19-3 shows the maximum cumulative health risks and PM_{2.5} concentrations near HSR stations and the MOWF.¹¹

Table 3.19-3 Cumulative Cancer and Noncancer Health Risks from Station and MOWF Operation

Facility	Cancer (per million)	Chronic Hazard Index (unitless)	PM _{2.5} (µg/m ³)
San Jose Diridon Station			
Ambient risk	68	<1	0.5
Incremental project contribution ¹	<10 ²	<1 ³	<0.1
Total	<78	<1	0.5
Downtown Gilroy Station			
Ambient risk	18	<1	0.2
Incremental project contribution ¹	<10 ²	<1 ³	<0.1
Total	<28	<1	0.2
East Gilroy Station			
Ambient risk	5	<1	0.1
Incremental project contribution ¹	<1	<1	<0.1
Total	15	<1	0.1
MOWF (East Gilroy Location)			
Ambient risk	1	<1	<0.1
Incremental project contribution ^{1,3}	3	<1	<0.1
Total	4	<1	<0.1
Threshold⁴	100	10	0.8

¹ Presents the maximum incremental project contribution (project minus existing). These risks do not exceed BAAQMD's project-level thresholds. There would be no changes in operational station or MOWF health risks with or without the DDV or TDV.

² A project-specific cancer risk and chronic health hazard assessment was not conducted since BAAQMD Regulation 2, Rule 5, Section 302, prohibits generator use if they would result in cancer or acute hazard impacts in excess of BAAQMD's health risk thresholds of significance.

³ There are no receptors within 1,000 feet of the South Gilroy MOWF. Accordingly, a health risk assessment is not required, consistent with BAAQMD (2017) guidance.

⁴ BAAQMD has adopted both project- and cumulative-level thresholds for health risks. BAAQMD's cumulative thresholds are used in this analysis. Exceedances of BAAQMD's cumulative thresholds are shown in underline with an asterisk (*).

PM_{2.5} = particulate matter 2.5 microns or less in diameter

µg/m³ = micrograms per cubic meter

< = less than

¹⁰ Bus service levels at the existing San Jose Diridon and Downtown Gilroy Stations are to remain constant into the future given that no operator has a funding plan to deliver more service. Accordingly, there would be no change in risk relative to existing conditions.

¹¹ There are no receptors within 1,000 feet of the South Gilroy MOWF. Accordingly, a health risk assessment is not required, consistent with BAAQMD (2017) guidance.

As shown in Table 3.19-2, total cumulative cancer and noncancer chronic health hazards to sensitive receptors located near the relocated freight service would not exceed the BAAQMD's health risk thresholds. However, cumulative PM_{2.5} exposure at certain locations is above the BAAQMD's threshold of 0.8 µg/m³. The exceedances are the result of existing sources in the vicinity of the freight tracks. Freight relocation that would occur under all alternatives would reduce PM_{2.5} concentrations at these locations relative to existing conditions. As shown in Table 3.19-3, total cumulative health risks to sensitive receptors located near the HSR stations and the MOWF would not exceed the BAAQMD's health risk thresholds.

Combined Construction- and Operations-Related DPM and PM_{2.5} Exhaust

Individuals currently residing near the project corridor are exposed to a certain amount of pollution (representative ambient risks shown in Table 3.19-1 through Table 3.19-3). If such individuals remain in the same location during and after construction, they would be exposed to project-generated DPM during construction and then any incremental changes in risk from project-generated DPM during operations. The Authority conservatively estimated the potential lifetime risks to long-term residents that may be present during both construction and operations. Table 3.19-4 shows the results of the analysis and compare the risks to the BAAQMD's cumulative thresholds. Because there would be no freight relocation or station operations in the Pacheco Pass Subsection, there is no potential for combined risk from construction and operations; accordingly, the subsection is not included in the table.

More than one cumulative scenario may be shown in Table 3.19-4 in subsections where receptors at different locations may be exposed to a particular combination of construction and operational project risks. For example, in the San Jose Diridon Station Approach Subsection under Alternative 4, receptors near the San Jose Diridon Station may be exposed to emissions from construction near the station and long-term station operations. Farther north, a different receptor may be exposed to emissions from construction and freight relocation. Accordingly, two cumulative scenarios are assessed for Alternative 4 in the San Jose Diridon Station Approach Subsection.

Table 3.19-4 Cumulative Cancer and Noncancer Health Risks from Combined Construction and Operations in the Bay Area Air Quality Management District

Subsection/Source	Cancer (per million)				Chronic Hazard Index (unitless)				PM _{2.5} (µg/m ³)			
	Alternative	1	2	3	4	1	2	3	4	1	2	3
San Jose Diridon Station Approach (Cumulative Scenario 1)												
Ambient risk	68	68	68	68	<1	<1	<1	<1	0.5	0.5	0.5	0.5
HSR construction ¹	4	4	4	5	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Station operations ²	<10	<10	<10	<10	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Total	<82	<82	<82	<83	<1	<1	<1	<1	0.5	0.5	0.5	0.5
San Jose Diridon Station Approach (Cumulative Scenario 2)												
Ambient	(4)	(4)	(4)	100	(4)	(4)	(4)	<1	(4)	(4)	(4)	51.7
HSR construction ¹	(4)	(4)	(4)	5	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1
Freight relocation ³	(4)	(4)	(4)	(17)	(4)	(4)	(4)	<0	(4)	(4)	(4)	<0.0
Total	(4)	(4)	(4)	88	(4)	(4)	(4)	<1	(4)	(4)	(4)	51.7*

Subsection/Source Alternative	Cancer (per million)				Chronic Hazard Index (unitless)				PM _{2.5} (µg/m ³)			
	1	2	3	4	1	2	3	4	1	2	3	4
Monterey Corridor												
Ambient risk	34	34	34	94	<1	<1	<1	<1	0.3	0.3	0.3	2.4
HSR construction ¹	5	5	5	6	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Freight relocation ³	(4)	(4)	(4)	(2)	<0	<0	<0	<0	<0.0	<0.0	<0.0	<0.1
Total	35	35	35	98	<1	<1	<1	<1	0.3	0.3	0.3	<u>2.4*</u>
Morgan Hill and Gilroy (Cumulative Scenario 1)												
Ambient risk	18	18	5	18	<1	<1	<1	<1	0.2	0.2	0.1	0.2
HSR construction ¹	3	5	9	3	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1
Station operations	<10 ²	<10 ²	<1	<10 ²	<1 ²	<1 ²	<1	<1 ²	<0.1 ²	<0.1 ²	<0.1	<0.1 ²
Freight relocation ³	1	1	5	0	<1	<1	<1	0	<0.1	<0.1	<0.1	0
Total	<32	<34	19	31	<1	<1	<1	<1	0.2	0.2	0.1	0.2
Morgan Hill and Gilroy (Cumulative Scenario 2)												
Ambient risk	(4)	(4)	1	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1	(4)
HSR construction ¹	(4)	(4)	9	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1	(4)
MOWF operations	(4)	(4)	3	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1	(4)
Freight relocation ³	(4)	(4)	5	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1	(4)
Total	(4)	(4)	13	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1	(4)
Morgan Hill and Gilroy (Cumulative Scenario 3)												
Ambient risk	(4)	(4)	(4)	68	(4)	(4)	(4)	<1	(4)	(4)	(4)	29.6
HSR construction ¹	(4)	(4)	(4)	3	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1
Freight relocation ³	(4)	(4)	(4)	<1	(4)	(4)	(4)	<1	(4)	(4)	(4)	<0.1
Total	(4)	(4)	(4)	71	(4)	(4)	(4)	<1	(4)	(4)	(4)	<u>29.7*</u>
Threshold²	100	100	100	100	10	10	10	10	0.8	0.8	0.8	0.8

¹ BAAQMD has adopted both project- and cumulative-level thresholds for health risks. BAAQMD's cumulative thresholds are used in this analysis. The amount of construction effort for the design variants would be approximately the same as the alternatives without the DDV and TDV and thus the amount of construction period TAC emissions would be approximately the same. Under Alternative 4 with the DDV, the DDV would be constructed closer to a few sensitive receptors east of the construction area north of the SAP Center. However, these receptors are farther from the construction footprint than the maximally impacted receptor under Alternative 4 without the DDV, which is shown in this table. Note that risks from neither construction nor operations exceed the BAAQMD's project-level thresholds.

² A project-specific cancer risk and chronic health hazard assessment was not conducted since BAAQMD Regulation 2, Rule 5, Section 302, prohibits generator use if they would result in cancer or acute hazard impacts in excess of BAAQMD's health risk thresholds of significance.

³ Presents the maximum incremental contribution from the relocated freight service, relative to existing conditions.

⁴ Analysis scenario does not exist under the alternative.

PM_{2.5} = particulate matter 2.5 microns or less in diameter; µg/m³ = micrograms per cubic meter
Exceedances of BAAQMD's cumulative thresholds are shown in underline with an asterisk (*).

Global Climate Change

Climate change occurs globally and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors), which are primarily pollutants of regional and local concern. Given their long atmospheric lifetimes, GHGs emitted by sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to produce global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Therefore, GHG impacts are inherently cumulative.

Global GHG emissions due to population growth and economic growth continue to increase which is worsening the effects of global climate change. While there are a myriad of efforts at the local, state, national, and international level to promote the reduction of GHG emissions overall, current projections are that these emissions will still increase for the following decades adding to the current GHG concentrations in the atmosphere.

The HSR project will result in a net reduction of GHG emissions, with the project's construction emissions offset in a short period of time by operational emissions and with ongoing substantial reduction in GHG emissions over the operational lifetime of the HSR project. While this will help to reduce GHG emissions, the project's GHG emission reductions would not, by themselves offset projected global GHG emission increases in the next few decades.

Contribution of the Project Alternatives

Air Quality

Regional Impacts

Construction-Related Criteria Pollutants

Construction of any of the four alternatives would result in ROG and NO_x emissions that would exceed the BAAQMD's thresholds and in NO_x, CO, and PM₁₀ emissions that would exceed SJVAPCD's thresholds. None of the alternatives would exceed MBARD's PM₁₀ threshold. Table 3.19-5 shows the highest annual and daily emissions for each alternative within the jurisdiction of the BAAQMD, MBARD, and SJVAPCD.

ROG and NO_x emissions would be offset in the BAAQMD. Within the SJVAPCD, all regional pollutants (ROG, NO_x, PM₁₀, and PM_{2.5}) would be offset pursuant to the Authority's memorandum of understanding with the SJVAPCD. Because this purchase of offsets would reduce emissions to below air district thresholds (or net zero), construction of any of the project alternatives would not contribute to a significant cumulative impact of regional exceedances of ROG, NO_x, or PM₁₀ during construction.

Pursuant to SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts*, emissions offsets cannot be used to mitigate CO impacts. Accordingly, CO emissions would remain above SJVAPCD's threshold even after implementation of all feasible mitigation. Exceedances of the air district thresholds constitute a significant cumulative regional air quality impact; therefore, the project would considerably contribute to the regional cumulative air quality impact for CO during construction.

Table 3.19-5 Summary of Highest Annual and Daily Emissions from Construction of Any of the Project Alternatives

Alternative	Highest tons per year estimate ¹										Highest maximum pounds per day estimate ^{1,2}									
	VOC	NO _x	CO ³	SO ₂	PM ₁₀			PM _{2.5}			VOC	NO _x	CO	SO ₂	PM ₁₀			PM _{2.5}		
					Exhaust	Dust	Total ³	Exhaust	Dust	Total ³					Exhaust	Dust	Total ³	Exhaust	Dust	Total ³
Bay Area Air Quality Management District																				
Alt 1	7	106*	245	1	1	65	66	1	14	15	64*	1,158*	2,216	8	12	590	596	12	128	134
Alt 2	9	155*	304	1	1	92	93	1	21	21	77*	1,334*	2,630	9	13	779	787	13	177	184
Alt 3	8	114*	293	1	1	68	69	1	15	15	73*	1,064*	2,586	8	12	616	623	12	135	141
Alt 4	8	156*	272	1	1	95	95	1	22	23	74*	1,731*	2,358	9	13	824	831	12	188	195
Monterey Bay Air Resources District																				
Alt 1	1	7	19	<1	<1	4	4	<1	2	2	5	93	176	1	1	46	46	1	10	10
Alt 2	1	12	26	<1	<1	6	7	<1	3	3	8	179	244	1	1	65	66	1	15	15
Alt 3	1	6	22	<1	<1	4	4	<1	2	2	5	101	181	1	1	34	35	<1	7	8
Alt 4	1	14	25	<1	<1	8	8	<1	4	4	7	200	229	1	1	77	78	1	18	19
San Joaquin Valley Air Pollution Control District																				
Alt 1	6	56*	226	1	1	23	24	1	11	11	51	450*	1,808*	4	5	184	189*	5	41	45
Alt 2	6	56*	226	1	1	23	24	1	11	11	51	450*	1,808*	4	5	184	189*	5	41	45
Alt 3	6	56*	226	1	1	23	24	1	11	11	51	450*	1,808*	4	5	184	189*	5	41	45
Alt 4	6	56*	226	1	1	23	24	1	11	11	51	450*	1,808*	4	5	184	189*	5	41	45

¹ Emissions results include incorporation of AQ-IAMF#1 through AQ-IAMF#6. The amount of construction effort for the design variants would be approximately the same as the alternatives without the DDV and TDV and thus the amount of construction period criteria pollutant emissions would be approximately the same. Exceedances of federal *de minimis* levels and/or air district CEQA thresholds are shown in **bolded underline with an asterisk (*)**.

² Presents the highest emissions estimate during a single day of construction in each year in the BAAQMD and MBARD, based on concurrent construction activities. Within SJVAPCD, presents the highest average emissions estimate during a single day of construction in each year.

³ Total PM₁₀ and PM_{2.5} emissions consist of exhaust and fugitive dust emissions. Annual values may not add due to rounding. Daily results may not add because the table presents maximum emissions results for each individual pollutant component. For example, the maximum PM exhaust emissions may not occur on the same day as the maximum total dust emissions.

CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; SO₂ = sulfur dioxide; VOC = volatile organic compounds

Operations-Related Criteria Pollutants

As disclosed in the discussion of Impact AQ#9 in Section 3.3, HSR service would help the region attain air quality standards and plans by reducing the amount of regional vehicular traffic and providing an alternative mode of transportation. Criteria pollutant emissions from additional electricity required to power the HSR system, as well as from operation of the stations and maintenance facilities, would increase relative to the 2015 Existing and 2029 and 2040 No Project conditions. Fugitive dust emissions would also increase as a result of train movement over the track. However, the project would result in emissions reductions from on-road vehicles and aircraft relative to the 2015 Existing and 2029 and 2040 No Project conditions. These emissions benefits would be achieved equally by all four alternatives through reductions in single-occupancy vehicle trips and aircraft activity; with a greater number of people traveling on the HSR system, fewer vehicle and aviation miles would be necessary. Ultimately, the criteria pollutant reductions achieved by changes in on-road vehicles and aircraft activity would more than offset the emissions increase from project operations (electricity, train movement, stations, and maintenance facilities). Because the project would help to decrease emissions of criteria pollutants and precursors (e.g., ROG, NO_x), project operations would result in a net benefit to regional air quality and would not result in a contribution to significant cumulative air quality impacts.

Local Impacts

Construction-Related Criteria Pollutants

As disclosed in the discussion of Impact AQ#5 in Section 3.3, construction activities would lead to new violations of the PM₁₀ and PM_{2.5} CAAQS and NAAQS, as well as potentially contribute to existing PM violations through exceedances of the SIL. Alternatives 1, 2, and 4 would also violate the 1-hour NO₂ NAAQS and CAAQS. Because pollutant concentrations resulting from construction of any of the project alternatives would violate the CAAQS and NAAQS, these activities would contribute to a localized significant cumulative air quality impact.

Construction-Related DPM and PM_{2.5} Exhaust

The combined effects of the electrified passenger rail service, displacement of VMT and air travel, and motor vehicle and stationary source turnover represent the new emissions paradigm to which receptors would be exposed. Although there are areas of the RSA with greater existing health risks (Table 3.19-1), the addition of HSR service would achieve health risk reductions in the RSA, constituting a localized air quality benefit. Nevertheless, combined total cumulative cancer risks and noncancer impacts on sensitive receptors located near the project footprint would exceed the BAAQMD's thresholds. The exceedances are primarily the result of existing ambient sources, as the project's relative contribution to the exceedances of the screening threshold is less than the BAAQMD's project-level health thresholds and is minor compared to health risks from existing sources. Nevertheless, the project alternatives would contribute to the existing significant cumulative impact.

Operational-Related CO Hot-Spots

As previously discussed, there would be no significant cumulative impact with respect to operations-related CO hot-spots. Additional traffic created by the project would not result in CO concentrations in excess of the NAAQS or CAAQS (see Table 3.3-24 in Section 3.3). Therefore, this impact would be less than significant.

Operations-Related DPM and PM_{2.5} Exhaust

As shown in Table 3.19-2, total cumulative cancer and noncancer chronic health hazards to sensitive receptors located near the relocated freight service would not exceed the BAAQMD's health risk thresholds. However, cumulative PM_{2.5} exposure at certain locations would be above the BAAQMD's threshold of 0.8 µg/m³. The exceedances are the result of existing sources in the vicinity of the freight tracks, as the freight relocation would reduce PM_{2.5} concentrations at these locations relative to existing conditions. Accordingly, the project alternatives would not contribute

to the existing significant impact. As shown in Table 3.19-3, total cumulative health risks to sensitive receptors located near the HSR stations and the MOWF would not exceed the BAAQMD's health risk thresholds. Under Alternative 4 with the DDV, the DDV would operate closer to a few sensitive receptors. The positional shift relative to proposed project changes the 1,000-foot zone of influence for the cumulative health risk assessment such that there would be two additional stationary sources within 1,000 feet of the residences most affected by the track shift. Based on BAAQMD's online database, the background cancer risks from these sources are below BAAQMD cumulative threshold of 100 per million cancer risk. Moreover, when added to other stationary sources and roadway values within the 1,000-foot analysis radius, total combined cumulative risk would be less than 100 per million. Thus, cumulative health risk to the most affected residences under Alternative 4 with the DDV would still be less than the BAAQMD cumulative threshold so would present no significant impact under CEQA, which is the same conclusion as Alternative 4 without the DDV.

Combined Construction- and Operations-Related DPM and PM_{2.5} Exhaust

As shown in Table 3.19-4, total cumulative health risks during construction and long-term operations would not exceed BAAQMD's thresholds at locations where a single receptor could be located during both construction and operations. Cumulative PM_{2.5} exposure would exceed BAAQMD's threshold in all subsections under Alternative 4. The exceedances are primarily the result of existing sources in the vicinity of the freight tracks, as the freight relocation would either result in minimal PM_{2.5} (<0.1 µg/m³) or reduce PM_{2.5} concentrations at these locations relative to existing conditions. Nevertheless, the project alternatives would contribute to the existing significant impact at those locations where the project would increase PM_{2.5} concentrations.

Global Climate Change

Construction of any of the project alternatives would result in a one-time increase in GHG emissions. However, project operations would decrease overall GHG emissions by reducing vehicle and aircraft trips and would also result in a net reduction in CO₂ emissions, as disclosed in the discussion of Impact AQ#17 in Section 3.3. This reduction in GHG emissions would more than offset the increase in GHG emissions associated with construction of project facilities. The emissions associated with project construction would be offset in 8 to 14 months of train operations because of reduced passenger vehicle travel on roadways.

Total amortized GHG construction emissions for the project are estimated to be between 14,870 and 20,043 metric tons CO₂ equivalent per year, with Alternative 4 generating the most emissions, and Alternative 1 generating the least. Most emissions would occur in the BAAQMD (58 percent to 65 percent), followed by SJVAPCD (28 percent to 37 percent), and MBARD (4 percent to 7 percent). Because operations-related emission reductions are tied to ridership, and ridership is assumed to be the same under all four alternatives, GHG reductions achieved by long-term project operations would not differ among the alternatives. Consequently, the overall GHG effects (construction plus operations resulting in net reduction) would therefore be consistent with the state's long-term GHG reduction trajectory. Thus, the project would not result in net increases of direct or indirect GHG emissions and would not conflict with any applicable plans to reduce GHGs. Therefore, the HSR system is anticipated to result in a net cumulative GHG reduction.

CEQA Conclusion

Air Quality

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant regional cumulative impact with respect to ROG, NO_x, and PM₁₀ because construction activities would exceed air district thresholds. The project alternatives' contribution to this significant cumulative impact would not be cumulatively considerable because purchase of offsets through project-level mitigation will offset ROG, NO_x, and PM emissions to below air district thresholds or net zero. Therefore, CEQA does not require any further mitigation.

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant regional cumulative impact with respect to CO because construction activities would exceed the SJVAPCD's threshold. The project alternatives' contribution to this significant cumulative impact would be cumulatively considerable because CO cannot be offset. Therefore, CO emissions would remain above the SJVAPCD's CEQA threshold even after implementation of all feasible mitigation. No further mitigation is available to address this cumulative impact.

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact with respect to localized NO₂, PM_{2.5}, and PM₁₀. The project alternatives' contribution to this significant cumulative impact would be cumulatively considerable because of new or worsened violations of the ambient air quality standards even after implementation of all feasible mitigation. No further mitigation is available to address this cumulative impact.

The combined effects of the electrified passenger rail service, displacement of VMT and air travel, and motor vehicle and stationary source turnover represent the new emissions paradigm to which receptors would be exposed. Although there are areas of the RSA with greater existing health risks, the addition of HSR service would achieve health risk reductions in the RSA, constituting a localized air quality benefit. Nevertheless, combined total cumulative cancer risks and noncancer impacts on sensitive receptors near the project footprint would exceed the BAAQMD's thresholds, resulting in a significant cumulative impact. The project alternatives' contribution to this cumulative impact during construction would be cumulatively considerable. The Authority would coordinate with BAAQMD to identify if there are feasible additional measures consistent with the HSR project that may lower some of the cumulative health risks in areas with existing cumulative health risks above cumulative thresholds and where the HSR project would contribute in a limited way to those risks. This may result in lowering of some of the cumulative health risks identified, but the feasibility and effectiveness of any such measures are unknown at this time and not presumed for the purposes of CEQA determinations.

Project operations, in combination with planned projects in the cumulative RSA, would not result in local cumulative impacts with respect to CO hot spots. CO hot spots are typically observed at heavily congested roadway intersections where a substantial number of gasoline-powered vehicles idle for prolonged periods throughout the day; however, modeling conducted at five intersections with the highest traffic volumes and worst congestion shows that CO concentrations at these intersections would not be in excess of the CAAQS and NAAQS. There would be no cumulative impact since the cumulative condition would not result in CO concentrations in excess of the NAAQS or CAAQS; therefore, CEQA does not require mitigation.

Project operations, in combination with planned projects in the cumulative RSA, would result in a local significant cumulative impact with respect to PM_{2.5} because local concentrations at sensitive receptors near freight realignments would exceed the BAAQMD's threshold. The project's contribution to this significant cumulative impact would not be cumulatively considerable because the project would reduce PM_{2.5} concentrations relative to existing conditions. Accordingly, the freight realignments would not contribute any additional risk to the existing significant impact. Similarly, the project would not contribute to a new long-term cumulatively considerable impact as health risks from the HSR stations and the MOWF, in combination with planned projects in the cumulative RSA, would not exceed the BAAQMD's health risk thresholds. Therefore, CEQA does not require mitigation.

Combined project construction and operations, in combination with planned projects in the cumulative RSA, would result in a local significant cumulative health impact because local risks and PM_{2.5} concentrations at sensitive receptors would exceed the BAAQMD's thresholds. The project's contribution to this significant cumulative impact would be cumulatively considerable. The Authority would coordinate with BAAQMD to identify if there are feasible additional measures consistent with the HSR project that may lower some of the cumulative health risks in areas with existing cumulative health risks above cumulative thresholds and where the HSR project would contribute in a limited way to those risks.

Global Climate Change

Past, present, and future projects cumulatively contribute to GHG impacts. Although construction of any of the project alternatives would result in a temporary increase in GHG emissions, project operations would decrease overall GHG emissions by reducing vehicle and aircraft trips, offsetting the increase in GHG emissions associated with project construction in short order and resulting in substantial GHG emissions reductions over the lifetime of the HSR project. The contribution of the project to cumulative GHG impacts would not be cumulatively considerable; therefore, CEQA does not require mitigation.

3.19.6.3 Noise and Vibration

Resource Study Area

This cumulative analysis utilizes the same RSAs for noise and vibration as those described in Section 3.4, Noise and Vibration, because they are sufficiently broad to cover the area in which the potential noise and vibration impacts of the project alternatives, in combination with past, present, and future projects, could result in cumulative impacts. The noise RSA extends approximately 2,500 feet from the project alternatives' centerlines and includes all sensitive receptors potentially exposed to noise impacts.

Cumulative Condition

Noise

Present activities that contribute to the baseline ambient noise environment of the cumulative RSA include Caltrain passenger trains, other passenger trains, and freight trains. Additionally, traffic on roadways throughout the cumulative RSA, as well as aircraft, local community noise sources, and agricultural and recreational hunting activities in the San Joaquin Valley Subsection along Henry Miller Road contribute to the baseline ambient noise environment. Future population growth along the project extent, especially the growth anticipated in San Jose, Morgan Hill, and Gilroy, will cause increased traffic in the cumulative RSA and increased operations at nearby airports, resulting in increased noise. Little or no development is anticipated in the Pacheco Pass Subsection; consequently, the ambient noise environment in this area is anticipated to remain stable within 1 or 2 A-weighted decibels (dBA) over time. Some of the planned developments listed in Appendix 3.19-A could add localized noise increases as a result of increased traffic associated with those developments.

Appendix 3.19-B lists the transportation projects that would be undertaken in the cumulative RSA. The planned rail and transit projects, including HSR construction and operations, would be most likely to contribute to cumulative noise impacts because they would generate the most additional noise exposure. Some roadway projects could also cause cumulative impacts where changes in traffic would occur near sensitive receptors in the cumulative RSA.

Rail and Transit

For the cumulative noise impact analysis for 2029 and 2040, analysts evaluated the changes as a result of project operations and the PCEP, as well as anticipated changes in passenger and freight rail operations in the project extent. Existing passenger and freight rail operations include Caltrain (which accounts for most of the existing rail operations), ACE, UPRR freight operations (which occur mostly at nighttime), and Amtrak Capitol Corridor and Coast Starlight passenger train service. Volume 2, Appendix 3.4-A quantifies the existing daily train operations, as well as the projected 2029 and 2040 train operations. Compared to existing conditions, train operations in 2029 and 2040, as well as associated noise levels, would be expected to increase substantially to accommodate growth and because of the introduction of several new planned passenger rail services in the cumulative RSA—the Coast Daylight, the TAMC Rail Extension, and the BART Silicon Valley Santa Clara Extension. The Authority modeled noise level changes associated with changes in passenger and freight operations in 2029 and 2040 in accordance with Federal Transit Administration (FTA) methods and incorporated this analysis into the 2029 and 2040 No Project conditions and the 2029 and 2040 Plus Project cumulative conditions.

Planned rail and transit projects most likely to cause cumulative noise impacts in concert with the HSR project include the Caltrain PCEP, the ACEforward project, the Amtrak Capitol Corridor Extension to Salinas, the Amtrak Coast Daylight project, and the BART Silicon Valley Santa Clara Extension project. Additionally, the cumulative noise analysis included projected increases in rail transit operations for the Amtrak Capitol Corridor and Coast Starlight service, as well as future growth of freight operations. These projects would occur in the more populated areas—San Jose, Morgan Hill, and Gilroy—in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. HSR is the only planned rail or transit project in the Pacheco Pass and San Joaquin Valley Subsections.

Additional rail or transit projects that could combine with the project to cause cumulative noise impacts include the El Camino Real BRT Improvements project, the Mineta San Jose International Airport People Move project, the Caltrain Double-Track Segments between San Jose and Gilroy project, and the Regional Transit–Gilroy Caltrain project. The cumulative noise effects of these projects were not analyzed quantitatively because potential noise increases generated by them would be more localized than the increases associated with the projects analyzed. Potential localized increases in noise from these projects could combine with HSR, although the likelihood that such combinations would cause cumulative impacts would decrease markedly with distance from the noise source.

Construction activities of planned rail and transit projects including HSR would generate temporary noise levels requiring project-specific mitigation. Construction of any of the project alternatives in combination with the noise generated by other planned construction projects in the cumulative RSA would not, however, result in cumulative noise impacts, because construction, which could include pile driving, of multiple projects generating high noise levels would have to take place simultaneously and near sensitive receptors such that they would combine to create noise levels exceeding federal (Federal Railroad Administration [FRA] and Federal Highway Administration [FHWA]) or state standards. The possibility exists that substantial construction activity (or phases thereof), such as building the Google Project in San Jose, could occur simultaneous to HSR construction. While the precise timing of HSR construction in San Jose is uncertain at this time, there is the possibility that construction of portions of the two projects could occur at the same time. To the extent feasible, simultaneous construction activities would not be collocated such that the same receptors would be affected, and it is assumed that some construction noise would be attenuated by intervening structures. However, both projects would likely contribute to a cumulative construction noise impact.

Additionally, the project will be required to comply with FRA and FTA guidelines for minimizing construction noise when work is conducted within 1,000 feet of sensitive receptors (NV-IAMF#1). Furthermore, the Authority will implement a noise-monitoring program and noise control measures (NV-MM#1) (see Section 3.4.7, Mitigation Measures, for more information on the mitigation measures). Therefore, there would not be a cumulative noise impact in the cumulative RSA from rail and transit projects related to construction.

HSR and other planned rail and transit projects would create new and permanent sources of noise during operations from train passbys. The Authority will reduce exposure of sensitive receptors to operational noise by installing noise barriers where they are effective; if noise levels are still not reduced below the threshold for severe noise impact, the Authority will consider installing sound insulation at residences and institutional buildings to improve outdoor-to-indoor noise reduction (NV-MM#3). If noise barriers or sound insulation are not effective, the Authority would acquire affected properties or compensate for habitat impacts (i.e., where noise results in impacts on biological resources). The Authority will support potential implementation by local jurisdictions of Quiet Zones, which will avoid trains sounding warning horns when approaching at-grade crossings (NV-MM#4). The Authority will require bidders for HSR vehicle technology procurement to meet federal regulations for vehicle noise (NV-MM#5), install special trackwork to minimize noise at track junctions (NV-MM#6), and conduct additional noise analysis during final design to identify further opportunities for noise mitigation (NV-MM#7). While mitigation will reduce exposure of sensitive receptors to noise from train passbys during operations, it will not eliminate the exposure of sensitive receptors to noise that, in combination with noise from other

rail and transit projects, will exceed standards set by the FRA for high-speed ground transportation (see quantitative modeling results in discussion of project contribution). Therefore, the project in combination with other cumulative transportation projects would result in a cumulative impact.

Roadways and Traffic

Appendix 3.19-B lists numerous roadway projects that could contribute to cumulative noise impacts in the RSA. These projects, most of which are in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections, include:

- Santa Clara County
 - US 101 Express Lane Conversion project
 - SR 152 alignment project
 - SR 87 High-Occupancy Vehicle (HOV) Conversion project
- City of Morgan Hill
 - US 101 Express Lanes project
 - US 101/Tennant Avenue Interchange Improvements project
- City of Gilroy
 - SR 152/Frazier Lake Road Intersection project
- San Benito County
 - SR 25 Operational Enhancements
- Merced County
 - SR 152 Los Banos Bypass

Even with the implementation of mitigation such as installation of noise barriers and additional noise analysis during final design, increases in traffic-related noise associated with the project would occur at roadway segments near San Jose Diridon Station, along the Monterey Corridor, and near Gilroy, increasing ambient noise above existing levels by more than 3 decibels (dB). In combination with existing sources of traffic noise, traffic-related noise associated with the project would combine with noise generated by other planned and future transportation projects to create a cumulative noise impact during operations.

Nontransportation projects within the cumulative noise RSA would not be expected to increase traffic or noise and therefore would not be expected to cause cumulative impacts.

Vibration

Building the project and other planned projects in the cumulative RSA would produce vibration. Ground-borne vibration generally travels only short distances from the vibration source and does not readily combine with other sources of vibration to increase in magnitude because of differing frequencies. Certain types of specialized construction activities, such as pile-driving, can generate levels of ground-borne vibration that can annoy humans and animals and cause physical damage to structures. Project construction will require some pile-driving activities; however, project design specifies compliance with FRA and FTA guidelines for minimizing construction vibration when work is conducted within 1,000 feet of sensitive receptors (NV-IAMF#1). The Authority will also implement mitigation to avoid or offset vibration impacts from construction, including the development of vibration reduction methods for all high vibration-producing activities that will take place within 50 feet of any building (NV-MM#2). Therefore, even if construction activities were taking place on adjacent projects, it is unlikely that there would be multiple vibration sources (such as impact pile drivers) in close proximity generating high levels of vibration at the same frequency and at the same time near sensitive receptors. As noted above, the precise timing of HSR construction in areas where other construction activities may be ongoing is uncertain at this time. While there is a possibility that elements of the HSR project and

the Google Project would be under construction simultaneously and within proximity in San Jose, associated construction vibration would not readily combine with other sources of vibration to increase in magnitude because of differing frequencies.

Existing operational vibration sources consist primarily of existing Caltrain operations, other passenger train operations, and freight train operations between San Jose and Gilroy. Some of these sources in the San Jose Diridon Station Approach and Monterey Corridor Subsections currently generate vibration levels that exceed the residential criterion of 72 vibration decibels (VdB). The project includes mitigation to minimize vibration impacts from operations; however, it may not be possible to avoid all vibration impacts. Therefore, increased passenger and freight rail operations and the addition of train passbys associated with the project would further increase vibration levels in the San Jose Diridon Station Approach and Monterey Corridor Subsections, contributing to the current exceedance of the residential vibration criterion and resulting in a cumulative vibration impact. While implementing mitigation measures such as NV-MM#8 would reduce exposure of sensitive receptors to vibration from train passbys during operations, it would not eliminate the exposure of sensitive receptors to vibration. Operation of existing and planned roadway projects would not be expected to contribute to any cumulative vibration effects, because the vibration levels generated by rubber-tired vehicles are typically very low (FRA 2012). No cumulative operational vibration effects are anticipated in the Pacheco Pass or San Joaquin Valley Subsections because there are no other planned rail projects in those areas.

