

3.19 Cumulative Impacts

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

- Section 3.19.3.1, Section 3.19.3.2, Section 3.19.4.3, and Section 3.19.5.3 have been updated to reflect new hazardous materials spoils hauling assumptions in the San Joaquin Valley Air Control District due to changes in trucking routes. Additionally, Section 3.19.5.2, Section 3.19.5.6, Section 3.19.5.7, and Section 3.19.5.10 have been updated to reflect changes made to construction debris and tunnel spoils quantity in a cumulative context.
- Information about new planned projects in the resource study area (RSA) has been added to Section 3.19.5.2 and Section 3.19.5.7.
- Section 3.19.5.6 has been updated to reflect changes to cumulative water demand during construction.
- Section 3.19.5.2, Section 3.19.5.7, Section 3.19.5.8 and Table 3.19-6 have been revised to reflect the most recent Palmdale 2045 General Plan.
- Table 3.19-1 has been updated to reflect revised RSAs for Transportation, Air Quality and Global Climate Change, and Public Utilities and Energy.
- Footnote 9 added to address ridership numbers in the 2024 Business Plan.

3.19.1 Introduction

This section describes cumulative impacts associated with implementing the Build Alternatives in combination with other past, present, and reasonably foreseeable future actions or projects (cumulative projects) that contribute to those impacts. This section focuses on the Palmdale to Burbank Project Section of the California High-Speed Rail (HSR) System and the regional context appropriate for each resource area, including adjacent sections of the HSR system.

Sections listed below contain references to the Palmdale Station. The Palmdale Subsection and HSR facilities located therein are analyzed in the Bakersfield to Palmdale Project Section EIR/EIS and is included in this document for reference purposes only.

- Section 3.2, Transportation
- Section 3.3, Air Quality and Global Climate Change
- Section 3.4, Noise and Vibration
- Section 3.6, Public Utilities and Energy
- Section 3.8, Hydrology and Water Resources
- Section 3.18, Regional Growth
- Chapter 6.0, Project Costs and Operations

Cumulative Impacts

Cumulative impacts, from varying sources, accumulate over time and can result in degradation of important resources. By looking at cumulative impacts, decision-makers understand how outside sources, in addition to the proposed project, may affect the natural and built environment over time.

For a discussion of the impacts of implementing the California HSR System in its entirety, refer to the 2005 Final Program Environmental Impact Report/Environmental Impact Statement for the Proposed California High-Speed Train System (California High-Speed Rail Authority [Authority] and Federal Railroad Administration [FRA] 2005).

This cumulative impact analysis complies with the following guidelines and regulations:

- National Environmental Policy Act (NEPA) Regulations (Title 40 of the Code of Federal Regulations [C.F.R.]1508.7)
- California Environmental Quality Act (CEQA) Guidelines (Title 14 of the California Code of Regulations, Section 15130)

- California Department of Transportation Guidance for Preparers of Cumulative Impact Analysis (California Department of Transportation [Caltrans] 2016a)
- Council on Environmental Quality (CEQ) Considering Cumulative Effects under the National Environmental Policy Act (CEQ Handbook) (CEQ 1997)
- Appendix 3.19-A, Cumulative Project List, identifies, describes, and maps cumulative projects considered in this analysis. In addition, the following appendices provide more detailed information:
 - Appendix 2-E, Impact Avoidance and Minimization Features (IAMFs), lists IAMFs included as applicable in each of the Build Alternatives for purposes of the environmental impact analysis
 - Appendix 3.1-B, USFS Policy Consistency Analysis, assesses the consistency of the Palmdale to Burbank Project Section with applicable laws, regulations, plans, and policies governing proposed uses and activities within the Angeles National Forest (ANF) and the San Gabriel Mountains National Monument (SGMNM)

3.19.2 Laws, Regulations, and Orders

3.19.2.1 Federal

Clean Water Act (33 United States Code [U.S.C.] 1251 et seq.)

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

Federal Railroad Administration, Procedures for Considering Environmental Impacts (64 Federal Regulations 28545)

On May 26, 1999, the FRA released *Procedures for Considering Environmental Impacts* (FRA 1999). These FRA procedures supplement the CEQ Regulations (40 C.F.R. Parts 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.C. 4321 et seq.). The FRA's *Procedures for Considering Environmental Impacts* state 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 Environmental Policy Act (42 U.S.C. 4321 et seq.; 40 C.F.R. Parts 1500–1508)

Pursuant to NEPA and CEQ regulations, a lead agency must consider cumulative impacts in addition to direct and indirect project impacts.¹ The CEQ regulations define cumulative effects as the 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 time (40 C.F.R. 1508.7).

¹ The CEQ issued new regulations, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Parts 1500-1508. However, because the Authority initiated the NEPA process before September 14, 2020, it is not subject to the new regulations. The Authority is relying on the regulations as they existed prior to September 14, 2020. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations [amended in 1986, 51 Federal Register 15618 (April 25, 1986)], pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 *Federal Register* 43340.

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

- Step 1—Identify the cumulative effects issues associated with the proposed action and define the assessment goals.
- 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.’” This analysis follows that instruction.

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

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

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

The Federal Endangered Species Act, Section 7, defines cumulative impacts as those effects of future state or private activities (not involving federal activities) reasonably certain to occur in the action area subject to consultation with the United States Fish and Wildlife Service, the National Marine Fisheries Service, or both.

United States Forest Service Authorities

Cumulative impacts within the ANF, including the SGMNM, are regulated by several federal laws and their implementing regulations, as well as policies, plans, and orders. The primary laws governing cumulative impacts are the Federal Land Policy and Management Act, the National Forest Management Act, and the Antiquities Act of 1906. Appendix 3.1-B, USFS Policy Consistency Analysis, provides an analysis of the consistency of the six Build Alternatives with these laws, regulations, policies, plans, and orders.

3.19.2.2 State

California Environmental Quality Act (California Code of Regulations, Title 14, Section 15000 et seq.)

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 environmental impact report (EIR) must discuss whether the project’s incremental effect is “cumulatively considerable,” where cumulatively considerable means that the project’s incremental effect is significant when viewed in the context of past, present, and reasonably probable future projects.

Similar to 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 are not significant, the EIR will briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR. A lead agency shall identify facts and analysis supporting its conclusion that the cumulative impact is less than significant (CEQA Guidelines 15130[a][2]).

3.19.3 Methods for Evaluating Impacts

The evaluation of cumulative impacts is a requirement of NEPA and CEQA. The following sections summarize the cumulative impacts RSAs and the methods used to analyze cumulative impacts. The methodology used for this analysis follows the guidelines of the Guidance for Preparers of Cumulative Impact Analysis (Caltrans 2016a), the CEQ Handbook (1997), and the CEQA Guidelines. Consistent with these guidelines, the cumulative impact analysis for each resource generally involves the following steps, described further in the subsequent subsections:

- Define the geographic boundary or RSA for the cumulative effects of each resource.
- Review the direct and indirect impacts of the proposed project for each resource area. In instances where the project would have a beneficial effect, consider this in conjunction with any adverse effects on the resource and proposed mitigation.
- Compile a list and description, as well as environmental impact information for past, present, and reasonably foreseeable future projects and relevant plans for consideration of cumulative impacts. For the purpose of this analysis, reasonably foreseeable future projects are defined as those that are likely to occur in the 2040 planning horizon for the Palmdale to Burbank Project Section and that would contribute to the cumulative impact on a particular resource. Check for such projects in regional transportation plans; regional transportation improvement programs; 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 Build Alternatives. Where relevant to the analysis for a particular resource, consider the cumulative impacts of construction and operation of adjacent project sections.
- Gather applicable projected growth trends (projections) contained in adopted local, regional, or statewide plans used in part to describe and evaluate conditions contributing to potential cumulative impacts.
- Identify the resources for which the project and other cumulative projects could, together, cause a cumulative impact.
- Determine whether the project's incremental contribution to significant cumulative impacts would be cumulatively considerable under CEQA (assuming implementation of mitigation measures previously identified for the respective resource), using the two-step CEQA cumulative analysis process.
- Provide a comprehensive discussion of the project's impacts in terms of context and intensity—defined for each resource topic in its respective section of this Final EIR/EIS—under NEPA.
- Identify reasonable, feasible options for avoiding or mitigating the project's contribution to significant cumulative impacts.