Contribution of the Project Alternatives

Noise

HSR operations and other planned rail and transit projects would expose sensitive receptors within the cumulative RSA to noise levels exceeding standards set by the FRA for high-speed ground transportation.

A cumulative noise impact assessment was conducted for both the 2029 No Project and 2029 Plus Project conditions. The cumulative analysis assumed that the Caltrain PCEP will be implemented and that the increase in other passenger and freight operations in 2029 (quantified in Volume 2, Appendix 3.4-A) would occur. As shown in Table 3.19-6, the results indicate that under the 2029 No Project cumulative condition there would be 9 severe noise impacts on sensitive receptors and 841 moderate noise impacts on sensitive receptors caused by increases in other, non-HSR train operations. Under the 2029 Plus Project cumulative condition there would be 71 sensitive receptors that would experience severe impacts and 1,620 sensitive receptors that would experience moderate impacts under Alternative 1; 200 severe impacts and 1,426 moderate impacts under Alternative 2; 48 severe impacts and 1,306 moderate impacts under Alternative 3; and 475 severe impacts and 1,500 moderate impacts under Alternative 4. Under the 2029 Plus Project cumulative condition with the DDV and TDV, there would be 75 sensitive receptors that would experience severe impacts and 1,623 sensitive receptors that would experience moderate impacts under Alternative 1; 205 severe impacts and 1,427 moderate impacts under Alternative 2; 51 severe impacts and 1,312 moderate impacts under Alternative 3; and 501 severe impacts and 1,496 moderate impacts under Alternative 4. Future 2027 community noise equivalent level airport noise contours for Norman Y. Mineta San Jose International Airport (2010) were also used to evaluate the cumulative conditions.

Table 3.19-6 Summary of 2029 No Project and Plus Project Cumulative Noise Impacts on Sensitive Receptors

Subsection	Land Use Category ¹	No Project Cumulative		Plus Project Cumulative							
				Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Mod	Sev	Mod	Sev	Mod	Sev	Mod	Sev	Mod	Sev
San Jose Diridon Station Approach	2	191	1	193	11	228	1	228	1	152 (143) ²	50 (70)
	1, 3	5	0	1	0	1	0	1	0	3 (5)	0
Monterey Corridor	2	279	4	388	16	214	12	388	16	397	83
	1, 3	0	0	1	0	1	0	1	0	0	0
Morgan Hill and Gilroy	2	365	4	947 (951)	17 (19)	890 (893)	161 (164)	598 (605)	5 (6)	857 (861)	315 (319)
	1, 3	1	0	1	1	3 (2)	0	1	0	2	1
Pacheco Pass	2	0	0	9 (10)	1	9 (10)	1	9 (10)	1	9 (10)	1
	1, 3	0	0	0	0	0	0	0	0	0	0
San Joaquin Valley	2	0	0	80 (78)	25 (27)	80 (78)	25 (27)	80 (78)	25 (27)	80 (78)	25 (27)
	1, 3	0	0	0	0	0	0	0	0	0	0
Subtotal	2	835	9	1,617 (1,620)	70 (74)	1,421 (1,423)	200 (205)	1,303 (1,309)	48 (51)	1,495 (1,489)	474 (500)
	1, 3	6	0	3	1	5 (4)	0	3	0	5 (7)	1
Total	1, 2, 3	841	9	1,620 (1,623)	71 (75)	1,426 (1,427)	200 (205)	1,306 (1,312)	48 (51)	1,500 (1,496)	475 (501)

¹ FRA Land Use Categories are summarized in Table 3.4-5. Land Use Category 1 = areas where quiet is an essential element to the land use; Category 2 = Residential; Category 3 = Institutional use and passive-use parks.

² Impacts associated with the design variants are shown in parentheses. The DDV would affect Alternative 4 within the San Jose Diridon Station Approach Subsection; the remaining noise impacts are associated with the TDV.

Mod = moderate

Sev = severe

The Authority also conducted a cumulative noise impact assessment for both the 2040 No Project and 2040 Plus Project conditions. The noise impact assessments were based on land use type and on a comparison of existing noise conditions with future noise conditions. Details of the noise impact assessment methods are provided in Section 3.4. The noise impact assessment methodology incorporates all future daily train operations for a given receptor location. As shown in Table 3.19-7, under Alternative 1, in 2040 there would be a total of 879 cumulative severe noise impacts associated with train passbys during operations, compared to 337 severe impacts with only HSR and the PCEP. The additional 542 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. Under Alternative 2, in 2040 there would be a total of 1,237 cumulative severe impacts associated with train passbys during operations, compared to 755 severe impacts with only HSR and the PCEP. The additional 482 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. There would be more cumulative impacts associated with Alternative 2 because of its longer embankment alignment, compared with Alternatives 1 and 3, which use a longer aerial profile, resulting in lower operational noise levels. Under Alternative 3, in 2040 there would be a total of 647 cumulative severe noise impacts associated with train passbys during operations, compared to 222 severe impacts with only HSR and the PCEP. The additional 425 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. Alternative 3 would result in the fewest cumulative operational noise impacts because of its stretches on aerial structure and because the alignment would pass through less populated areas in east Gilroy. Under Alternative 4, in 2040 there would be a total of 1,589 cumulative severe noise impacts associated with train passbys during operations, compared to 1,212 severe impacts with only HSR and the PCEP. The additional 377 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy.

Environmental effects of the alternatives without the DDV and TDV would be increased due to the DDV and TDV relative to noise. Accordingly, the project's contribution to cumulative impacts related to noise would be slightly greater with the DDV and TDV compared to the alternatives without the DDV and TDV. Under Alternative 1 with the DDV and TDV, in 2040 there would be a total of 890 cumulative severe noise impacts associated with train passbys during operations, compared to 337 severe impacts with only HSR and the PCEP. The additional 553 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. Under Alternative 2, in 2040 there would be a total of 1,249 cumulative severe impacts associated with train passbys during operations, compared to 766 severe impacts with only HSR and the PCEP. The additional 483 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. Under Alternative 3, in 2040 there would be a total of 658 cumulative severe noise impacts associated with train passbys during operations, compared to 233 severe impacts with only HSR and the PCEP. The additional 425 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy. Under Alternative 4, in 2040 there would be a total of 1,601 cumulative severe noise impacts associated with train passbys during operations, compared to 1,224 severe impacts with only HSR and the PCEP. The additional 377 cumulative impacts from rail and transit projects would occur along the existing rail corridor in San Jose, Morgan Hill, and Gilroy.

Table 3.19-7 Summary of 2040 No Project and Plus Project Cumulative Noise Impacts on Sensitive Receptors

Subsection	Land Use Category ¹	No Project Cumulative		Plus Project Cumulative							
				Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Mod	Sev	Mod	Sev	Mod	Sev	Mod	Sev	Mod	Sev
San Jose Diridon Station Approach	2	268	13	308	81	363	12	363	12	472 (475) ²	174
	1, 3	3	0	0	1	0	0	0	0	4	0
Monterey Corridor	2	454	110	540	253	447	159	540	253	339	410
	1, 3	0	0	1	0	1	0	1	0	5	0
Morgan Hill and Gilroy	2	780	168	1,667 (1,663)	432 (440)	1,078 (1,073)	953 (962)	1,415 (1,421)	271 (279)	1,065 (1,059)	891 (900)
	1, 3	1	0	3	1	6	2	1	0	11	3
Pacheco Pass	2	0	0	4	10 (11)	4	10 (11)	4	10 (11)	4	10 (11)
	1, 3	0	0	0	0	0	0	0	0	0	0
San Joaquin Valley	2	0	0	32 (30)	101 (103)	32 (30)	101 (103)	32 (30)	101 (103)	32 (30)	101 (103)
	1, 3	0	0	1	0	1	0	1	0	1	0
Subtotal	2	1,502	291	2,551 (2,545)	877 (888)	1,924 (1,917)	1,235 (1,247)	2,354 (2,358)	647 (658)	1,912 (1,907)	1,586 (1,598)
	1, 3	4	0	5	2	8	2	3	0	21	3
Total		1,506	291	2,556 (2,550)	879 (890)	1,932 (1,925)	1,237 (1,249)	2,357 (2,341)	647 (658)	1,933 (1,928)	1,589 (1,601)

¹ FRA Land Use Categories are summarized in Table 3.4-5. Land Use Category 1 = areas where quiet is an essential element to the land use;

Category 2 = Residential; Category 3 = Institutional use and passive-use parks.

² Impacts associated with the design variants are shown in parentheses. The DDV would affect Alternative 4 within the San Jose Diridon Station Approach Subsection; the remaining noise impacts are associated with the TDV.

Mod = Moderate

Sev = Severe

HSR would be the largest contributor to the cumulative noise impacts during operations, affecting many sensitive receptors. The project would contribute to this cumulative impact by substantially increasing ambient noise levels, exceeding FRA standards for high-speed ground transportation.

Cumulative traffic noise impacts would also occur as a result of existing, planned, and future projects, including trips to HSR stations that would add vehicles to the regional roadway network. Under Alternatives 1 and 2, in 2029 there would be 7 roadway segments with traffic-related noise increases exceeding 3 dB above existing conditions, and in 2040 there would be 12 roadway segments exceeding 3 dB above existing conditions. Under Alternatives 3 and 4, in 2029 there would be a total of 6 roadway segments with traffic-related noise increases exceeding 3 dB above existing conditions, and in 2040 there would be 12 roadway segments exceeding 3 dB above existing conditions. The project alternatives would contribute to this cumulative impact by increasing ambient noise above existing levels by more than 3 dB along multiple roadway segments near San Jose Diridon Station, along the Monterey Corridor, and near Gilroy. No feasible mitigation measures are available to avoid this impact.

Vibration

Train passbys associated with the project in combination with planned rail operations in the cumulative RSA would result in a significant cumulative vibration impact because they would exceed the vibration criterion for multiple receptors in the San Jose Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. Alternative 1 would result in 81 vibration impacts on sensitive receptors, Alternative 2 in 143 vibration impacts, Alternative 3 in 140 vibration impacts, and Alternative 4 in 1,203 vibration impacts. The project would contribute to this cumulative impact because project operations would expose a large number of sensitive receptors to increases in ground-borne vibration from operations.

CEQA Conclusion

Noise

During construction, the project in combination with planned projects in the cumulative RSA would result in a significant cumulative noise impact under CEQA because construction activities could occur simultaneously near sensitive receptors such that they would combine to create noise levels exceeding federal (FRA and FHWA) or state standards. As noted above, while the timing of HSR construction activities within areas where other planned development construction is likely to occur is uncertain at this time, there is the potential that elements of the HSR project and the Google Project could be under construction simultaneously in San Jose. The project design would comply with FRA and FTA guidelines for minimizing construction noise when work is conducted within 1,000 feet of sensitive receptors. Consequently, the project would not cause or contribute to a significant cumulative construction noise impact. Therefore, CEQA does not require mitigation.

During operations, the project in combination with other planned projects in the cumulative RSA would result in significant cumulative noise impacts under CEQA because noise-sensitive receptors would generate noise levels above existing ambient levels and in exceedance of FRA criteria for moderate and severe noise impact as a result of train passbys. The project's contribution to the cumulative impact would be considerable because it would substantially increase the baseline ambient noise conditions of the many planned transportation projects. The Authority would implement mitigation measures to minimize operations noise impacts (NV-MM#3, NV-MM#5, NV-MM#6, NV-MM#7), discussed in more detail in Section 3.4. However, while these mitigation measures will be effective at reducing the number of severe noise impacts in the cumulative RSA, they will not mitigate all noise impacts because noise barriers are not cost effective or acoustically feasible in all areas with predicted noise impacts. Because severe noise impacts will remain following mitigation, the cumulative impact will be significant and unavoidable under CEQA.

Traffic noise generated by the project in combination with planned transportation projects would result in a significant cumulative noise impact under CEQA because the combined noise exposure would increase by 3 dB or more above existing conditions. The contribution of the project alternatives to this cumulative impact would be considerable because it would affect multiple roadway segments near San Jose Diridon Station, along the Monterey Corridor, and near Gilroy.

Vibration

During construction, the project in combination with other planned projects in the cumulative RSA would not generate a significant cumulative vibration damage impact under CEQA because vibration levels decrease markedly with distance. Vibrations from multiple sources do not readily combine with one another, and the Authority would develop and implement vibration reduction methods for all high vibration-producing activities that would occur within 50 feet of any building. Project features will minimize construction vibration and its potential to cause structural damage and human annoyance. Therefore, there would not be a significant cumulative construction vibration impact under CEQA caused by the project or to which the project would contribute. CEQA does not require additional mitigation.

During operations, the project in combination with other planned projects in the cumulative RSA would generate a significant cumulative vibration impact under CEQA because vibration levels would exceed acceptable FRA criteria of 72 VdB for residential use, 65 VdB for lab facilities, and 75 VdB for institutional use at multiple receptors in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. The contribution of the project to this cumulative impact would be considerable because it would be the primary contributor to the increases in ground-borne vibration along the corridor. The Authority would implement mitigation measures to reduce vibration impacts from operations. There are various options to reduce train vibration, though it may not be possible in all instances to mitigate all vibration impacts because it may not be cost effective or acoustically feasible. The specific design and implementation of this mitigation measure would be identified during final design. There is no additional feasible mitigation.

3.19.6.4 Electromagnetic Fields and Electromagnetic Interference

Resource Study Area

The cumulative RSA for electromagnetic fields (EMF) and electromagnetic interference (EMI) is the same as the RSA used for the analysis in Section 3.5, Electromagnetic Fields and Electromagnetic Interference, because it is sufficiently broad to cover the area in which the potential impacts of the project alternatives, in combination with past, present, and future projects, could result in cumulative impacts. The EMF and EMI RSA is defined as the project footprint for each of the four project alternatives plus 500 feet from the track centerline¹² and 500 feet from the perimeter of the MOWF sites, traction power substations, interconnection facilities, and existing Pacific Gas and Electric Company (PG&E) facilities to be modified. All identified ongoing and future development projects falling wholly or partially within the RSA were considered in determining cumulative EMF and EMI effects.

Cumulative Condition

The project extent traverses urban and rural settings. Urban and rural settings have different sensitivities associated with EMFs and EMI:

- Urban areas are characterized by more densely spaced residential housing, high-voltage overhead power lines, and associated urban infrastructure. These areas may include laboratories and other facilities that operate EMI-sensitive research or medical devices.
- Rural and agricultural areas typically have only sparsely distributed residences. These areas may have underground pipelines, underground cables, and fencing associated with agricultural operations, including irrigation systems that may be affected by EMFs and EMI.

Approximately 20 percent of the planned and future projects identified in Appendices 3.19-A and 3.19-B fall within the cumulative RSA for one or more of the project alternatives. These projects are distributed roughly equally between transportation and nontransportation developments. The majority of the nontransportation projects overlapping the cumulative RSA are residential, retail, mixed-use, or other developments that would not contribute substantially to the generation of EMF or be particularly sensitive to EMI. The cumulative EMF resulting from these developments would not exceed human exposure limits. Three future projects (Communications Hill in San Jose, North Gilroy Neighborhood District, and Downtown Gilroy Specific Plan) involve developments that include research and development facilities. These would potentially introduce new sensitive receptors into the RSA such as magnetically sensitive research equipment and instrumentation.

Electrical power equipment that emits EMFs and EMI, including high-voltage electric power lines, would continue to be used in the cumulative RSA. The largest change in this regard is the PCEP, which would increase operational EMF levels along the RSA from Tamien Station northward. Directional and nondirectional (cellular and broadcast) antennas and radio frequency

¹² Although 60 Hz magnetic fields are generated by the OCS conductors, the HSR track centerline is used as a proxy from which distance to sensitive receptors and other potentially affected land uses is measured.

communication equipment would continue to be used and expanded through ongoing development and transportation projects.

Construction activities under all project alternatives would entail equipment that would generate fluctuations in EMF levels and lead to EMI. In the more urbanized areas between San Jose and Gilroy, the project would be directly adjacent to existing commercial land uses and other planned and future projects that would also generate or be affected by EMF and EMI: a baseball stadium in the Diridon/Arena area; several mixed-use projects in San Jose and Morgan Hill, including the Butterfield Professional Center; the Equinix Data Centers at the Great Oaks mixed-use site; and numerous residential and commercial projects in Gilroy (see Appendix 3.19-A for more detail). These projects, in addition to HSR, would likely increase the intentional demand for EM spectrum, as well as the unintentional generation of EMI from fluctuations in magnetic fields through the increased use of vehicles, high-voltage power lines and electrical power equipment, directional and nondirectional antennas, and radio equipment during both construction and operations. In the rural and agricultural areas of Pacheco Pass and the San Joaquin Valley, the project would generally be located farther from other existing and planned and future projects that would likely not generate or be affected by EMF and EMI.

The practical effects of exposure to EMF and fluctuations in EMF levels from construction activities, including those of the project alternatives and other planned and future projects, are expected to be limited to within 50 feet of construction activities; these levels are expected to remain below levels known to disrupt agricultural activities or result in a documented health risk. Furthermore, project features include specifications for controlling EMF and limiting EMI in specific areas where it could disrupt nearby sensitive equipment—in particular those in the more densely populated areas of San Jose and the Monterey Corridor (EMI/EMF-IAMF#2). In addition, Federal Communications Commission (FCC) regulations designed to prevent interference would be applied to the use of communications equipment at all construction sites; therefore, the use of this equipment during construction of planned and future projects, including HSR, would not subject sensitive equipment at other facilities to potential EMF and EMI. As described in Section 3.5, EMF fluctuation generated by construction vehicle movements related to project construction would attenuate below background levels at all construction locations adjacent to facilities with known sensitive equipment. No cumulative impact is anticipated during construction of HSR and other planned and future projects because construction activities of these various projects would not generally overlap, EMF from radio equipment would comply with FCC regulations designed to prevent interference, sources of EMF and EMI would attenuate within approximately 50 feet of construction activity, and EMFs are expected to remain below levels known to disrupt agricultural activities or result in a documented health risk.

Operations of three projects could generate or be affected by EMF and EMI within the cumulative RSA in the rural areas of the project: an expansion of the Liberty Packing Company, development of the George Simmons minor subdivision, and the Don Chapin Company concrete batch plant; the latter two are near Volta (see Appendix 3.19-A for more detail). These projects, in addition to HSR, would likely increase the intentional demand for EM spectrum and the unintentional generation of EMI through the increased use of vehicles, high-voltage power lines and electrical power equipment, directional and nondirectional antennas, and radio equipment. In urban areas, numerous existing, planned, and future projects, in addition to the project alternatives, would generate and be affected by EMF and EMI. These include medical facilities such as the St. Louise Regional Hospital and high technology facilities such as the Great Oaks Research Park, Paramit Manufacturing, and Butterfield Professional Center.

In both rural and urbanized areas, EMF levels are not expected to increase to levels that would expose people, livestock, or poultry to health risks because exposure to such levels generally occurs only very close to EMF-generating sources. Aside from the electricity required to operate HSR trains, there are no other existing, planned, or future large sources of EMF within the cumulative RSA that would not be regulated and controlled to prevent EMI. Furthermore, all radio equipment would be required to comply with FCC regulations designed to avoid interference. With respect to the project alternatives, the Authority will utilize dedicated spectra for radio and automatic train control equipment (EMI/EMF-IAMF#2). The Authority also maintains an

Electromagnetic Compatibility Program Plan that provides a performance standard of maintaining compatibility with the equipment of all neighboring facilities, thereby avoiding potential interference with other equipment and facilities. The project will also include grounding of linear metallic structures to avoid the potential for corrosion or nuisance shocks from ground currents, as well as coordination with adjacent railroads to avoid radio frequency interference with train signaling equipment (EMI/EMF-IAMF#1). Therefore, project operations, in combination with existing, planned, and future projects, would not result in a cumulative EMF and EMI impact.

While numerous EMF sources would be introduced into the RSA as part of the cumulative environment, they would not combine with project impacts to result in cumulative effects. For these impacts to be cumulatively significant the contributing sources must not only be close together, but their emissions must overlap in time *and* affect the same portions of the electromagnetic spectrum. The analysis did not identify any instance where the cumulative environment EMI would combine in a way to cause equipment malfunctions or result in health risks during either project construction or operations.

CEQA Conclusion

The project, in combination with other planned projects in the cumulative RSA, would not generate a significant cumulative impact under CEQA related to EMI and EMF to which the project alternatives would contribute. Therefore, CEQA does not require mitigation.

3.19.6.5 Public Utilities and Energy

Resource Study Area

Public Utilities

The cumulative RSA for public utilities is the entirety of Santa Clara, San Benito, and Merced Counties, an area larger than the RSA used for the analysis in Section 3.6, Public Utilities and Energy (defined as affected service areas of utilities and utility-owned properties within and beyond the project footprints). The cumulative RSA was chosen to develop a broad, regional consideration of cumulative impacts and because it captures impacts on public utilities associated with construction and operations of the project alternatives and regional impacts on public utilities associated with planned development. Specifically, the cumulative RSA allows for the analysis of additional planned projects that could affect stormwater and water supply lines; water supplies (potable water, recycled water, agricultural water); wastewater and stormwater treatment facilities; solid waste landfills; electricity transmission facilities; natural gas and petroleum product pipelines; fiber optics; and communication facilities.

Energy

The cumulative RSA for energy (including electricity) is the same as the RSA described in Section 3.6, because the entire electricity grid of California and other western states that produce energy and export to California is sufficiently broad to cover the area in which the potential impacts of the project, in combination with other projects, could result in impacts. Electricity is examined using projections, rather than a list of other projects, given its large RSA.

Cumulative Condition

Public Utilities

Ongoing urban development and agricultural practices are expected to continue in the cumulative RSA, with the exception of the vicinity of the Pacheco Pass Subsection, which is not expected to experience urban development because of existing land use protections (ranching, open space, and recreation) and general plan designations. Areas adjacent to Henry Miller Road in the San Joaquin Valley Subsection have agricultural uses. The general plans for Santa Clara, San Benito, and Merced Counties direct future growth to minimize conversion of agricultural land to urban or transportation uses.

Cumulative nontransportation projects that could combine with the HSR project to cause cumulative impacts on public utilities include the Cordoba Center in San Martin and the

Dunne/EAH and Walnut Grove/Diana developments in Morgan Hill. Major utilities—communications lines, electrical lines, potable water, stormwater, and wastewater (sewer) lines—either cross or run parallel to the HSR right-of-way in the vicinity of these proposed projects and the project alternatives.

Cumulative transportation projects that could combine with the HSR project to cause cumulative impacts on public utilities are located in the project right-of-way. These include the Capitol Corridor Joint Powers Authority Oakland to San Jose Phase 2 Double-Track Project, the Caltrain Double-Track San Jose to Gilroy Segment, and the Caltrain PCEP. These cumulative projects entail construction of a second mainline track and modifications to existing tracks between San Jose and Gilroy within the UPRR right-of-way, which is parallel to the HSR right-of-way.

Utility Relocation

Construction of any of the project alternatives in combination with cumulative transportation and nontransportation projects would require relocation of utility lines, which could result in planned or accidental temporary interruption of utility services. Construction activities in the right-of-way under all four project alternatives would require the temporary shutdown of aboveground, belowground, and overhead (i.e., overhead contact system [OCS] electrical transmission lines, natural gas transmission pipeline facilities, petroleum product conveyance facilities, and water conveyance infrastructure). Shutdowns could interrupt utility services to industrial, commercial, agricultural, and residential customers. Established practices of utility identification prior to commencement of construction required by California regulations and local ordinances, including development of a construction safety and security management plan (SS-IAMF#2), will minimize the potential for accidental disruption. Contractors working on planned transportation and nontransportation projects including HSR would, in accordance with regulatory requirements, coordinate with utility service providers and local government agencies to identify and map the locations of underground and overhead utilities prior to commencement of construction and would establish safety and response procedures in the event that a previously unidentified or unmapped underground utility is encountered during construction. Prior to construction in areas where utility service interruptions are unavoidable, the public utility would notify the affected public and utility service providers of the planned outage. Construction will be coordinated with utility service providers and utility customers to avoid interruptions of utility service to hospitals and other critical users (PUE-IAMF#3). Prior to project construction, the contractor will prepare a technical memorandum documenting how construction activities will be coordinated with utility service providers to minimize or avoid interruptions of utility service (PUE-IAMF#4). Based on the incorporation of project features and procedures for contractors and utilities to minimize service interruptions, as well as similar procedures that would be applicable to other transportation and nontransportation projects in accordance with state regulations and local ordinances, project construction in combination with existing, planned, and future projects would not result in cumulative impacts related to interruption of utility services.

Utility Access

The HSR right-of-way would be permanently fenced and secured to prevent unauthorized access during operations. In addition, construction activities associated with the project and other planned transportation and nontransportation projects would require work in the right-of-way that would reduce maintenance access to existing utilities that remain within the right-of-way. It is common practice for utility districts to coordinate and schedule in advance any field visits to their facilities with the owner of the property within which their facilities lie. Prior to construction of any of the project, coordination and scheduling procedures will be established between the utility owners and the Authority (PUE-IAMF#4). This practice would also be followed by other cumulative projects (i.e., transportation projects sharing the corridor) to avoid reduced access to existing utilities that are located in the right-of-way.

The construction schedules of the cumulative projects would not necessarily coincide with the construction schedule for the HSR project. For example, the proposed Los Banos Bypass project was not included on the Merced County regional transportation funding list in 2016, and the schedule for construction of the Los Banos Bypass in addition to these other transportation projects may not coincide with the construction schedule of the project (Merced SunStar 2016;

MCAG 2018). Construction schedules would be developed and coordinated with utility service providers to minimize the areal extent and duration of planned service interruptions. Therefore, there would not be a cumulative impact on public utilities associated with reduced access from construction or operations of the project in combination with other existing, planned, and future projects.

Construction of New Utility Lines

Cumulative development and transportation projects would entail construction of new utility lines and utility infrastructure to provide energy service (e.g., electricity, natural gas); water, wastewater, and stormwater management services; and communications services as the population grows and demand on utility services increases. The general plans of Santa Clara, San Benito, and Merced Counties and the Cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos anticipate growing demand for utilities and allow for coordinated development planning with utility service providers.¹³ Consequently, future public utility capacity in the cumulative RSA would keep pace with planned growth in the region to meet future demand. Accordingly, the construction and operations of the project in combination with other existing, planned, and future projects would not place a demand on utility services that exceeds their capacities, and there would be no cumulative impact on the availability of public utility services.

Solid Waste Generation

Construction activities associated with planned and future transportation, residential, commercial, and industrial projects, including HSR, in the cumulative RSA would generate solid waste during demolition, excavation, and concrete preparation. Operation (i.e., occupancy and use) of residential, commercial, and industrial development projects in the cumulative RSA would also result in solid waste generated by domestic (residential), commercial, and industrial activities. This increased solid waste generation would result in direct impacts on solid waste management landfills and facilities. While construction and demolition wastes generated by proposed projects would be reused to the extent feasible, particularly for transportation projects, these projects would still result in construction wastes. The HSR project includes preparation of a demolition plan to address disposition of solid wastes associated with construction and demolition (HMW-IAMF#5). Existing landfills in Santa Clara, San Benito, and Merced Counties have the capacities to receive solid wastes from these projects. Solid waste landfills in the cumulative RSA could be used for disposal of nonhazardous solid waste from HSR construction activities. Collectively these nonhazardous solid waste landfills have an estimated 92.5 million cubic yards of remaining disposal capacity (CalRecycle 2019a, 2019b, 2019c, 2019d, 2019e, 2019f). Further, planned development projects would be required to comply with local policies within the RSA, which require development of waste management plans and diversion of a substantial proportion of construction waste. Therefore, existing nonhazardous solid waste landfills would have adequate estimated capacities through 2038 or longer for the disposal of construction and demolition material generated by HSR construction, which would contribute up to 0.6 percent of the remaining disposal capacity.

Santa Clara, San Benito, and Merced County planning documents account for the increased need for solid waste disposal facilities to dispose of wastes that would be generated by cumulative projects. Consequently, construction of HSR in combination with other existing, planned, and future projects would not exceed the capacity of permitted solid waste landfills and would therefore not result in a cumulative impact related to generation of solid waste.

Hazardous Waste Generation

Planned residential, commercial, and industrial development projects, including HSR, would generate hazardous waste resulting from demolition, excavation, and other construction activities. During operations, these projects, including HSR, would generate hazardous waste such as chemical solvents and household hazardous waste. There are three licensed hazardous waste disposal facilities in California with available capacity of approximately 15 million cubic yards. The Chemical Waste Management hazardous waste landfill located at Kettleman Hills (Kings County)

¹³ The communities of Santa Nella and Volta are included in the Merced County General Plan.

was issued a permit in 2014 by the California Department of Toxic Substances Control to expand the landfill's capacity by 4.9 million cubic yards; the Kettleman Hills landfill was nearing full capacity at the time the permit was issued in 2014 (DTSC 2014). The Buttonwillow hazardous waste landfill (Kern County) and Westmorland hazardous waste landfill (Imperial County) have not applied for permits to expand hazardous waste disposal capacity; each has an estimated permitted disposal capacity of 5 million cubic yards (Clean Harbors 2017a, 2017b). The capacity of the three existing hazardous waste facilities would be sufficient for hazardous waste generated by HSR and other projects in the cumulative RSA. In light of adequate existing landfill capacities to receive solid and hazardous wastes, and because county planning documents account for the increased need for waste disposal facilities, the project in combination with existing, planned, and future projects would not exceed the capacity of permitted hazardous waste landfills and would therefore not result in cumulative impacts related to generation of hazardous waste.

Water Consumption

Construction of planned and foreseeable residential, commercial, and industrial development projects in the cumulative RSA would result in water consumption for construction during excavation and concrete preparation. Construction of proposed transportation projects, including HSR, would also require water consumption. Operations of these projects, including occupancy and use, agricultural irrigation, and drinking water supplies, would also result in water use. Water uses from these projects would increase the demands of water suppliers in or servicing the cumulative RSA. The largest water suppliers in Santa Clara and San Benito Counties are the Santa Clara Valley Water District (SCVWD) in Santa Clara County and the San Benito County Water District (SBCWD) in San Benito County. The SCVWD maintains a Water Shortage Contingency Plan that provides a strategy for detecting and responding to water shortages. The SCVWD implements programs for short-term reductions of water use when the projected end-of-year groundwater storage volume falls below 300,000 acre-feet. The SBCWD also operates water storage reservoirs for management of water supply (SBCWD 2017).

The SBCWD provides water to municipal and rural land uses in San Benito County through four major sources of water supplies: local groundwater, imported water, recycled water, and local surface water. Local groundwater, which provides approximately 83 percent of the total supply, is withdrawn from the basin by private irrigation wells, domestic wells, and public water supply retailers. Imported water from the U.S. Department of the Interior, Bureau of Reclamation's (Reclamation) Central Valley Project (CVP) constitutes approximately 16 percent of the total supply. The SBCWD has a 40-year contract (extending to 2027) to purchase municipal and industrial CVP water from Reclamation for a maximum of 8,250 acre-feet per year. Local surface water is not used directly for potable use in the basin, but creek percolation is a significant source of groundwater recharge (SBCWD 2015).

Reclamation's CVP and the California Department of Water Resources' (DWR) State Water Project provide potable water to municipal and special water districts in Merced County through the Delta-Mendota Canal and the California Aqueduct. The Delta-Mendota Canal, jointly operated by Reclamation and the San Luis and Delta-Mendota Water Authority, delivers water to the San Luis Reservoir; this water is then pumped to a facility in the Pacheco Pass near Casa de Fruta, where the water is diverted to the SCVWD and SBCWD (SBCWD 2018).

Water supply projects in the cumulative RSA have been implemented or proposed to increase the availability of water in the San Joaquin Valley and elsewhere in the region. Moreover, the schedules for implementation of projects in the cumulative RSA may not overlap with each other or with the HSR construction schedule, potentially reducing the concurrent demands for water resources. Therefore, construction and operations of the project in combination with other existing, planned, and future projects would not exceed the capacity of water supplies and would not result in a cumulative impact.

Wastewater Generation

Construction of planned development and transportation projects would result in direct impacts on wastewater management facilities by generating wastewater through excavation and concrete preparation. Operation (i.e., occupancy and use) of residential, commercial, and industrial

development projects would also result in wastewater generation related to domestic, commercial, and industrial water use. Construction and operations of the project would also generate wastewater from preparing concrete, operating tunnel boring machines, excavating, landscaping, dust control, and operations of HSR stations and maintenance facilities, placing greater demands on existing wastewater conveyances and treatment plants in the cumulative RSA. Project features such as implementing BMPs and complying with discharge limitations of local and regional wastewater treatment plants will minimize impacts of wastewater generation (HYD-IAMF#3).

Municipalities operate several wastewater treatment plants within the cumulative RSA with the capacity to accept and treat anticipated wastewater from cumulative projects. Further, certain cumulative projects, such as the Google Project, would include private wastewater collection networks and on-site wastewater treatment facilities to accommodate their demand. The total capacity of wastewater treatment systems that serve the cumulative RSA is 182 million gallons per day (mgd); the total average dry weather flow rate is 114.7 mgd. Wastewater generation from HSR construction activities would represent less than 0.5 percent of overall available wastewater treatment capacity in the cumulative RSA. The amount of wastewater generated from operations of HSR stations and maintenance facilities is assumed to equal the amount of water consumed at those facilities, or approximately 70,800 gallons per day (gpd). Wastewater generated at stations and the MOWF during operations would be discharged to the sewer system and would constitute less than 1 percent of the available treatment capacity of local wastewater treatment facilities. Thus, there is adequate capacity at existing wastewater treatment plants to serve the project's projected wastewater treatment demand, in addition to their existing commitments.

The local wastewater treatment authority must approve any connections to the sewer system for proposed projects; it is assumed that connections of planned and foreseeable projects would only be allowed if there is adequate wastewater treatment capacity for the wastewater discharge from those projects. The addition of wastewater generation for cumulative projects in combination with HSR construction and operations would not exceed the capacity of existing wastewater treatment facilities that would result in the need for construction of new wastewater treatment infrastructure. Therefore, there would not be a cumulative impact.

Stormwater Generation

Construction of existing, planned, and future projects, including HSR, would result in changes to stormwater runoff from new impervious surfaces. Greater stormwater runoff would place higher demands on existing stormwater infrastructure. The Authority, during the detailed design phase, would evaluate each receiving stormwater system's capacity to accommodate runoff from the project. The contractor will construct new stormwater management structures in accordance with the stormwater pollution prevention plan (SWPPP) (HYD-IAMF#3) and stormwater management and treatment plan. Proposed transportation and nontransportation projects would be subject to permitting of proposed stormwater management systems under Santa Clara, San Benito, and Merced Counties' National Pollutant Discharge Elimination System (NPDES) stormwater management programs, including assessment of potential conflicts of proposed projects with existing stormwater management infrastructure and stormwater management system capacity.

In view of these requirements, the HSR project together with cumulative projects would not require construction of additional stormwater management systems beyond those systems that would be constructed within the project footprint as part of the HSR project, that are already in place, or that would be built in conjunction with planned and foreseeable projects; nor would the construction of any of the project alternatives in combination with cumulative projects result in exceedance of stormwater management system capacity. Consequently, the project in combination with existing, planned, and future projects would not result in cumulative impacts on stormwater management utilities.

Energy

The cumulative condition for energy resources consists of the statewide electrical grid and is reflected in electricity supply and demand planning documents of the California Energy Commission (CEC) and California Independent System Operator (Cal-ISO). The cumulative

condition for energy resources also involves natural gas supply and distribution and petroleum product (diesel fuel, gasoline) supply and distribution. Together, the project alternatives, planned development, and cumulative conditions disclosed in the general plans of Santa Clara, San Benito, and Merced Counties and the Cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos, as well as adjacent HSR project sections and relevant additional future development and transportation projects identified in Appendices 3.19-A and 3.19-B constitute the cumulative condition relevant to energy resources.

According to the CEC, total statewide electricity consumption grew from 166,979 gigawatt hours in 1980 to 283,000 gigawatt hours in 2015 (CEC 2016). Santa Clara County consumed the most electricity (83.5 percent of the region's 20,107 gigawatt hours of electricity consumption), followed by Merced County (14.5 percent), and San Benito County (2 percent). Statewide electricity consumption in 2027 is projected to be approximately 320,000 gigawatt hours for the mid-demand energy projection case. Average annual projected energy demand growth rate from 2015 to 2027 is 1.1 percent for the mid-energy demand case (CEC 2017). The increasing demand for electrical energy is based on growth in both population (i.e., households) and commerce (commercial and industrial businesses).

Planned development and growth will contribute to a cumulative increase in electricity use and increased demands on the existing electric utility infrastructure within the cumulative RSA, including increased peak and base period electricity demand. Project construction and operations would consume electricity for construction equipment, train operation, stations, and maintenance facilities, requiring upgrades to existing electrical systems including reconductoring of existing electric transmission lines and construction of new electrical substations to provide electric power to the HSR system. Proposed nontransportation projects (e.g., commercial, residential, and industrial development projects) would consume electricity during the same timeframe as HSR construction and operations, and the generally projected increase in population and economic output in the cumulative RSA would result in increased electricity demands. High-voltage electric transmission lines, power lines, and distribution lines would need to be both built and upgraded to serve the increased electricity demand and to meet grid reliability requirements.

Electricity providers in California perform regular electricity demand projections that estimate the demand created by planned development. In addition, Cal-ISO annually publishes a transmission plan that assesses the need for transmission lines or other electrical infrastructure to meet the future needs of the Cal-ISO-controlled electrical grid. The Cal-ISO 2016–2017 Transmission Plan indicates that transmission infrastructure projects needed to meet California's renewable energy standards by 2020 are already approved and underway, and that Cal-ISO will conduct an assessment of transmission infrastructure needed to meet California's 2030 renewable energy goals (Cal-ISO 2017). The Panoche Valley Solar Farm Project in San Benito County is a 130-megawatt (MW) solar energy generation facility that commenced operation in January 2018; the project increased renewable electric generating capacity in the cumulative RSA and delivers electricity to the regional transmission system by connecting to the PG&E Moss–Panoche/Coburn–Panoche 230-kilovolt transmission line on site (SBCWD 2015). Planned utility-scale projects such as the 200 MW Wright Solar Park Project in Merced County would contribute to the renewable electricity supply. The Quinto Solar Photovoltaic Project, a 108 MW solar project, also located in Merced County near Los Banos, commenced operation in 2015. These developments would be expected to help accommodate the additional electrical demand associated with planned and future development projects and regional growth within the cumulative RSA. As a result, energy used for construction of cumulative projects in combination with HSR construction and operations would not require additional energy capacity beyond that which already exists or is already planned, and there would not be a cumulative impact on energy resources.

The population in California is projected to increase by approximately 28 percent by 2040 over 2010 census figures. That growth equates to almost 10 million people (CDOF 2014, 2016). In 2015, sales of diesel fuel to California end users were approximately 1,093,000 gpd, and sales of gasoline were approximately 4,341,000 gpd (approximately 16 billion gallons per year) (EIA 2017a, 2017b). Because of trends in travel demand, congestion, and other travel conditions, the

market for intercity travel in California that the proposed HSR system would serve is projected to grow by up to 46 percent over the next 30 years, placing greater demands on gasoline and fuel resources. Construction of planned and future projects would consume gasoline and diesel fuel for operation of construction equipment and vehicles. Operations (i.e., occupancy and use) of planned projects and general population growth would result in increases in petroleum product consumption. Construction of any of the project alternatives would consume gasoline and diesel fuel for operation of construction vehicles and equipment. Moreover, the project will abide by the Authority's sustainability requirements included in its design-build contracts (PUE-IAMF#1). However, HSR operations would result in a reduction in demand for transportation fuels because passengers would use HSR as an alternative to vehicles and airplanes. Consumption of gasoline and diesel fuel for construction and operation of planned and reasonably foreseeable projects, including HSR, would not result in constraints on the availability of fuel in the cumulative RSA because fuel supplies for construction and operation of cumulative projects would be supplied by the existing and sufficient petroleum product production and distribution infrastructure in California, and because HSR operations would result in a reduction in demand for petroleum fuel products. Therefore, there would not be a cumulative impact on energy resources from construction and operations of the HSR project in combination with existing, planned, and future projects.

CEQA Conclusion

Public Utilities

There are no anticipated significant cumulative impacts under CEQA related to public utilities to which the project would contribute. Planned and anticipated transportation and nontransportation projects within the cumulative RSA would for the most part be temporally or geographically separated from project construction. Several planned and anticipated projects within the cumulative RSA could be implemented at the same time and location as the HSR project. There would be no construction-related significant cumulative impacts under CEQA related to public utilities for these projects because local and regional planning and regulatory requirements would minimize the effect of temporary utility service interruptions on public utilities and public utility customers through effective coordination and notification activities. Transportation and nontransportation projects within the cumulative RSA that could affect public utilities would be subject to state regulatory and local ordinance requirements and BMPs that would minimize such impacts. Further, planned development projects, such as the Google Project, which could substantially increase the demand for public utilities, would provide on-site service systems to accommodate their projected demand. Construction that would affect the rail right-of-way would be subject to design and construction requirements to maintain access to utilities within the right-of-way and to avoid impacts on utilities remaining within the right-of-way. Water conservation measures and use of nonpotable and recycled water for construction activities will reduce impacts from water use for project construction. Therefore, CEQA does not require any mitigation.

Energy

There are no anticipated significant cumulative impacts under CEQA related to energy to which the project would contribute because energy consumption for construction and operations would not place a substantial demand on regional energy supply, require construction of substantial additional electric generating capacity, or substantially increase peak- or base-period electricity demand. Therefore, CEQA does not require mitigation.

3.19.6.6 Biological and Aquatic Resources

Resource Study Area

The cumulative RSA for biological and aquatic resources is the same as the regional RSA described in Section 3.7, Biological and Aquatic Resources. The regional RSA is appropriate for analyzing cumulative impacts because it was identified to allow for a landscape-level analysis of impacts and is based on ecoregion, watershed, and county boundaries. The cumulative RSA captures regional impacts on biological and aquatic resources associated with past, present, and

reasonably foreseeable future development projects affecting similar land cover types and neighboring watersheds.

Cumulative Condition

Past development in the cumulative RSA has resulted in the widespread conversion of undeveloped land to commercial, residential, transportation, and agricultural land uses, resulting in large-scale destruction of habitats for plants and wildlife. These trends are expected to continue, although at a slower pace, resulting in additional conversion or degradation of land cover types for special-status species, non-special-status wildlife, special-status plant communities, aquatic resources, and wildlife movement corridors.

Special-Status Species

Past and present development in the cumulative RSA has resulted in the conversion of large areas of freshwater and alkali wetlands (including vernal pool complexes), valley grasslands, alkali scrub, and riparian woodlands (including California sycamore woodland) that provide habitat for native plants and wildlife to residential, commercial, industrial, and agricultural uses. The historical trend of converting as well as degrading these natural land cover types has compromised the ecological integrity of the region¹⁴ and resulted in the listing of multiple plant and wildlife species under the FESA and the California Endangered Species Act (CESA) and the designation of many more as special-status species (e.g., California Department of Fish and Wildlife [CDFW] species of special concern). Conversion of agricultural lands to residential, commercial, or industrial development also reduces habitat for special-status species that have adapted to and regularly forage in such areas (e.g., Swainson's hawk).

Construction of cumulative projects, including the HSR project, would result in temporary and permanent impacts on special-status species and their habitats. Examples of planned development projects include The Villages of Laguna San Luis Community Plan (6,200 acres) and Fox Hills Community Specific Plan Update (3,460 residential units) in Merced County, both of which would reduce habitat for special-status species occurring along the western side of the San Joaquin Valley (e.g., San Joaquin kit fox, Swainson's hawk, burrowing owl). Planned transportation projects such as the widening of SR 25 between Gilroy and Hollister, construction of the Los Banos Bypass (Segments 1, 2, and 3), and the HSR Central Valley Wye would also combine with the HSR project to reduce habitat for special-status species occurring in the Santa Clara and San Joaquin Valleys. Construction impacts on special-status species resulting from the HSR project would include the direct removal of habitat, mortality or removal of individuals, and modification and fragmentation of habitats.

Temporary construction impacts of the HSR project would result from grading, construction of staging areas, temporary roadways, tunnels, and cut-and-fill slopes. The project would also have impacts on designated critical habitat for California tiger salamander, California red-legged frog, Bay checkerspot butterfly, and steelhead (central California coast and south-central California coast distinct population segments). Additionally, construction could result in the loss or degradation of existing special-status plants and cause disturbance, injury, and mortality of individuals of special-status wildlife species. Project features to reduce the potential degradation of suitable habitat include preparing a biological resources management plan (BRMP), which will provide a comprehensive compilation of mitigation measures and permit conditions relevant to protection of habitat and species (BIO-IAMF#5); conducting environmental awareness training for workers (BIO-IAMF#3); siting staging areas away from sensitive resources (BIO-IAMF#8); developing a BMP field manual that will address proper waste management and storage, nonstormwater management, and other general site cleanliness measures to avoid spills of hazardous materials (BIO-IAMF#11); and designing and constructing tunnels to maintain existing groundwater levels over the tunnel structures throughout the tunnel design service life (HYD-IAMF#5). The Authority would implement mitigation that includes preparing and implementing a

¹⁴ Ecosystems have ecological integrity when their native components—abiotic components, biodiversity, and ecosystem processes—are intact.

restoration and revegetation plan and weed control plan (BIO-MM#1, BIO-MM#2); conducting pre-construction surveys for special-status species (BIO-MM#7, BIO-MM#16, BIO-MM#17, BIO-MM#23, BIO-MM#29, BIO-MM#32, BIO-MM#34, BIO-MM#36, BIO-MM#38, BIO-MM#41, BIO-MM#43, BIO-MM#45, BIO-MM#48, BIO-MM#52, BIO-MM#53, BIO-MM#56, BIO-MM#59, BIO-MM#64, BIO-MM#65, BIO-MM#66, BIO-MM#67); preparing and implementing a plan for salvage, relocation, and propagation of special-status plant species (BIO-MM#8); preparing and implementing a groundwater adaptive management and monitoring plan (GAMMP) (BIO-MM#9); conducting biological monitoring during construction (BIO-MM#4); and providing compensatory mitigation for impacts on special-status species habitat (BIO-MM#10). While mitigation will reduce temporary and permanent impacts on special-status species during construction, it will not eliminate those impacts. Therefore, impacts of the cumulative projects in combination with the HSR project would result in a cumulative impact on special-status species.

Operations of these cumulative projects, including HSR, could result in additional impacts on special-status species. Operation of transportation projects could result in direct injury or mortality of individuals of special-status species through maintenance and mowing of roadside embankments and through vehicle and train strikes. Indirect habitat degradation near developed sites could result from factors such as nighttime lighting that illuminates adjacent habitat, herbicides applied for vegetation management drifting into adjacent habitat, and trash blown from nearby residential and commercial areas. Train passbys could disturb resident individuals or populations (e.g., breeding, nesting, and foraging waterbirds), driving birds from productive foraging and resting areas and resulting in an impaired energy budget and potentially in reduced reproductive success. Such disturbance could also degrade preferred nesting habitat. Because the loss of individuals from populations of special-status species or the degradation of important habitat would reduce the viability of such populations and potentially lead to their extirpation, these impacts would exacerbate regional population declines and thus would constitute a cumulative impact on special-status species within the cumulative RSA. However, because operations would potentially affect a wide array of wildlife taxa and because such effects are primarily associated with wildlife moving across or through the project footprint, these impacts are addressed in the discussion of Wildlife Corridors.

Non-Special-Status Wildlife

As described in Section 3.7, the cumulative RSA supports an abundant diversity of non-special-status wildlife species that do not receive legal protection and that are not considered sensitive by regulatory agencies, but that nonetheless contribute to the state's biodiversity. Past and present development in the cumulative RSA has resulted in the conversion or degradation of habitat for some species and has encouraged the expansion of generalist species that have adapted to and thrive in human-dominated landscapes (e.g., American crow, black-tailed deer). Most areas that still support large concentrations of native wildlife (e.g., Grasslands Ecological Area [GEA]) are cooperatively owned and managed by federal, state, and private entities for the benefit of wildlife (see Section 3.7.7.2, Biological Conditions).

Construction of cumulative projects, including the HSR project, would result in temporary and permanent construction impacts on non-special-status wildlife. The new SR 152 alignment between SR 156 and US 101 in Santa Clara and San Benito Counties is the only other planned project located in an area identified as important for migratory waterfowl and shorebirds (i.e., Upper Pajaro River Important Bird Area [IBA]). The HSR project would also affect this IBA, as well as the GEA IBA in Merced County. All aspects of construction have the potential to cause impacts, either from direct removal of habitat or mortality of individuals (e.g., loss of active bird nests or bat roosts), or from indirect impacts such as introduction of nonnative invasive species or changes in hydrology. Project features to reduce these impacts include preparing a BRMP (BIO-IAMF#5); conducting environmental awareness training for workers (BIO-MM#3); siting staging areas away from sensitive resources (BIO-IAMF#8); and developing a BMP field manual that will address proper waste management and storage, nonstormwater management, and other general site cleanliness measures to avoid spills of hazardous materials and reduce degradation of suitable habitat (BIO-IAMF#11). The Authority would implement mitigation that includes conducting pre-construction surveys for and delineating no-work buffers around active bird nests

(BIO-MM#43) and providing compensatory mitigation for impacts on waterfowl and shorebird habitat (BIO-MM#58). While mitigation will reduce temporary and permanent impacts on non-special-status wildlife during construction, it will not eliminate the impact. Therefore, these impacts would result in a cumulative impact from construction.

Operational impacts of the project in combination with cumulative projects would be similar to those described for special-status species. Because operations would potentially affect a wide array of wildlife taxa and because such effects are primarily associated with wildlife moving across or through the project footprint, these impacts are addressed in the discussion of Wildlife Corridors.

Special-Status Plant Communities

Past and present development in the cumulative RSA has resulted in the conversion of natural plant communities to residential, commercial, industrial, and agricultural land uses. The historical trend of converting as well as degrading these resources has resulted in the designation of multiple plant communities as sensitive by the CDFW (Table 3.7-7).

Construction of any of the project alternatives and other planned projects would result in temporary and permanent impacts on special-status plant communities. Planned development projects that could affect special-status plant communities include the Villages of Laguna San Luis Community Plan and Fox Hills Community Specific Plan Update projects in Merced County, both of which may affect wetland, grassland, and riparian land cover types that support special-status plant communities (e.g., California annual grassland within the footprints of these projects may support the *Nassella pulchra* Herbaceous Alliance [Table 3.7-8]); impacts would occur if activities associated with these projects result in the direct removal or degradation of these communities in or adjacent to the project footprints. Planned transportation projects such as the widening of SR 25 between Gilroy and Hollister, construction of the Los Banos Bypass (Segments 1, 2, and 3), and the HSR Central Valley Wye would also affect special-status plant communities in the Santa Clara and San Joaquin Valleys. The HSR project would affect 11 special-status plant communities, including California sycamore woodland (Table 3.7-16). All aspects of construction have the potential to cause impacts, either from direct removal associated with construction or from indirect impacts such as changes in hydrology or noxious weed infestations.

Project features to reduce the potential degradation of special-status plant communities include preparing a BRMP (BIO-IAMF#5); conducting environmental awareness training for workers (BIO-IAMF#3); siting staging areas away from sensitive resources (BIO-IAMF#8); developing a BMP field manual that will address proper waste management and storage, nonstormwater management, and other general site cleanliness measures to avoid spills of hazardous materials (BIO-IAMF#11); and designing and constructing tunnels to maintain existing groundwater levels over the tunnel structures throughout the tunnel design service life (HYD-IAMF#5). The Authority would implement mitigation that includes preparing and implementing a restoration and revegetation plan and weed control plan (BIO-MM#1, BIO-MM#2), conducting botanical surveys for special-status plant communities (BIO-MM#7); preparing and implementing a GAMMP (BIO-MM#9); conducting biological monitoring during construction (BIO-MM#4), restoring temporary riparian impacts (BIO-MM#68), and providing compensatory mitigation for permanent riparian impacts (BIO-MM#72). Other planned projects would have in place similar measures to minimize impacts on special-status plant communities. While mitigation will reduce temporary and permanent impacts on special-status plant communities during construction, it will not completely prevent the loss of all special-status plant communities throughout the cumulative RSA. Therefore, these impacts, in combination with those of other cumulative projects, would constitute a cumulative impact on special-status plant communities.

Operation of the planned projects, in combination with the HSR project, could result in intermittent impacts on special-status plant communities. Project operations would include inspection and maintenance activities along the HSR right-of-way. Because these activities would be conducted in areas that had already been cleared of vegetation and subjected to extensive ground disturbance to construct the HSR track and systems and other planned projects and

developments, it is highly unlikely that any special-status plant communities would remain within the right-of-way or other areas of disturbance. Therefore, there would not be a cumulative impact on special-status plant communities from operations.

Aquatic and Other Related Resources

Past and present development in the cumulative RSA has resulted in the conversion of aquatic and other related resources to residential, commercial, industrial, and agricultural land uses. The historical trend of converting as well as degrading these resources has resulted in the regulation of aquatic resources by the USACE, State Water Resources Control Board (SWRCB), and CDFW (see Section 3.7).

Construction of any of the planned projects, including the HSR project, would result in temporary and permanent impacts on aquatic and other related resources. Examples of planned development projects that could affect aquatic resources include The Villages of Laguna San Luis Community Plan and Fox Hills Community Specific Plan Update development projects in Merced County. Planned transportation projects such as the widening of SR 25 between Gilroy and Hollister, construction of the Los Banos Bypass (Segments 1, 2, and 3), and the HSR Central Valley Wye would also affect aquatic resources in the Santa Clara and San Joaquin Valleys. The HSR project would result in direct impacts on waters of the state and the waters of the U.S. as well as riparian areas subject to the regulatory provisions of California Fish and Game Code Section 1600 et seq. Construction would result in the conversion and degradation of such aquatic resources through direct removal, filling, and hydrological interruption.

HSR project features to reduce these impacts include preparing a BRMP (BIO-IAMF#5); conducting environmental awareness training for workers (BIO-IAMF#3); siting staging areas away from sensitive resources (BIO-IAMF#8); developing a BMP field manual that will address proper waste management and storage, nonstormwater management, and other general site cleanliness measures to avoid spills of hazardous materials (BIO-IAMF#11); and designing and constructing tunnels to maintain existing groundwater levels over the tunnel structures throughout the tunnel design service life (HYD-IAMF#5). The Authority would implement mitigation that includes preparing and implementing a restoration and revegetation plan and weed control plan (BIO-MM#1, BIO-MM#2); preparing and implementing a GAMMP (BIO-MM#9); conducting biological monitoring during construction (BIO-MM#4), restoring temporary impacts on jurisdictional waters (BIO-MM#73), and providing compensatory mitigation for unavoidable impacts on jurisdictional waters (BIO-MM#74). While mitigation will reduce temporary and permanent impacts on aquatic resources during construction, such mitigation will not eliminate the impact. These impacts, in combination with those of other cumulative projects, would result in a cumulative impact.

Operations of cumulative projects, including the HSR project, would include inspection and maintenance activities. Permanently affected aquatic features in the footprints of these projects would have been eliminated during construction, and therefore would not continue to be affected. Aquatic resources inside the project footprint that were avoided during construction (e.g., natural watercourses spanned by viaducts) and outside but adjacent to the project footprints (e.g., seasonal wetlands outside the footprint of facilities and staging areas) would remain unaffected. In addition, construction of planned projects and the HSR project would result in the creation of new aquatic resources (e.g., constructed basins and watercourses for drainage) in some portions of the footprints of those projects. Therefore, there would not be a cumulative impact on aquatic resources from operations.

Protected Trees

Protected trees are afforded protection by, and specifically identified in, county and city ordinances, codes, and general plans (see Appendix 2-J). A single project may affect protected trees in multiple jurisdictions, but there is no single law or policy covering all public trees in the cumulative RSA. Planned development and transportation projects would affect protected trees if construction or operation activities require the removal or trimming of trees protected under local tree protection ordinances. Because cumulative projects, including the HSR project, would entail

removal and trimming of protected trees, construction activities would result in a cumulative impact. The Authority would implement mitigation to reduce this impact by transplanting affected trees where possible and through compensatory mitigation (BIO-MM#75).

Operation of cumulative projects, including the HSR project, could require occasional trimming of some protected trees. However, because construction would likely have resulted in the bulk of impacts (removal, extensive trimming) of protected trees, operations in the same area are not likely to have substantial additional impact. Accordingly, there would not be a cumulative impact on protected trees from operation of cumulative projects, including the HSR project.

Wildlife Movement

As described in Section 3.7 and the Wildlife Corridor Assessment (Appendix C of the Biological and Aquatic Resources Technical Report [Authority 2020]), the cumulative RSA contains several wildlife corridors of regional importance, including three that have been identified by the CDFW and local stakeholders as particularly important: the Santa Cruz Mountains to Diablo Range linkage across Coyote Valley in Santa Clara County, the Diablo Range to Inner Coast Range linkage across Pacheco Creek and SR 152 in Santa Clara County, and the GEA IBA in Merced County. Past and present development and transportation projects have reduced habitat connectivity for wildlife throughout the region by introducing barriers and/or sources of mortality for wildlife attempting to move across landscapes in the region. For example, SR 152 within the Pacheco Pass region serves as a substantial barrier to wildlife movement as a major four-lane highway with a median barrier. As noted by CDFW, SR 152 is a substantial source of mortality from vehicle strikes for a variety of wildlife species attempting to move across SR 152. Among the wildlife species recorded as vehicle strikes in the Pacheco Pass region are larger species, which are known to avoid using small undercrossings, such as mountain lion, mule deer, and elk. Continued residential, commercial, and other development within the Coyote Valley region along US 101 has similarly affected wildlife attempting to move between the Santa Cruz and Diablo mountain ranges across the valley to the extent that there are few undercrossings that are routinely used by wildlife (e.g., the Fisher Creek undercrossing), and mule deer and other species are routinely killed by vehicles in the region. Within the GEA and surrounding region, past and present roads (such as SR 152/SR 33), continued residential and other development around Los Banos, and development within other surrounding communities have continued to affect habitat for migratory and other birds, as well as terrestrial species, such as kit fox and mule deer. The construction of reasonably foreseeable projects, including the HSR project, would result in additional temporary and permanent impacts on wildlife corridors through ground-clearing and other physical work necessary to construct the developments, roads, or road improvements but primarily by adding additional barriers to movement or changing barriers to movement or by causing wildlife to change activity or behavior patterns, affecting movement. Many of the planned transportation projects consist of improvements to existing roads or railroads that already serve as barriers or partial barriers to wildlife movement, and local stakeholders are engaged with California Department of Transportation (Caltrans) and other agencies to address wildlife movement in the design of projects, to the extent feasible.

Examples of planned development projects that would affect wildlife corridors in the GEA region include The Villages of Laguna San Luis Community Plan and Fox Hills Community Specific Plan in Merced County, both of which would reduce habitat connectivity for San Joaquin kit fox and other terrestrial wildlife species along the western edge of the San Joaquin Valley. The SR 152 Los Banos Bypass (Merced County) and the HSR Central Valley Wye projects would also affect wildlife corridors in the GEA region by adding new barriers to movement.

Projects that would introduce new barriers to the landscape in the Pacheco Pass region include the new SR 52 alignment between SR 25 and SR 152 in the adjacent Soap Lake floodplain (Santa Clara County), and the Fairview Road/Memorial Drive East-West Arterial north of Hollister (San Benito County). Within the Coyote Valley transportation projects such as the US 101 express lane conversion and new interchanges would introduce new barriers to wildlife movement or increase existing barriers to movement.

Construction of cumulative projects and the HSR project would continue to affect regional and local wildlife movement by introducing new infrastructure, buildings, tracks, and track systems to areas through which wildlife can currently move freely (e.g., across an expanse of open grassland or agricultural field) but would have to move around after the introduction of these projects. Barriers to movement and habitat fragmentation reduce resource availability and isolate breeding groups; both conditions ultimately lead to reduced reproductive success and inbreeding depression. This is particularly true in the case of mountain lion, where genetic connectivity between subpopulations has been identified as a significant issue for the continued persistence of populations in the region.

The Authority would implement mitigation that includes avoiding and minimizing temporary impacts on wildlife movement (BIO-MM#76a and BIO-MM#76b), modifying project design to accommodate wildlife movement (BIO-MM#77, BIO-MM#78), protecting land in the Santa Cruz to Gabilan Wildlife Linkage or the Soap Lake 10-year floodplain (BIO-MM#79a), and providing for improvements to existing wildlife movement opportunities between the Diablo Range and the Inner Coast Range (BIO-MM#79b). While mitigation implemented as part of the project will reduce temporary and permanent impacts on wildlife movement corridors during construction, it will not eliminate the impacts. These impacts, in combination with those of planned and future projects, would result in a cumulative impact.

Operation of the planned projects, including the HSR project, would intermittently but permanently affect wildlife movement through noise, vibration, visual stimuli, lighting, train strike, electrocution, entrapment in OCS poles, and collision with power lines or the OCS. Some of the nonphysical impact mechanisms that can interfere with movement (e.g., noise, visual disturbance) pertain equally to disturbance of resident individuals or populations (e.g., breeding, nesting, and foraging waterbirds). For example, noise, visual stimuli, and vibration from moving trains may startle individuals moving near the rail alignment, potentially causing abrupt changes in movement patterns and avoidance of areas near the alignment. Because mapped corridors and other undeveloped areas are more hospitable to wildlife, such areas are likelier than more developed areas to support wildlife movement as well as resident individuals and species. Train passbys could disturb resident individuals or populations (e.g., breeding, nesting, and foraging waterbirds), driving birds from productive foraging and resting areas and resulting in an impaired energy budget and potentially in reduced reproductive success. Such disturbance could also degrade preferred nesting habitat. Train strikes, electrocution, and entrapment could cause injury and mortality to individuals foraging near or resting on HSR infrastructure, including the Mud Slough area of the GEA in San Joaquin Valley (an important migratory and wintering habitat for waterfowl and shorebirds in western North America). Mitigation would be implemented to minimize permanent intermittent impacts on wildlife movement through incorporation of exclusion features for terrestrial species and deterrent and diversion features for avian species (BIO-MM#80, BIO-MM#81, BIO-MM#82, BIO-MM#83). While mitigation will reduce intermittent operations impacts on wildlife corridors, it will not eliminate such impacts. These impacts, in combination with those of other cumulative projects, would result in a cumulative impact on wildlife movement.

Conservation Areas

Construction of cumulative projects in the cumulative RSA would result in the removal or degradation of natural land cover on parcels that are protected or managed specifically or that have been designated as targets for the conservation of biological or aquatic resources. Major conservation areas outside the project footprint but within the cumulative RSA include Henry Coe State Park (Diablo Range, Santa Clara County), San Luis National Wildlife Refuge (Merced County), and Merced National Wildlife Refuge (Merced County). The project would cross the following conservation areas in Santa Clara, Merced, and San Benito Counties:

- Santa Clara County
 - Bloomfield (North and South) (Santa Clara Valley Open Space Authority)
 - Coyote Creek Parkway (Santa Clara County Parks and Recreation Department)
 - Fisher Creek Conservation Area (Silicon Valley Land Conservancy)

- Guadalupe River Park and Gardens (City of San Jose)
- Halperin Conservation Easement (Santa Clara Valley Open Space Authority)
- Pacheco Creek Open Space Regional Reserve (Santa Clara Valley Habitat Agency)
- Pajaro Ranch (The Nature Conservancy)
- Pajaro River Agricultural Preserve (Santa Clara Valley Open Space Authority)
- Pajaro River Mitigation Bank (Wildlands, Inc.)
- Silveira (Santa Clara County Parks and Recreation Department)
- Tulare Hill Land Bank (Santa Clara County Parks and Recreation Department)
- Tulare Meadows (Santa Clara Valley Open Space Authority)
- Tulare Hill Wedge Open Space Regional Reserve (Santa Clara Valley Habitat Agency)
- Merced County
 - Mud Slough Conservation Easement (CDFW)
 - Romero Ranch Conservation Easement (The Nature Conservancy)
 - Sequoia Riverlands Trust Conservation Easement (Sequoia Riverlands Trust)
- San Benito County
 - Soap Lake Ranch Easement (San Benito Agricultural Land Trust)

Although the planned development and transportation projects would include measures to minimize impacts on conservation areas, they would not prevent such impacts. Other planned development and transportation projects in the same corridor as the HSR project, such as the New SR 152 Alignment, the Merced County 2014 Regional Transportation Plan, and SR 152 Los Banos Bypass Phase 1, could also affect conservation areas. The combined construction-related impacts of these projects and the HSR project would result in a cumulative impact.

Operation of cumulative projects, including the HSR project, would affect habitat and ecological function in conservation areas through the same mechanisms previously identified for special-status species, non-special-status species, special-status plant communities, aquatic resources, protected trees, and wildlife corridors (including noise, visual, and vibration effects) where such projects encroach upon conservation area boundaries. Mechanisms such as vehicular travel associated with maintenance activities, runoff from developed areas, and increased human traffic in and near conservation areas could indirectly affect water quality and could lead to the introduction of invasive nonnative organisms. The project would include features and mitigation measures that will reduce the contribution of the project to these cumulative effects.

Habitat Conservation Plans

The Santa Clara Valley Habitat Plan (SCVHP) has been designed with cumulative projects and development patterns in the plan area in mind, minimizing the potential for conflicts. However, not all cumulative projects are included as covered activities in the SCVHP. For example, the expansion of Pacheco Reservoir and the new SR 152 alignment between SR 156 and U.S. 101, as well as the HSR project, are not covered activities in the SCVHP and their construction could conflict with SCVHP provisions.

The HSR project would conflict with three provisions (conservation actions) of the SCVHP:

- Action LAND-L4 requires the acquisition and enhancement of natural and semi-natural landscapes between the Santa Teresa Hills and Metcalf Canyon to the south that will contribute to providing connectivity between the Santa Cruz Mountains and Diablo Range to promote the movement of covered and other native species at many spatial scales.
- Action LAND-R3 requires the acquisition in fee title of or obtaining conservation easements on lands that protect at least 40 acres of existing California sycamore woodland (i.e., sycamore alluvial woodland) to preserve this rare land cover type in the SCVHP Plan Area. The biological objective that includes this action (Objective 9.2) further specifies that acquired stands should be at least 10 acres in size and contiguous.

- Action LAND-WP7 requires the acquisition of habitat near Santa Teresa Hills and Tulare Hill to provide connectivity between populations in the Diablo Range and the Santa Cruz foothills.

Conflicts with Actions LAND-L4 and LAND-WP7 are similar in that the project would affect connectivity between the Santa Cruz Mountains and the Diablo Range by limiting or affecting the movement of species between these regions. Two potential conflicts with Action LAND-R3 would occur: impacts on the Pacheco Creek Reserve, a property owned and managed by the SCVHA; and a lack of available acres of California sycamore woodland to meet the combined preservation and restoration needs of the SCVHA and the Authority. The project alternatives would cause permanent and temporary impacts in the area targeted for protection; consequently, additional lands would need to be secured to meet the objectives of that action.

Due to the HSR project effects, combined with potential effects of future projects, such as the Pacheco Reservoir expansion and the new SR 152 alignment from SR 156 to U.S. 101, there would be cumulatively significant impacts on the SCVHP.

Cumulative land use and/or infrastructure development in the Coyote Valley area between Morgan Hill may also conflict with wildlife crossing modifications identified as part of the Coyote Valley Linkage proposed by the Santa Clara Valley Open Space Authority's *Coyote Valley Landscape Linkage* report (SCVOSA 2017). The HSR project would conflict with 11 of 24 wildlife crossing modifications identified as part of the Coyote Valley Linkage. These impacts would vary with alternative as shown in Table 3.7-22. In locations where a specific length is proposed, the project alternatives would necessitate increasing the length of the crossings. Generally, Alternative 2 would increase the lengths more than Alternatives 1 or 3. Additionally, all project alternatives would increase the complexity and cost of implementing the crossing modifications.

Due to the HSR project effects, combined with potential effects of future development in Coyote Valley, there would be cumulatively significant impacts on wildlife crossing modifications in the *Coyote Valley Landscape Linkage* report.

Operation of cumulative projects, including the HSR project, is not likely to result in conflicts with HCPs because all impacts would have occurred as a result of project construction. Therefore, operation of the planned projects would not contribute to a cumulative impact on HCPs.