The cumulative impact analysis for many resources is based on the cumulative project list (Appendix 3.19-A). For some resources, the analysis is based on both the cumulative project list and growth projections, as discussed under each respective resource below. As previously noted, where relevant to a particular resource, the analysis also considers the cumulative impacts of construction and operation of adjacent project sections (i.e., the Bakersfield to Palmdale Project Section and the Burbank to Los Angeles Project Section).

3.19.3.1 Determining Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries in which the environmental investigations specific to each resource topic were conducted. For cumulative impacts, the RSA includes the geographic extent of each affected resource within which Build Alternatives' impacts accumulate or interact with the impacts of other actions, including adjacent project sections. The RSA for cumulative effects has the potential to be larger than the RSA used

for analyzing the project’s direct impacts to ensure a broad consideration of impacts on a more regional and/or statewide basis as appropriate to the resource considered.

Table 3.19-1 identifies the RSA used for each resource evaluated in this cumulative impact analysis and the rationale for selecting that RSA boundary. Throughout the remainder of this section, the term RSA refers to the cumulative RSA for each resource being discussed.

Table 3.19-1 Resource Study Areas for Cumulative Impact Analysis

Resource	Resource Study Area Boundaries	Reason for Selecting the Resource Study Area
Transportation		
Transportation	Los Angeles County, and a portion of Kern County ¹	The transportation RSA includes all of Los Angeles County and a portion of Kern County, to account for land use and roadway network changes that could have a cumulative impact on transportation. However, this analysis focuses on the following areas where the Build Alternatives would have the most significant effects to roadway networks: the southern Antelope Valley (specifically, the city of Palmdale); the northern San Fernando Valley (specifically, the city of Burbank); and the rural areas between these two regions.
Air Quality and Global Climate Change		
Air Quality	Mojave Desert Air Basin, South Coast Air Basin, and San Joaquin Valley Air Basin	Air quality impacts, which are local and regional in nature, are regulated by California’s 15 regional air quality districts. The project is located within three air basins in three air districts—MDAB, SCAB, and SJVAB—representing the RSA for regional air quality impacts. Meteorological and topographical factors generally limit criteria pollutant mixing across air basin boundaries. The RSA for localized air quality impacts is limited to areas within 1,000 feet of project-related diesel sources and high-traffic intersections, and within 1,000 feet of the Build Alternatives.
Greenhouse Gas Emissions	State of California	Impacts from GHGs are not specific to the area in which they are produced. The RSA for GHG emissions encompasses the state of California because existing plans, emissions targets, and CEQA thresholds are established based upon statewide goals. The California HSR System’s GHG impacts (benefits) would also occur at the state level because many of the reductions in mobile source emissions would be achieved by long-distance travel on the California HSR System.
Noise and Vibration		
Noise	Build Alternative footprint plus 2,500 feet on either side of the HSR centerline	The maximum FRA screening distance of 1,300 feet for noise was replaced with a screening distance of 2,500 feet due to the number of trains projected per day. The Authority has determined that noise and vibration impacts associated with the project would

Resource	Resource Study Area Boundaries	Reason for Selecting the Resource Study Area
Vibration	275 feet on either side of the HSR right-of-way	not likely be experienced by receivers located beyond the screening distances.
Electromagnetic Interference and Electromagnetic Fields		
Electromagnetic Interference and Electromagnetic Fields	500 feet on either side of the HSR centerline and electrical transmission lines	This RSA was determined based on typical EMI/EMF screening distances and project-specific factors. Screening distances indicate whether any EMI/EMF-sensitive receivers are near enough to the proposed alignment for an EMI/EMF impact to be possible under typical conditions. Impacts would be unlikely if receivers are located beyond these screening distances.
Public Utilities and Energy		
Public Utilities	Service areas of utility providers where utility infrastructure would be used and/or potentially disrupted by HSR stations and maintenance facilities	Two RSAs are considered in the analysis of public utility and energy resources (i.e., electricity, natural gas, petroleum distribution, telecommunications, potable/recycled/irrigable water deliver, stormwater, wastewater, and solid waste disposal)—one for evaluating direct conflicts with public utilities, and one to determine impacts related to indirect utility demands (and the upgrades needed for such infrastructure). This area encompasses utility infrastructure throughout the cities of Lancaster, Palmdale, Santa Clarita, Los Angeles, and Burbank, as well as unincorporated areas of Los Angeles County, and a portion of unincorporated areas of Kern County .
Energy	State of California	The RSA for determining impacts on electricity generation and transmission includes the entire state of California, because the California HSR System would draw power from the statewide grid.
Biological and Aquatic Resources		
Special-Status Species Habitat, Aquatic Resources, Wildlife Movement Corridors, and Other Sensitive Biologic Resources	Antelope Valley, San Gabriel Mountains, and San Fernando Valley	This area encompasses all species-specific habitat and wildlife movement corridors vulnerable to cumulative impacts.

Resource	Resource Study Area Boundaries	Reason for Selecting the Resource Study Area
Hydrology and Water Resources		
Flooding	Federal Emergency Management Agency-designated 100-year floodplains crossed by the Build Alternative footprint and adjacent land	Floodplain impacts (increases in water surface elevation) are localized in the area of structures proposed in a specific floodplain.
Surface Hydrology and Water Quality	Watersheds crossed by the Build Alternative footprint—Antelope Valley Watershed, Santa Clara River Watershed, and Los Angeles River Watershed	Hydrologic and water quality impacts on surface water are regional in nature and can affect downstream receiving waters in the watershed.
Tunnel Construction	The tunnel construction RSA is defined as the area within 1 mile of the centerline of each of the six Build Alternatives	Hydrogeologic changes resulting from tunneling activity could have regional impacts on groundwater basins and surface water features.
Groundwater	Groundwater basins crossed by the Build Alternative footprint—Antelope Valley Groundwater Basin, Santa Clara River Valley East Subbasin, Acton Valley Groundwater Basin, and San Fernando Valley Groundwater Basin	Hydrologic and water quality impacts on groundwater are regional and can affect the groundwater basin.
Geology, Soils, Seismicity, and Paleontological Resources		
Geology, Soils, and Seismicity	Antelope Valley (within the Mojave Desert geomorphic province), Transverse Ranges geomorphic province, and San Fernando Valley	Some geologic and seismic hazards—e.g., soil failures, settlement, corrosivity, shrink-swell, erosion, and earthquake-induced liquefaction risks—are limited to the project site level and do not accumulate across projects; therefore, these issues are not included in the cumulative impacts analysis. However, other issues such as seismicity, faulting, and dam failure inundation would be cumulative across projects if the associated damage affected multiple projects within the same geographic area and timespan; thus, impacts on these resources are assessed at a broader regional level within the RSA.
Paleontological Resources	All geologic units partially overlap by the Build Alternative footprint in the Antelope Valley, Transverse Ranges geomorphic province, and San Fernando Valley	Paleontological resources occur as part of the broader geologic record and are irregularly distributed across a geographic region as well as throughout the vertical extent of the geologic units present in any given region. The fossil record comprises all fossils occurring in the geologic record. Impacts on any one paleontological resource occur in the context of the entire fossil record of a region; therefore, cumulative impacts are evaluated at a broader regional level.
Hazardous Materials and Wastes		

Resource	Resource Study Area Boundaries	Reason for Selecting the Resource Study Area
Hazardous Materials and Wastes	Build Alternative footprint	Impacts related to hazardous materials are localized and would not contribute to cumulative effects.
Safety and Security		
Safety and Security	Los Angeles County	This RSA captures cumulative impacts on emergency response and evacuation routes relative to impacts on roadway connectivity to emergency service providers.
Socioeconomics and Communities		
Population and Community Impacts	Los Angeles County—focusing on the cities of Lancaster, Palmdale, Santa Clarita, Los Angeles, San Fernando, and Burbank	This RSA captures cumulative impacts on communities along the alignment.
Housing	The RSA for housing and businesses includes the Los Angeles County cities of Lancaster, Palmdale, and Burbank, and the city of Los Angeles neighborhoods of Lake View Terrace, Shadow Hills, Pacoima, and Sun Valley. The following unincorporated Los Angeles communities are also included in the RSA: Acton, Southeast Antelope Valley, and Tujunga Canyon	The RSA includes all of the cities and unincorporated communities where displacement would occur from construction of any of the Build Alternatives. The RSA for community facilities is defined as a 0.5-mile buffer area surrounding the proposed Build Alternative footprint. This area captures cumulative impacts on housing, businesses, and community facilities along the alignment.
Economic Impacts	Los Angeles County	Economic impacts generally occur countywide. Given the substantial costs associated with construction and operation of the project and the regional nature of employment in southern California, the project is anticipated to generate direct and indirect economic impacts on a scale that would be felt throughout the regional economy.
Station Planning, Land Use, and Development		
Station Planning, Land Use, and Development	Los Angeles County	Land use impacts are regional in nature and are regulated by incorporated cities or other planning agencies and bodies.
Agricultural Farmland and Forest Land		
Agricultural Farmland and Forest Land	Los Angeles County	The RSA for agricultural farmland encompasses the areas where direct and indirect impacts could result in conversion of Important Farmland to a nonagricultural use. Direct impacts include temporary use and permanent conversion of Important Farmland or forest land and would be confined to the footprint of each of the six Build Alternatives. Regulatory land use decisions that result in the conversion of agricultural land to nonagricultural use are typically made at the county level.

Resource	Resource Study Area Boundaries	Reason for Selecting the Resource Study Area
Parks, Recreation, and Open Space		
Parks, Recreation, and Open Space	Los Angeles County, with emphasis on the cities of Palmdale, and Burbank	Impacts on these resources are regulated by the relevant jurisdiction in which the facility is located. In unincorporated county areas, cumulative impacts on park, recreation, and/or open space resources are localized to where demand for these resources occurs, rather than the county as a whole. The RSA for direct and indirect impacts (i.e., noise, visual, and air quality) to park, recreation, and/or open space resources includes any resources within 1,000 feet of the proposed Build Alternative footprint.
Aesthetics and Visual Quality		
Aesthetics and Visual Quality	Project viewshed is within 0.25 mile of the centerline in urban areas (Bakersfield, Lancaster, Palmdale); within 0.5 mile of the centerline in rural areas; and within 3 miles (limit of human sight) in open landscape and mountainous areas	The project viewshed (i.e., area that could have views of project features) is the distance from the alignments where cumulative projects could have visual impacts that would overlap with those of the project. The project's viewshed accounts for existing terrain, predominant land uses, and proposed elevated components of the project.
Cultural Resources		
Archaeological Properties	Area of potential ground disturbance beyond the immediate footprint—includes all preconstruction, construction, and operation activities that could involve ground disturbance along the proposed alignment for all of the Build Alternatives	The RSA corresponds with that of the <i>Palmdale to Burbank Project Section Archaeological Survey Report</i> (Authority 2019a) to guide record searches at relevant California Historical Resources Information Centers and represents the geographic range of known archaeological properties potentially affected by the project.
Built Resources	Includes all legal parcels adjacent to those intersected by the proposed project for all of the Build Alternatives if the built resources on those parcels may be directly or indirectly affected	The RSA encompasses areas that contain built resources that may be subject to cumulative impacts, and encompasses the geographic area needed to provide historical context for the built environment. Therefore, the RSA is assumed to include built resources that are eligible or that could become eligible for listing on national, state, and local registers of historic resources in the reasonably foreseeable future.

Note:1 The RSA also includes freeway segments associated with spoils hauling to Buttonwillow in Kern County
 CEQA = California Environmental Quality Act; EMF = electromagnetic field; EMI = electromagnetic interference; FRA = Federal Railroad Administration; GHG = greenhouse gas; HSR = high-speed rail; MDAB = Mojave Desert Air Basin; RSA = resource study area; SCAB = South Coast Air Basin

3.19.3.2 Methods for NEPA and CEQA Impact Analysis

Overview of Impacts Analysis

This section describes the sources and methods used by the Authority to analyze cumulative project impacts associated with each of the six Build Alternatives. These methods apply to both NEPA and CEQA analyses unless otherwise indicated. Refer to Section 3.1.4.4, Methods for

Evaluating Impacts, in Section 3.1, Introduction, for a description of the general framework for evaluating impacts under NEPA and CEQA.

Identifying Resources for Cumulative Impact Analysis

Resources evaluated in this cumulative impact analysis were determined based on a review of the project effects, including benefits, for each resource (Sections 3.2 through 3.18 of this Final EIR/EIS). If the project would not directly or indirectly affect a resource, it would not contribute to a cumulative impact on that resource. Therefore, this cumulative impact assessment includes resources that would be substantially affected by the project. It also includes resources that are in poor or declining health or that would be at risk even if proposed project impacts are not substantial.

Resources for which the project has the potential to contribute to cumulative impacts when considered in combination with other cumulative projects include the following:

- Transportation
- Air Quality and Global Climate Change
- Noise and Vibration
- Electromagnetic Interference and Electromagnetic Fields
- Public Utilities and Energy
- Biological and Aquatic Resources
- Hydrology and Water Resources
- Geology, Soils, Seismicity, and Paleontological Resources
- Hazardous Materials and Wastes
- Safety and Security
- Socioeconomics and Communities
- Station Planning, Land Use, and Development
- Agricultural Farmland and Forest Land
- Parks, Recreation, and Open Space
- Aesthetics and Visual Quality
- Cultural Resources

Cumulative impacts from regional growth are not included in this analysis because regional growth impacts are analyzed cumulatively and are therefore addressed in the discussion in Section 3.18, Regional Growth. Similarly, the project's operational period transportation impacts on roadway segments and intersections are not analyzed in this chapter because the analysis presented in Section 3.2, Transportation, describes the cumulative impacts of the project on roadway segments and intersections. Finally, the operations air quality analysis conducted in Section 3.3, Air Quality and Global Climate Change, is inherently cumulative insofar as it considers aggregate air quality emissions associated with (1) vehicle trips generated by reasonably foreseeable future development (as identified by the transportation analysis); and (2) construction and operation of reasonably foreseeable future development within affected air basins (as identified by the Antelope Valley Air Quality Management District [AVAQMD], the South Coast Air Quality Management District [SCAQMD], and the San Joaquin Valley Air Pollution Control District [SJVAPCD]).

Effects of the Build Alternatives on Environmental Justice populations are addressed in Chapter 5, Environmental Justice. Cumulative impacts from environmental justice communities are not included in this analysis because environmental justice communities' impacts are analyzed cumulatively and are therefore addressed in the discussion in Chapter 5.

3.19.3.3 Methods for Evaluating Impacts under NEPA

Council on Environmental Quality NEPA regulations (40 C.F.R. Parts 1500–1508) provide the basis for evaluating effects (Section 3.1.4.4). As described in Section 1508.27 of these regulations, the criteria of context and intensity are considered together when determining the severity of the change introduced by the Palmdale to Burbank Project Section. "Context" is defined as the affected environment in which a proposed project develops. "Intensity" refers to the

severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved; the location and the extent of the effect; duration of the effect (short- or long-term); and other considerations of context. Beneficial effects are also considered. When no measurable effect exists, no impact is found to occur. For the purposes of NEPA compliance, the same methods used to identify and evaluate impacts under CEQA are applied here.

3.19.3.4 Methods for Determining Significance under CEQA

CEQA requires that an EIR identify the significant environmental impacts of a project (CEQA Guidelines Section 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a significance determination for each impact using a threshold-based analysis (see Section 3.19.3.3 for further information). By contrast, under NEPA, significance is used to determine whether an EIS would be required; NEPA requires that an EIS be prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.”

The CEQA analysis involves a two-step process. The first step is a determination of whether the project section, in combination with other projects, creates a significant cumulative effect. If it does not, an explanation is provided and the analysis ends. The second step applies when a project would contribute to a significant cumulative impact, and, if so, considers whether the incremental contribution is cumulatively considerable. This evaluation considers the project's effects after mitigation measures have been applied.

3.19.3.5 Cumulative Projects and Growth Forecasts

For the purpose of this analysis, reasonably foreseeable future projects are defined as those likely to occur in the 2040 planning horizon for the Build Alternatives, and that would contribute to the cumulative impact on a particular resource. Reasonably foreseeable projects are future projects (including those currently proposed) that are likely or probable, rather than those that are merely possible. This analysis assumes these proposed projects would be constructed during the same time frame as the Build Alternatives, to provide a worst-case analysis of cumulative impacts. Generally, projects are reasonably foreseeable if they meet any one or more of the following conditions:

- The project is a foreseeable future phase of an existing project.
- Applications for project entitlements or construction are pending with a government agency (these projects may have been identified during interviews with local and regional planning agencies or may have been analyzed in a recent environmental document).
- The project is included in regional transportation plans; regional transportation improvement programs; local long-range transportation plans; local land use, general, and specific plans; or an agency's budget or capital improvement program.