Contribution of the Project Alternatives

As described in Section 3.7, Biological and Aquatic Resources, environmental effects of the alternatives with the TDV and DDV would not change with respect to impacts on biological and aquatic resources. Accordingly, the project's contribution to cumulative impacts related to biological resources would not change with the TDV and DDV compared to the alternatives without the TDV and DDV. Consequently, there would be no change in the significance of any cumulative impacts or the project's contribution to cumulative impacts under CEQA related to the TDV and DDV.

Special-Status Species

Construction of all four project alternatives would be nearly identical with respect to the number of special-status plant species potentially affected. Alternative 3 would affect habitat for one additional species. Alternatives 1, 3, and 4 would generally result in lesser permanent and temporary impacts on habitat for special-status plant species than Alternative 2, primarily because the larger project footprint of the Alternative 2 embankment in the Monterey Corridor Subsection would convert more habitat than the viaduct under Alternatives 1 and 3. The relative aggregate magnitude of impacts would be, in descending order, Alternative 2, Alternative 3, Alternative 1, and Alternative 4.

The amount of habitat for special-status wildlife species removed by the four alternatives would be identical for some species and slightly different for others. For example, impacts on giant garter snake habitat would be identical under all four alternatives because all would follow the same alignment in the San Joaquin Valley Subsection—the only subsection where habitat for the species is present. In contrast, impacts on California tiger salamander habitat would vary due to slight differences in the alternative footprints in the Monterey Corridor and Morgan Hill and Gilroy

Subsections (see Section 3.7.8, Environmental Consequences). Despite minor differences in the amount of affected habitat for some species, all four project alternatives would have generally similar impacts on special-status species habitat and similar potential impacts on individuals.

IAMFs and the implementation of compensatory mitigation measures will reduce the project's contribution to cumulative impacts. The measures proposed and compliance with FESA and CESA mitigation requirements will fully offset impacts on special-status species habitat and individuals.

Non-Special-Status Wildlife

Construction of all four project alternatives would be similar with respect to their potential to cause direct mortality of non-special-status terrestrial wildlife and permanent impacts on habitat for migratory waterfowl and shorebirds. Because of its more extensive embankment profile, Alternative 2 would likely have a greater impact on non-special-status terrestrial wildlife than Alternatives 1, 3, and 4, which make greater use of aerial structures or existing at-grade Caltrain tracks. Impacts in the GEA would be the same under all four alternatives because they would follow the same alignment in that area. Impacts in the UPR IBA would be slightly greater under Alternative 3 than under Alternatives 1, 2, and 4 because it would traverse more of the UPR IBA than the other alternatives.

The project would contribute to this significant cumulative impact because the HSR project, in contrast to other cumulative projects, would affect the most sensitive area (i.e., the GEA) for non-special-status wildlife. Within the GEA region, BIO-MM#P1 requires the Authority to preserve and offset impacts on biological resources by acquiring easements on 10,000 acres of land within or adjacent to the GEA. This substantial commitment will help to preserve and establish additional wildlife habitat within the region which will offset impacts at the project-level to non-special-status wildlife. This mitigation measure will reduce the contribution of the project to cumulative effects on non-special-status wildlife.

Special-Status Plant Communities

Construction of all four alternatives would have identical impacts on vernal pools (both a special-status plant community and an aquatic resource) because that community is only present in the Pacheco Pass and San Joaquin Valley Subsections, where the alternatives would be identical. The ranking of overall impacts on special-status plant communities would be, in descending order, Alternative 2, Alternative 3, Alternative 1, and Alternative 4.

The project would contribute to this cumulative impact because the HSR project would increase the area and number of communities affected by other planned projects. Mitigation including BIO-MM#P1, and the associated mitigation measure BIO-MM#10 will require the Authority to mitigate for habitat loss through the establishment of conservation easements. These measures will substantially reduce this cumulative impact.

Aquatic and Other Related Resources

Construction of all four alternatives would have identical impacts on vernal pools (both a special-status plant community and an aquatic resource) because that community is only present in the Pacheco Pass and San Joaquin Valley Subsections, where the alternatives would be identical. The ranking of overall impacts on jurisdictional aquatic resources would be, in descending order, Alternative 2, Alternative 3, Alternative 1, and Alternative 4. Indirect impacts (modification of hydrology, introduction of invasive nonnative species) are assumed to be roughly proportional to direct impacts.

For aquatic and other related resources regulated under California Fish and Game Code Section 1600 et seq., the ranking of total impacts would be, in descending order, Alternative 2, Alternative 1, Alternative 3, and Alternative 4.

IAMFs, avoidance and minimization measures, and compensatory mitigation measures will reduce the project's contribution to cumulative impacts on aquatic resources. The measures

proposed and compliance with the USACE's no net loss of wetlands policy will fully offset impacts on aquatic and other related resources.

Protected Trees

Construction of all four alternatives would have similar impacts on protected trees. The ranking of overall impacts on land cover types suitable to support protected trees would be, in descending order, Alternative 3, Alternative 1, Alternative 2, and Alternative 4. Before mitigation, the project would contribute to this cumulative impact because of the multiple jurisdictions through which it passes where protected trees are present. Mitigation Measure BIO-MM#75: Implement Transplantation and Compensatory Mitigation for Protected Trees will be implemented, and will result in transplantation of protected trees, replacement of protected trees, and/or contribution to a tree-planting fund. With mitigation, the project would not contribute to a cumulative impact because affected protected trees would be replaced to fully offset tree removal.

Wildlife Movement

Although the extent and location of construction activities would be broadly similar under all four project alternatives, Alternative 2 would have greater impacts than Alternatives 1, 3, and 4 because it would be at grade or on embankment and fenced through large portions of the Monterey Corridor and Morgan Hill and Gilroy Subsections, affecting the movement of several species groups within that movement corridor. Alternatives 1, 2, and 4 would cross less land that has been protected to conserve wildlife movement and would cross less of the Santa Cruz to Gabilan Range modeled wildlife corridor in the Soap Lake floodplain than Alternative 3. Alternatives 1, 2, and 4 would follow a highly developed transportation corridor in downtown Gilroy rather than crossing the undeveloped agricultural areas east of Gilroy where Alternative 3 would be built. Alternative 3 would result in more extensive in-water impacts on aquatic species movement than Alternatives 1, 2, and 4 because of greater impacts in Llagas Creek. Within the Pacheco Pass region and the area within and surrounding the GEA, there are no differences among alternatives, and therefore all alternatives would have identical effects within those areas.

As described earlier, there are cumulative impacts on wildlife movement in the region from past, present, and reasonably foreseeable projects. The HSR project would contribute to this cumulative impact because it would also affect wildlife movement within important wildlife movement corridors. The extent to which the project alternatives would contribute to the cumulative impact is difficult to quantify. The Wildlife Corridor Assessment (Appendix C of the Biological and Aquatic Resources Technical Report [Authority 2020]) included permeability modeling for the purposes of quantifying pre- and post-project permeability for various species guilds, but did not model the cumulative setting.

The reductions in permeability modeled for the project vary between species and alternative considered. The modeling also represents a simplistic view of the contribution of the project effects on each species because not all modeled permeability reductions are equal in importance to the species, or the interaction of species and location is complex. For example, the majority of the permeability reductions for tule elk are within the Soap Lake and western Pacheco Pass region, an area where they have been historically uncommon. However, facilitating movement of this species over existing barriers to movement in this region may be of regional importance for the species given recent use of the area by the species as recorded by the Santa Clara Valley Habitat Agency. Conversely, the modeling indicates a relatively small reduction in permeability for mountain lion within the western Pacheco Pass region, however that area is extremely important for regional connectivity between mountain lion subpopulations. Considering these regional and species-specific factors and considering the contribution of other temporary and permanent impacts not quantified in the permeability analysis (e.g., noise and light, as described in Section 3.7), the Authority included mitigation measures that would further reduce [and offset] the contribution of the HSR project to cumulative wildlife movement impacts even though the project's incremental contribution is relatively minor.

Within the GEA region, BIO-MM#P1 requires the Authority to preserve and offset impacts on biological resources by acquiring easements on 10,000 acres of land within or adjacent to the GEA. This substantial commitment to acquire open space and habitat, which can include important habitat linkages and other areas important for wildlife movement, will help to preserve

and establish additional wildlife habitat within the region (especially for shorebirds and waterfowl) which will offset wildlife movement impacts at the project-level. Within the western Pacheco Pass region, BIO-MM#79b would result in enhanced wildlife movement in that region compared to existing conditions through the implementation of a wildlife overcrossing. The wildlife overcrossing would offset the project's contribution to wildlife movement impacts, particularly for species which require large crossings such as mountain lion, tule elk, and black-tailed deer, and would contribute to substantial improvements in the cumulative condition (i.e., SR 152 is currently a substantial barrier or hinderance to movement in the region and a wildlife overcrossing would help to substantially improve movement over this barrier). Within the Santa Clara Valley region (including the Soap Lake area), BIO-MM#79a will help to offset effects by preserving movement corridors between the Santa Cruz Mountains and Diablo Range. Lastly, the Authority has committed to various other mitigation measures including BIO-MM#76a which will minimize impacts on wildlife movement during construction, BIO-MM#76b which will help to improve movement opportunities within the western Pacheco Pass region, BIO-MM#77a to facilitate movement, and BIO-MM#77b which will require monitoring and adaptive management at dedicated wildlife crossings.

Collectively, these mitigation measures will further reduce the contribution of the project to cumulative wildlife movement effects.

Conservation Areas

Construction of any of the four project alternatives would have impacts of similar extent on conservation areas. Alternatives 2, 3, and 4 would generally affect a larger number of and more acreage in conservation areas than Alternative 1. The aggregate magnitude of impacts would be, in descending order, Alternative 3, Alternative 2, Alternative 4, and Alternative 1. The project would contribute to this cumulative impact because the HSR project would increase the area and number of conservation areas affected by cumulative projects and would affect the GEA, which provides some of the most important migratory and wintering habitat for waterfowl and shorebirds in western North America. However, the HSR project includes mitigation measures to mitigate this impact at a project level by replacing the permanent loss of habitat and ecological function through a compensatory mitigation plan. The measures proposed will offset impacts on habitat and ecological function in conservation areas.

Operation of the HSR project would affect habitat and ecological function in conservation areas through the same mechanisms previously identified for special-status species, non-special-status species, special-status plant communities, aquatic resources, protected trees, and wildlife corridors (including noise, visual, and vibration effects). Mechanisms such as vehicular travel associated with maintenance activities, runoff from developed areas, and increased human traffic in and near conservation areas could indirectly affect water quality and could lead to the introduction of invasive nonnative organisms. The project would include features and mitigation measures that will reduce the contribution of the project to these cumulative effects.

Habitat Conservation Plans

Construction of any of the four project alternatives would be nearly identical with respect to potential conflicts with HCPs. All four could conflict with the SCVHP's goal Action LAND-R3, which requires the protection of California sycamore woodland. All alternatives could also conflict with 11 of 24 planned wildlife crossings outlined in the Coyote Valley Linkage. Generally, Alternative 2 would require greater lengths (and cost and complexity) of wildlife crossings than Alternatives 1, 3, and 4. The project would contribute to this cumulative impact because the HSR project could make it difficult for the SCVHP to meet its conservation targets and for the Coyote Valley Linkage to be implemented as planned, increasing the cost and complexity of wildlife movement crossings. However, the HSR project includes mitigation measures to provide compensatory mitigation to ensure the SCVHP meets its conservation targets and mitigation to ensure that wildlife crossings are effective, with provisions for the protection and enhancement of wildlife movement habitat. The measures proposed will offset impacts on habitat conservation plans.

CEQA Conclusion

Special-Status Species

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to special-status species because it would contribute to ongoing habitat loss caused by development. The project's contribution to this impact would be considerable, however, extensive mitigation measures, such as species-specific avoidance, minimization, and compensatory mitigation measures, are proposed to help reduce the project's contribution to this impact. These measures will fully mitigate effects on listed species.

Operations impacts on special-status wildlife are addressed in the discussion of Wildlife Corridors.

Non-Special-Status Wildlife

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to non-special-status wildlife because such activities would convert or degrade habitat of continental importance to migratory shorebirds and waterfowl in the San Joaquin Valley (GEA). Because the HSR project would be the sole contributor to this impact in the GEA, its contribution would be considerable. However, the HSR project includes substantial mitigation measures within the GEA and surrounding region to address the project's contribution toward impacts on non-special-status wildlife such that the contribution will be less than considerable.

Operations impacts on non-special-status wildlife are addressed in the discussion of Wildlife Corridors.

Special-Status Plant Communities

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to special-status plant communities because they would contribute to loss and degradation of these resources through conversion and development. The project-specific impacts would combine with those related to construction of other planned projects such that there would be a cumulative impact on special-status plant communities in the region. However, the HSR project includes substantial mitigation measures to address the project's contribution toward habitat impacts such that the contribution will be less than considerable.

No cumulative impacts on special-status plant communities are anticipated during operations because these activities would be conducted in areas that had already been cleared of vegetation and subjected to extensive ground disturbance to construct the HSR track and systems and other planned projects and developments. It would be highly unlikely that any special-status plants would remain within the right-of-way or other areas of disturbance. Therefore, there would not be a significant cumulative impact during operations on special-status plant communities under CEQA caused by the project or to which the project would contribute. Therefore, CEQA does not require mitigation.

Aquatic and Other Resources

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to aquatic and other resources because such activities would contribute to loss and degradation of these resources. Measures are proposed to avoid and minimize such impacts and to compensate for any unavoidable effects on aquatic resources, including mitigation measures requiring compensatory mitigation for aquatic resources so that no net loss of aquatic resources will be achieved. With implementation of these mitigation measures, project-specific cumulative impacts on aquatic resources would not be cumulatively considerable. Therefore, CEQA does not require any mitigation.

No cumulative impacts on aquatic resources are anticipated during operations because workers would avoid sensitive areas, would avoid the introduction and spread of invasive nonnative species, and would be required to attend WEAP training about sensitive biological resources. Therefore, there would not be a significant cumulative impact during operations on aquatic resources under CEQA caused by the project or to which the project would contribute. Therefore, CEQA does not require mitigation.

Protected Trees

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to protected trees because such activities would result in the loss and disturbance of trees protected under an array of local ordinances and general plan policies. The project's contribution to this impact, before mitigation, would be considerable because of the multiple jurisdictions through which it passes where protected trees are present. With mitigation, the project-specific impacts would be fully offset such that there would not be a considerable contribution to a cumulative impact on protected trees.

No contribution to cumulative impacts on protected trees is anticipated during project operations because protected trees would have already been removed during construction. Therefore, there would not be a significant cumulative impact on protected trees under CEQA caused by the project or to which the project would contribute. Therefore, CEQA does not require mitigation.

Wildlife Movement

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to wildlife movement because such activities would interfere with wildlife movement across several known wildlife corridors as well as other portions of the alignment. The project will contribute to this cumulative impact because it would increase the impermeability of wildlife movement in the RSA as a result of cumulative projects as well as the level of disturbance to resident wildlife near the project alignment. The project-specific impacts would combine with those related to construction of other planned projects such that there would be a cumulative impact on wildlife movement in the region. However, the HSR project includes substantial mitigation measures to address the project's contribution toward wildlife movement impacts. Mitigation BIO-MM#76a will reduce construction related impacts such as ALAN. Mitigation BIO-MM#76b will maintain existing movement opportunities in the sensitive Pacheco Pass region through work areas during construction. Permanent wildlife crossings will be constructed under BIO-MM#77a. Wildlife permeability enhancements such as crossings will be subject to monitoring and adaptive management under BIO-MM#77b. Wildlife crossings will be incorporated into the guideway in the western Pacheco Pass region under BIO-MM#78. Impacts on the sensitive movement corridor between the Santa Cruz mountains and Diablo Range will be addressed by focused habitat acquisition set forth in BIO-MM#79a. Impacts on the movement opportunities in the Pacheco Pass region will be further mitigated by BIO-MM#79b, which would provide a wildlife overcrossing over SR 152 to allow animals, particularly large mammals, to safely cross a highway that roadkill data indicates is a substantial source of mortality for species like the mountain lion. Impacts on aerial species will be addressed by BIO-MM#80, particularly impacts in the GEA region. Impacts associated with train strike and entrapment will be minimized under BIO-MM#81. Impacts associated with entrapment of avian species will be addressed under BIO-MM#82. Wildlife movement in and around the GEA will be protected by BIO-MM#P1. For these reasons, the project construction's contribution to impacts on wildlife movement would be less than considerable.

Project operations, in combination with past and planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to wildlife movement. The project would cause intermittent but permanent disturbance of migratory waterfowl and shorebirds in the GEA and also introduce both temporary and permanent new infrastructure into areas that already have wildlife movement constraints (e.g., the western Pacheco Pass region). However, the project would include design features and mitigation measures that will reduce the

contribution of the project to these cumulative effects. Under BIO-MM#80, the Authority will construct noise/visual barriers within the GEA to reduce noise and visual impacts as well as potential train strike impacts, particularly for waterfowl and other shorebirds. Additionally, under BIO-MM#80, the Authority will construct an enclosure approximately 3.4 miles in length with the GEA IBA to enclose the train's operating envelope and OCS to reduce noise, visual, and potential train strike impacts.

The permeability modeling results set out in the WCA, which were developed prior to identification of proposed mitigation measures, indicate that the project would reduce permeability across species guilds in the Pacheco Creek Reserve region by an average of approximately 5%. For some mammals such as elk and foxes, the reduction in permeability was higher. For example, for foxes the reduction in permeability would be 12% and for elk 18%. The permeability model used in the WCA estimates that with mitigation measures (dedicated wildlife undercrossings within the Pacheco Pass region set forth in BIO-MM#77a), the project would result in an improvement in permeability. The reduction in permeability for foxes and elk would be approximately 7% with the dedicated wildlife undercrossings. The project's residual impact as indicated by permeability modeling would be approximately a 3% decrease in average permeability across all species guilds (an improvement from a 5% average decrease prior to mitigation). However, as noted within Section 3.7, Impact BIO#42 and Impact BIO#43, the project would have additional impacts, not quantified in the permeability modeling, related to the timing of construction at the tunnel portion in the Pacheco Pass Reserve region as well as other impacts from noise and light related to construction and operations.

The project's residual impacts (permeability reductions plus noise and light impacts) would be offset by implementation of BIO-MM#79b. The SCVHA has been awarded a local assistance grant from CDFW (awarded in 2021) to conduct a wildlife connectivity study along SR 152 in the Pacheco Pass region. The objective of that study is to identify the best locations and projects to implement wildlife connectivity enhancements in the region. A dedicated overcrossing over SR 152 in the Pacheco Pass region, which would be informed by the SCVHA's wildlife connectivity study, is the most effective solution for offsetting impacts. A recent study published by the U.S. Forest Service (prepared in cooperation with the Center for Large Landscape Conservation and the Western Transportation Institute) highlighted the efficacy of overpasses for wildlife, including mountain lion, elk, and other large ungulates, and included strategies to reduce the cost of such structures (McGuire et al. 2021). Data from wildlife overcrossings installed in North America indicate that such crossing structures typically reduce road mortality in a wildlife movement corridor of similar size to the Pacheco Pass region by approximately 50% (NDOT 2015). Based on those data, it is expected that road mortality on SR 152 in the Pacheco Creek Reserve region could decrease by approximately 50% with the installation of the wildlife overcrossing. Recent roadkill data provided by Pathways for Wildlife (Diamond 2021a) indicates that for a three-year period from August 2018 to September 2021, four mountain lions and one elk were killed by collisions with vehicles in the region. For species such as mountain lion and elk, a wildlife overcrossing over SR 152 would ameliorate a substantial threat to population viability and gene flow by reducing projected mountain lion mortality over a ten-year period by six individuals and reducing elk mortality over a ten-year period by two individuals (a 50% reduction in the estimated 10 year vehicle collision rate). It's important to note, however, that benefits to wildlife movement in the region resulting from a wildlife overcrossing, and in particular for large animals such as elk and mountain lion, may be substantially greater as the roadkill data only indicates animals killed by vehicles, not animals which approach but do not attempt to cross SR 152. In essence, it is likely that a wildlife overcrossing would facilitate greater movement than is indicated solely by the roadkill data. However, even the reduction in road mortality that currently occurs on SR 152 would provide a substantial benefit to gene flow (especially for mountain lions where every individual is critically important to gene flow between populations) and population viability that would more than offset the project's contribution to cumulative permeability impacts in the Pacheco Creek Reserve Area. The Authority has conferred with subject matter experts that have studied wildlife movement in the region and these experts validate the conclusion that an overcrossing would offset the remaining residual contribution to the cumulative context in the Pacheco Pass region, where additional mitigation is needed to reduce the level of significance

(Diamond 2021b). As such, the project's contribution to wildlife movement impacts will be less than considerable.

Conservation Areas

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to conservation areas because the project would result in loss and disturbance of habitat and ecological function. The contribution of the project to this cumulative impact would be cumulatively considerable because the HSR project would contribute to loss of habitat and ecological function in conservation areas. The project-specific impacts would combine with those related to construction of other planned projects such that there would be a cumulative impact on habitat and ecological function in conservation areas. However, the HSR project includes mitigation measures to provide compensatory mitigation which will offset the loss of habitat and ecological function in conservation areas such that the contribution will be less than considerable.

Project operations, in combination with cumulative projects in the cumulative RSA, would result in direct impacts on habitat and ecological function in conservation areas. Mechanisms such as vehicular travel associated with maintenance activities, runoff from developed areas, and increased human traffic in and near conservation areas could indirectly affect water quality and could lead to the introduction of invasive nonnative organisms. However, the project would include features and mitigation measures that will reduce the contribution of the project to these cumulative effects such that the contribution will be less than considerable.

Habitat Conservation Plans

Construction of any of the project alternatives, in combination with planned projects in the cumulative RSA, would result in a significant cumulative impact under CEQA with respect to provisions of the SCVHP and planned wildlife crossings in the Coyote Valley Linkage. However, the HSR project includes mitigation measures to provide compensatory mitigation to ensure the SCVHP meets its conservation targets and mitigation to ensure that wildlife crossings are effective, with provisions for the protection and enhancement of wildlife movement habitat which will reduce the project's contribution to cumulative impacts on the SCVHP and the Coyote Valley Linkage to a less than considerable level. Therefore, CEQA does not require further mitigation.

3.19.6.7 Hydrology and Water Resources

Resource Study Area

The cumulative RSA for surface water, groundwater, and floodplains is the same as those described in Section 3.8, Hydrology and Water Resources, because they are sufficiently broad to cover the area in which the potential cumulative impacts of the project alternatives, in combination with past, present, and reasonably foreseeable future projects, could occur. The three RSAs are illustrated on figures in Section 3.8.

The surface water hydrology, surface water quality, and floodplain RSAs share the same outermost boundary, so they are collectively referred to as the surface water RSA. The surface water RSA consists of the CalWater Planning Watersheds crossed by the project extent as described in Section 3.8.4.1, Definition of Resources Study Area (Figure 3.8-1). The surface water RSA was further defined by limiting it to the portions of planning watersheds within 3 miles of the project footprint in all but the Los Banos watershed, where a distance of 6.5 miles was used. These distances (3 miles and 6.5 miles) were determined in general conformance with identifying threshold drainage areas for Rapid Stability Assessments according to the Caltrans Hydromodification Guidance (2015). With respect to floodplains, all Federal Emergency Management Agency (FEMA)-delineated 100-year floodplains within the surface water RSA are included in the effects analysis, as described in Section 3.8.4.1 (Figure 3.8-6). The project alternatives cross numerous floodplains, including a large dynamic floodplain in the upper reaches of the Pajaro River southeast of Gilroy known as the Soap Lake floodplain.

The groundwater RSA includes the portions of DWR's Bulletin 118 groundwater basins crossed by the project extent that are within 2 miles of the project footprint as described in Section 3.8.4.1

(Figure 3.8-2). However, portions of the project footprint are not located within groundwater basins defined by DWR; in these areas, the RSA consists of all subsurface areas within 1 mile of the project footprint. The American Society for Testing and Materials Standard E1527-13 for environmental site assessments uses a distance of 1 mile as a study limit for investigations into groundwater quality; this distance satisfies federal regulations such as the Comprehensive Environmental Response, Compensation, and Liability Act. Therefore, distances of 2 miles and 1 mile are anticipated to be conservative for the purposes of analyzing potential effects on groundwater resources.

Volume 2, Appendix 3.8-B, Summary of Hydraulic Modeling for Existing and Proposed Conditions, provides detailed information on floodplains crossed by the project extent.

Cumulative Condition

Past and ongoing urban development and agricultural practices have resulted in widespread conversion of undeveloped land to commercial, residential, transportation, and agricultural land uses. Under the cumulative condition, such conversion is expected to continue in the RSAs. Urban development stemming from the projected population increase through 2040 will result in the conversion of agricultural and undeveloped lands to accommodate housing, commercial and office development, transportation infrastructure, parks, and schools. However, a portion of the planned urban development under the cumulative condition would consist of redevelopment—improving or reconstructing areas that were previously developed—particularly in the urbanized areas of San Jose, Morgan Hill, and Gilroy.

Surface Water Hydrology

During project construction, substantial temporary construction impacts on surface water hydrology would result from the construction of tunnels in the Morgan Hill and Gilroy and Pacheco Pass subsections. This would occur as a result of groundwater seeping into the tunnels as the excavation advances through the subsurface, resulting in a temporary lowering of the surrounding groundwater table and associated reductions in groundwater discharges to receiving waterbodies. These impacts are expected to occur in approximately 47 waterbodies, 1 public water supply well, 23 private water supply wells, and 1 seep/spring. Project features include designing and constructing the tunnels to be as watertight as feasible through the use of state-of-the-art tunnel liner systems and a tunnel boring machine capable of controlling groundwater inflows with grouting and other methods (HYD-IAMF#5). Additionally, mitigation would be implemented to offset any remaining adverse impacts on the hydrology of receiving waterbodies (HYD-MM#1). This mitigation will include the implementation of an adaptive monitoring and management plan that will include providing supplemental water during project construction to correct any anticipated or observed changes in surface water hydrology conditions in order to avoid or minimize impacts on public and private water supply resources such as springs and seeps, as well as aquatic resources and special-status species habitat. Mitigation would be implemented until monitoring efforts confirm that pre-construction surface water hydrology conditions have been restored and that mitigation is no longer necessary. Tunneling is currently expected to begin in 2022 and end in 2027 for an overall duration of 5 years; the temporary surface water hydrology impacts associated with tunneling may extend for months or years after tunnel construction is complete. The impact of tunnel construction on surface water hydrology is expected to be the same under all four alternatives.

Of the cumulative projects, several developments are proposed with the intent to permanently and substantially alter surface water hydrology conditions in the RSA. The planned San Luis Reservoir Low Point Improvement Project, which is sponsored by the SCVWD, Pacheco Pass Water District, and the San Benito County Water District, proposes to increase the capacity of the Pacheco Reservoir along North Fork Pacheco Creek. Expanding the reservoir would impound additional surface flows in the North Fork Pacheco Creek watershed, increase summer low flows in Pacheco Creek to improve aquatic habitat for salmonids, and reduce or withhold discharges from the reservoir during winter high flow conditions to enhance flood control in Pacheco Creek and the Soap Lake floodplain. Construction of the San Luis Reservoir Low Point Improvement Project is currently expected to begin in 2024 and extend up to 2029 for a duration of

approximately 5 years, with the permanent hydrology impacts beginning after construction of the dam is complete. Additionally, the 25-Year Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority makes available up to 80,000 acre-feet of water conserved through tailwater recapture or other conservation measures in the San Joaquin Valley for transfer or use by certain members of the San Luis & Delta-Mendota Water Authority for irrigation, municipal, and domestic water supply purposes. These water transfers would convey surface water derived from the Sacramento–San Joaquin River systems to water users in Contra Costa, Alameda, Santa Clara, and San Benito Counties. While the San Luis Reservoir Low Point Improvement Project and 25-Year Water Transfer Program would permanently alter existing surface water hydrology conditions by transferring surface water between watersheds, impounding large volumes of water, and releasing imported water stored in reservoirs into streams, these impacts are largely expected to benefit the environment by conserving water, improving water supply reliability, enhancing aquatic habitat, and controlling floods (Reclamation 2013, 2019).

For the project alternatives, other temporary construction impacts resulting from earthwork, temporary stream diversion, and construction activities in waterbodies are anticipated to minimally affect existing surface water hydrology conditions. Cumulative projects that are expected to require similar activities that could affect surface water hydrology include the HSR Central Valley Wye Project, which requires new crossings of waterbodies, as well as developments that involve bridges, such as the Light Rail Bridge and Structure Repair project and the Isabel Bridge Replacement project, in the cumulative RSA. Linear road and highway projects that could affect waterbodies include the completed SR 85 between I-280 and SR 87 near Campbell, the planned US 101 Express Lane Conversion currently under construction, and the planned San Mateo/Santa Clara County Line to Cochrane Road project, the entire length of SR 237 between Milpitas and Sunnyvale, SR 152 between SR 156 and US 101 near Gilroy and a new bypass in Los Banos, SR 25 Widening Project and Route Adoption Hollister to Gilroy, several expressways in Santa Clara County, and numerous other local roadway projects.

Additionally, new roadway and highway widening projects and commercial and residential development would add pavement area, rooftops, sidewalks, and other new construction that would replace existing undeveloped land. This increase in impervious surface and drainage density would result in permanent increases in stormwater runoff volumes during rain events and would require new drainage systems or modification of existing systems to handle the increase in flow. For the project alternatives, the goal for the design of drainage systems is to maintain existing drainage patterns, to the extent feasible, to avoid or minimize resulting changes in erosion and sedimentation patterns on- and off-site. CWA Section 402 NPDES municipal separate storm sewer system (MS4) permits—such as the municipal regional permit (MRP) in Santa Clara and San Jose; the Phase II MS4 permit, which applies to the Authority’s right-of-way and the Cities of Morgan Hill and Gilroy; and Caltrans NPDES permit on the state highway system—require new development, redevelopment, and transportation projects to incorporate flow-control and hydromodification features (e.g., basins, bioswales, storage features) to permanently moderate peak discharges and prevent additional runoff from cumulative projects from exceeding existing drainage capacity. In accordance with these existing laws and permit processes, the Authority would design drainage systems to handle anticipated flows and improve existing drainage systems or use detention or other facilities to maintain existing drainage capacity.

Existing laws and permit processes in the cumulative RSA would work together to ensure avoidance and minimization of cumulative construction impacts on surface water hydrology from cumulative projects, including the project alternatives. Project features include the development of a SWPPP that describes the temporary BMPs applied within the project footprint to stabilize soil, control sediment transport, and minimize leaks and spills of equipment and materials (HYD-IAMF#3). The SWPPPs would include temporary erosion and sediment control BMPs to control erosion and sedimentation resulting from construction of drainage improvements, permanent changes in topography (e.g., cut-and-fill slopes), temporary drainage systems such as slope drains and stabilized flow conveyance systems, and temporary creek diversion and dewatering to

maintain existing drainage patterns during construction of planned development. Additional project features will maintain pre-project hydrology by reducing the quantity of runoff from new impervious surfaces and improving the quality of runoff (HYD-IAMF#1). Mitigation will be provided for substantial temporary hydrology impacts associated with tunneling, such that all surface water hydrology effects will be reduced to less than significant levels. Therefore, while there is potential for the mitigated adverse hydrology impacts on Pacheco Creek associated with the project alternatives to overlap with the beneficial hydrology impacts on Pacheco Creek from the San Luis Reservoir Low Point Improvement project, these impacts would not accumulate and would not result significant cumulative hydrology impacts on Pacheco Creek or other receiving waterbodies.

Project operations in combination with cumulative projects have the potential to directly affect waterbodies through the maintenance of bridges, culverts, and drainage systems. HSR operations and maintenance activities would involve intermittent maintenance activities such as vegetation management along or near streams and cleaning storm drainage systems. Operations and maintenance BMPs would be implemented in accordance with the Phase II MS4 Permit to prevent substantial changes in drainage patterns or drainage capacity. These project features will minimize intermittent surface water hydrology impacts with BMPs designed to avoid or minimize erosion and sedimentation in receiving waterbodies. Therefore, project operations in combination with planned development in the cumulative RSA would not result in cumulative impacts on surface water hydrology.

Surface Water Quality

The project alternatives and cumulative projects would result in temporary and permanent construction impacts on waterbodies where projects cross these features or where development occurs on or near their banks. The project and any planned projects that cross over waterbodies and involve the construction of bridges or other infrastructure in or near waterbodies may require construction activities in waterbodies, potentially exposing surface water to direct introduction of construction materials, equipment, and wastes, and requiring the removal of riparian vegetation for access. Additionally, some of the cumulative projects, including the project alternatives, would cause the permanent loss of aquatic resources and riparian habitat through fill and conversion to other land uses, resulting in increased turbidity and sediment concentrations, increases in water temperature, and decreases in dissolved oxygen concentrations in waterbodies. Planned transportation projects that could result in direct impacts on waterbodies or otherwise generate pollutants include the completed BART Silicon Valley Extension, the Caltrain Double-Track Segments between San Jose and Gilroy, Capitol Corridor Extension to Salinas currently in construction, the planned ACE Forward, and various BRT and light rail projects in the Santa Clara Valley as well as improvements to SR 152 between SR 156 and US 101, the Hecker Pass and Glen Loma Ranch specific plans, and expansion of the Pacheco Pass landfill composting facility. Planned development projects most likely to affect surface water quality include transportation projects such as the HSR San Francisco to San Jose Project Section and Central Valley Wye Project, both of which require new crossings of waterbodies.

Cumulative projects, including the HSR project, would also entail the construction of impervious surfaces. As mentioned in the discussion of surface water hydrology, new and modified roadways associated with the HSR project in addition to planned transportation and development projects would add impervious surfaces to the landscape and would replace existing undeveloped land. This increase in impervious surface would collect additional pollutants from surrounding land uses. When it rains, these pollutants would be discharged into waterbodies. Refer to the discussion of cumulative impacts on surface water hydrology for more information on how these impervious surfaces would affect runoff volumes.