Appendix 3.19-A provides detailed information about cumulative projects and plans, including transportation projects, in the RSA. The tables included in Appendix 3.19-A show the cumulative project list used for this analysis. The cumulative project list includes development projects intended to help accommodate the projected 2040 population of the RSA.

The development projects identified in the cumulative project list represent only a portion of the projects likely to be constructed in the RSA through 2040. The general plans of the cities and county in the RSA include provisions for future growth beyond existing development levels under their land use elements. Although there would be additional future development projects that are not included on this list because they were not planned at the time this list was developed (not reasonably foreseeable), these development projects are expected to proceed in the future on the basis of the general plans' land use designations.

Appendix 3.19-A includes a series of tables that list major capital or new development projects by jurisdiction for the RSA. The information on the development projects planned for the near-term (10 years or less) was obtained by contacting city and county planning departments.

Appendix 3.19-A also presents transportation improvements that have the potential to result in environmental effects, such as roadway or intersection expansions. The list of transportation improvements is based on applicable plans programmed for the RSA, such as regional transportation plans and capital improvement programs.

Cumulative development is also affected by population growth in the various jurisdictions, as additional residential and community development would be needed to support growing populations (see discussion of Projected Growth Trends under Section 3.19.4, Affected Environment below). Los Angeles County is covered by the regional transportation plan for the entire Southern California Association of Governments (SCAG) region. General plans and other planning documents for the cities and county in the RSA estimate the locations and types of growth likely to occur under buildout of these plans. These projections represent the future condition under the No Project Alternative.

3.19.4 Affected Environment

This section describes the affected environment in general for the project vicinity and then more specifically for each resource, including how conditions have changed over time and the current condition of the resource.

3.19.4.1 Historical Context

Cumulative analysis requires an understanding of the historical context of the area under review. This section therefore provides an overview of the history of cultural development in the area from the Spanish Period through the Gold Rush and the development of railroads, roads, and water conveyance infrastructure that brought new settlers to the area and facilitated development in the Antelope and San Fernando Valleys. This discussion is derived from the *Palmdale to Burbank Project Section: Historic Architectural Survey Report* (Authority 2019b).

The major themes of influence in the region from late-18th century through the 19th century included the Spanish Period, the Mexican Period, and the American Period. The period from the late-18th century through the mid-19th century in California was characterized by Spanish colonial settlement along the California coast in the form of missions and pueblos, the establishment of the Spanish and Mexican rancho systems, and the first trickle of American settlers to the area. During this early period, only scattered communities were founded in Southern California. Yet with the start of the Gold Rush in 1848 and the establishment of California as a state, California's population and economy experienced an unprecedented boom, during which many towns and industries were established that persisted long after the initial rush ended.

During the Spanish and Mexican periods, the mountain areas saw little development, as they were not typically included in the rancho lands. Natural passages, such as the Cajon Pass, were utilized first by the Spanish traveling between Northern and Southern California, and later by trapping expeditions and settlers moving into the San Bernardino Valley. The forest was utilized for lumber and other building materials, hunting game, and the construction of ditches and canals to bring water to the mission lands. Gold was discovered in the mountains in the eastern portion of the present-day Angeles National Forest (ANF) during the early 1840s. Several issues, all related to water, led to the establishment of the San Gabriel Timberland Reserve. Beginning in 1905, the reserve fell under the supervision of the United States Forest Service (USFS), transferred from the Department of the Interior to the Department of Agriculture. In 1907, President Theodore Roosevelt ordered that California's first federal forest be combined with the San Bernardino National Forest and renamed it the Angeles National Forest; in 1926, President Calvin Coolidge separated the San Bernardino National Forest from the ANF and extended the ANF into the west to its present-day boundaries. The Civilian Conservation Corps, established in 1933 and terminated in 1942, established camps throughout the forest for fire prevention. Other Civilian Conservation Corps projects included trail development and maintenance, with some of

the most notable work completed on the Pacific Crest National Scenic Trail—the main artery in the ANF’s network of trails.

The development of a transportation system, spanning from the early historic roads and railroads of the 19th century to the interstates of the mid-20th century, provided the means for economic growth and settlement in Los Angeles County. Advancements in irrigation and agriculture technology transformed the environmentally advantageous but sparsely inhabited region into a prosperous area in the late 19th century. Subsequent events and developments beginning at the turn of the 20th century spurred continued growth in the vicinity of the Palmdale to Burbank Project Section. These included the rise of the motion picture industry, the focus on developing community infrastructure (including construction of education and government facilities), the rise in tourism, and the widespread adoption of the automobile (with the ensuing highway construction that permitted post-World War II suburban residential development). The development of the cities and communities through which the Palmdale to Burbank Project Section passes, such as Palmdale, Acton, Santa Clarita, Sylmar, San Fernando, and Burbank, were all influenced in one way or another by these major themes of development within Los Angeles County.

Prospectors after 1848 discovered an increasing number of oil seeps (oil seeping to the surface). In Southern California, large seeps were found in Ventura, Santa Barbara, Kern, and Los Angeles Counties. Interest in oil and gas seeps was stirred in the 1850s and 1860s and became widespread after the 1859 commercial discovery of oil in Pennsylvania. In conjunction with the California oil boom was the California power boom. The first electric light plant in Los Angeles was built in 1882 by the California Electric Light Company (later changed to Los Angeles Electric Company) to provide electricity for the city's new streetlights that it also installed. In the early 20th century, power companies throughout Los Angeles County installed many overhead and underground transmission lines, transmission towers, power lines, and communication lines. One such line is Southern California Edison’s approximately 18.7-mile-long linear arrangement of steel lattice transmission towers extending generally southward through the ANF from the vicinity of Southern California Edison’s Vincent Substation, near Acton, to Pasadena.

The transportation system underwent transformation as well. Prior to the arrival of the railroads in the 1870s, travelers in Southern California relied on existing trails and roads—El Camino Real and El Camino Viejo, in particular—supplemented by a few wagon and stagecoach roads built during the mid-19th century. The completion of the Southern Pacific Railroad through Southern California in 1876 improved passenger and freight transport, and drastically changed the speed at which goods and people could travel. Paved automobile routes became increasingly common with the onset of the automobile age in the 1920s, which culminated in the federal interstate system of the 1950s, and the transition of rail travel to primarily freight routes.

The earliest Spanish settlements in semiarid Southern California operated an aqueduct system that brought water to the adobe homes and agricultural crops at the Pueblo of Los Angeles. The City of Los Angeles formulated plans to construct the first publicly owned water system in the state. The Los Angeles County Department of Water and Power was also created to oversee construction of this system. The Los Angeles Aqueduct, also known as the Owens Valley Aqueduct, was constructed in 1913. Water development was critical to the establishment and growth of Palmdale. The Southern Antelope Valley Irrigation Company built the Palmdale Ditch to convey water from Little Rock Creek to Harold Reservoir (Lake Palmdale). To further increase the water supply, the Palmdale Water Company arranged to construct Little Rock Dam and Reservoir for the Little Rock and Palmdale Irrigation Districts. When completed in 1924, Little Rock Dam was the second largest concrete arch dam in the world. That same year, Harold Reservoir (Lake Palmdale) was also rehabilitated to receive water from Little Rock Reservoir via ditch and flume.

After devastating floods in 1914, the California State Legislature authorized the creation of the Los Angeles County Flood Control District to undertake construction of upstream mountain flood-control dams as well as levees and dams nearer to population centers. Present today, although altered, a new concrete bridge was constructed to carry San Fernando Road traffic over Pacoima Wash in 1926. In 1929, with the district’s recommendation, Pacoima Dam was created, and in 1931 Big Tujunga Dam was constructed for flood control measures on the Tujunga and

Pacoima watersheds. Later, in 1940, Hansen Dam was constructed, which became an iconic feature of the eastern San Fernando Valley landscape.

Los Angeles County was an important agricultural center in the United States into the 1950s, well known for its production of abundant fruit, vegetables, and flowers. After completion of the Los Angeles Aqueduct, and particularly after World War II, urban and suburban development emanating from the city of Los Angeles grew quickly eastward, swallowing land previously used for agriculture; agricultural lands in Los Angeles County decreased from more than 100,000 acres in 1934 to 46,000 acres by 1955. A second aqueduct was added to the original Los Angeles Aqueduct between 1963 and 1970 to meet growing water demands in Los Angeles County.