Project features will reduce impacts on water quality. Project features will include temporary BMPs that will be applied within the project footprint to stabilize soil, control sediment transport, and minimize leaks and spills of equipment and materials through development and implementation of a SWPPP (HYD-IAMF#3). Additionally, permanent water quality impacts from impervious surfaces will be minimized by reducing the quantity and improving the quality of runoff with a Stormwater Management and Treatment Plan (HYD-IAMF#1). A Stormwater Management

and Treatment Plan and similar plans would be prepared for all applicable development projects to permanently manage runoff from new and reconstructed impervious surfaces for all regulated projects in accordance with the Phase II MS4 permit, MRP, and Caltrans NPDES permit.

Mitigation measures will further reduce aquatic resource and riparian habitat impacts, including preparing and implementing a restoration and revegetation plan (BIO-MM#1), establishing environmentally sensitive areas and nondisturbance zones (BIO-MM#3), preparing a plan for dewatering and water diversions (BIO-MM#25), restoring temporary riparian habitat and aquatic resource impacts (BIO-MM#71 and BIO-MM#73), and providing compensatory mitigation for permanent riparian impacts (BIO-MM#72). Mitigation measures incorporated into the project will reduce temporary and permanent impacts on water quality during construction in accordance with applicable federal and state requirements. Therefore, the project would not contribute to temporary or permanent cumulative impacts on water quality.

Operations and maintenance of the HSR project in combination with cumulative projects have the potential to affect surface water quality in the cumulative RSA. HSR and cumulative projects would use materials and generate wastes, such as pesticides, lubricants, hazardous materials, and brake dust, that could contribute to cumulative surface water quality impacts if such materials are discharged to waterbodies. Operations and maintenance of many planned developments would be subject to the Phase II MS4 permit, MRP, and Caltrans NPDES permit. Planned industrial development may also be regulated under the industrial general permit (IGP). These permits require the implementation of BMPs to minimize impacts of municipal, industrial, commercial, and transportation operations on surface water quality. Project operations would be regulated under the IGP and Phase II MS4 permit. The SWPPP prepared for the project under the IGP would only apply to specific areas that engage in industrial activities, such as stations, the East or South Gilroy MOWF, and the MOIS. The Phase II MS4 permit would apply to the project's entire right-of-way. These features of planned development and the project would reduce the risk of planned development and HSR services violating water quality standards or creating a substantial new source of contaminated runoff. Therefore, project operations in combination with cumulative projects in the cumulative RSA would not result in cumulative impacts on surface water quality.

Groundwater

As described previously under Surface Water Hydrology, substantial temporary construction impacts on surface water hydrology would result from the construction of Tunnel 1 and Tunnel 2 in the Morgan Hill and Gilroy and Pacheco Pass subsections, respectively. These hydrology impacts would occur as a result of groundwater seeping into the tunnels as the excavation advances through the subsurface, resulting in a temporary lowering of the surrounding groundwater table and associated reductions in groundwater discharges to receiving waterbodies. These impacts are expected to accumulate in downstream waterbodies such as Pacheco Creek, Ortega Creek, and Romero Creek, with the largest potential effects on groundwater levels occurring along Pacheco Creek because it is a perennial waterbody sustained by groundwater baseflows. Project features include designing and constructing the tunnels to be as watertight as possible through the use of state-of-the-art tunnel liner systems and a tunnel boring machine capable of controlling groundwater inflows with grouting and other methods (HYD-IAMF#5). Mitigation would be implemented to offset any remaining adverse impacts on the productivity of water supply wells, seeps, and springs as well as groundwater levels along receiving waterbodies (HYD-MM#1). This mitigation will include an adaptive monitoring and management plan that will include treating groundwater inflows prior to release into receiving waterbodies, including Pacheco Creek. This is expected to reduce, if not completely avoid, impacts on groundwater levels along receiving waterbodies. Additionally, mitigation will include providing supplemental water during project construction to correct any anticipated or observed reductions in the productivity of water supply wells, seeps, and springs. Mitigation would be applied until monitoring observes that pre-construction surface water groundwater conditions have been restored and mitigation is no longer necessary.

Although this mitigation will reduce impacts on the water supply uses of wells, seeps, and springs as well as surface water flow alterations resulting from a lowered groundwater table, mitigation will not avoid a lowering of the groundwater table associated with tunneling. Impacts on groundwater levels are expected to be the same for each of the project alternatives, and they are expected to persist for years after construction of the tunnels is complete in 2027.

The SCVWD is planning a maintenance project for the Pacheco Conduit, which is in the vicinity of the proposed Tunnel 1 and Tunnel 2, but that project does not expect to encounter substantial amounts of groundwater or require dewatering substantial volumes of groundwater from aquifers in the Morgan Hill and Gilroy or Pacheco Pass Subsections of the project alternatives. The planned San Luis Low Reservoir Point Improvement project is a water supply project that proposes to expand the capacity of the Pacheco Reservoir. The San Luis Low Reservoir Point Improvement project would have temporary impacts on groundwater recharge along Pacheco Creek associated with a temporary reduction in reservoir releases during the construction phase, but these impacts would not substantially differ from existing conditions (SCVWD 2017a). Furthermore, expansion of the reservoir would permanently benefit groundwater conditions in the cumulative RSA through an increase in percolation of reservoir releases through the bed of Pacheco Creek as well as a decrease in pumping within Santa Clara Valley Water District's and San Benito County Water District's service area by offering alternative surface water sources (SCVWD 2017a). The project alternatives and San Luis Low Reservoir Point Improvement project are not expected to have overlapping construction schedules. No other projects have been identified that would potentially affect groundwater levels along Pacheco Creek or in the vicinity of the project alternatives' tunnels.

Groundwater overdraft has been a concern in the San Joaquin Valley region, and groundwater levels have dropped in shallow aquifers despite increased regulation and conservation associated with the Sustainable Groundwater Management Act. Future development in the San Joaquin Valley area could permanently increase impervious surfaces, reducing the amount of water that could recharge aquifers, as well as increasing groundwater pumping in the cumulative RSA. Continued population growth, agricultural production, and the associated demand for potable water sources would require drawing more water from aquifers, particularly when surface water supplies are reduced during periods of drought. Planned projects that could affect groundwater include the planned construction of more than 20,000 new residential units and developments, such as industrial and commercial projects, that require water to construct and operate. The Sustainable Groundwater Management Act is likely to further reduce demand on the San Joaquin Valley Basin through increased conservation and management. However, drafts of groundwater sustainability plans prepared pursuant to the Sustainable Groundwater Management Act are not yet in place and therefore could not be reviewed during preparation of this analysis. It is presumed that these groundwater sustainability plans would result in reduced groundwater pumping and increased groundwater recharge. Nevertheless, given the intensity of groundwater pumping in the San Joaquin Valley, recovery from existing overdraft conditions is expected to take multiple years, if not decades.

Existing laws and permit processes in the cumulative RSA, such as the Sustainable Groundwater Management Act and drilling permits required by local agencies with oversight of groundwater basins, would work together to minimize groundwater withdrawal and reduce cumulative impacts on groundwater from the HSR project and cumulative projects. Project features will include temporary BMPs that will prevent or reduce leaks and spills as well as the exposure of contaminants to runoff that could percolate into the groundwater table and affect groundwater quality (HMW-IAMF#6). The Authority will prepare a SWPPP in accordance with the IGP and a Hazardous Materials Monitoring Plan, as well as replace hazardous materials with nonhazardous alternatives for use during operations (HYD-IAMF#3 and HMW-IAMF#9). To address the potential permanent impacts from the added impervious areas of the HSR project and cumulative projects—i.e., reduction of recharge areas for groundwater—infiltration-type stormwater BMPs would be considered in compliance with the Phase II MS4 permit, MRP, and Caltrans NPDES permit. Permanent stormwater treatment BMPs required by these permits would be incorporated

into the design of the HSR project and planned development, including linear transportation projects, to maximize stormwater infiltration and recharge to groundwater aquifers and minimize impacts on groundwater. Additionally, mitigation (HYD-MM#1) would be implemented to offset temporary reductions in the productivity of water supply wells, seeps, and springs, but this mitigation will not completely offset significant temporary reductions in groundwater levels within aquifers affected by tunneling.

The Sustainable Groundwater Management Act is likely to further reduce demand on the San Joaquin Valley Basin through increased conservation and management. However, existing groundwater overdraft is expected to continue during operations and maintenance due to high agricultural demand.

Of the cumulative projects, the largest source of groundwater depletion is associated with HSR project tunneling in the Morgan Hill and Gilroy and Pacheco Pass Subsections as well as the impact of planned development in the San Joaquin Valley. Project tunneling activities have the potential to substantially lower the groundwater table in the Pacheco Pass area and affect the productivity of water supplies derived from seeps, springs, and wells, but these impacts would be temporary. Mitigation (HYD-MM#1) has been incorporated into the project alternatives to address any disruptions in the water supply associated with HSR project tunneling, which will reduce project-level groundwater impacts associated with tunnelling. The impact is expected to be the same under all four alternatives. There are no other cumulative projects in the Pacheco Pass area that would also adversely affect groundwater levels. Groundwater effects associated with the project tunnelling would not overlap with continued and expected future groundwater withdrawal in the San Joaquin Valley, because groundwater withdrawal associated with these developments would not occur in the same groundwater basin or subbasin. The project alternatives' effects on groundwater depletion in the Pacheco Pass area associated with tunneling would be a project-only effect because construction of Tunnels 1 and 2 are the only actions in the cumulative RSA that would substantially affect groundwater levels in this area, and as such there is no significant adverse cumulative effect on groundwater in this area since adverse effects are limited to the project itself.

Floodplains

Construction of any of the project alternatives would require temporary fill in 100-year floodplains; this temporary fill could include falsework, trestles, stream diversions, and other temporary structures. Some developments in the cumulative condition are expected to involve installation of permanent infrastructure and buildings, including bridges and culverts, in 100-year floodplains regulated by FEMA. However, the Authority's design-build contractor would monitor weather forecasts for potential flood conditions, coordinate with water and irrigation districts regarding scheduled releases from dams, and relocate equipment and materials temporarily stored in floodplains when floods are forecast or releases from dams are scheduled to avoid project-specific temporary impacts on floodplains.

Planned projects that could permanently affect floodplains include new and improved bridge crossings, such as the Light Rail Bridge and Structure Repair and adjacent HSR project sections. Residential and commercial developments could be undertaken in floodplain areas susceptible to overland flows, such as within the Soap Lake and San Joaquin River floodplains. The SCVWD and USACE are implementing the Upper Llagas Creek Flood Protection Project, which is currently in construction and would provide flood control improvements that would protect hundreds of residences, business, and croplands in Morgan Hill, San Martin, and Gilroy from flooding during the 100-year flood. However, this flood control project would alter peak flood flows in Soap Lake, because Llagas Creek is a tributary of Soap Lake. Additionally, the Pacheco Reservoir Expansion Project would alter peak flood flows in Pacheco Creek through the increased reservoir capacity. If the impacts on floodplains from these projects were to combine to redirect flood flows or increase flood elevations such that structures within a floodplain would be imperiled, it would be considered a cumulative impact.

The greatest potential for permanent cumulative floodplain impacts is in the Soap Lake floodplain. Soap Lake is a large floodplain area south of Gilroy in the upper reaches of the Pajaro River that is fed by Llagas Creek, Uvas and Carnadero Creeks, Pacheco Creek, Tequisquita Slough, and other named and unnamed drainages. During the 100-year flood, the combined flows from these drainages overtop channel banks and inundate thousands of acres of agricultural land. Because of the large area that drains into Soap Lake, developments that alter flows of any tributary of Soap Lake could result in cumulative impacts. Though agricultural land uses predominate in the Soap Lake area, planned developments in the Soap Lake area include construction of the planned South County Regional Wastewater Authority Maintenance Building, the widening of SR 25 between Hollister and Gilroy, a new SR 152 alignment between SR 156 and US 101, and new commercial/industrial development approved by the City of Gilroy. These developments would include the placement of fill or other obstructions to flood flows in the floodplain, increasing the 100-year water surface elevation (WSE) of the floodplain or exposing new areas to flooding.

In the Soap Lake area, the HSR project would entail construction of an MOWF and viaducts, both of which have been designed to minimize impacts on WSEs and flood flow patterns. These design features include equalizer culverts and ditches along track embankments and strategic placement of viaduct sections to maintain flood flow patterns, as well as flood control basins at the potential MOWF sites. Additional flood protection measures that will be documented in a flood protection plan will minimize development in floodplains and prevent increases in 100-year WSEs by more than 1 foot in floodplains and no increases in floodways (HYD-IAMF#2). As part of receiving approval to construct the HSR project from floodplain managers with jurisdiction over Soap Lake, the final design of the project would be required to demonstrate through hydraulic modeling that the project would not combine with planned development to redirect flood flows or increase flood elevations such that structures within a floodplain would be imperiled. Accordingly, conditions for approval to construct the project would preclude significant cumulative impacts on floodplains, including Soap Lake.

Operations and maintenance of the project and planned development would require maintenance activities conducted in or near floodplains, such as the routine maintenance of existing bridges, culverts, and drainage systems. However, these maintenance activities would not require temporary fill within a floodplain. Therefore, project operations in combination with planned development in the cumulative RSA would not result in cumulative impacts on floodplains.

CEQA Conclusion

Surface Water Hydrology

Significant cumulative impacts related to surface water hydrology are anticipated during construction or operations of the project in combination with cumulative projects in the cumulative RSA. The project alternatives would result in temporary significant adverse impacts on surface water hydrology as a result of tunneling, but these temporary surface water hydrology impacts will be mitigated to a less than significant level (HYD-MM#1). Beginning in 2029, remedial actions and adaptive management measures associated with the Groundwater Adaptive Management and Monitoring Program (HYD-MM#1) have the potential to overlap with permanent beneficial surface water hydrology impacts associated with the San Luis Low Reservoir Point Improvement project, but these temporary adverse impacts and permanent beneficial impacts will not result in significant cumulative adverse impacts on surface water hydrology. On this basis, the project would not result in cumulatively considerable contributions to construction or operational impacts on surface water hydrology under CEQA; therefore, CEQA does not require mitigation.

Surface Water Quality

Construction of the project, in combination with planned projects in the cumulative RSA, would not result in a significant cumulative impact under CEQA with respect to water quality. Project features and mitigation measures have been incorporated into the project alternatives to avoid and/or minimize these impacts as well as compensate for remaining impacts; these actions will include restoration of temporarily affected waterbodies, revegetating riparian areas, and compensatory mitigation for permanently affected aquatic resources so that no net loss of aquatic resources occurs. All cumulative projects would be subject to the same federal and state regulations that protect jurisdictional aquatic resources, including creeks, streams, wetlands, and riparian areas. Therefore, with implementation of these project features and mitigation measures, project-specific contributions to cumulative impacts on water quality would not be cumulatively considerable. Therefore, CEQA does not require any mitigation.

Groundwater

The project would not contribute to significant cumulative impacts on groundwater as a result of project tunneling, because construction of Tunnels 1 and 2 are the only actions in the cumulative RSA that would substantially affect groundwater levels in the Pacheco Pass area. As described in Section 3.7, Hydrology and Water Resources, with implementation of the Groundwater Adaptive Management and Monitoring Program (HYD-MM#1), the project’s tunnelling effects on groundwater would be less than significant. Although planned development in the San Joaquin Valley is expected to place additional demand on the groundwater basin, which is already experiencing severe overdraft conditions, significant impacts associated with tunneling under the project alternatives would not contribute to this condition of overdraft in the San Joaquin Valley. On this basis, the project alternatives would not result in cumulatively considerable contributions to cumulative on impacts on groundwater.

Floodplains

Significant cumulative impacts related to floodplains are not anticipated during project construction or operations in combination with planned development in the cumulative RSA. Regulatory standards and conditions of individual project approvals would minimize impacts on floodplains associated with cumulative projects, including HSR. On this basis, the project would not result in cumulatively considerable contributions to construction or operational impacts on floodplains, including Soap Lake, under CEQA; therefore, CEQA does not require mitigation.

3.19.6.8 Geology, Soils, Seismicity, and Paleontological Resources

Resource Study Area

Geology, Soils, and Seismicity

The cumulative RSA for geology, soils, and seismicity encompasses 5 miles on either side of the project alternatives’ footprints. This RSA is larger than the RSAs used for the analyses in Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources (defined as 150 feet on either side of the project footprints for geologic conditions and soils and 0.5 mile on either side for geologic hazards). The larger cumulative RSA is sufficiently broad to cover an area in which the potential impacts associated with geology, soils, and seismicity pertaining to the project alternatives, in combination with past, present, and future planned development in the region, could result in cumulative impacts. Specifically, the cumulative RSA allows for the analysis of additional projects that regionally affect geology, soils, and seismicity.

Paleontological Resources

The cumulative RSA for paleontological resources is the entirety of Santa Clara, San Benito, and Merced Counties, which is larger than the RSA used for the analysis in Section 3.9 (defined as 150 feet on either side of the project alternatives’ footprints). The cumulative RSA is larger because it captures impacts on paleontological resources associated with planned development and allows for the analysis of additional projects that would affect paleontological resources in the region.

Cumulative Condition

Geology, Soils, and Seismicity

Most of the planned infrastructure development activities identified in Appendices 3.19-A and 3.19-B would be susceptible to seismic and geologic hazards in the cumulative RSA. If the impacts of these cumulative projects were to combine to create public risk related to geologic, soil-related, or seismic hazards, such risk would constitute a cumulative impact.

In general, past and present development has led to more densely populated land use, thereby exposing more people to hazards associated with geology, soils, and seismicity. This is evident in the Santa Clara Valley, where past development was constructed on unstable soils susceptible to strong ground shaking, surface fault rupture, liquefaction, and erosion. The Pacheco Pass area is susceptible to landslides and surface fault rupture. While this area would not likely be developed into densely populated land use, SR 152 connecting the Santa Clara and San Joaquin Valleys through the area is an important transportation corridor. In the San Joaquin Valley near the project extent, future development would likely occur near Los Banos; this area could be affected by collapsible soil.

Transportation and development projects in the cumulative RSA, in combination with the HSR project, could be affected by ground subsidence caused by regional groundwater extraction. For example, the SR 152 Los Banos Bypass project would be located in an area that may be affected by subsidence, which could permanently damage roadways, bridges, retained structures, utilities, and buildings. Project features will inform project design to minimize ground subsidence impacts (GEO-IAMF#1, GEO-IAMF#10). Site conditions will be assessed to determine the most appropriate engineering solutions prior to construction of any of the project alternatives in accordance with relevant design guidelines and standards (GEO-IAMF#10). Additionally, prior to construction of any of the project alternatives, project features will minimize or avoid exposure of people or structures to impacts from regional or localized ground subsidence (GEO-IAMF#1). With these project features in place, construction or operations of the HSR project, in combination with past, present, and future projects, will not result in a significant cumulative impact regarding ground subsidence.

Unstable soils, including collapsible, soft, and expansive soils, can cause permanent damage to transportation and development projects throughout the cumulative RSA. Exposing transportation and development projects, such as the Gateway Tower Mixed Use Development, in combination with the HSR project to unstable soils could result in damage from ground settlement, bearing capacity failure, and soil expansion. Because building standards and project features require the application of geotechnical engineering practices, impacts on the project from unstable soils will be minimized (GEO-IAMF#1, GEO-IAMF#10). Project features used to minimize impacts from unstable soils include overexcavation, ground improvement, and deep foundations in combination with geotechnical engineering techniques. With these project features in place, construction and operations of the HSR project, in combination with past, present, and future projects, will not result in a significant cumulative impact regarding unstable soils.

Landslides would affect future transportation and development projects when such projects are sited near existing landslides or steep slopes. The risk of landslides is limited to sloping areas, such as Communications Hill, Tulare Hill, and mountainous areas in the Morgan Hill and Gilroy and Pacheco Pass Subsections. Development in steep terrain, such as improvements to SR 152 and the Communications Hill Specific Plan, in combination with the HSR project, particularly tunnel construction in Pacheco Pass, would increase risks of exposure to landslides. Potential impacts on the project from landslides would be minimized because building standards require identifying and designing for landslide hazards. Project features used to minimize impacts from landslides include overexcavation, tie backs, soil nails, retaining walls, and debris barriers (GEO-IAMF#1, GEO-IAMF#10). Based on the use of these geotechnical engineering techniques, construction and operations of the HSR project, in combination with past, present, and future projects, would not result in a significant cumulative impact associated with landslides.

Accelerated soil erosion, including the loss of topsoil, would result from construction of any of the project alternatives in combination with future transportation and development projects throughout the cumulative RSA. Construction activities associated with the project alternatives and other development in all subsections would involve ground-disturbing activities such as excavating and grading that would entail the removal of vegetation and the generation of stockpiles. Removal of vegetation and generation of soil stockpiles exposes soil at the ground surface, making it susceptible to erosion. Because typical regional construction practices and project features require implementing erosion control measures, construction and operations of the project, in combination with past, present, and future projects, will not result in a significant cumulative impact regarding soil erosion.

The increasing population would result in development in areas, particularly in the Santa Clara Valley, with risk of primary and secondary seismic hazards. While development in such areas, in combination with the HSR project, would result in increased risk to the public and a greater chance of property damage from seismic hazards, advances in engineering and building standards have resulted in reduced risks from hazards related to geology, soils, and seismicity. Future development will require project-specific analyses to evaluate the risks of primary and secondary seismic hazards as well as individual project permits that specify regulatory requirements and design standards to reduce potential hazards. For example, the California Building Code requires that projects adhere to geotechnical regulations and be designed to avoid or minimize impacts from seismic hazards. Project features include designing components for the impacts of earthquakes, including bending moments, shear forces, and displacements resulting from surface fault rupture. Because the project will comply with California Building Code requirements for adherence to geotechnical engineering standards and will be designed to avoid or minimize impacts related to primary and secondary seismic hazards (GEO-IAMF#1, GEO-IAMF#7, GEO-IAMF#10), construction and operations of the HSR project, in combination with past, present, and future projects, will not result in a significant cumulative impact related to primary and secondary seismic hazards.

A seismically induced dam failure of one or more of the dams in the cumulative RSA would result in flooding in the cumulative RSA in mapped inundation zones; however, such an occurrence is unlikely because the seismic event would need to be large enough to cause catastrophic damage to the dam structures. Existing and future development, in combination with the HSR project, would result in the greatest potential exposure of people to this hazard in the Santa Clara Valley where there are dense populations downstream of major dams. However, DWR's dam safety program minimizes public risk involving dam failure inundation by providing oversight for the design, construction, and maintenance of dams. HSR project features include utilizing an earthquake early detection system or similar warning system that detects ground motion; this system would be integrated with the automatic train control system such that all trains in an area would be autonomously brought to an emergency stop or train speeds would be reduced during or after significant ground shaking. Project features also include shutting down operations temporarily during or after a potentially damaging earthquake to minimize the risk of a moving train encountering flood water or structures damaged by earthquake-induced flooding (GEO-IAMF#1, GEO-IAMF#10). Based on project features, construction and operations of the HSR project, in combination with past, present, and future projects, will not result in a significant cumulative impact related to risks associated with seismically induced dam failure and inundation.

Paleontological Resources

The project and cumulative projects identified in Appendices 3.19-A and 3.19-B, constitute the cumulative condition relevant to paleontological resources. A cumulative impact on paleontological resources would occur when past, present, and future projects, in combination with the HSR project, would cumulatively disturb, damage, or destroy scientifically important fossil resources; once lost, such resources cannot be recovered.

Under the cumulative condition, ongoing urban development and agricultural operations are expected to continue within the cumulative RSA. Future projects in the RSA entailing ground disturbance during construction would involve geologic units that have produced abundant and

diverse fossil resources, including vertebrate remains, and are thus considered highly sensitive for paleontological resources (i.e., would produce additional similar finds in the future). Construction of various planned and future projects in the cumulative RSA would require ground-disturbing activities in areas underlain by the Knoxville Formation, Panoche Formation, Moreno Formation, an unnamed clay shale and claystone unit, Monterey Formation, Santa Clara Formation, Modesto Formation, and older Quaternary deposits. These developments, in combination with the HSR project, have the potential to cumulatively disturb, damage, or destroy scientifically important fossil resources.

The HSR project, in combination with projects such as the Plan Bay Area, El Camino Real and Stevens Creek Corridor BRT Improvements, US 101 Express Lane, SR 87 HOV and I-280 Express Lane conversions, Caltrain Double-Track, Capitol Expressway Corridor projects, and the Google Project have the potential to cause ground disturbance in paleontologically sensitive geologic units and to cumulatively disturb, damage, or destroy scientifically important fossil resources. These cumulative projects could contribute to cumulative impacts on paleontological resources if native sediments are directly disturbed by construction activities. Project features will address impacts on paleontological resources through monitoring and mitigation, discovery procedures, halting construction when paleontological resources are found, and training construction personnel to avoid affecting unique paleontological resources or sites (GEO-IAMF#11, GEO-IAMF#12, GEO-IAMF#13, GEO-IAMF#14, GEO-IAMF#15). Regulatory standards that provide protections for paleontological resources would reduce potential impacts if paleontological resources are found during ground-disturbing activities associated with construction and operation of planned development projects within the cumulative RSA. Such regulatory standards include California Public Resources Code requirements; regional and local policies in Santa Clara, San Benito, and Merced Counties; and Caltrans paleontological standards. The HSR project, in combination with past, present, and future projects, would have a cumulative impact on paleontological resources during construction.

Ground disturbance associated with project operations would be minimal and likely would occur within areas of previous disturbance, and other cumulative projects would not coincide spatially. Therefore, HSR operations, in combination with operation of past, present, and future projects, would not result in a significant cumulative impact related to paleontological resources.

Contribution of the Project Alternatives

As discussed in Section 3.9, paleontological resource impacts would be similar under all four project alternatives, with some variations as shown in Table 3.9-10. All four alternatives would affect the same paleontologically sensitive geologic units, and the overall construction process and operations and maintenance activities would be similar under the four alternatives, resulting in similar potential for impacts on paleontological resources during ground-disturbing activities.

Alternative 4 would have fewer effects on paleontological resources than Alternatives 1, 2, or 3 because it would use a blended at-grade profile in the San Jose to Diridon, Monterey Corridor, and Morgan Hill and Gilroy Subsections, requiring substantially less excavation than the viaducts and embankments proposed in these subsections under the other three alternatives.

Viaduct elements under Alternatives 1 and 3 would potentially affect a greater number of paleontological resources at depth because of excavation required for viaduct supports. Alternative 2 would have the potential to result in fewer impacts on paleontological resources because it would be on embankment from Bernal Way to downtown Gilroy, requiring substantially less excavation than the viaducts proposed under Alternatives 1 and 3.

Alternative 1 would result in more ground disturbance in sensitive geologic units in the Morgan Hill and Gilroy Subsection than Alternative 2. Alternative 3, where it would traverse east Gilroy, would have greater potential to affect paleontological resources.

The project would contribute only incrementally to impacts on paleontological resources because the project would require monitoring, discovery procedures, and halting construction when resources are found, avoiding the destruction of unique paleontological resources or sites. No feasible mitigation measures are available.

CEQA Conclusion

Geology, Soils, Seismicity

The HSR project, in combination with past, present, and future projects, would not result in a significant cumulative impact under CEQA with respect to risks associated with geology, soils, and seismicity hazards because project features will minimize impacts. Also, future projects in the RSA would adhere to applicable building codes and construction standards that would include minimizing impacts from hazards related to geology, soils, and seismicity.

Paleontological Resources

The HSR project, in combination with past, present, and future projects, would result in a significant cumulative impact under CEQA with respect to paleontological resources because these actions have the potential to disturb, damage, or destroy scientifically important fossil resources throughout the cumulative RSA. The project's contribution to this cumulative impact would not be cumulatively considerable because the project would require monitoring, discovery procedures, and halting construction when resources are found, preventing the destruction of unique paleontological resources or sites. Therefore, CEQA does not require mitigation.

3.19.6.9 Hazardous Materials and Wastes

Resource Study Area

The cumulative RSA for hazardous materials and waste is a compilation of those described in Section 3.10, Hazardous Materials and Waste. The alignment RSA consists of the project footprint for each of the project alternatives plus a 150-foot buffer to account for hazardous material and waste issues on adjacent properties. The RSA for potential environmental concern (PEC) sites consists of a 0.25-mile buffer around the project footprint.

Cumulative Condition

Under the cumulative condition, ongoing urban development and agricultural operations are expected to continue in the cumulative RSA. The project alternatives in concert with adjacent HSR project sections and projects identified in Appendix 3.19-A and 3.19-B that fall within 0.25 mile of the project alternatives constitute the cumulative condition relevant to hazardous materials and waste. The project alternatives would traverse urban, rural, residential, and industrial settings, each of which has different hazardous materials and hazardous waste contexts. Historically, hazardous materials have been used within the cumulative RSA where it follows the existing UPRR alignment. Beginning in San Martin and Gilroy, where the project alternatives diverge from the existing railway, the land within the cumulative RSA is primarily undeveloped or agricultural. Hazardous materials from agricultural land uses are generally related to historical use of pesticides and herbicides in this portion of the cumulative RSA.

In general, the cumulative RSA has historically contained areas of potential hazardous material and waste concerns: transportation of hazardous materials and wastes, building materials containing hazardous substances, hazardous substances associated with road and railway corridors, hazardous substances associated with utility corridors, landfills, hazardous substances associated with agricultural operations, hazardous substances associated with industrial facilities, naturally occurring hazards, proximity to school facilities, oil and gas wells, and PEC sites. In general, past and present development has led to more densely populated land uses, which have in turn resulted in more people potentially exposed to hazardous materials. This condition is particularly evident in the Santa Clara Valley, which is also where the bulk of future development would occur. However, future planned development, including industrial and commercial developments, would be required to comply with state and local regulatory requirements that would avoid individual hazardous material impacts. Such environmental regulations have resulted in reduced risks to the public from hazardous materials.

Construction of any of the project alternatives in combination with planned transportation, residential, mixed-use, industrial, and commercial projects would contribute to the transport, storage, use, and disposal of hazardous materials and wastes. Planned transportation and

railroad projects such as SR 87 HOV and I-280 Express Lane conversions, Caltrain Double-Track, and the Capitol Expressway Corridor projects would combine with the HSR project to contribute to the cumulative transport of, and potential risk for spills or releases of, hazardous substances within the cumulative RSA.

Temporary construction activities under all four project alternatives would increase the potential for new hazards to the public or the environment through the routine transport, use, or disposal of hazardous materials; the approximate scale, type, and duration of construction activities would be approximately the same for all four alternatives. Through conditions that involve the release of hazardous materials into the environment, including hazardous air emissions, project construction would pose a risk to human health or safety. However, the use of hazardous materials during construction and operation of transportation and development projects is tightly controlled to protect human health and avoid releases. For example, the Authority will require construction contractors to comply with BMPs established as part of a spill prevention, control, and countermeasure plan so that any release of hazardous materials is cleaned up; containers used to store hazardous materials are in good condition and not leaking; containers are kept closed except when adding or removing hazardous materials; hazardous materials storage and handling areas are away from natural watercourses, storm drains, and other sensitive receptors; and policies for cleaning up accidental spills are in place and enforced (HMW-IAMF#6, HMW-IAMF#8, HMW-MM#1). Future planned development, including the project alternatives, would be required to comply with state and local regulatory requirements that would avoid individual hazardous materials impacts. As part of project design, the contractor is required to comply with regulations that control the transport, use, and storage of hazardous materials and minimize the potential for an accidental release of hazardous materials during construction and transport of these hazardous wastes (HMW-IAMF#7). In the project timeframe, some of the existing PEC sites within the cumulative RSA would be investigated further and, if necessary, remediated with appropriate regulatory agency oversight. With such measures and restrictions in place concerning the use of hazardous materials, the potential for the cumulative accumulation or release of hazardous materials from project construction and operations, in combination with planned projects, will be low; accordingly, cumulative impacts will be less than significant.

CEQA Conclusion

There are no anticipated significant cumulative impacts under CEQA related to hazardous materials and wastes to which the project would contribute because current and future projects, including the HSR project, are subject to strict federal, state, and local regulatory requirements to protect human health, avoiding the potential for cumulative accumulation or release of hazardous materials. Therefore, CEQA does not require mitigation.

3.19.6.10 Safety and Security

Resource Study Area

The cumulative RSAs for safety and security are the same as those used for the analysis in Section 3.11, Safety and Security: within 0.5 mile of the project footprint of each alternative; within 0.25 mile of the project footprint for schools and landfills; within 2 miles of the project footprint for airports and high-risk facilities; within 200 feet for oil and gas wells; and encompassing the identified service area for emergency service providers (e.g., fire departments, police departments, hospitals).

The emergency service provider RSA (the identified service areas of the service providers) represents the largest RSA for cumulative projects that could affect safety and security. Accordingly, this assessment considers cumulative projects within the emergency service provider RSA. In Santa Clara County, the cumulative emergency service provider RSA is characterized mostly by incorporated cities (Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos) and unincorporated areas outside these cities. In San Benito and Merced Counties, the cumulative emergency service provider RSA is characterized by large areas of undeveloped land, agricultural land, and rural land with limited population and more concentrated populations in several municipalities and communities, including Los Banos, Santa Nella, and Volta.

Cumulative Condition

Emergency Services

The project alternatives and other cumulative projects would result in temporary closures of and modifications to some regionally significant roadways and would generate indirect effects related to transportation, such as increased congestion on US 101. Such projects could include the US 101 Express Lanes, BART Silicon Valley Extension, BRT projects in San Jose, and various interchange improvement projects on US 101. Under Alternatives 1, 2, and 3, Monterey Road would be narrowed, resulting in temporary delays and permanent changes to the roadway network that would contribute to degradation of service. Alternative 4 would not entail narrowing Monterey Road, but there would be temporary delays caused by temporary detours and closures associated with construction; there would be no permanent changes to the roadway network in the Monterey Corridor Subsection. Construction activities of the HSR project and other cumulative projects would have multiple-year construction timeframes, leading to potentially overlapping construction periods and locations. The Authority's contractor will prepare a construction safety transportation management plan (SS-IAMF#1) in collaboration with local jurisdictions to maintain emergency vehicle access during construction. The Authority's contractor will also develop a CTP (TR-IAMF#2) that will establish procedures for implementing temporary road and lane closures as well as coordination efforts between the construction contractor and local jurisdictions to minimize conflicts and maintain pedestrian, bicycle, and transit access. The closures and modifications of significant roadways caused by all four alternatives during construction in combination with other cumulative projects would result in a significant cumulative impact on emergency response times during construction,

Taken together, the planned transportation projects including the HSR project would result in regional improvement to transportation circulation and access. Nevertheless, while these planned transportation improvements would alleviate a portion of the transportation network deficiencies or failures, the RTPs recognize that, due to cumulative growth, traffic and congestion levels will continue to outpace the transportation network's ability to serve the demand. This effect would be most pronounced in the urbanized areas around San Jose, Morgan Hill, and Gilroy because of the scale of continued growth anticipated in these areas. The delays resulting from project operations, in combination with the various growth projections based on regional forecasts, would result in cumulative delays at intersections and at-grade rail crossings for emergency responders.