Natural Environment

Topography and climate within the project area are diverse, ranging from relatively flat high desert habitats in the Antelope Valley, steep mountains and canyons within the central portion, and lower-elevation, flat, urban landscapes in the San Fernando Valley. As a result, several different ecosystems occur throughout the project area, ranging from semiarid shrublands with relatively sparse vegetation to dense woodlands in canyons and drainages. These ecosystems host a variety of plant and wildlife species, many of which are federally or state-listed as threatened or endangered, as well as several considered as sensitive by the USFS. Many of the original natural biotic communities of Los Angeles County have been disturbed and/or divided by extensive human activities and development. Notwithstanding, the project area contains numerous relatively intact ecological areas that contain habitat for important animal and plant species, including within the ANF including SGMNM, the Big Tujunga Wash area, and the Santa Clara River, among other locations.

Primary Jurisdictions

Agriculture drove the early success and growth of the city of Palmdale, aided by irrigation systems and dry farming techniques, and remained the primary economic force in Palmdale until defense contractors and the U.S. military came to the area in the years leading up to World War II. Between 1933 and 1940, the construction of the Muroc Army Air Field, now the Edwards Air Force Base, and construction of U.S. Air Force Plant 42 in Palmdale, an emergency landing strip for the United States Army, led to the doubling of Antelope Valley's population. After World War II, the aerospace industry became the primary local source of employment.

The expansion of the aerospace industry directly affected Palmdale's population growth. Palmdale was incorporated as a city in 1962. In 1964, with the completion of the Antelope Valley Freeway (the southern portion of State Route [SR] 14), Palmdale was linked more directly and reliably to the San Fernando Valley and Los Angeles. During the same period, talks began about a future Palmdale intercontinental airport, which eventually came to fruition in 1971 as the Los Angeles/Palmdale Regional Airport. However, commercial air service came to a halt in 2008. During the 1980s and 1990s, construction of affordable housing led to meteoric population growth—from just over 12,000 in 1980 to nearly 69,000 in 1990—with Palmdale becoming a bedroom community for those working in Los Angeles. By 2000, the population was nearly 117,000 and, as of 2014, was over 158,000. Over the past 25 years, Palmdale has often ranked in the top 25 fastest growing cities in the United States.

Unincorporated portions of Los Angeles County comprise approximately 65 percent of the county's land area and contain over 1 million people. Railroad, mining, farming, and ranching operations gave rise to several unincorporated communities in Los Angeles County in the late 1800s, in the Antelope Valley and the San Fernando Valley. Some communities in the Antelope Valley, particularly Acton and Agua Dulce, have retained some elements of a rural character, while some communities in the San Fernando Valley, such as Pacoima and Sun Valley, took on a more suburban character.

Construction of a Southern Pacific Railroad rail line connecting Burbank and Los Angeles in the late 1800s spurred population growth and farming, leading to Burbank’s eventual incorporation in 1911. Around the 1920s, industrial development associated with the growing aerospace industry began to replace agricultural lands. Around the same time, Burbank also became an important hub for the entertainment industry, with the establishment of several movie studios, including Warner Brothers and the Walt Disney Company. For the next several decades, population grew steadily, aside from a pause during the Great Depression, increasing to nearly 80,000 by 1950. The population of the city of Burbank has continued to rise—to over 105,000 residents as of 2015.

Projected Growth Trends

Los Angeles County is home to more than 10 million people (U.S. Census 2015). Under the No Project Alternative, Los Angeles County is projected to grow to a population of over 11.5 million by 2040 (13.2 percent), which is a net increase of 1.34 million people (SCAG 2016). This growth rate is lower than that for the state of California as a whole, which is expected to increase by 20.7 percent by 2040. Over the same period, the population in the cities of Lancaster and Palmdale will increase by 30.3 percent and 27.2 percent, respectively. Unincorporated areas of Los Angeles County are also expected to grow at a higher rate than the state—by 21.2 percent. The populations of the cities of Los Angeles and Burbank are also projected to grow robustly (although at lower rates than the state) at 16.1 percent and 12.7 percent, respectively (U.S. Census 2015).

These projections indicate that the populations of the cities of Lancaster and Palmdale will continue to increase at a higher average annual rate (2.0 percent and 1.8 percent, respectively) than the annual average increase in population of the cities of Los Angeles (1.1 percent) and Burbank (0.8 percent), Los Angeles County (0.9 percent), and the state of California as a whole (1.4 percent) (SCAG 2016). General plans and other planning documents for Los Angeles County and cities in the region project the locations and types of growth likely to occur under buildout of the plans. Accommodating this new population will require land and the construction of new residential areas, roadways, electric power generation facilities, utilities, schools, hospitals, and commercial and industrial facilities. The combined environmental influence of these future changes in conjunction with the Build Alternatives is referred to as the cumulative condition for 2040.

3.19.4.2 Transportation

The RSA for cumulative transportation effects encompasses all of Los Angeles County and small portions of the Kern County (specifically San Joaquin Valley); however, this analysis focuses on the roadway network within the southern Antelope Valley (specifically in the city of Palmdale), the northern San Fernando Valley (specifically in the city of Burbank), and the rural areas between these two regions. Past projects in this RSA converted undeveloped and agricultural land to urban uses, boosting residential and employment populations and increasing demand for expanded transportation infrastructure.

Several freeways service this RSA:²

- SR14 (Antelope Valley Freeway)
- Interstate (I)-5 (Golden State Freeway)
- I-210 (Foothill Freeway)
- U.S. Highway 101/SR 134 (Ventura Freeway)
- SR 170 (Hollywood Freeway)
- SR 118 (Ronald Reagan Freeway)

The southern Antelope Valley’s current street network consists of regional, major, and secondary arterials developed generally in a grid pattern. The area between the Antelope Valley and the San Fernando Valley is served by major arterials and regional roads—including Pearblossom Highway, Sierra Highway, Soledad Canyon Road, and Angeles Forest Highway—as well as

² Refer to Section 3.2, Transportation, for the average annual daily trips for each of these freeways within the RSA.

numerous local-serving rural roads. The street network within the San Fernando Valley consists of a grid of arterial roadways. Major arterials in the RSA include San Fernando Road, Glenoaks Boulevard, Hollywood Way, Buena Vista Street, Empire Avenue, San Fernando Boulevard, San Fernando Road, and Wentworth Street.

While travel by automobile is the predominant mode in the RSA, numerous transit operators provide service to points within and beyond the RSA. Major operators in the RSA include but are not limited to Metrolink, the Antelope Valley Transit Authority, the Los Angeles County Metropolitan Transportation Authority, BurbankBus, Amtrak, and Greyhound.

- Antelope Valley Transit Authority operates local and regional transit, including accessibility services, with a network of 13 local transit routes, 4 commuter routes, and 1 supplemental school route.
- Metrolink provides intercity rail service along seven lines and to 61 stations covering over 512 route miles. The Antelope Valley Metrolink Line connects the Palmdale Transit Center and Los Angeles Union Station in approximately 2 hours, and services several existing stations between Palmdale and Burbank, including Vincent Grade/Acton, Via Princessa, Santa Clarita, Newhall, Sylmar/San Fernando, and Sun Valley. Metrolink also provides service to the Hollywood Burbank Airport Metrolink Station along its Ventura County Line (Los Angeles Union Station – Ventura East).
- Greyhound Bus service serves more than 3,800 stops nationwide, including one at the Palmdale Transportation Center, and several throughout the Los Angeles metropolitan area, including Downtown Los Angeles, North Hollywood, El Monte, and San Fernando. Greyhound provides one daily trip between Palmdale and Los Angeles.
- Los Angeles County Metropolitan Transportation Authority provides a variety of bus lines serving the Burbank area and beyond; the Metropolitan Transportation Authority also operates the regional subway system.
- Amtrak offers two rail services in the Los Angeles area: Pacific Surfliner and the Coast Starlight. Both lines serve the Hollywood Burbank Airport Metrolink Station. Amtrak also provides a Thruway bus station at the Palmdale Transit Center, providing service between Bakersfield and Los Angeles for passengers on Amtrak's San Joaquin service (Caltrans 2018).
- BurbankBus provides bus services in the San Fernando Valley communities of Pacoima, Sun Valley, and Burbank. BurbankBus offers four bus services in the city of Burbank—including the Empire/Downtown route, the North Hollywood/Airport route, the North Hollywood/Media District Route, and the Metrolink/Media District route.

The Union Pacific Railroad carries rail freight through the RSA on the Valley Subdivision, which extends from the city of Lancaster south to the city of Los Angeles (OpenStreetMap 2018). Metrolink owns this route and operates its Antelope Valley Line passenger service along this track segment.

The RSA contains four airports: Palmdale Regional Airport, Agua Dulce Airpark, Whiteman Airport (in the Pacoima neighborhood of Los Angeles), and Hollywood Burbank Airport. Hollywood Burbank Airport is the only one of these four airports that provides scheduled commercial air service. As of 2015, the Hollywood Burbank Airport served approximately 3.8 million passengers annually over 118,543 aircraft operations. People living and working in the RSA also access air travel through other major airports in the region, particularly Los Angeles International Airport, which served more than 80 million passengers annually in 2016 and 2017 (LAWA 2018).

Pedestrian facilities in the southern Antelope Valley and San Fernando Valley include an existing sidewalk network with marked pedestrian crosswalks and Americans with Disabilities Act access at intersections. Portions of roads within the Antelope Valley and San Fernando Valley also

provide Class I, II, and III bicycle facilities. Rural neighborhoods outside of these urbanized areas provide little or no pedestrian or bicycle infrastructure.

3.19.4.3 Air Quality and Global Climate Change

Air Quality

As described in Section 3.3, Air Quality and Global Climate Change, construction activities associated with the Build Alternatives involves three air basins: (1) the Mojave Desert Air Basin (MDAB) within the AVAQMD, (2) the South Coast Air Basin (SCAB) within the SCAQMD, and (3) the San Joaquin Valley Air Basin (SJVAB) within the SJVAPCD. Therefore, the RSA for cumulative impacts on air quality includes the MDAB, SCAB, and SJVAB. The MDAB air mass in the northeast portion of Los Angeles County interacts with that of the SCAB to the southwest. The northernmost portion of the SCAB interacts with the southern portion of the SJVAB. The boundary between the MDAB and the SCAB cuts roughly through the community of Acton, while the boundary between the SCAB and the SJVAB is roughly through the community of Lebec.

The RSA for greenhouse gas (GHG) emissions encompasses the state of California because existing reports and plans typically describe GHG emissions at the state level and policies establish emissions targets at the state level. Additionally, the California HSR System's GHG impacts (in this case, benefits) would also occur at the state level because many of the reductions in mobile source emissions would be achieved by long-distance travel on the California HSR System.

The following summary of existing air quality conditions is from the *Palmdale to Burbank Project Section: Air Quality and Global Climate Change Technical Report* (Authority 2020). The MDAB rarely experiences the type of summer temperature inversions that trap polluted air layers in the SCAB, so the air of the high desert is relatively cleaner. The most important weather pattern is associated with the funneling of the daily onshore sea breeze through Soledad Canyon into the upper desert to the north of the heavily developed portions of the SCAB, bringing polluted air into the MDAB, particularly in late afternoons from late spring to early fall. Wind-blown dust, exacerbated by human disturbance of the desert environment, represents a major source of respirable particulate matter (PM₁₀) emissions in the Antelope Valley. As shown in Table 3.19-2, the MDAB is in federal and state nonattainment for ozone and state nonattainment for PM₁₀ but is in attainment for other pollutants.

Table 3.19-2 Federal and State Attainment Status of the Mojave Desert Air Basin

Pollutant	Federal Attainment Status	State Attainment Status
Ozone	Nonattainment (Severe – 15) ¹	Nonattainment
PM ₁₀	Unclassified	Nonattainment
PM _{2.5}	Attainment/unclassified	Unclassified
Carbon monoxide	Attainment	Attainment
Nitrogen dioxide	Attainment/unclassified	Attainment
Sulfur dioxide	Attainment/unclassified	Attainment

Source: Authority 2020

¹ The "Nonattainment (Severe – 15)" classification represents that the expected timeline for attainment is 15 years. Authority = California High-Speed Rail Authority; PM_{2.5} = fine particulate matter (less than 2.5 microns in diameter); PM₁₀ = respirable particulate matter (less than 10 microns in diameter)

The area from Acton southward is entirely within the SCAB. The topography and climate of Southern California combine to make the SCAB an area of high air pollution potential. The region frequently experiences temperature inversions, in which a warm air mass descends over the cool, moist marine layer, trapping air pollutants near the ground. Light winds further limit ventilation, and abundant sunlight triggers the photochemical reactions that produce ozone and the majority

of particulate matter. Vehicular, commercial, and industrial sources in the highly urbanized SCAB contribute large amounts of emissions and air pollutants.

Beginning in the early 1900s through the 1960s, the Los Angeles area experienced severe ozone problems caused by rapid industrialization and urbanization coupled with a lack of modern air pollution control measures. Air quality began to improve with the passage of the Federal Clean Air Act in 1970 and the establishment of the SCAQMD in 1975, and ozone levels in the area have dramatically declined since. However, the region is still subject to ozone and particulate matter pollution. As shown in Table 3.19-3, the SCAB is in nonattainment with the federal standards for ozone, fine particulate matter (PM_{2.5}), and lead. The SCAB is in nonattainment with the state standards for ozone, PM₁₀, and PM_{2.5}.

Table 3.19-3 Federal and State Attainment Status of the South Coast Air Basin

Pollutant	Federal Attainment Status	State Attainment Status
Ozone	Nonattainment (extreme)	Nonattainment
PM ₁₀	Attainment/Maintenance (serious)	Nonattainment
PM _{2.5}	Nonattainment (serious)	Nonattainment
Carbon monoxide	Attainment/Maintenance	Attainment
Sulfur dioxide	Attainment/unclassified	Attainment
Nitrogen dioxide	Attainment/Maintenance	Attainment
Lead	Nonattainment (partial Los Angeles County only) Attainment (rest of the South Coast Air Basin)	Attainment

Source: Authority 2020

Authority = California High-Speed Rail Authority; PM_{2.5} = fine particulate matter (less than 2.5 microns in diameter); PM₁₀ = respirable particulate matter (less than 10 microns in diameter)

The SJVAB encompasses the southern two-thirds of California's Central Valley. Mountain ranges border the sides and southern boundary of the bowl. The valley's weather conditions include frequent temperature inversions; long, hot summers; and stagnant, foggy winters, all of which are conducive to forming and retaining air pollutants.

As shown in Table 3.19-4, the SJVAB is in nonattainment with the federal standards for ozone, and PM_{2.5}. The SJVAB is in nonattainment with the federal standards for ozone, PM₁₀, and PM_{2.5}.

Table 3.19-4 Federal and State Attainment Status of the San Joaquin Valley Air Basin

Pollutant	Federal Attainment Status	State Attainment Status
Ozone	Nonattainment (extreme)	Nonattainment
PM ₁₀	Maintenance	Nonattainment
PM _{2.5}	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment/unclassified	Attainment
Sulfur Dioxide	Attainment/unclassified	Attainment

Source: Authority 2020

PM₁₀ = respirable particulate matter (10 microns or less in diameter); PM_{2.5} = fine particulate matter (2.5 microns or less in diameter)

Greenhouse Gases

Global GHG emissions from fossil fuels have increased substantially since 1900. Since 1970, global carbon dioxide emissions have increased by about 90 percent. The main causes of the increase in global GHG emissions since 1970 are fossil fuel combustion, industrial processes, agriculture, deforestation, and other land-use changes (Authority 2020).

The California Air Resources Board estimated total statewide GHG emissions in 2018 at 425 million metric tons of carbon dioxide-equivalent (Authority 2020). The transportation sector has historically, and is currently, the largest source of GHG emissions in California, accounting for 41 percent of the 2018 inventory. Industrial sources are the second largest source of the state's GHG emissions, contributing 24 percent of total GHG emissions in 2018. While the RSA for GHG emissions is the state of California, GHG emissions are cumulative at a global scale.

3.19.4.4 Noise and Vibration

The RSA for noise impacts includes the Build Alternative footprint plus 2,500 feet on either side of the Build Alternative centerlines. The RSA for vibration impacts includes the Build Alternative footprint plus a 275-foot buffer from the HSR right-of-way. These RSAs were determined based on typical screening distances used by the FRA and project-specific conditions. If receivers are located outside of these areas, the Authority has determined that noise and vibration impacts would be unlikely.

Existing measured day-night sound levels (L_{dn}) in the RSA ranged from 51 to 67 A-weighted decibels (dBA). Noise levels within the RSA have been influenced by the presence of transportation infrastructure, including truck and automobile traffic on freeways and major arterials, freight and passenger railroads, and airports, as well as general community noise. The RSA also includes areas with major industrial and mining uses.