Community Safety and Security

Under the cumulative condition, the demand for newly planned development would continue to increase with increasing population. Such growth and development would lead to a potential increase in criminal activities and exposure to traffic hazards, airport safety hazards, Valley fever, high-risk facilities, train accidents, and fire and wildfire hazards.

Criminal Activity

Criminal, violent, and terrorist acts, which would lead to the exposure of workers and the public to safety and security risks, would be expected to increase as increasing population results in the need for newly planned development. The violent crime rate in Merced County increased by 6.7 percent from 2010 to 2015. In the Santa Clara metropolitan statistical area (Santa Clara County and San Benito County), the violent crime rate decreased by 4.9 percent from 2010 to 2015. Property crime in the Santa Clara metropolitan statistical area increased by 2.5 percent and decreased by 22 percent in Merced County from 2010 to 2015. Assuming that the local crime rates (incidents per capita) remain relatively constant in the future, an increase in population would be expected to result in a corresponding increase of incidents. Planned and foreseeable projects would also result in conversion of currently undeveloped areas, effectively increasing the area within the cumulative RSA that would need to be serviced by law enforcement, fire protection, and emergency medical service providers.

Projects planned in the cumulative RSA would result in an increased residential population. For example, large planned urban developments in San Jose include the proposed Gateway Tower Mixed Use Development Project and other mixed-use developments (including residential uses),

such as Flea Market General Plan Amendment and Rezoning Project, Garden City Rezoning Project, 363 Delmas Residential Project in San Jose, 641 North Capitol Avenue Mixed Use Project, the Google Project, and Del Webb at San Juan Oaks Specific Plan in San Benito County. Large residential projects in Merced County include Buena Vista Subdivision, Fox Hills Community Specific Plan Update, and The Villages of Laguna San Luis Community Plan.

Increased risk of exposure to criminal activities from development and population increase would occur throughout the cumulative emergency service provider RSA. The risk would be greater in the areas of the RSA that are planned for urban development (i.e., the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections) than in the San Joaquin Valley Subsection, where planned projects include development of new residential communities, and the Pacheco Pass Subsection, which is not expected to experience planned urban development.

Goals and policies in the general plans for Santa Clara, San Benito, and Merced Counties contain elements for the logical and efficient expansion or upgrading of law enforcement, fire protection, and emergency medical services to accommodate future growth in the cumulative RSA. These goals and policies would reduce the risk of exposure to safety and security risks associated with criminal acts. Criminal or terrorist acts associated with the HSR project that could result in increased exposure to safety and security risks will be minimized through heightened deterrence and detection systems and threat and vulnerability assessments; increased security procedures; security lighting; and security and training procedures (SS-IAMF#3). Occupational and construction-related public safety regulations and BMPs would also reduce the potential for the HSR project and other planned and foreseeable projects to result in exposure to safety and security risks that would increase demand for law enforcement, fire protection, and emergency response services beyond already-planned expansions. With these measures, goals, and policies in place it is anticipated that increased urbanization from cumulative projects, including the HSR project, will not result in a cumulative impact from the increased exposure to safety and security risks from criminal activity.

Construction Site Hazards

Planned and foreseeable project construction would not result in cumulative impacts related to construction site hazards. Construction site hazards for the HSR project and for planned and foreseeable projects would be confined to the specific project locations and would occur only during each project's construction period. Construction of any of the HSR project alternatives would therefore not affect the potential for construction site hazards associated with planned and foreseeable projects. Planned and foreseeable projects similarly would not result in cumulative impacts related to construction site hazards of the HSR project. The workplaces for the cumulative projects and the HSR project would remain separate; consequently, construction site hazards from planned projects and the project could not combine to result in cumulative impacts.

Traffic Hazards

Construction activities and operations associated with cumulative projects identified in Appendices 3.19-A and 3.19-B, in combination with the HSR project and other regional growth, would result in increased exposure of construction workers and the public to traffic hazards and potential accidents from temporary road closures and relocations, operation of construction vehicles, and other construction activities.

The most pronounced levels of traffic hazards would be experienced in the areas with the most growth—especially in and around San Jose, Morgan Hill, and Gilroy. Cumulative project construction and operation in these areas would result in a greater potential for impacts due to the higher level of traffic and congestion resulting from a dense concentration of cumulative project activities. Transportation projects that would contribute to hazards include the US 101/Blossom Hill Road Interchange Project and the SR 85/Cottle Road Interchange Project in the Monterey Corridor Subsection that would permanently affect traffic patterns on Monterey Road between Capitol Expressway and Bernal Road. Changes to traffic patterns from these planned projects and other planned and reasonably foreseeable projects in the cumulative RSA would affect traffic hazards by introducing construction- and operation-related congestion into affected

communities. Fewer projects are planned for the Pacheco Pass and San Joaquin Subsections, the most notable being the proposed SR 152 Los Banos Bypass, which would contribute to traffic delays near Los Banos during construction.

Project features will require the contractor to prepare a construction safety traffic management plan (CSTMP) to allow traffic flow to continue during construction and to maintain safe pedestrian, bicycle, and transit access (SS-IAMF#1). Other planned and foreseeable projects would implement similar construction management plans, in collaboration with local jurisdictions, to coordinate construction activities and avoid or minimize potential traffic hazards. CSTMPs would minimize vehicle conflicts and related safety risks by allowing traffic flow to continue during construction and would require coordination between the construction contractor and local jurisdictions to provide alternate routes and measures to reduce congestion, thereby minimizing the potential for increased traffic hazards. With implementation of CSTMPs, including traffic management and coordination to reduce safety risks from traffic hazards, the HSR project in combination with planned and reasonably foreseeable projects would not result in a cumulative impact on safety involving traffic hazards.

Airport Safety

All planned cumulative transportation and nontransportation projects within the cumulative RSA for airport safety (i.e., within 2 miles of an airport), including the HSR project, would be subject to assessment and review with respect to compliance with Federal Aviation Regulation (FAR) Part 77 height limits and conformance with airport comprehensive land use plans. Proposed projects that potentially could affect airport safety, including the proposed Gateway Tower Mixed Use Development project in the vicinity of Norman Y. Mineta San Jose International Airport, would be reviewed by the Federal Aviation Administration (FAA) and would be subject to and would conform with FAA requirements. Accordingly, structures that would be built for the HSR project and other planned and foreseeable projects would not exceed FAR Part 77 height limits for any airport within the cumulative airport safety RSA and would not pose safety hazards for aviation such as navigation hazards to aircraft and hazards to people on the ground in areas exposed to aircraft overflight. Because all planned and reasonably foreseeable projects would be in compliance with airport operations, there would be no cumulative impact related to interference with airport safety.

Valley Fever

Construction activities associated with the HSR project and other cumulative projects, including the Fox Hills Community and The Villages of Laguna San Luis in Merced County, would collectively result in grading, excavation, and landscaping activities that would temporarily disrupt previously undisturbed soil in the San Joaquin Valley and generate airborne dust. This dust could contain the fungus that causes Valley fever; construction workers, visitors to the site, or individuals in the immediately surrounding areas could contract the disease if they inhale dust containing the fungus. The project will implement a fugitive dust control plan that will include features to prevent the spread of Valley fever during construction (SS-IAMF#2). Planned and foreseeable projects in the cumulative RSA would be required to implement fugitive dust control plans to comply with regulations imposed by the regional air districts, avoiding or minimizing the potential exposure of workers and the public to safety risks associated with Valley fever. Therefore, there would be no cumulative impact related to temporary exposure of the fungus that causes Valley fever.

Rail-Related Hazards

The HSR project would increase the number and frequency of trains operating in the San Jose to Gilroy rail corridor. Planned and foreseeable projects, including passenger and freight rail improvements, in the San Jose to Gilroy rail corridor may also result in an increased number and frequency of trainsets, and planned and foreseeable highway improvement projects may result in an increase in the number and frequency of vehicles traveling on highways adjacent to the HSR right-of-way. Under all four project alternatives, passenger and freight trains would operate on tracks adjacent to the HSR tracks in some segments of the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. Operation of passenger and freight rail on adjacent tracks and operation of vehicles on adjacent highways could result in intrusion of

other trains, vehicles, or objects into the HSR right-of-way. Project design, including barrier systems constructed between the HSR right-of-way and adjacent transportation rights-of-way, are intended to prevent derailed trains, vehicles, or objects from an adjacent rail line or highway from entering the HSR guideway and obstructing the track.

The addition of blended service predominantly within the existing San Jose to Gilroy railroad rights-of-way under Alternative 4 (and on the 2.6-mile segment of blended service in the San Jose Diridon Approach Subsection under Alternative 1) is expected to increase the number and frequency of trainsets operating on blended track, while reducing the distance between trains. Planned and foreseeable projects including passenger and freight rail improvements in the San Jose to Gilroy rail corridor may also result in an increased number and frequency of trainsets. These factors and the use of at-grade roadway crossings would increase the potential for collisions and derailments and the potential for accidents and incidents involving trains, other objects, vehicles, animals, and people. HSR and other trains operating in the corridor would be controlled by the systems that use positive train control (PTC) and collision avoidance technology, intrusion detection, and roadway traffic signal coordination. These features will reduce the potential for train-to-train collisions. HSR trains would operate at lower speeds than in dedicated portions of the system because of geometric alignment limitations, shared passenger rail use of the route, and use of at-grade roadway crossings. Lower speeds would also reduce the kinetic energy involved in collisions between trains; freight trains and non-HSR passenger trains would be heavier but would travel at slower speeds than HSR trains. However, HSR and Caltrain would operate on one set of tracks while freight trains would operate on separate tracks. With these safety measures in place for operation of HSR trains on dedicated and blended track, the HSR project in combination with other planned and reasonably foreseeable projects will not result in a cumulative impact from increased risk of safety hazards during train operations.

High-Risk Facilities

High-risk facilities, including high-risk utility lines, would be affected by construction of any of the HSR project alternatives and other planned and foreseeable projects. High-risk facilities in the cumulative RSA are identified in Appendix 3.11-A, Safety and Security Data.

The construction of new tracks within the UPRR right-of-way, the proposed new SR 152 alignment in the Morgan Hill and Gilroy Subsection in Santa Clara County, construction of the Los Banos Bypass in the San Joaquin Valley Subsection in Merced County, and other proposed transportation projects within the cumulative RSA could all lead to increased conflicts with utilities or other high-risk facilities (e.g., oil and natural gas pipelines, dams, electrical substations, cement and lime plants, bulk fuel storage facilities), resulting in the increased potential for exposure of workers to hazards. Specifically, regarding utility conflicts, construction of the San Joaquin Valley Subsection would involve both relocation and protection in place of utility lines near the intersection of SR 165 and Henry Miller Road, potentially adding to utility conflicts resulting from the Los Banos Bypass project (should that project proceed).

High-risk utilities also include potable water conveyance facilities and pump stations operated by federal and state agencies and municipal government entities, including the Santa Clara and Pacheco Conduits, Reclamation facilities that provide potable water to the SCVWD and SBCWD. The Santa Clara Conduit and Pacheco Conduit and tunnels generally follow SR 152 in southern Santa Clara County and northern San Benito County, and vaults within the conduit system are accessible from SR 152. Several planned and foreseeable projects have been identified in southern Santa Clara County and northern San Benito County, including the proposed new SR 152 alignment between SR 156 and US 101 in Santa Clara and San Benito Counties and the San Benito SR 156 Improvement Project. These and other planned and foreseeable projects in southern Santa Clara County and northern San Benito County are not expected to affect the operation of the Santa Clara Conduit, Pacheco Conduit, or other water conveyance facilities.

Projects potentially affecting high-risk facilities would be implemented in all subsections except the Pacheco Pass Subsection, which is not expected to experience major transportation development.

High-risk utilities within the project footprint would be relocated, protected in place, removed, realigned, or abandoned in place during the construction period. The Safety and Security Management Plan (SSMP) developed as part of the project would include procedures for such activities. Pursuant to utility agreements negotiated between the Authority and the utility service providers, the Authority would work with utility owners during final engineering design and construction of any of the alternatives to remove, realign, or relocate utilities within the right-of-way or to protect or abandon them in place.

Project features will guide removal, relocation, or protection in place of high-risk facilities; development of facility-specific measures; and operational safety features to minimize the potential for high-risk facilities to pose significant hazards (SS-IAMF#2). Pursuant to utility agreements negotiated between stakeholders, reasonably foreseeable planned development and transportation projects would typically require collaboration with utility providers to remove, relocate, or protect utilities in place, as necessary, during construction, reducing potential conflicts and helping to avoid hazards from high-risk facilities. Consequently, the HSR project in combination with other planned and reasonably foreseeable projects would not result in a cumulative impact on safety as a result of conflicts with or exposure to high-risk facilities.

Operational Safety Hazards and Impacts on Schools

Cumulative transportation projects—the HSR project, improvements to the San Jose Diridon Station, passenger and rail service in the UPRR right-of-way, and the installation of 8 miles of Caltrain double tracking in the existing UPRR corridor between San Jose and Gilroy—would result in potential increases in operational safety impacts related to train accidents. Derailment of a train operating on an adjacent track within the right-of-way would increase the risk that train components or cargo from the derailed train intrude onto the HSR guideway. Train operations would also increase the potential for safety hazards at schools located along at-grade track in the event of an accident. Several schools are adjacent to or within the corridor of the planned Caltrain double tracking installation in the Morgan Hill and Gilroy Subsection: the Charter School of Morgan Hill, Morgan Hill Community Adult School, San Martin Gwinn Elementary School, Gilroy Preparatory School, Gilroy Unified School District Preschool, and South Valley Middle School.

Planned and foreseeable rail projects along tracks and within adjacent rights-of-way would establish protective barriers and automatic train control (ATC) systems to prevent train derailments and reduce the potential for safety hazards in the event of a derailment or accident. Other features, such as intrusion detection systems, derailment containment systems, and maintenance programs, will also minimize the risk of operational safety hazards related to train accidents that could lead to the intrusion of train components or cargo from trains operating on adjacent tracks.

Alternatives 2 and 3 would use a fully grade-separated and access-controlled guideway from Scott Boulevard to Carlucci Road. Only HSR trains would use the fully grade-separated track. Other non-HSR passenger trains (Caltrain/Amtrak/ACE) and freight trains would use separate tracks within the same right-of-way but would not use the same track as the HSR trains. Consequently, train-to-train collisions involving an HSR train and a non-HSR train would not occur along the fully grade-separated and dedicated track. There would also be no risk of collision between HSR trains and vehicles, pedestrians, or bicycles along the fully grade-separated and dedicated track, because there would be no at-grade crossings.

Alternative 1 would operate as a blended system on 2.6 miles of track in the San Jose Diridon Approach Subsection, and Alternative 4 would operate as a blended system on 35.3 miles of track from San Jose to Gilroy in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. Other passenger trains (i.e., Caltrain) would operate on the same track as HSR trains.

With these safety measures in place for operation of HSR trains on dedicated and blended tracks, the project alternatives in combination with other planned and reasonably foreseeable projects will not result in a cumulative impact on schools or other users or facilities near the alignment from increased risk of safety hazards during train operations.

Wildfires

Cumulative transportation and development projects, including extension of existing passenger rail lines, increased passenger rail service on existing rail lines, construction of new mainline tracks in the UPRR right-of-way, and other improvements in passenger and freight rail service, would increase the potential for wildfire. Freight trains often carry fuels, hazardous materials, or flammables that are fire risks. Operation of the HSR project and other electrified trains would rely on electrical systems for rolling stock and would require traction power facilities that present inherent fire hazards. An accident or train derailment associated with these projects, particularly in lands with dry fuels, would increase the risk for wildfires.

Projects in the cumulative RSA would typically identify fire and life safety programs, which include coordination with local and regional emergency response to facilitate rapid response to emergency accidents and prevent the potential for accidents to lead to wildfire events. If cumulative transportation projects entail handling hazardous or flammable materials, they would be required to identify safe procedures for handling and treatment of such materials to prevent accidents that may lead to wildfires.

The project includes fire and life safety programs that would be incorporated into project design, construction, and operations and that would reduce the risk of wildfires. Project features will include coordination and planning for rapid emergency response to reduce the potential for uncontrolled wildfires (SS-IAMF#2). Pending major transit rail-related projects in San Jose include the Capitol Corridor Joint Powers Authority Oakland to San Jose Phase 2 Double Track (Segment 2A), BART Silicon Valley Extension and Caltrain Modernization Program, and Light Rail Transit Extension projects. Various passenger rail improvements that would affect service in the San Jose to Merced corridor are planned through 2040 (Table 2-13); these include the PCEP and South County (Coyote to Gilroy) track improvements. Planned improvements include track and signal improvements, bridges, maintenance and layover facilities, and station improvements. Passenger and freight rail operators and any rail improvement projects within the cumulative RSA would also have emergency response plans and procedures applicable to their operations, including safe handling and treatment of hazardous or flammable materials, in accordance with applicable regulations, that would reduce the potential for wildfires. Therefore, there would be no cumulative safety impact related to exposure to wildfires.

Contribution of the Project Alternatives

Emergency Services

The project alternatives would contribute to the cumulative impact on emergency vehicle response times. All alternatives would contribute to cumulative delays in emergency response times near the San Jose Diridon Station as a result of HSR station traffic. Alternatives 1, 2, and 3 would contribute to cumulative delays in emergency response times along Monterey Corridor caused by the narrowing of Monterey Road. Alternatives 1, 2, and 4 would contribute to cumulative delays in emergency response times because of Downtown Gilroy Station traffic. Alternative 4 would contribute to cumulative delays in emergency response times in downtown San Jose, along the Monterey Corridor, and in Morgan Hill and Gilroy caused by increased delays at intersections near at-grade crossings. Available mitigation includes installing emergency vehicle detection at certain intersections along Monterey Road (SS-MM#3). This mitigation measure will be effective in improving emergency vehicle response times on Monterey Road by providing detection and preemption equipment at those intersections where it does not currently exist.

Available mitigation also includes installing emergency vehicle priority treatments and new traffic control devices on certain roads to mitigate fire station emergency access and response time impacts related to the San Jose Diridon Station and the Downtown Gilroy Station (SS-MM#4). This mitigation measure will be effective in response time improvements.

The Authority would conduct monitoring of travel time on certain roadways and make a fair-share contribution to implement phased emergency vehicle priority treatment strategies. Where monitoring identifies impacts, the Authority would develop an Emergency Vehicle Priority

Treatment Plan in conjunction with local agencies. The Authority’s fair share contribution would entail providing capital funds to local agencies for project implementation.

Emergency vehicle priority treatments could include such measures as constructing improvements to streets parallel to the HSR corridor to speed travel to adjacent grade-separated crossings or to provide new emergency service facilities on the opposite side of the corridor where there are not adjacent grade-separated crossings (SS-MM#4). Implementation of these measures would reduce the project’s contribution to increased emergency response times; however, as described in Section 3.2, if local cities and counties do not construct and operate the additional emergency response improvements called for in project mitigation (for which HSR would fund construction), then the project would result in additional contributions to significant cumulative impacts on emergency response times.

CEQA Conclusion

Emergency Response and Services

The project alternatives, in combination with planned and foreseeable projects in the cumulative RSA, would result in a significant cumulative CEQA impact with respect to emergency response because these projects would contribute to a potential increase in emergency response time in certain locations, depending on alternative. Mitigation for Alternatives 1, 2, and 3 will include vehicle detection on Monterey Road, which could reduce the contribution to a less-than-considerable level, if implemented. Mitigation under Alternative 4 will include emergency response improvements, which will also reduce the contribution to a less-than-considerable level, if implemented. While HSR can provide funding for these improvements, it cannot compel the City of San Jose, Santa Clara County, the City of Morgan Hill, or the City of Gilroy to construct and operate new fire stations. If the mitigation proposed is not adequately implemented, the project alternatives in combination with planned and foreseeable projects would result in cumulatively significant delays to emergency response times.

Community Safety and Security

There are no anticipated significant cumulative impacts under CEQA related to community safety and security to which the project would contribute, because current, planned, and foreseeable projects, including the HSR project, would comply with public safety regulations and would implement BMPs to reduce the occurrence of and exposure to criminal or terrorist acts, construction transportation and safety plans and coordination to reduce traffic hazards, and management of dust emissions through a fugitive dust control plan to prevent the spread of Valley fever. The planned and foreseeable projects would also comply and conform with applicable aviation requirements and land use plans to avoid interference with airport safety; implement procedures to effectively and safely remove, relocate, or protect in place high-risk facilities to minimize safety hazards or potential conflicts; implement protective barriers, ATC systems, intrusion deterrence, and inspection and maintenance programs to avoid safety impacts on schools from train operations; follow proper procedures for handling flammable or hazardous materials; and implement fire and life safety programs to reduce the risk of wildfires. Therefore, CEQA does not require mitigation.

3.19.6.11 Socioeconomics and Communities

Resource Study Area

The cumulative RSA for socioeconomics and communities is the entirety of Santa Clara, San Benito, and Merced Counties, the largest of the RSAs used for the analyses in Section 3.12, Socioeconomics and Communities. This three-county area is sufficient to develop a broad regional consideration of cumulative impacts and to capture impacts on socioeconomics and communities from construction and operations of the San Jose to Central Valley Wye project alternatives in concert with impacts associated with planned development throughout the region.

Cumulative Condition

Recent development trends are anticipated to continue, potentially resulting in the disruption or division of communities; effects on children's health and safety; displacements and relocations of residences, businesses, community facilities, and agricultural operations; and changes in the local economy. Population growth and associated development pressures will also result in the removal of agricultural land from productive agricultural use at a rate similar to recent agricultural development trends in the cumulative RSA (see Section 3.14, Agricultural Farmlands).

Communities and Neighborhoods

As described in detail in the *San Jose to Merced Project Section Community Impact Assessment* (Authority 2019) and Section 3.12, Socioeconomics and Communities, the population in the cumulative RSA increased 11 percent between 2000 and 2014 and is projected to increase an additional 29.8 percent between 2014 and 2040. The region's projected population increase is greater than that projected for the state as a whole, with most of the growth projected to occur in San Benito and Merced Counties (both increasing by nearly 50 percent). Santa Clara County is the most populous of the three counties, with more than 86 percent of the region's population. Merced and San Benito Counties consist primarily of agricultural land and low population concentrations, with small towns scattered throughout, separated by large agricultural and open space areas. Overall, the population of Merced and San Benito Counties is expected to continue to grow at a faster pace than that of Santa Clara County or California as a whole. In comparison, the annual growth rate in Santa Clara County is projected to decline steadily through 2040 (Caltrans 2015).

Construction and operations of planned residential development and transportation projects in concert with the project alternatives are most likely to cause cumulative impacts on communities and neighborhoods in the Morgan Hill and Gilroy area. These planned projects consist primarily of residential development projects, with one mixed-use project on East Dunne Avenue. Transportation projects in the Morgan Hill area consist primarily of installation of express lanes and modifications to US 101, interchange improvements at US 101/Tennant Avenue, pedestrian and bicycle improvements at two parks, and miscellaneous road realignments. Projects in Gilroy include several residential projects and one new maintenance building for an existing public facility. Transportation projects in Gilroy include intersection and pedestrian improvements.

Disruption or Division of Communities

Communities along the project extent include Santa Clara, San Jose, South San Jose, Morgan Hill, San Martin, Gilroy, and areas of unincorporated Santa Clara and Merced Counties. Construction activities in much of the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections would take place within an existing transportation corridor, although Alternative 3 would bypass most of Gilroy. Access to neighborhoods and community and public facilities would be maintained during project construction through the use of detours and signage. Construction of any of the project alternatives would not result in the provision of new or physically altered government facilities except for potential replacement of one fire station (San Jose Fire Station #18) should other existing facilities not accommodate the services provided by the fire station. However, construction of one new fire station, if required, would not be expected to result in substantial physical impacts on the environment. Consequently, construction activities related to the project alternatives and other planned projects would not physically divide the communities along the project alignment.

Operational impacts of the project alternatives and other planned projects would not physically divide established communities or require construction of new government facilities. Project operations would take place within an existing transportation corridor or in sparsely populated areas. Access to neighborhoods and community and public facilities would be maintained. Planned projects, including the HSR project, would include development of individual construction plans and coordination with local agencies, reducing the potential for disruption of emergency services in communities in the cumulative socioeconomic RSA where construction activities of different projects would overlap. In addition, development projects would be consistent with

applicable land use plans and would not physically divide an established community or result in or introduce incompatible uses.

As described in Section 3.13.5.2, Planned Development, the Cities of San Jose and Gilroy have adopted plans and policies that would support transit use, complement the existing environment near the San Jose Diridon and Downtown Gilroy Stations, and encourage transit-compatible residential and commercial development around transit hubs. Because past, present, and reasonably foreseeable development projects are generally planned and included in city and county general plans and transportation plans (such as RTPs), ongoing and future changes in land use patterns and density would be compatible with adjacent land uses, and agricultural and other existing land uses would continue to exist alongside new transportation and development projects in the cumulative RSA. Consequently, continued growth in the region, along with construction and operations of the HSR project in combination with other cumulative projects, would not result in cumulative impacts from disruption of community interactions or division of established communities.

In light of the foregoing, there are no anticipated cumulative impacts of the HSR project during construction or operations that would result in the disruption or division of communities. Therefore, there would not be a significant cumulative construction or operational impact.

Community Cohesion

Construction of any of the stations, platforms, track and track alignment structures, and grade separations would require temporary road closures or modifications, resulting in the diversion of traffic. In addition to automobile traffic, these closures would alter pedestrian, bicycle, and transit circulation patterns in the communities along the project alignment, potentially inconveniencing residents and businesses. The greatest effects would be in the Morgan Hill and Gilroy Subsection.

Temporary road closures would disrupt communities and community interactions where access to some neighborhoods, businesses, or community facilities would be temporarily obstructed, especially for those with ingress and egress on roadway segments that are under construction. Residents and community members would be required to take detours. The changes to circulation and access during construction would result in short-term inconvenience and increased travel times for pedestrians, bicyclists, motorists, and transit, affecting established social engagement patterns in the communities.

The Authority will engage in station area planning (LU-IAMF#1 and LU-IAMF#2). Although access to some neighborhoods, businesses, and community and public facilities would be disrupted and detoured for short periods during project construction, access would remain available. The construction contractor will prepare a CTP that will provide a traffic control plan identifying when and where temporary closures and detours will occur with the goal of maintaining traffic flow, especially during peak travel periods (TR-IAMF#2). The traffic control plan would be developed for affected locations and would include, at a minimum, signage to alert drivers to the construction zone, traffic control methods, speed limitations, and alternative access and detour provisions during road closures. Additionally, project features will minimize detours and maintain accessibility to residences, businesses, and community facilities (TR-IAMF#1, TR-IAMF#4, TR-IAMF#5, and TR-IAMF#11).

Closure or removal of parking areas or roadways during construction would be temporary and these facilities would be restored upon completion of construction. Roadways requiring realignment would be constructed before the closure of the existing roadway to minimize impacts. Standard construction procedures related to traffic management would be used for project construction, including identification of when and where temporary closures and detours would occur to maintain traffic flow during peak travel periods.

Planned projects include mixed-use, commercial, and industrial uses throughout Santa Clara, Morgan Hill, and Gilroy. The largest of these planned developments is a proposed 320-acre sand and gravel mining operation on Sargent Ranch south of Gilroy and the Google Project, a mixed-use development plan on 81 acres in San Jose. Land development projects planned in Morgan

Hill, as identified in Appendix 3.19-A, consist of mixed-use or residential projects of varying sizes. Land development projects in Gilroy are predominantly residential but also include a public facility (wastewater management building) and new commercial development. In the San Joaquin Valley Subsection, land development projects include expansion of industrial facilities, a new truck stop, and new residential communities. Most of the new residential units that would be added in the RSA would be in Morgan Hill and Gilroy.

Operation of planned projects, including the HSR project, would increase traffic, particularly around HSR station areas and through the increase in residential units and commercial activity associated with future growth. Planned projects that would contribute to the increased traffic include the new residential and mixed-use projects in the communities of Santa Clara, San Jose, Morgan Hill, and Gilroy. Operation of planned projects and the HSR project would not, however, result in a loss of community cohesion because roadway improvements, including those associated with the project, would increase mobility and access throughout the cumulative RSA. HSR operations would take place within an existing transportation corridor or within sparsely populated areas, and access to neighborhoods and community and public facilities would be maintained. In addition, all of these planned developments have been required or will be required to undergo design review and individual project approval, during which time the decision makers will determine consistency with applicable land use plans and policies, including zoning, and will undergo environmental review and analysis of potential impacts, including potential traffic impacts.

Consequently, there are no anticipated cumulative impacts during construction of any of the project alternatives that would result in the disruption of community cohesion. Therefore, there would not be a significant cumulative construction or operational impact.

Visual Quality

The presence of track, track structures, stations, MOWF, viaducts, embankments, trench, and tunnel portals would change the visual environment for adjacent viewers. As noted in Section 3.16, Aesthetics and Visual Quality, all four alternatives would introduce large-scale infrastructure affecting the existing visual character along the alignment. Where HSR construction would occur within the existing rail corridor or Monterey Road, the changes to the visual environment would be less apparent because of the existing industrial character of the corridor and would not be expected to affect community cohesion. In the more suburban and rural areas of the project extent south of San Jose and south and east of Gilroy, the visual change would be more noticeable. For those areas outside existing transportation corridors, few viewers would be affected and there are no established communities that would experience loss of community cohesion from the visual impacts of ongoing operations. All these planned developments have been required or will be required to undergo design review and individual project approval, during which time the decision makers will determine consistency with applicable land use plans and policies, including zoning, and will undergo environmental review and analysis of potential impacts. The visual changes of the project or the planned projects would not be expected to alter the sense of place and community character for residents. Therefore, the HSR project in combination with other planned projects would not result in a significant cumulative construction or operational impact on visual quality.

Children's Health and Safety

Some planned development and transportation projects would be built and would operate near or adjacent to places where children congregate. Potential impacts on children's health and safety include potential respiratory impacts associated with air quality, noise impacts on health and learning, EMI, exposure to hazardous materials, and potential safety risks. However, cumulative projects, including the project alternatives, would be required to implement project features to avoid impacts and mitigation measures to reduce exposure of sensitive receptors to potential impacts, and to adhere to regional and local regulations regarding air quality, noise, and hazardous materials.

The project alternatives, in combination with cumulative projects, are not expected to have an adverse impact on children's health and safety. The HSR project is expected to have a beneficial

effect on regional air quality and safety. In addition, any increases in operational noise are not expected to be perceptible. Therefore, the project alternatives, in combination with cumulative projects, would not result in a cumulative impact on children's health and safety during operation.

Property Displacements and Relocations

Some planned development projects may require acquisition of land and result in displacement and relocation of residences, businesses, agricultural operations, and community facilities. Such projects would be widely distributed, would be consistent with applicable land use plans, and would not physically divide an established community or result in or introduce incompatible uses.

The total residential units and residents displaced by the HSR project would be 147 units and 471 residents under Alternative 1, 603 units and 1,945 residents under Alternative 2, 157 units and 486 residents under Alternative 3, and 68 units and 219 residents under Alternative 4. The greatest numbers of residential displacements would occur in unincorporated Merced and Santa Clara Counties, Gilroy, and San Jose under Alternative 1; Morgan Hill, Gilroy, and San Martin under Alternative 2; unincorporated Santa Clara and Merced Counties, Santa Clara, and San Jose under Alternative 3; and San Jose and unincorporated Merced County under Alternative 4. Most of the residential property displacements would occur in Santa Clara County, which has the highest median income of the three counties.

Construction of any of the project alternatives would not result in the displacement of a substantial number of existing housing units or necessitate the construction of replacement housing elsewhere. There would likely be sufficient available residential properties in the RSA to accommodate displaced residents. However, at the community level, displaced residents in several communities may be unable to relocate within the same community because the available residential units might not be near the displaced housing. Sufficient relocation resources would not be available in unincorporated Merced County and Volta under the four project alternatives and in Morgan Hill, San Martin, and Gilroy under Alternative 2 at the time of the analysis. Displaced residents would be supported in their efforts to find replacement housing in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act), which provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence. The Authority would develop a relocation mitigation plan for all displaced residential, business, agricultural operations, and community facility properties in consultation with affected cities and counties.

There would be 217 commercial and industrial facilities displaced under Alternative 1, 348 facilities under Alternative 2, 157 facilities under Alternative 3, and 66 facilities under Alternative 4. Development of individual project construction plans, coordination with local agencies, and compliance with the Uniform Act would minimize the potential for temporary and permanent impacts associated with residential, business, agricultural operations, and community facility displacements and relocations in the cumulative RSA.

A gap analysis performed for commercial and industrial business relocations revealed an adequate supply of properties that would be available to accommodate displaced businesses. However, at the community level, displaced commercial and industrial businesses may be unable to relocate within the same community, because the available commercial and industrial facilities might not be near the displaced businesses. Sufficient relocation resources would not be available in unincorporated Merced County and San Martin under the four project alternatives. Additionally, sufficient relocation resources would not be available in unincorporated Santa Clara County under Alternatives 1, 2, and 3; in Gilroy under Alternatives 1, 2, and 4; and in Morgan Hill under Alternative 2. Displaced businesses in these communities may need to relocate to Santa Clara, San Jose, or Los Banos, where greater supplies of commercial and industrial facilities would be available for rent or lease. In addition, it is also expected that most of the labor force working on these cumulative projects would come from the labor force already living in or near the cumulative RSA, thereby not requiring new housing or services (see the regional growth discussion in Section 3.18 for more information on construction employment). Environmental effects of Alternative 4 without the DDV would be increased due to the DDV relative to commercial displacements. Accordingly, the project's contribution to cumulative impacts related

to commercial displacements would be slightly greater with the DDV compared to Alternative 4 without the DDV. However, due to the limited scale of these changes, there would be no change in the significance of any cumulative impacts or the project's contribution to cumulative impacts under CEQA.

Therefore, the project alternatives, combined with other planned development projects, would not result in a cumulative impact as a result of residential or nonresidential displacements or relocations.

Operations of planned projects, including the project alternatives, would not result in property displacements or relocations. There would be no cumulative impact as a result of project operations.

Economic Impacts

School District Funding

Future development projects in the cumulative RSA include transportation improvement projects, residential developments, expansion of existing industrial facilities, and implementation of general and specific plans throughout Santa Clara, San Benito, and Merced Counties. As described in the Community Impact Assessment (Authority 2019), the number of students displaced as a result of the HSR project would represent less than 0.1 percent of the overall student enrollment in the cumulative RSA, and the resulting loss of funding to affected school districts would be less than 0.5 percent; these losses would represent less than 1 percent of total estimated fiscal year 2015/2016 funding for all school districts in the RSA.

In addition, planned development projects would facilitate growth in population, housing, and jobs. This commercial, industrial, and residential development would be largely concentrated in and around San Jose, Morgan Hill, and Gilroy, and is expected to increase property tax revenues and support the regional economy, school districts, and budgets for public services in these communities. Thus, the HSR project, in combination with planned and reasonably foreseeable development, would not result in a cumulative impact on property tax revenues that would lead to changes in school district funding.

Agricultural Economy

The project alternatives would require permanent acquisition and conversion of Important Farmland to nonagricultural use in the amounts of 1,036 acres under Alternative 1, 1,181 acres under Alternative 2, 1,193 acres under Alternative 3, and 1,033 acres under Alternative 4. Because Important Farmland is not replaceable, its conversion results in the permanent depletion of agricultural resources (discussed further in Section 3.19.6.13). Permanent acquisition of 0.1 acre of the waste management pond area for the one poultry operation in the Morgan Hill and Gilroy Subsection would be necessary under Alternative 1, and 1.38 acres would be necessary under Alternative 2. No waste management pond area would be acquired under Alternatives 3 or 4. The estimated total reduction in agricultural production under any of the project alternatives would represent a small amount of the total annual revenue generated by agricultural production in each of the counties in the economic effects RSA. Thus, the HSR project, in combination with planned and reasonably foreseeable development, would not result in a cumulative impact on the agricultural economy.

CEQA Conclusion

Communities and Neighborhoods

The project alternatives, in combination with planned projects in the cumulative RSA, would not result in significant cumulative impacts under CEQA related to the loss of community cohesion in the cumulative RSA. Therefore, CEQA does not require mitigation.

Property Displacements and Relocations

There would be no significant cumulative impacts on communities under CEQA as a result of relocations and displacements caused by the HSR project in combination with other planned projects, because where residents and displacements are required, HSR and other projects

would include coordination with local agencies and compliance with the Uniform Act to minimize impacts associated with displacements and relocations. An adequate supply of properties in the cumulative RSA would be available to accommodate any displaced businesses and residents, and it is expected that the current labor force in the cumulative RSA would be sufficient to support any future labor need, and therefore would not require new housing, services, or employees that could result in additional displacements or relocations. Therefore, CEQA does not require mitigation.

Economic Impacts

CEQA does not require an analysis of economic impacts. Therefore, no further discussion is required.

3.19.6.12 Station Planning, Land Use, and Development

Resource Study Area

The cumulative RSA for station planning, land use, and development encompasses the entirety of Santa Clara, San Benito, and Merced Counties, a larger area than the RSA described in Section 3.13, Station Planning, Land Use, and Development. This three-county area is sufficient to develop a broad regional consideration of cumulative impacts and to capture impacts on station planning, land use, and development associated with construction and operations of the project alternatives in concert with impacts associated with planned development throughout the region. Cumulative impacts related specifically to agricultural lands are discussed separately in Section 3.19.6.13. Cumulative impacts on communities are discussed in Section 3.19.6.11.

Cumulative Condition

Land uses in Santa Clara County range from dense, urban areas in the northern portion of the project extent (San Jose Diridon Station Approach Subsection) to more suburban uses (Monterey Corridor and Morgan Hill and Gilroy Subsections), with scattered rural and agricultural uses between areas of urban/suburban development, to undeveloped open space, grazing land, and agricultural and dairy operations (Pacheco Pass and San Joaquin Valley Subsections). Urbanized land uses in Santa Clara County—commercial, industrial, and residential—are most dense in the cities of Santa Clara, San Jose, Morgan Hill, and Gilroy. Some rural areas in Santa Clara County, such as Casa de Fruta along the southern county border, contain small pockets of commercial uses. Some developed areas are present in the northern part of San Benito County, but overall land uses in this area are predominantly rural, with scattered farms and rural residential uses. Through the Pacheco Pass Subsection, in both Santa Clara and Merced Counties, the land is predominantly undeveloped open space and grazing land with hilly topography. The San Joaquin Valley Subsection in southwestern Merced County is characterized by agricultural and dairy operations.

Past and ongoing growth trends in the cumulative RSA are expected to continue, resulting in increasing population growth and continued changes to land uses, such as the conversion of agricultural land and open space to residential, commercial, and industrial uses. Development of new transportation infrastructure will also have effects on the existing land use patterns. The project alternatives, planned development, and cumulative conditions disclosed under the general plans of Santa Clara, San Benito, and Merced Counties and the Cities of Santa Clara, San Jose, Morgan Hill, Gilroy, and Los Banos, as well as adjacent HSR project sections and relevant cumulative projects identified in Appendices 3.19-A and 3.19-B, constitute the cumulative condition relevant to alteration of land use patterns and induced population growth. Considered at the cumulative level, such growth could exceed levels anticipated in regional and local land use plans. Cumulative impacts would occur if growth leads to widespread alterations of land use patterns that result in incompatible land use patterns or increases in population beyond planned levels in the cumulative RSA.

Alteration of Land Use Patterns

As described in Section 3.18, Regional Growth, the three counties in the cumulative RSA are anticipated to experience continued pressure to convert vacant and agricultural land to more

urban and suburban uses to accommodate projected regional growth through 2040, potentially resulting in altered land use patterns and population growth that could exceed planned levels. Planned transportation improvements, including highway improvements (such as widening US 101 with interchange expansion; widening SR 152, Ingomar Grade Road, and Mercy Springs Road in Merced County; and other projects discussed later) would enhance access to areas subject to conversion. This increased access could, in turn, facilitate land use changes that could then result in induced population growth beyond planned levels. Planned residential and commercial projects would more directly induce land use changes and population growth.

Development projects, including planned residential, commercial, and agricultural projects built under the cumulative condition, could result in permanent changes in the pattern of land uses resulting in incompatibility with existing adjacent land uses. Local governments apply several mechanisms to achieve their desired development intensity and pattern, such as policy plans (general plans, specific plans, and precise plans); development agreements; zoning overlays; and, in some cases, redevelopment authority. Santa Clara, San Benito, and Merced Counties recognize in their current general plans and RTPs that future growth must be accommodated. The Santa Clara County General Plan, for example, contains policies that encourage compact development as an overall approach to managing future growth, directing most future growth into appropriate locations in existing urban areas, particularly along transit corridors and closer to employment centers, rather than expanding outward into the hillsides and rural countryside. The San Benito County General Plan contains guiding principles that encourage new growth in existing unincorporated communities, new communities, or clustered developments to preserve Prime Farmland and rangeland; protect natural habitats; and reduce the financial, social, and environmental impacts of urban sprawl. The Merced County General Plan contains policies that direct urban development to vacant and underused land within cities and unincorporated communities. Thus, each of these general plans directs future growth to minimize conversion of agricultural land to urban or transportation uses, helping to minimize or avoid incompatible land uses and substantial alteration of existing land use patterns.

The Cities of San Jose and Gilroy have also recognized and incorporated compact mixed-use or transit-oriented development (TOD) strategies in their general plans and other land use plans to encourage compact growth for the areas surrounding existing rail stations. Encouraging increased TOD would result in more infill development, directing future growth toward existing urban areas. While varying in amount and intensity, higher density TOD development has also been proposed for the areas in and around the San Jose Diridon Station in the *Diridon Station Area Plan* (City of San Jose 2014) and the Downtown Gilroy Station in the *Downtown Gilroy Specific Plan* (City of Gilroy 2005).

A review of projects in the cumulative RSA relevant to land use and station planning shows that there are several local jurisdictional plans, development projects, and transportation projects that have identified contributions to land use changes and population growth. Development projects include mixed-use, commercial, and industrial uses throughout Santa Clara, San Jose, Morgan Hill, and Gilroy. The largest of these planned developments are the Google Project, a mixed-use development plan for an area in San Jose that is largely within the Diridon Station Area Plan, a new data center, and a proposed sand and gravel mining operation on the 320-acre Sargent Ranch. All of the land development projects planned in Morgan Hill, as identified in Appendix 3.19-A, consist of mixed-use or residential projects of varying sizes. Land development projects in Gilroy are predominantly residential, but also include a public facility (wastewater management building) and new commercial development. In the San Joaquin Valley Subsection, land development projects include expansion of industrial facilities, a new truck stop, and new residential communities. The majority of the new residential units that would be added in the RSA would be near downtown San Jose and in Morgan Hill and Gilroy. These projects and others would contribute to changes in land uses and increases in population growth in the cumulative RSA.

In the Pacheco Pass Subsection, the only planned development project is the Pacheco Pass Landfill Composting Facility Expansion, which entails expansion of an existing facility and is not

expected to contribute to cumulative impacts because it is limited in size and would not substantially alter land use patterns.

Planned transportation improvements in the cumulative RSA in Santa Clara County and San Jose, Morgan Hill, and Gilroy, as identified in Appendix 3.19-B, include light rail and BRT expansions; installation of carpool and express lanes; construction of new interchanges on US 101; a new SR 152 alignment; road widening and improvements on numerous roadways; pedestrian and bicycle improvements; and various intersection improvements. Additional transportation improvement projects in San Benito County include the San Benito SR 156 Improvement Project, SR 25 widening and improvements, and various road improvements. Planned transportation improvement projects in Merced County include the SR 99 Hilmar-Turlock Interchange and Bypass, the SR 152 Los Banos Bypass, and various roadway improvements. As discussed above, transportation improvements can facilitate population growth and changes to land use patterns by providing enhanced access and ultimately encouraging new land development.

Alternative 3 would substantially alter land use patterns in east Gilroy through permanent conversion of existing land uses to a transportation use. However, this impact would be confined to the east Gilroy area, not the entire three-county RSA, and would not be anticipated to combine with cumulative development projects to result in a significant cumulative impact.

Because past, present, and reasonably foreseeable future development projects are generally planned and included in city and county general plans and transportation plans (such as RTPs), ongoing and future changes in land use patterns would be compatible with adjacent land uses, and agricultural and other existing land uses would continue to exist alongside new transportation and development projects in the cumulative RSA. One exception in San Jose is the Google Project, which required an amendment to the Diridon Station Area Plan to allow residential units on the project site, which is mostly within the Diridon Station Plan Area and is almost entirely designated for nonresidential uses. However, the increased density around the Station Area, including residential uses, would be compatible with Plan Bay Area's vision for increased density in proximity to transit. Although Alternative 3 would result in some localized changes in land use patterns in east Gilroy, the project would not lead to incompatible uses on a broad scale that would result in substantial alteration of land use patterns.

Inducement of Population Growth beyond Planned Levels

Construction of planned development and transportation projects identified in Appendix 3.19-A and 3.19-B would generate short-term construction employment in the region as well as permanent jobs to maintain new and expanded facilities, but no permanent and significant land use and population changes are expected to result from cumulative construction activities. As previously stated, the land use plans of Santa Clara County and its jurisdictions encourage infill and higher-density development in urban areas and concentration of uses around transit corridors to accommodate future population growth and provide more modal choices for residents and workers. In 2016, the voters of Gilroy adopted Measure H, amending the City's general plan to establish an urban growth boundary (UGB) and designate land outside the UGB as Open Space. An objective of the UGB is to reduce growth and concentrate development within existing developed areas in the city. Population increases near the San Jose Diridon and Downtown Gilroy Stations have been anticipated in the station area plans for these sites and similarly encourage dense development in already urbanized areas. Population growth at the East Gilroy Station would be prevented by Measure H constraints, and development around the MOWF sites would be restricted by existing zoning. These cumulative projects would not substantially contribute to overall population growth because they would not induce population growth beyond planned levels. Further, the land use plans of Santa Clara and Merced Counties have accounted for the potential for HSR, and cumulative development in the RSA is largely anticipated to be compatible with local and regional planning efforts.

The project, combined with cumulative development, would not result in a cumulative impact with regard to alteration of land use patterns or population growth that would exceed planned levels.

CEQA Conclusion

There are no anticipated significant cumulative impacts under CEQA related to station planning, land use, and development to which the HSR project would contribute because planned development projects, including HSR, are generally identified in city and county general plans and transportation plans (such as RTPs). In addition, ongoing and future changes in land use patterns and population would be consistent with general plans and therefore compatible with adjacent land uses, and agricultural and other existing land uses would continue to exist alongside new transportation and development projects in the cumulative RSA. Therefore, CEQA does not require mitigation.

3.19.6.13 Agricultural Farmland

As disclosed in Section 3.14, Agricultural Farmlands, the analysis of cumulative impacts on agricultural farmland focuses on impacts of construction because there would be no significant impact under any of the project alternatives from operation of HSR trains. The sole operational impact for agricultural farmland would be related to induced wind impacts (e.g., impacts on pollination, dust, and aerial spraying). Because the wind speed would attenuate to a low speed that would not affect pollination, dust, and aerial spraying by the edge of the right-of-way, there would no significant impact on agricultural farmland related to induced wind. Accordingly, no cumulative impacts from operations would occur, and they are not addressed further in this analysis.

Resource Study Area

The cumulative RSA for agricultural farmland is the entirety of Santa Clara, San Benito, and Merced Counties, a larger area than the RSA defined in Section 3.14 (defined as the project footprint of the project alternatives and areas beyond the footprints where direct and indirect impacts could result). The cumulative RSA was selected to encompass the regional impacts of project construction and operations on Important Farmland,¹⁵ a type of agricultural farmland particularly suited for cropland, and farmland protected under Williamson Act contracts in combination with cumulative development in the cumulative RSA. Agriculture is a regional resource that depends on regionally available resources such as water and transportation infrastructure. Loss of agricultural farmland destabilizes the entire agricultural infrastructure system and leads to potential for further conversion of agricultural farmland to nonagricultural use.

Cumulative Condition

Under the cumulative condition, ongoing urban growth trends in the cumulative RSA are expected to continue, resulting in the continued conversion of agricultural farmland to residential, commercial, and industrial uses, as well as for transportation infrastructure. Residential, commercial, and industrial growth will take place primarily in northern and central Santa Clara County, northern San Benito County, and portions of Merced County east of Pacheco Pass.

Past growth in Santa Clara, San Benito, and Merced Counties has resulted in extensive conversion of agricultural farmland to urban uses. From 2002 to 2014, Santa Clara and San Benito Counties lost several thousand acres of Important Farmland. Although Merced County gained Important Farmland overall, as shown in Table 3.14-3, the amount of Prime Farmland and Farmland of Statewide Importance decreased, while the amount of Unique Farmland and Farmland of Local Importance increased, reflecting a decrease in the relative amount of higher-quality farmland. The amount of urban and built-up land in the three counties gained between 2 and 18 percent over this period (DOC 2014a, 2014b, 2014c).

As described in Section 3.14, based on projections, an additional 44,000 acres of agricultural land could be converted to nonagricultural uses in Santa Clara, San Benito, and Merced Counties by 2040. Additionally, planned transportation improvements, including the adjacent Merced to

¹⁵ In this analysis, change in acreage of Important Farmland is used as a representative measure of change in acreage of agricultural farmland.

Fresno Project Section as well as various RTP projects identified in Santa Clara, San Benito, and Merced Counties (Appendix 3.19-B), would convert additional agricultural land (including lands under Williamson Act contracts) to urban or transportation uses in the cumulative RSA. These planned projects would temporarily use Important Farmland during construction to accommodate material laydown areas and staging areas as well as permanently converting Important Farmland to nonagricultural use to accommodate project operations. Planned development and transportation projects would follow applicable regulations and would likely include various forms of mitigation to address conversion and temporary use of Important Farmland. In addition to the direct conversion of Important Farmland, growth and development through 2040 would contribute cumulatively to Important Farmland severance, resulting in parcels smaller than county thresholds for protected farmland contracts, easement encroachments, and infrastructure disruption that could lead to indirect conversions when these changes leave farmland without convenient access to roads, water, and other necessary infrastructure to support agricultural use.

Multiple plans and projects in Santa Clara County, San Jose, Morgan Hill, and Gilroy, identified in Appendices 3.19-A and 3.19-B, would lead to the conversion of agricultural farmland to nonagricultural uses. Farmland would be converted to residential, mixed-use, and municipal uses. Planned transportation improvements in the cumulative RSA that may convert agricultural farmland to nonagricultural uses include the HSR project, new interchanges on US 101, a new SR 152 alignment, and road widening and improvements on numerous roadways. Covering a nine-county area, the *Plan Bay Area 2040* identifies transit priority areas, priority development areas, and potential future projects, adding up to 770 acres of converted farmland for Santa Clara County, out of approximately 420,000 total acres of farmland in the county (ABAG and MTC 2017). The plan focuses growth in existing communities along the existing transportation network, reducing greenfield development but still affecting agricultural farmland near priority development areas.

The *San Benito County 2035 General Plan* estimates that up to 5,520 acres of Important Farmland, approximately 15 percent of the total acreage of Important Farmland in the county, could be converted to nonagricultural uses for new residential units, employment-generating uses, and other urban uses in the northwestern part of the county. One example is the Sunnyside Estates Project, which permanently converted 13.3 acres of Important Farmland (out of 37.7 total acres of agricultural farmland on the site) to nonagricultural uses. Transportation improvement projects in San Benito County include the SR 156 Improvement Project and the SR 25 widening and improvements, which would convert agricultural farmland. Despite San Benito County's priority of preserving agricultural farmland, development continues to convert agricultural farmland, albeit at a slower rate than in Santa Clara County.

Projects in Merced County including in Los Banos could also affect agricultural farmland. The Villages of Laguna San Luis Community Plan, a Specific Urban Development Plan, anticipates that more than 15,000 residential units, commercial and office space, schools, a fire station, and a wastewater treatment facility will convert 870 acres of Important Farmland. The Buena Vista Subdivision, Fox Hills Community, and Yosemite Ranch Estates residential projects would convert more than 120 acres of Important Farmland. The HSR Merced to Fresno Project Section crossing Merced County would convert up to 1,483 acres of agricultural farmland to nonagricultural uses and sever up to 124 land parcels. Planned transportation improvement projects in Merced County include the SR 99 Hilmar-Turlock interchange and bypass and the SR 152 Los Banos bypass, both of which would convert Important Farmland.

Planned transportation projects such as the SR 156 Improvement Project, the SR 25 widening and improvements project, the SR 99 Hilmar-Turlock interchange and bypass, the SR 152 Los Banos bypass, and the HSR Merced to Fresno Project Section could contribute to cumulative conversion of Important Farmland to nonagricultural use, disruption of agricultural infrastructure, and creation of remnant parcels of Important Farmland, in addition to temporary use of agricultural land during construction.

Cumulative projects would in the future temporarily use Important Farmland during construction to accommodate material laydown areas, staging areas, and concrete prefabrication yards. In

addition, such development would result in a permanent reduction in the amount of available farmland as a result of conversion to nonagricultural uses. Planned development and transportation projects would likely include various forms of mitigation to address temporary use and permanent conversion of Important Farmland. The Authority will restore Important Farmland used temporarily during construction for temporary staging areas for HSR construction (AG-IAMF#1). However, agricultural farmland is expected to be converted to nonagricultural uses as a result of past, present, and planned future projects, including the HSR project.

In addition to the direct conversion of Important Farmland, population growth and land development through 2040 will contribute cumulatively to Important Farmland severance, resulting in remnant parcels, some of which may be too small, too oddly shaped, or otherwise inappropriately situated for continued agricultural use. Nonviable remnant parcels would be indirectly subject to conversion to nonagricultural uses. Planned development and transportation projects would likely include various forms of mitigation to address parcel severance and subsequent potential indirect conversion of Important Farmland. The HSR project will include a Farmland Consolidation Program, administered by the Authority, to facilitate the sale of remnant parcels to neighboring landowners for consolidation with adjacent farmland properties (AG-IAMF#3). However, even with this project feature, parcel severance is expected to cause conversion of agricultural farmland to nonagricultural uses as a result of past, present, and planned future projects, including the HSR project.

Cumulative projects could result in infrastructure disruption that could lead to indirect conversions of agricultural farmland when these changes leave farmland without convenient access to roads, water, and other necessities to support agricultural use. Planned development and transportation projects would likely include various forms of mitigation to address temporary and permanent infrastructure disruption and subsequent potential indirect conversion of Important Farmland. In areas where utilities, utility and agricultural access roads, and power supply infrastructure would be disrupted during construction, the Authority will install new facilities and make them operational before existing facilities will be disconnected (PUE-IAMF#3). Construction activities will be coordinated with service providers to minimize or avoid interruptions in service that will affect agricultural operations (PUE-IAMF#4). The public would be notified in advance through a coordinated outreach campaign. To provide agricultural property owners or leaseholders sufficient lead time to make any changes to their operations in response to project construction, the Authority will provide written notification to agricultural property owners or leaseholders immediately adjacent to the area of project-related disturbance (AG-IAMF#4). The project will provide temporary livestock and equipment crossings to minimize delays and access limitations to agricultural infrastructure caused by temporary road closures (AG-IAMF#5). Any road closures necessary on county roads typically will not result in detours greater than 1–2 miles and will be coordinated with the local jurisdiction (TR-IAMF#2). Project features will include provision of equipment crossings at road closures, minimizing the impact of road closures on agricultural operations (AG-IAMF#6).

In addition to these project features, the Authority would implement mitigation to conserve Important Farmland as part of project approval. Mitigation will include the Authority entering into an agreement with the California Department of Conservation's (DOC) California Farmland Conservancy Program to implement agricultural land mitigation for the HSR project. The Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers. Implementing this mitigation would place existing agricultural lands that are currently not under any type of agricultural conservation easement into a new easement that would permanently protect the land from future conversion to nonagricultural uses.

Contribution of the Project Alternatives

All four project alternatives would temporarily use Important Farmland. However, because the project will restore Important Farmland following the cessation of construction activities to as close to pre-construction conditions as possible, with the goal that parcels remain available for long-term agricultural use (AG-IAMF#1), the contribution to the cumulative condition of temporary

use of Important Farmland will be minor. All four project alternatives would result in the permanent conversion of Important Farmland to a nonagricultural use either directly within the right-of-way or indirectly through parcel severance. Alternative 3 would directly convert the largest acreage with 1,192.5 acres, and Alternative 4 would directly convert the smallest acreage with 1,032.6 acres. The largest conversion by subsection (up to 575 acres) would take place in the Morgan Hill and Gilroy Subsection. Only 152 acres would be converted in the Pacheco Pass Subsection because most of the subsection would be in Tunnel 2. No conversions of Important Farmland would take place in the San Jose Diridon Station Approach or Monterey Corridor Subsections.

Variations among the project alternatives with respect to impacts on Important Farmland occur primarily in the Morgan Hill and Gilroy Subsection and, for temporary impacts to a small degree, in the Monterey Corridor Subsection. No Important Farmland would be affected in the San Jose Diridon Station Approach Subsection, and the total amount of Important Farmland converted in the Pacheco Pass and San Joaquin Valley Subsections would be the same for all four alternatives because the alignments would be the same. In the Morgan Hill and Gilroy Subsection, Alternative 4 would result in the smallest contribution to the cumulative impact because it would stay predominantly within the existing transportation corridor right-of-way, minimizing land use displacements and conversion, and because it would pass through downtown Gilroy, thus avoiding some of the Important Farmland in this subsection. Alternative 1 would result in the next smallest contribution because it would also pass through downtown Gilroy, avoiding some of the Important Farmland in this subsection. Alternative 2 would result in an intermediate contribution because it would be built on embankment, converting more Important Farmland than Alternative 1, but it would also pass through downtown Gilroy. Alternative 3 would result in the largest contribution to the cumulative impact because, while it would follow the same alignment as Alternative 1 north of San Martin, the alignment east of Gilroy would displace Important Farmland. The Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers (AG-MM#1). The Authority will minimize the area required to operate and maintain the aerial guideway (AG-MM#2). These measures will reduce the impact, but Important Farmland will still be converted to nonagricultural uses.

In addition, in all but the San Jose Diridon Approach Subsection, the project alternatives would result in the indirect and permanent conversion of Important Farmland through the creation of remnant parcels. Alternative 3 would create the most extensive area of remnant parcels (252.8 acres), and Alternative 4 the smallest (147.0 acres). Alternative 2 would create the most remnant parcels (250), and Alternative 1 would create the fewest (139). Although the Authority has entered into an agreement with the DOC and its California Farmland Conservancy Program to implement Important Farmland mitigation for the HSR system (AG-IAMF#3), no new agricultural farmland will be created to replace converted land and cumulative impacts will not be reduced or avoided.

Even with implementation of mitigation measures AG-MM#1 and AG-MM#2, the project alternatives would contribute to the cumulative impact on permanent conversion of Important Farmland to nonagricultural use because the alternatives would directly result in the permanent conversion of Important Farmland throughout the RSA.

Some infrastructure serving Important Farmland could be temporarily or permanently interrupted or relocated, resulting in temporary disruption of utilities, agricultural irrigation infrastructure, utility and agricultural access roads, and agricultural drainage infrastructure. Incorporation of IAMFs and implementation of mitigation measures described in the cumulative condition will address these impacts. Moreover, the Authority would coordinate with landowners during preliminary engineering for design-build procurement or during final design for construction to determine drainage and to identify preferences for facility relocation to reduce impacts on continued operation of drainage facilities.

The HSR project in combination with cumulative projects would contribute to cumulative impacts on Important Farmland by converting agricultural farmland directly to another use or indirectly by creating remnant parcels, despite project features. The HSR project would not contribute to cumulative impacts on Important Farmland through temporary or permanent disruption to agricultural infrastructure.

CEQA Conclusion

The project alternatives, in combination with cumulative projects in the cumulative RSA, would result in a significant cumulative impact with respect to agricultural farmland because construction would permanently convert large areas of agricultural farmland to nonagricultural uses. The project's contribution to this cumulative impact would be cumulatively considerable because the project would permanently convert Important Farmland to nonagricultural uses and no new agricultural farmland would be created to replace converted land. While project-level mitigation will address the permanent conversion of Important Farmland, no mitigation is available to replace the converted farmland, and the project contribution will cumulatively be considerable.

3.19.6.14 Parks, Recreation, Open Space, and School District Play Areas

Resource Study Area

The cumulative RSA for publicly accessible parks, recreation, open space, and school district play areas includes the entirety of Santa Clara, San Benito, and Merced Counties, a larger area than the RSA used for the analysis in Section 3.15, Parks, Recreation, and Open Space (areas within 1,000 feet of the project footprint for track alignment and within 0.5 mile of the project footprint for stations and maintenance facilities).¹⁶ This cumulative RSA was selected because it encompasses impacts on parks, recreation, open space, and school district play areas of the project alternatives in concert with those of past, present, and future projects that would collectively increase population growth and consequently increase the pressure on parks, recreation, open space, and school district play areas in the cumulative RSA. This analysis also considers planned parks, recreational facilities, open space areas, and school district play areas that would be built by the time the HSR project is under construction.

Cumulative Condition

The project extent traverses urban, rural, residential, and industrial settings. From north to south and west to east along its route, the cumulative RSA includes urban and suburban development in San Jose, open space and agricultural lands through Coyote Valley, and suburban development in Morgan Hill and Gilroy that is surrounded by rural residential and agricultural lands. East of Gilroy, the RSA extends through mountainous open space in the Pacheco Pass and into the agricultural lands of the San Joaquin Valley. The type and character of the parks, recreational facilities, open space, and school district play areas within the RSA vary with the landscape, resulting in a diverse range of resources and associated user experiences.

Past development in the RSA has resulted in the creation of new parks, recreation, open space, and school district play areas, while past transportation development has resulted in the conversion of such resources to other land uses. Under the cumulative condition, ongoing urban and transportation development are expected to continue within the cumulative RSA.

As described in Section 3.18, Regional Growth, the population of Santa Clara, San Benito, and Merced Counties is projected to increase by approximately 23 percent, 47 percent, and 45 percent, respectively, by 2040. To maintain the current quality of life, the incorporated areas and other communities in the cumulative RSA would need to add parkland acreage to accommodate

¹⁶ Only parks and recreational facilities open to the public were considered in the analysis. Schools that contain play areas and other recreational facilities, such as sports fields or running tracks, were also considered if they are available for public use outside school hours, regardless of whether a joint-use agreement between the city and school exists. Even without joint-use agreements, school play areas generally represent publicly accessible open space/recreational amenities for the communities in which they are situated. Resources not available for public use, such as privately owned churches with playfields, privately owned recreational facilities, private schools, conservation easements, or agricultural preserves, are not included in this analysis.

the population forecast for 2040. Due to higher than anticipated land costs and population growth, San Jose has not yet reached its goal to provide access to public parks or recreational open spaces within 0.5 kilometer (0.3 mile) of every urban resident (City of San Jose 2011). Neither Morgan Hill nor Gilroy has an existing parkland shortage; both cities currently meet their parks and recreation goals.

Cumulative impacts would occur if the incremental demand associated with planned developments under the cumulative condition combines with the HSR project to result in a shortage of park facilities for communities or contributes to an existing shortage, or if the demand results in the loss of parkland that communities in the cumulative RSA presently use. Cumulative impacts would also occur if the HSR project and other development combine to result in permanent air quality, noise and vibration, or visual impacts on parkland, thereby creating barriers or perceived barriers to use that would preclude use of the resources.

The relevant projects in the cumulative RSA consist of residential, industrial, commercial, mixed-use, transit improvement, and roadway improvement projects. None of the planned projects identified in Appendices 3.19-A and 3.19-B would result in the acquisition of parkland, recreation, or open space resources, and the project alternatives would not affect the ability of the urbanized jurisdictions subject to rapid growth, such as San Jose, to maintain sufficient park facilities to support a growing population. Additionally, some projects in the cumulative RSA include construction of new park or recreational facilities to serve projected increases in population. For example, the Communications Hill development project includes plans to develop 17.8 acres of parks, including a total of 4.6 miles of on- and off-site trails. Additionally, the Google Project would include construction of parks, on- and off-site trail connections, and recreational open space in San Jose. However, while construction of one of the three SR 152 Los Banos bypass alternatives would result in noise, vibration, and construction emissions in the Los Banos Wildlife Area, the construction period is currently unplanned and contingent on funding.

The Cities of San Jose, Morgan Hill, and Gilroy require that all new residential and commercial development fund the provision of park and recreational facilities or create new recreational facilities within project limits (such as a neighborhood park or public plaza within a new residential or commercial development) to meet the need created by that development. These provisions are also required by other cities in Santa Clara, San Benito, and Merced Counties, such as Santa Clara, Hollister, and Merced. In that way, future development projects would not contribute to the shortage of facilities but would directly provide recreation areas or contribute funds for new parks to accommodate their incremental demand for parkland. Therefore, there would not be a cumulative impact in the RSA related to acquisition of parkland during construction.

Construction activities for the planned projects including the HSR project would generate temporary noise and visual impacts that could result in individual impacts requiring project-specific mitigation. While it is not considered likely that construction of any of the HSR project alternatives would combine with the noise-generating activities or temporary visual impacts of other construction projects to result in cumulative impacts on parks, recreation, open space, and school district play areas, it is possible that construction of elements of the Google Project would occur simultaneous to the HSR project in San Jose. For such cumulative impacts to occur, construction of multiple projects generating high noise levels and visual impacts would have to take place simultaneously and near these resources such that they would combine to create noise levels exceeding federal (FRA and FHWA) or state standards, or such that they would create a barrier to use that would preclude the use of the resource. While this scenario is unlikely to occur because the construction of planned projects would be temporary, the projects do not generally have overlapping or adjacent construction footprints and construction activities would not preclude use of the resources, the potential exists for the project to make a contribution to a cumulative impact on parks and recreational facilities during construction. Project features require compliance with FRA and FTA guidelines for minimizing construction noise when work is conducted within 1,000 feet of sensitive receptors, which include parks, recreation, open space, and school district play areas (NV-IAMF#1). The Authority and its contractors will screen and site activities away from sensitive viewers, restore temporary construction sites to their pre-construction condition, and develop and implement a fugitive dust control plan to minimize fugitive

dust emissions and associated visual impacts (NV-IAMF#1, AQ-IAMF#1, LU-IAMF#3, SOCIO-IAMF#1). Access to all resources will be maintained during the construction period (PK-IAMF#1, PR-MM#1, PR-MM#2). Mitigation to address specific conditions at existing parks, recreation, and open space facilities (PR-MM#6 and PR-MM#7) will schedule construction around noise-sensitive outdoor events and avoid acquiring a portion of a park that will affect a planned multiuse turf/soccer field. However, despite implementation of these measures, there could be a construction-related cumulative impact on parks, recreation, open space, and school district play areas in the RSA.

The HSR project and other planned rail projects would create new and permanent sources of noise during operations from train passbys at parks, recreation, open space, and school district play areas. The Authority would implement mitigation as part of project approval that would reduce exposure of users of parks, recreation, open space, and school district play areas to noise associated with operations of the HSR system. Mitigation will include installation of noise barriers, and if noise levels are still not reduced to reasonable levels, the Authority will install sound insulation at buildings to improve the outdoor-to-indoor noise reduction (NV-MM#3). If noise barriers or sound insulation are still ineffective, the Authority would acquire affected properties. The Authority will support potential implementation of Quiet Zones by local jurisdictions (NV-MM#4). Trains sound the warning horns when approaching at-grade crossings because it is required by the FRA as a safety precaution. The FRA does allow for the possibility of establishing Quiet Zones, which would eliminate the requirement for all trains to routinely sound their warning horns when approaching at-grade highway/rail crossings. The Authority will require bidders for HSR vehicle technology procurement to meet federal regulations for vehicle noise, install special trackwork to minimize noise at track junctions, and conduct additional noise analysis during final design to identify further opportunities for noise mitigation (NV-MM#5, NV-MM#6, NV-MM#7). While mitigation will reduce exposure of users of parks, recreation, open space, and school district play areas to noise from train passbys during operations, it will not eliminate the exposure of these users to noise that, in combination with noise from other planned projects, will exceed standards set by the FRA for high-speed ground transportation and will create a perceived barrier to use. Therefore, there would be a cumulative impact during operations.