Major sources of noise in the Palmdale region include the Antelope Valley Freeway (southern portion of SR14) and the arterial roadway system, aircraft operations (including military aircraft) related to U.S. Air Force Plant 42 (Palmdale Regional Airport), Fox Field, Edwards Air Force Base, and freight rail operations along the Union Pacific Railroad line (City of Lancaster 2009). Concentrations of residences and other noise- and vibration-sensitive receivers are located in the urban and suburban areas of the city of Palmdale. Outside of these urban and suburban areas, land uses are more rural and the land more sparsely populated, with fewer sensitive receivers. Noise levels in this area are typical for urban settings dominated by vehicular traffic and railroad operations. Sources of existing vibration include freight trains, passenger trains, and truck and automobile traffic on highways.

South of the Palmdale area, the cumulative RSA encompasses suburban and rural communities between Palmdale and the entry to the San Fernando Valley. Existing measured L_{dn} in the Central Subsection ranged from 51 to 67 dBA. Major noise sources include motor vehicle traffic on highways and roadways, and freight and passenger rail operations. Aircraft, industrial, and commercial activities are not significant noise sources (City of Santa Clarita 2010). Residences and other noise- and vibration-sensitive receivers are located near the Acton area, Santa Clarita, and San Fernando. Within the ANF including SGMNM, major noise sources are generally limited and short term, primarily associated with motorized activities, ecosystem management (e.g., operation of chainsaws for thinning vegetation), and road and trail maintenance.

In the Burbank area, many sources contribute to the noise environment. These include but are not limited to aircraft noise from the Hollywood Burbank Airport, passenger and freight railroad operations, and automobile noise from I-5 and SR 134 as well as from major roads (including Hollywood Way, Glenoaks Boulevard, Burbank Boulevard, and Magnolia Boulevard) (City of Burbank 2013). Concentrations of residences and other noise- and vibration-sensitive receivers are located in the urban and suburban areas of the city of Burbank.

The majority of noise-sensitive land uses in the Burbank area are residential and are primarily located in two areas: generally northeast of commercial and industrial land uses along I-5, and generally north of SR 134 and southwest of commercial and industrial land uses adjacent to I-5

and the Hollywood Burbank Airport (City of Burbank 2013). Existing measured L_{dn} in the city of Burbank ranged from 54 to 61 dBA. These noise levels are typical for urban settings dominated by vehicular traffic and railroad operations.

3.19.4.5 **Electromagnetic Interference and Electromagnetic Fields**

The long-range historical context in the RSA is described by a gradual introduction and use of electric power with its associated infrastructure, throughout the area, supplemented by regional broadcast radio and television services. Services such as fire and police protection, aviation, and military training activities have increasingly adopted communications and tracking technologies that have further contributed to the electromagnetic interference (EMI) and electromagnetic fields (EMF) environment. Such changes closely correlate to both spatial and temporal changes in population over the last 100 years.

Recent trends include a rapid increase in the deployment of cellular telecommunications and other wireless communications systems. These uses tend to be more concentrated in fully developed areas, although not exclusively. Government decisions have played roles, both indirect (e.g., zoning and regional planning) and direct (e.g., regulatory restrictions on the siting of cell towers and transmission lines), in shaping the EMI/EMF environment.

The EMI/EMF RSA extends 500 feet on either side of the HSR centerline and electrical transmission lines. Screening distances indicate whether EMI-/EMF-sensitive receivers are near enough to the proposed alignment for an EMI/EMF impact to be possible under typical conditions. If receivers are located farther than these screening distances, the *Draft Environmental Impact Report/Environmental Impact Statement Assessment of California High-Speed Train Alignment Electromagnetic Field Footprint* (Authority 2010) has determined that impacts would be unlikely.

This RSA includes local EMF sources, regional EMF sources, and facilities that could be sensitive to EMI. Local EMF sources (such as cell phone signals) decay quickly within a few miles of the transmitting antenna. Regional sources (such as television and radio signals) extend tens to hundreds of miles from broadcast antennas. Regional EMF sources along the project corridor include AM and FM radio stations, time signal transmitters, maritime and land mobile radio transmitters, air-to-ground transceivers, cell phone antennas, microwave communication links, and television station transmissions. In addition, the RSA contains several facilities that could be sensitive to EMI generated by the past, present, and reasonably foreseeable future development.

3.19.4.6 **Public Utilities and Energy**

This analysis considers two RSAs for cumulative impacts on public utility and energy resources: (1) the direct conflicts RSA, for evaluating direct conflicts with public utilities; and (2) the expanded utility RSA, to determine impacts related to indirect utility demands (and the upgrades needed for such infrastructure).

Public Utilities

The direct conflicts RSA for public utilities are site-specific and relate to the type and location of construction proposed. Utility infrastructure (i.e., utilities lines) beyond the RSA established for the Build Alternatives would not be directly impacted by the Build Alternatives. Although other projects may directly conflict with utilities beyond this distance, the project would not contribute to those impacts. Because there would be no additive effect related to direct conflicts beyond the project-level direct conflicts RSA with other approved or reasonably foreseeable development, the cumulative setting for direct utility conflicts is the same affected environment described in Section 3.6, Public Utilities and Energy. Section 3.6, Public Utilities and Energy, provides detailed maps of the direct conflicts RSA, by utility type.

Electromagnetic Fields and Electromagnetic Interference

Electric fields are forces that electric charges exert on other electric charges, while magnetic fields are forces that a magnetic object or moving electric charge exerts on other magnetic materials and electric charges.

Electromagnetic interference occurs when electromagnetic fields produced by a source adversely affect operation of an electrical, magnetic, or electromagnetic device.

The expanded utility RSA is used to understand the existing capacity and reserves of utility resources and energy reserves that would support the Build Alternatives and includes the larger utility providers' service areas. This area encompasses public utilities throughout the cities of Lancaster, Palmdale, Santa Clarita, Los Angeles, and Burbank, as well as in unincorporated areas of Los Angeles County. The analysis conducted for project-level increases in utility demand is cumulative by nature, in that the effects of the project are related to the total capacity of the service providers, considering all existing and planned development in their respective service areas. The energy analysis considers project-level effects in conjunction with statewide energy demand forecasts. Section 3.6, Public Utilities and Energy, details the utility providers that serve the expanded utility RSA. Given the above, the cumulative setting for indirect utility demands is the same affected environment described in Section 3.6, Public Utilities and Energy.

Public utilities within the RSAs include facilities for electricity; natural gas, and petroleum distribution; telecommunications; potable, recycled, and irrigable water delivery; stormwater; wastewater; and solid waste disposal. Past and present development projects have resulted in an increased demand for public utilities in the RSAs.

Water supply to the RSAs is derived from numerous sources. Some water is produced locally from groundwater sources, particularly in the Antelope Valley area. In the San Fernando Valley, the Los Angeles Department of Public Works manages several spreading grounds—including the Hansen, Pacoima, and Lopez Spreading Grounds near the proposed Build Alternatives—which facilitate percolation into the San Fernando groundwater basin.

All portions of the RSAs (and much of Southern California beyond Los Angeles County) also receive water delivered from a distance, including but not limited to the California, Los Angeles, and Colorado River aqueducts. Local agencies provide retail water service from these sources. Agencies serving the RSAs, through their adopted water management plans, anticipate adequate water supply through the horizon year of the project. While moderate or worse drought conditions have been present in Los Angeles County for several years (National Drought Mitigation Center 2018), water imports have helped meet demand. Of note, the Water Infrastructure Improvements for the Nation Act was signed in December 2016 to address California's drought conditions by restoring California waterways, helping to capture groundwater, and improving existing drought mitigation projects (ACWA 2016). Additional programs such as the California Water Fix and the Governor's Drought Task Force are also in place to address persisting drought conditions in the state as they arise (CNRA 2018).

3.19.4.7 Biological and Aquatic Resources

The cumulative RSA for biological resources includes biotic and aquatic habitat throughout the Antelope Valley, Transverse Ranges, and urbanized San Fernando Valley, as this area encompasses all species-specific habitat and wildlife movement corridors vulnerable to cumulative impacts. The varied topography and climate in this area have produced a diverse range of ecosystems that support high biodiversity of plant and animal species, many of which are endemic to the region (i.e., not found outside of Southern California). Historical habitat for many species has been heavily urbanized, resulting in habitat loss and fragmentation. Nonnative species invasions have accompanied human disturbance, with detrimental effects across ecosystems.