Contribution of the Project Alternatives

There are 46 parks, recreational facilities, and open space resources (including wildlife and waterfowl refuges) and 14 school district play areas throughout the project extent; most of these resources are between San Jose and Gilroy. Details regarding the size, type, location, and distance to the project footprint and temporary construction easements are shown in Tables 3.15-2 and 3.15-3. Under all four alternatives, severe noise impacts would occur at Los Banos Wildlife Area. Under Alternative 2, moderate and severe noise impacts would occur at Villa Mira Monte and Morgan Hill Community and Cultural Center. Under Alternative 4, moderate and severe noise impacts would occur at Highway 87 Bikeway North, Edenvale Gardens Regional Park, Villa Mira Monte, and Morgan Hill Community and Cultural Center. Therefore, Alternative 4 would result in a greater contribution to cumulative operational noise impacts than Alternatives 1, 2, and 3.

The HSR project would be the largest contributor to cumulative noise impacts during operations at parks, recreation, open space, and school district play areas. The project would substantially increase the perceived change in usability at parks, recreation, open space, and school district play areas. No feasible mitigation measures are available to avoid or reduce this impact.

CEQA Conclusion

There would be no cumulative impact during construction related to acquisition of or demand for parkland, recreational resources, open space areas, and school district play areas because projects within the cumulative RSA would not result in a reduction in the overall availability of such resources. However, cumulative impacts related to construction noise and visual changes could occur because, if HSR project construction in San Jose were to overlap with construction of other projects such as the Google Project, construction activities could create a barrier to use that would preclude the use of the resources. Therefore, there would be a significant cumulative

construction-related impact on parks, recreational facilities, open space resources, or school district play areas under CEQA caused by the project or to which the project would contribute. Such impacts would be reduced with implementation of HSR project IAMFs and mitigation measures, along with mitigation measures to address construction impacts associated with other development projects.

During operations, all four project alternatives would result in severe noise impacts at parks, recreational facilities, open space resources, or school district play areas. When these severe noise impacts would combine with the noise emissions of other planned projects, it would result in a significant cumulative operational impact on parks, recreational facilities, open space resources, or school district play areas under CEQA because the combined noise exposure would create a perceived barrier to use. The project's contribution to this cumulative impact would be considerable because operational noise would moderately to severely affect the user experience at these resources.

While mitigation measures are proposed to reduce noise impacts at parks, recreational facilities, open space resources, and school district play areas, there will still be intermittent permanent noise impacts along the project extent, especially in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. There is no additional feasible mitigation available to avoid or reduce this impact.

3.19.6.15 Aesthetics and Visual Resources

Resource Study Area

The cumulative RSA for aesthetics and visual resources is the same as that identified in Section 3.16, Aesthetics and Visual Resources, because it is sufficiently broad to cover the area in which potential aesthetic impacts of the project alternatives, in combination with past, present, and future projects, could result in cumulative impacts. The cumulative RSA is the project alternatives' viewshed (i.e., the area that could have views of HSR features).

Viewing distances along the project extent vary by location. For suburban and urban areas between Santa Clara and Gilroy, the RSA is generally within 0.25 mile of the alternatives' project footprints. Many views within this distance are obscured by landscaping or buildings, limiting views to and from the alternatives. From east of Gilroy through the San Joaquin Valley, where much of the landscape is characterized by open space, grazing lands, waterways, and agricultural areas planted with low-lying crops, viewing distances extend over wide areas because of the general scarcity of buildings and tall vegetation that could block views. In this area, the RSA expands to include areas within 0.5 mile of the alternatives' footprints. In the largely agricultural landscape, crop changes can limit views, especially when low-lying field crops are replaced by orchards. Seasonal variation in vegetation also alters the viewshed when tall-growing field crops are harvested or trees lose their leaves. Except where blocked by adjacent landscaping, development, or tree crops, the views can include the distant mountains. This wider RSA also accounts for the anticipated scale of the HSR's features and is generally the distance at which the project infrastructure can be distinguished from background features in the landscape.

Cumulative Condition

Over the past century, the visual character of the cumulative RSA in the Santa Clara and Coyote Valleys has been transformed from a primarily agricultural region with open fields and orchards to an urban and suburban landscape. Under the cumulative condition, the character of the agricultural portions of the RSA is anticipated to continue to change with the expansion of suburban development, with most development expected to occur in older developed areas, where commercial, industrial, and retail uses are expected to be redeveloped into denser and more urban uses.

Under the cumulative condition, growth trends within the RSA would likely result in additional development in existing developed areas around stations; along transportation corridors such as the Caltrain/UPRR railway; and as identified in the *Diridon Station Area Plan*, the *San Jose Downtown Strategy 2040*, *Edenvale Area Development Policy*, *Downtown Gilroy Specific Plan*,

and *Downtown Gilroy Station Area Plan*. The historic stations in San Jose and Gilroy would be affected by new development to enhance their function as transportation hubs. The *Diridon Station Area Plan*, *Downtown Gilroy Specific Plan*, and *Downtown Gilroy Area Station Plan* all promote design strategies to enhance and improve the aesthetic and visual environment as they plan for increased development around both stations. This includes the approved Google Project, which would include an amendment to the Diridon Station Area Plan and would substantially increase building heights and density around the San Jose Diridon Station. The historic station buildings would be enhanced by development designed to emphasize their prominence as community landmarks. This prominence would be further reinforced by additional planned rail service at the Gilroy Station as part of the TAMC extension from Salinas, and at the San Jose Diridon Station by the BART Silicon Valley Extension and *ACEforward*.

Redevelopment of existing uses adjacent to residential areas in other parts of the Santa Clara and Coyote Valleys with taller and denser buildings, either commercial or residential, would affect both views and light. Residents adjacent to new development would experience a reduction in visual quality from the change in land uses where such change would be out of scale or character with existing development. Although not all development would result in a reduction in visual quality, reductions would occur where, for example, smaller buildings are replaced with larger and taller buildings that block views. Accordingly, some planned and future development would degrade the existing visual character or quality of views for residents adjacent to planned development in the RSA. The degradation of existing visual quality as a result of new development in the cumulative RSA would have a permanent impact on sensitive residential viewers.

East of the Santa Clara and Coyote Valleys, the environment is rural. The valleys and hills of the Pacheco Pass have remained largely undeveloped except for the creation of the San Luis Reservoir, while the San Joaquin Valley has been transformed from open lands with prairie and marshes to a primarily agricultural region with open fields and orchards. The most important visual resources in this area are Pacheco Creek Valley, expansive views across the San Luis Reservoir, views of the GEA, and views toward the hills on the west side of the San Joaquin Valley.

There is very little existing development in the Pacheco Creek Valley beyond the roadside attractions clustered around Casa de Fruta. From the Santa Clara Valley to the San Joaquin Valley, there are very few homes and structures, leading to very low nighttime light levels beyond the traffic on SR 152 and the area around Casa de Fruta. The hills east of Pacheco Pass are drier with sparser vegetation and few trees compared to the area farther west. The San Luis Reservoir contrasts with the dry landscape as the hills meet the broad San Joaquin Valley, which is characterized by mostly flat terrain and small rural residential areas dispersed among a variety of agricultural land uses. The small communities of Volta and Santa Nella and traffic on I-5 and SR 152 are the primary sources of nighttime light.

No new residential or commercial development is expected in the Pacheco Pass area. In the San Joaquin Valley, new residential and commercial development is projected adjacent to existing developed areas along transportation corridors such as SR 152 and I-5, affecting residential viewers in areas that predominantly view open agricultural land. Some views would be blocked or disrupted by new residential, commercial, and transportation development, altering the visual character of the existing residential areas. The conversion of open agricultural land to new residential development would cover a broad area. In the San Joaquin Valley Subsection, SR 152 is a designated state scenic highway where it passes through Merced County on the east side of the Pacheco Pass past the San Luis Reservoir, and I-5 is a designated state scenic highway north of SR 152 where it intersects the project extent.

Construction and operations of planned transportation projects that would combine with the project to cause cumulative aesthetic and visual quality impacts include the HSR San Francisco to San Jose Project Section, PCEP, BART Silicon Valley Extension, Caltrain Double-Track segments between San Jose and Gilroy, *ACEforward*, TAMC extension from Salinas, and various BRT and light rail projects in the Santa Clara Valley. Additionally, highway projects that would

contribute to a cumulative impact include interchange reconstructions, widening existing freeways and expressways, a new SR 152 alignment between US 101 and the SR 152/156 interchange, and construction of a bypass around the north side of Los Banos for SR 152 (Appendix 3.19-B).

Temporary construction activities of planned projects, including HSR, would cause dust and material stockpiles that could collectively substantially degrade the visual unity and intactness of the surroundings. Depending on location, viewers could see staging areas, worker parking, and equipment and materials storage areas that would add industrial-looking elements into the landscape. The introduction of construction activities and equipment into the viewshed would be temporary, and the activities would generally be geographically dispersed. During construction of any of the project alternatives, the Authority and its contractors will screen and site activities away from sensitive viewers, restore temporary construction sites to their pre-construction condition, and develop and implement a fugitive dust control plan to minimize fugitive dust emissions and associated visual impacts (AQ-IAMF#1, AVQ-MM#1). The Authority and its contractors will also develop a CMP that will include visual protection measures designed to minimize impacts on residents and businesses (SOCIO-IAMF#1). Mitigation will require the contractor to prepare technical memoranda identifying how the project will minimize construction-related visual/aesthetic disruption and describing how the contractor will shield nighttime construction lighting and direct it downward in a manner to minimize light falling outside the construction site boundaries (AVQ-MM#1, AVQ-MM#-2). Accordingly, there would not be a significant construction-related cumulative impact on aesthetics and visual resources.

Construction of permanent features and infrastructure of the planned projects, including HSR, would result in new buildings, structures, and infrastructure in the cumulative RSA. Travelers in the cumulative RSA would observe the development of planned residential, commercial, and retail uses adjacent to major roadways. This change would have little impact on the travelers along major roadways, because vehicular users are generally not affected by changes in visual quality given their moderately low to moderate viewer sensitivity and brief exposure in vehicles traveling at highway speeds, resulting in a corresponding moderately low viewer response. Accordingly, these changes would not result in degradation of visual character and there would be no cumulative impacts related to travelers along major roadways.

Construction of these new permanent features would have a greater effect on more sensitive viewers, such as residents. The permanent conversion of agricultural and open space to urban or transportation uses would permanently alter views and scenic views, degrading the existing visual character or quality of the RSA. This impact would be greatest where new development and transportation facilities are built immediately adjacent to existing highly sensitive residential viewers and where they would block previously open views to surrounding scenic viewscapes. The degradation of existing visual quality as a result of new transportation and development projects in the cumulative RSA would have a permanent impact on these highly sensitive residential viewers. Additionally, the construction of the elevated tracks and stations in San Jose and Gilroy would degrade the visual character of those areas. Cumulative development of the district around the San Jose Diridon and Gilroy Stations would increase building density and height, reducing the contrast in scale of surrounding development in the station district with the HSR facilities; moreover, new buildings would be designed and situated to increase the visual prominence of the smaller historic station buildings. While the project will implement aesthetic guidelines and an aesthetic review process to integrate the HSR infrastructure into the surrounding landscape and local context (AVQ-IAMF#2), it will still change the existing visual character. Mitigation will include incorporating aesthetic design preferences into final design (AVQ-MM#3), providing vegetation screening adjacent to residential areas (AVQ-MM#4), replanting unused portions of land (AVQ-MM#5), and screening traction power substations and radio towers (AVQ-MM#6). While mitigation will reduce the impact of construction of new permanent features, it will not fully eliminate the impact of the project alternatives, which, in combination with construction of new permanent features of other cumulative projects in the cumulative RSA, will result in a permanent cumulative impact on aesthetics and visual resources.

Operations of the project and other cumulative projects in the cumulative RSA would also result in changes in the built environment and indirect impacts on visual quality. Operation of HSR service

and other planned transportation services would increase the number of people at the stations, generating increased demand for development and commercial activity, which would contribute in turn to visual impacts from substantial changes in the built environment. Such operations impacts would also result from new buildings, facilities, and trains being lit at night, contributing to increases in nighttime light levels. Project features will reduce potential land use impacts by implementing HSR station area development principles and guidelines and will institute lighting and building design intended to conform to the local design context (AVQ-IAMF#1). Mitigation will include providing vegetation screening adjacent to residential areas (AVQ-MM#4), screening traction power substations and radio towers (AVQ-MM#6), and implementing noise mitigation guidelines (noise barriers will serve to block train light from sensitive viewers along at-grade portions of the alignment) (NV-MM#3). While mitigation will reduce the impact of project operations, it will not fully eliminate the impact, which, in combination with operation of other planned projects, will result in a permanent cumulative impact on aesthetics and visual resources.

Contribution of the Project Alternatives

Under all alternatives, some residents would experience altered views from construction and operations of new HSR infrastructure. Alternatives 1, 2, and 3 would block views of scenic vistas, including the downtown San Jose skyline and surrounding hills and peaks visible from the cumulative RSA, for some sensitive viewers. Where the HSR would be elevated adjacent to residential areas, viaduct structures would contrast with the scale and materials of nearby residential areas. Alternative 2 would expose fewer highly sensitive viewers to aerial structures and other HSR infrastructure in San Jose, Morgan Hill, and Gilroy than Alternative 3, while Alternative 1 would expose the highest number of highly sensitive viewers to aerial structures and infrastructure. Alternative 4 would expose the fewest, because it would not use aerial structures in urbanized residential areas.

Alternatives 1 and 3 would introduce an elevated viaduct in the median of Monterey Road extending through southern San Jose and the Coyote Valley parallel to the Keesling's Shade Trees. This aerial structure would degrade the visual character of the historic shade trees through the contrast in scale with the elevated HSR. However, Alternative 2 would remove all the Keesling's Shade Trees along Monterey Road through southern San Jose and the Coyote Valley to northern Morgan Hill, resulting in a greater impact on the Keesling's Shade Trees. Alternative 4 would have the least impact, removing only a few of the trees and running at grade in the existing railway corridor.

Alternatives 1, 2, and 4 would degrade visual quality in the rural agricultural southern Santa Clara/Pajaro Valley through the change in visual character caused by construction of the South Gilroy MOWF. The permanent conversion of existing agricultural land uses to an industrial use and creation of a new HSR corridor in the Pajaro Valley under all alternatives would contribute to cumulative impacts on aesthetic and visual resources.

Alternative 3 would degrade visual quality in the rural agricultural area east of downtown Gilroy as a result of the anticipated increased urbanization around the East Gilroy Station, and would degrade visual quality in the rural agricultural southern Santa Clara/Pajaro Valley through the change in visual character from construction of the East Gilroy MOWF. The permanent conversion of existing agricultural land uses to urban and industrial uses and creation of a new HSR corridor in the Pajaro Valley with the introduction of Alternative 3 would also contribute to cumulative impacts on aesthetic and visual resources.

Construction of new permanent features associated with the project would constitute the largest change to aesthetics and visual resources among the cumulative projects. No feasible mitigation measures are available to avoid or reduce this impact.

During operations, Alternative 3 would cause greater direct and indirect impacts on visual quality than Alternatives 1, 2, and 4, primarily because the East Gilroy Station would be developed in a more rural setting than the Downtown Gilroy Station, introducing industrial elements into an agricultural context and thereby degrading the existing visual quality. All alternatives would result in similar impacts from nighttime lighting at fixed lighting sources because each alternative would

include the same types of components. However, Alternatives 1 and 3, running predominantly on viaduct from San Jose to Gilroy through the Monterey Highway, Coyote Valley, US 101, Morgan Hill-San Martin, and Gilroy Landscape Units, would cause more light spillover from passing trains into residential areas than Alternatives 2 and 4, which would run predominantly at grade. Consequently, train light spillover from Alternatives 2 and 4 would be contained by existing vegetation and noise barriers. In most other locations, the overall impact from light spillover would be the same under all four alternatives.

Project operations would constitute the largest change to aesthetics and visual resources among the cumulative projects. No feasible mitigation measures are available to avoid or reduce this impact.

CEQA Conclusion

There would be no cumulative impact from temporary construction activities on aesthetics and visual resources. Depending on location, viewers could see staging areas, worker parking, and equipment and materials storage areas, which would add industrial-looking elements into the landscape. Introduction of construction activities and equipment into the viewshed would be temporary, and the activities would generally be geographically dispersed. Accordingly, there would not be a significant cumulative temporary construction impact on aesthetics and visual resources under CEQA caused by the project or to which the project would contribute. Therefore, CEQA does not require mitigation.

The construction of new permanent project features, combined with other planned projects, would result in permanent significant cumulative aesthetic impacts under CEQA because the visual quality and setting would be degraded. The project includes aesthetic guidelines and an aesthetic review process to integrate HSR infrastructure into the surrounding landscape and local context. Mitigation will include incorporating aesthetic design preferences into final design, providing vegetation screening adjacent to residential areas, replanting unused portions of land, and screening traction power facilities and radio towers. While mitigation will reduce the impact of new permanent features, it will not fully eliminate the impact. The contribution of the project to this cumulative impact would be considerable because the HSR project would result in the largest perceived change in aesthetics and visual resources.

In addition, project operations in combination with other planned projects would result in permanent significant cumulative impacts under CEQA as a result of changes in land development, causing indirect changes to visual quality, and because new buildings, facilities, and trains being lit at night would contribute to increases in nighttime light levels. Project features will reduce potential land use impacts by implementing HSR station area development principles and guidelines and will provide lighting and building design intended to conform to the local design context. Mitigation will include providing vegetation screening adjacent to residential areas, screening traction power facilities and radio towers, and implementing noise mitigation guidelines. While mitigation will reduce the impact of project operations, it will not fully eliminate the impact. The contribution of the project to this cumulative impact would be considerable because the HSR project would result in the largest perceived change in aesthetics and visual resources.

While mitigation measures are proposed to reduce construction and operations impacts on aesthetics and visual resources, visual character and quality will still be degraded. These project-specific impacts would combine with other construction and operation of new permanent features such that there would be a new cumulative impact on aesthetics and visual resources. There is no additional feasible mitigation.

3.19.6.16 Cultural Resources

Resource Study Area

The cumulative RSAs for cultural resources are the same as the archaeological area of potential effect (APE) for archaeology and the architectural APE for built resources detailed in Section 3.17, Cultural Resources. These RSAs are sufficiently broad to cover the areas in which the

potential impacts of the project alternatives in combination with past, present, and future projects could result in cumulative impacts on cultural resources. The archaeological APE is defined as the area of ground proposed to be disturbed before, during, or after construction of any of the project alternatives. The architectural APE includes all legal parcels intersected by the project footprint under all project alternatives, including the proposed HSR right-of-way and ancillary features such as grade separations, stations, maintenance facilities, utilities, and construction staging areas. The architectural APE includes properties where historic materials or associated landscape features would be demolished, moved, or altered by construction. The architectural APE is larger than the project footprint and was delineated to take into consideration direct and indirect effects of the project alternatives.

Cumulative Condition

Under the cumulative condition, past and ongoing urban development and transportation projects are expected to continue in the cumulative RSAs. Urban development stemming from the anticipated population increase through 2040 will result in the conversion of large areas of agricultural and undeveloped land to accommodate residential, commercial, and industrial uses.

Cumulative impacts on cultural resources would occur during construction should the impacts of transportation and development projects combine to result in the physical demolition, destruction, relocation, or alteration of historical, archaeological, or other cultural resources that are determined significant in American history, architecture, archaeology, engineering, or culture, consistent with Criteria A through D of the National Register of Historic Places (NRHP) and Criteria 1 through 4 of the California Register of Historical Resources (CRHR) (see Section 3.17 for more information on application of the NRHP and CRHR criteria).

Archaeological Resources

Construction and operation of planned projects would need to take place within the archaeological APE (i.e., the area of ground disturbance) to cause cumulative impacts on archaeological resources. Because the archaeological APE constitutes a relatively small area, many of the cumulative projects identified in Appendices 3.19-A and 3.19-B are located outside the archaeological APE and are not considered in this analysis. Some of the planned projects that would combine with the HSR project to result in cumulative impacts on archaeological resources include the completed Liberty Packing Company project as well as the following current or future projects: Cordoba Center, Baseball Stadium in the Diridon/Arena Area, Mineta San Jose International Airport People Mover, BART to Silicon Valley Extension, Walnut Grove/Diana Subdivision, the Google Project, and the New SR 152 Alignment project. Potential damage or destruction of archaeological resources from these projects would combine with effects of the HSR project, resulting in cumulative impacts.

Construction activities of planned projects, including the HSR project, would involve ground-disturbing activities and excavation, which could cause damage or destruction of cultural resources, resulting in loss of the features that made the resource eligible for listing in the NRHP or the CRHR. Past and present development in the archaeological RSA has resulted in permanent disturbance or destruction of unknown archaeological sites through agricultural activities such as plowing and construction activities such as grading or excavating. This disturbance has occurred when agricultural lands have been converted to residential, commercial, and industrial uses, or when older development has been replaced by new development. Continued conversion of open land and redevelopment of existing properties in the RSA, such as that anticipated by the general plans of Santa Clara, San Benito, and Merced Counties for areas within the archaeological RSA, is assumed to result in further potential impacts on known and unknown archaeological sites. In the semi-rural and rural areas, there would be more impacts on archaeological resources resulting from conversion of undeveloped land for development.

Various laws and regulations that apply to planned development direct that archaeological resources be avoided and impacts on them be mitigated prior to development. Project features will minimize impacts by evaluating areas of archaeological sensitivity that require monitoring

within the APE, conducting pre-construction surveys, and implementing an archaeological monitoring plan (CUL-IAMF#1, CUL-IAMF#2, CUL-IAMF#3, CUL-IAMF#4, CUL-IAMF#5). Lastly, mitigation will include implementation of an archaeological treatment plan and halting work in case of an archaeological discovery and complying with the programmatic agreement, memorandum of agreement, archaeological treatment plan, and all state and federal laws, as applicable (CUL-MM#1, CUL-MM#2). Therefore, these requirements, project features, and mitigation measures will prevent the loss of significant archaeological resources and there will be no cumulative impact during construction.

Project operations in combination with planned development in the cumulative RSA would not result in impacts on archaeological resources because ground disturbance would not be necessary. Therefore, there would be no cumulative impact during operations.

Historic Built Resources

Planned projects for which construction and operations would be most likely to cause cumulative impacts on historic built resources would need to be located within the architectural APE. Because this constitutes a relatively small area, many of the planned projects identified in Appendices 3.19-A and 3.19-B are located outside the architectural APE and are not considered in this analysis. Some of the planned projects that could combine with the project alternatives to cause cumulative impacts on historic built resources include the Baseball Stadium in the Diridon/Arena Area, the Google Project, Mineta San Jose International Airport People Mover, Caltrain Double Track, and the BART to Silicon Valley Extension. Permanent demolition, destruction, relocation, or alteration of a built historic resource or its setting as a result of these projects could combine with HSR to cause cumulative impacts.

Construction activities of cumulative projects would result in permanent demolition, destruction, relocation, or alteration of built historic resources or their settings, resulting in loss of the features that made the resource eligible for listing in the NRHP or the CRHR. Past and present development in the architectural RSA has resulted in demolition, relocation, and alteration of historic built resources and their settings when older development has been replaced by new development through the demolition and replacement of existing buildings, and when agricultural lands have been converted to residential, commercial, and industrial uses, resulting in new construction and a change in the historic setting or rural areas. Continued conversion of open land and redevelopment of existing properties in the RSA, such as that anticipated by the general plans of Santa Clara, San Benito, and Merced Counties for areas located in the architectural RSA, would result in further potential impacts on known historic built resources. Conversion of agricultural land anticipated in the portion of the RSA south of Gilroy has the greatest potential to degrade the significance of historical agricultural resources. Continued residential development is also expected as the population increases in the area, resulting in further demolition and replacement of historic built resources, especially in and around the city centers of San Jose, Morgan Hill, and Gilroy.

Laws and regulations that apply to past, present, and planned projects direct that impacts on historic built resources be avoided or mitigated; compliance with these laws and regulations would, therefore, minimize or avoid some impacts on known resources. Project features will avoid and minimize these impacts (CUL-IAMF#6, CUL-IAMF#7, CUL-IAMF#8). Mitigation measures will require that the Authority or its contractors identify historic resources for relocation (CUL-MM#4), prepare and submit additional recordation and documentation (CUL-MM#6), prepare interpretative educational materials (CUL-MM#7), repair inadvertent damage (CUL-MM#8), and develop station design consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 C.F.R. Part 68) (CUL-MM#10). However, mitigation measures will not reduce or avoid impacts related to demolition of historic built resources. All four alternatives would result in impacts on historic built resources because construction activities would result in the demolition, destruction, or alteration of historic built resources, their settings, or both through the introduction of a new rail corridor, the construction of new roads, the expansion of existing rail tracks and roads, and the generation of ground-borne vibrations that have the potential to

damage historic built resources. These impacts, in combination with other planned projects, would result in a cumulative impact on historic built resources during construction.

Operation of cumulative projects in the cumulative RSA may also result in damage or loss of historic built resources through intermittent noise and vibration impacts. Intermittent operational vibration impacts from the project alternatives would not cause permanent destruction or alteration of cultural resources that could affect the ability of these resources to convey historic significance. None of the project alternatives would result in operational vibration impacts at levels that would cause permanent damage or that would affect the ability of these resources to convey their historical significance. The impacts of other cumulative projects could result in a cumulative impact on historic built resources; the project's contribution to this impact is discussed in the next section.

Contribution of the Project Alternatives

Historic Built Resources

Construction of any of the project alternatives would result in the permanent demolition, destruction, relocation, or alteration of built resources, the setting of the resources, or both. Surveys identified 35 historic built NRHP-listed and eligible properties in the APE. Of these 35 historic properties, 11 would be affected by Alternative 2, 7 would be affected by Alternative 1, 7 would be affected by Alternative 3, and 5 would be affected by Alternative 4. The properties that would be affected include single-family residences, agricultural farm or ranch properties, historic train depot complexes, and commercial or institutional properties. It is possible that additional properties surveyed and evaluated as NRHP-eligible during phased identification may also experience demolition, destruction, relocation, or alteration to the property or its setting as a result of project construction. Impacts could include crossing a historic property and demolishing it or altering the setting in a way that impairs the resource's integrity or setting. Mitigation measures will entail relocating built historic resources (CUL-MM#4), preparing interpretive educational materials (CUL-MM#6), preparing and submitting recordation and documentation (CUL-MM#7), repairing inadvertent damage (CUL-MM#8), and developing station design consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (CUL-MM#10).

Alternative 2 would cause the greatest amount of construction impacts on built historic resources because of its at-grade and embankment profile through the Monterey Corridor and Morgan Hill and Gilroy Subsections. Alternative 1 would avoid some of the impacts identified under Alternative 2 because of its aerial profile through the Morgan Hill and Gilroy Subsection. Alternative 3 would have lesser construction impacts because it would follow an aerial profile similar to that of Alternative 1 and would avoid the concentrated downtown Gilroy area, instead traveling through east Gilroy on viaduct, where there are fewer historic built resources. Alternative 4 would have the least amount of construction impacts because it would place the HSR right-of-way within the existing Caltrain rail corridor between Santa Clara and Gilroy. All four alternatives would have the same impacts in the Pacheco Pass and San Joaquin Valley Subsections.

The HSR project would be the largest contributor to cumulative impacts on historic built resources during construction. No additional feasible mitigation measures are available to avoid or reduce this impact.

While mitigation measures would be implemented to reduce the impacts, they will not compensate for the loss of all affected resources. These project-specific impacts would combine with other construction impacts such that there would be a new cumulative impact on historic built resources. There is no additional feasible mitigation.

CEQA Conclusion

Archaeological Resources

There would not be a significant cumulative construction or operational impact on archaeological resources under CEQA caused by the project alternatives or to which the project alternatives would contribute because requirements are in place for both planned development and the

project that would prevent significant cumulative impacts. These requirements include laws and regulations that apply to planned development, directing that archaeological resources be avoided or impacts on them be mitigated prior to development; project features that will avoid and minimize impacts by evaluating archaeological sensitivity that require monitoring within the APE, conducting pre-construction surveys, and implementing an archaeological monitoring plan; and actions that would include implementation of an archaeological treatment plan and halting work in case of an archaeological discovery and complying with the programmatic agreement, memorandum of agreement, archaeological treatment plan, and all state and federal laws, as applicable. Therefore, CEQA does not require mitigation.

Historic Built Resources

During construction, all four project alternatives would result in permanent demolition, destruction, relocation, or alteration of built historic resources or their settings, resulting in loss of the features that made the resource significant under NRHP or CRHR criteria. These impacts would combine with impacts of other planned projects to result in significant cumulative construction impacts on historic built resources under CEQA because these projects would result in the demolition, destruction, or alteration of historic built resources, their settings, or both. The contribution of the project alternatives to this cumulative impact would be considerable because construction of any of the project would result in damage or destruction of historic built resources, resulting in their loss of significance. There are no additional mitigation measures available.

3.19.6.17 Environmental Justice

Effects of the project alternatives on minority populations and low-income populations are addressed in Chapter 5, Environmental Justice. Chapter 5 also includes a discussion of the effects of cumulative projects on such communities.

3.19.7 Cumulative Impact Summary

The analysis of cumulative impacts determined that the resources shown in Table 3.19-8 would be subject to cumulative impacts. Resource topics for which no cumulative impacts were identified—Electromagnetic Fields and Electromagnetic Interference; Public Utilities and Energy; Hydrology and Water Resources; Geology, Soils, Seismicity, and Paleontological Resources; Hazardous Materials and Waste; Socioeconomics and Communities; and Station Planning, Land use, and Development—were omitted from the table.

Table 3.19-8 Summary of Cumulative Impacts

NEPA Cumulative Impact	CEQA Considerable Contribution
Transportation	
Construction- and operations-related delays and degradation of existing roadway networks affecting roadway traffic and bus transit.	Transit delays during construction at locations of substantial road closures—Alternatives 1, 2, and 3.
Air Quality and Global Climate Change	
Construction-related impacts related to CO in SJVAPCD, localized NO ₂ , PM _{2.5} , and PM ₁₀ emission impacts DPM, and PM _{2.5} .	Construction—considerable contribution to CO in SJVAPCD. Construction—considerable contribution to localized NO ₂ , PM _{2.5} , and PM ₁₀ emission impacts Construction—considerable contribution to localized risks and PM _{2.5} concentrations at sensitive receptors in the BAAQMD
Impacts of increased GHG emissions associated with increased growth.	Operations—net benefit to regional air quality. Net operational reduction of GHG emissions.

NEPA Cumulative Impact	CEQA Considerable Contribution
Noise and Vibration	
Operational rail noise impacts on sensitive receptors caused by train passbys.	Considerable contribution under all alternatives. Alternative 2 would have the greatest contribution because of its embankment profile; Alternative 3 would have the least because of its use of aerial structure and its alignment through east Gilroy.
Traffic-related noise impacts caused by traffic increases associated with project stations transportation projects.	Considerable contribution under all alternatives; slightly greater under Alternatives 1 and 2 than under Alternatives 3 and 4.
Operational vibration impacts on multiple receptors in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections.	Considerable contribution under all alternatives. Alternative 4 would have the greatest contribution; Alternative 1 would have the least.
Biological and Aquatic Resources	
Construction-related impacts on special-status species, special-status plant communities, and non-special-status wildlife species resulting from habitat loss and degradation will be offset by project mitigation.	Less than considerable with mitigation for special status plant communities. Less than considerable with mitigation for special-status wildlife species and non-special-status wildlife species.
Impacts resulting from loss and degradation of aquatic resources will be offset by project mitigation.	Less than considerable contribution under all alternatives with mitigation.
Impacts resulting from removal and disturbance of protected trees will be offset by mitigation.	Less than considerable contribution with mitigation for all alternatives.
Construction-related impacts on wildlife movement associated with temporary and permanent barriers as well as disturbance leading to alterations of movement patterns. Operational impacts on wildlife movement resulting from train strike, collision with electrical infrastructure, noise, and visual disturbance.	Less than considerable contribution with mitigation for all alternatives.
Construction-related loss and disturbance of areas under or designated for conservation purposes will be offset by project mitigation.	Less than considerable contribution with mitigation for all alternatives.
Impacts resulting from conflict with SCVHP provisions and planned wildlife crossings in the Coyote Valley Linkage will be offset by project mitigation.	Less than considerable contribution with mitigation for all alternatives.
Safety and Security	
Impacts on emergency response times resulting from increased gate down time with Alternative 4	Considerable contribution under Alternative 4 will be reduced to a less-than-considerable level with identified mitigation, if implemented. However, if local jurisdictions choose not to implement and operate emergency response improvements (whose construction would be funded by HSR), then Alternative 4 contributions may be considerable and unavoidable.

NEPA Cumulative Impact	CEQA Considerable Contribution
Agricultural Farmland	
Impacts resulting from conversion of Important Farmland to nonagricultural uses construction of any of the HSR rail alignment.	Considerable contribution under all four alternatives because of the extent of conversion. Alternative 3 would convert the greatest amount of farmland, Alternative 4 the smallest.
Parks, Recreation, Open Space, and School District Play Areas	
Operational noise-related impacts on users resulting from train passbys.	Considerable contribution under all alternatives. Alternative 4 would result in a greater contribution than Alternatives 1, 2, and 3. Alternative 1 would result in the least contribution.
Aesthetics and Visual Resources	
New buildings and rail infrastructure would degrade visual quality for sensitive (e.g., residential) viewers.	Considerable contribution under all alternatives. Alternative 1 would have the greatest contribution because of the extent of aerial structures; Alternative 4 would have the least. Alternative 3 would have the greatest contribution in the Morgan Hill and Gilroy Subsection because of its alignment through a largely undeveloped rural area.
Cultural Resources	
Construction of cumulative projects would result in permanent demolition, destruction, relocation, or alteration of built historic resources or their settings.	Considerable contribution under all alternatives. Alternative 2 would have the greatest contribution because of its extensive use of at-grade and embankment profiles through the Monterey Corridor and Morgan Hill and Gilroy Subsections; Alternative 4 would have the least contribution because of its use of existing transportation corridor between San Jose and Gilroy.