Riparian habitats throughout Southern California have declined in quality and quantity at low elevations, where they historically were most extensive, due to channelization, diversion, and damming, and to urbanization and nonnative plant and animal species invasions. Approximately 95 to 97 percent of low-elevation floodplain riparian habitat in Southern California has been eliminated, and most major streams now contain dams or diversions. In addition, many smaller streams and springs have been dammed or diverted for water supplies and local flood control. Subsurface waters have been heavily tapped for domestic water, lowering water tables and base flows of many springs and streams. Dams have directly removed riparian habitat due to inundation as well as altering downstream hydrologic regimes (USFS 2005a). Section 3.19.4.8, Hydrology and Water Resources, describes hydrologic trends throughout the cumulative RSA.

Antelope Valley

Within the Antelope Valley, large areas of natural communities surrounding the urban/suburban communities of Palmdale have been lost to residential, commercial, industrial/aerospace, and transportation development. The historical trend of losing or altering these natural communities has resulted in the decline of the biological complexity of the region. However, undisturbed natural areas still exist within the Antelope Valley that harbor sensitive biologic communities, including special-status species habitat, aquatic resources, and protected trees. Wildlife movement is constrained within the Antelope Valley due to urbanization and habitat fragmentation. Portions of the Antelope Valley that experienced minimal or moderate human disturbance still provide habitat and refuge for biological resources, albeit at a lower quality than undisturbed areas.

San Gabriel Mountains

Between the Antelope Valley and the San Fernando Valley, a lowland corridor within the Transverse Ranges separates the Sierra Pelona Mountains to the northwest from the San Gabriel Mountains to the southeast. Vast areas of alpine and subalpine habitats in these Sierra Pelona Mountains and the San Gabriel Mountains remain intact and undisturbed due to their protected status as part of the National Forest system. This designation prevents development throughout large portions of the San Gabriel Mountains, particularly in higher, more rugged alpine terrain. Comparatively, the valley that separates the Sierra Pelona Mountains from the San Gabriel Mountains contains suburban development—including the communities of Agua Dulce, Acton, and Santa Clarita—as well as transportation corridors (notably, SR14 and the Metrolink Antelope Valley line).

This area also contains the Santa Clara River system, the largest natural river remaining in Southern California. The Santa Clara River headwaters are located in the San Gabriel Mountains. This watercourse collects numerous ephemeral and intermittent tributaries along its 83-mile length. Los Angeles County designated portions of the Santa Clara River as a Significant Ecological Area (SEA), indicating an area with irreplaceable biological resources. The Santa Clara River riparian corridor is the primary east-west linkage between the Pacific coastline, Coast Ranges, interior ranges, high desert, and southern Sierra (via the Tehachapi Range). Animals moving through the Santa Clara River at one time had unobstructed passage along the river and within its tributaries. The present configuration of the tributary drainages has reduced connectivity from the Santa Clarita Valley to the north, but the Santa Clara River remains relatively intact and open. This SEA encompasses the river corridor and linkage zones that are essential to ensuring connectivity and resource values within the historical movement zones for local wildlife.

The San Gabriel Mountains and Sierra Pelona Mountains encompass the ANF. Alpine and subalpine habitats of the ANF remain, for the most part, largely intact and undisturbed at very high altitudes. While these mountain areas are vulnerable to trampling due to hiking, rock climbing, camping, road building, and other forms of ground disturbance, these impacts have been limited to a small number of locations around developed recreation areas and along trails and roads (USFS 2005a). The structure and species composition of montane conifer forests has also deviated from its natural state with the intervention of human management. Historically, these forests were dominated by large, old-growth, open stands with light-loving species—a structure that was maintained by regular surface fires every 30 to 50 years. In the late 1800s, the structure and species composition of montane conifer forests changed dramatically as a result of logging and, later in the early 1900s, by fire suppression. The remarkable success of fire suppression has created an unnatural increase in the density of understory trees. Air pollution, periodic drought, diseases, and bark beetle infestations have compounded the effects of logging and fire suppression. As a result, the risk of uncharacteristically severe fires has increased in the montane conifer forests of the ANF, including the SGMNM (USFS 2005a).

The relatively undeveloped San Gabriel Mountains contain existing wildlife corridors. The San Gabriel Mountains are centrally positioned in the Transverse Ranges and located just southeast of the convergence of four major ecoregions (Great Central Valley, Sierra Nevada, Mojave Desert, and South Coast) and five major biogeographic regions (Great Central Valley, Sierra Nevada, Mojave Desert, Coast Ranges, and Transverse Ranges). The San Gabriel Mountains, as part of the Transverse Ranges, provide a critical linkage between this convergence zone and the

Peninsular Range in the south. This area also contains a large amount of conserved and protected land, including the ANF and the SGMNM, the Sierra Madre-Castaic Linkage Design, Los Angeles County SEAs, the Nature Conservancy Ecoregional Priority Areas, and open space and recreation areas. Existing constraints to wildlife movement in the Palmdale to Burbank Project Section region come from a combination of habitat loss, fragmentation, and degradation of existing habitat resulting from urban and agricultural development and linear transportation barriers (roads and freeways), especially urban development associated with Palmdale to the north and the San Fernando Valley to the south.

San Fernando Valley

South of the San Gabriel Mountains, the RSA includes the urbanized San Fernando Valley. Most of the land in the San Fernando Valley is heavily developed, and the likelihood of occurrence for special-status species is low in most of the urban core. In general, wildlife movement within the San Fernando Valley is constrained by urban development and habitat fragmentation. Although most of the San Fernando Valley provides limited biological or aquatic habitat, this area contains the Big Tujunga Wash and the Tujunga Valley/Hansen Dam SEA. The Big Tujunga Wash originates in the San Gabriel Mountains and flows south, collecting runoff from numerous intermittent and ephemeral streams throughout the ANF including SGMNM. Within the San Fernando Valley, the Big Tujunga Wash contains biological resources of local, regional, and statewide significance, and provides a wildlife movement corridor. The Tujunga Valley/Hansen Dam SEA consists of the Tujunga Valley and Wash, starting in the riparian areas of Big Tujunga within the ANF, and including Hansen Dam, Hansen Dam Flood Control Basin, Hansen Dam Park, Hansen Dam Golf Course, and Tujunga Wash, as well as industrial areas downstream of Hansen Dam. This area is important for migrating birds on the Pacific Flyway and contains rare alluvial fan scrub habitat. The San Fernando Valley perimeter also includes relatively undisturbed areas that provide a transition into natural open spaces, including the Verdugo Mountains and the San Gabriel Mountains.

3.19.4.8 Hydrology and Water Resources

There are different RSAs for the various water resources considered under this topic area. Each subsection below defines the RSA for the particular water resource.

Watersheds and Surface Waters

The RSA for watersheds and surface waters include (1) the Antelope Valley watershed, which is managed by the Lahontan Regional Water Quality Control Board; and (2) the Santa Clara River and (3) Los Angeles River watersheds, both of which are managed by the Los Angeles Regional Water Quality Control Board. These three watersheds (described below) encompass all surface waters that could be affected by the Build Alternatives, including downstream and receiving waterbodies.

Hydrology and Water Resources Definitions

Watershed—A watershed is a network of waterbodies that share a common outlet.

Surface Water—Surface waters include streams, rivers, washes, lakes, and built reservoirs associated with dams.

Groundwater Basin—Groundwater is found in subsurface water-bearing formations, known as basins.

Antelope Valley Watershed

The Antelope Valley Watershed encompasses 1,220 square miles within Los Angeles County, 2,006 square miles within Kern County, and 143 square miles within San Bernardino County. This watershed is a closed topographic basin with no outlet to the Pacific Ocean. Streams originating in the mountains and foothills flow across the valley floor and eventually pond in the dry lakes adjacent to the Northern Los Angeles County line. The Antelope Valley lacks defined natural and improved channels outside of the foothills and is subject to unpredictable sheet flow patterns (Los Angeles County 2017). The most hydrologically significant surface waters in the Antelope Valley Watershed include Big Rock Creek, Little Rock Creek, and Amargosa Creek originating in the San Gabriel Mountains, and Oak Creek from the Tehachapi Mountains (City of Lancaster 2009).

Approximately 10 percent of lands within the Antelope Valley Watershed are developed. The watershed contains a total population of approximately 462,000 (Los Angeles County 2017).

Historically, water supplies within the Antelope Valley Watershed have been used primarily for agriculture; however, due to population growth, water demands from residential and business uses have increased significantly and this trend is expected to continue. The number of residents within the Antelope Valley Watershed expanded more than 280 percent between 1970 and 2010, growing from 103,000 people in 1970 to 390,000 people in 2010; with populations forecasted to increase to 547,000 by 2035 (RWMG 2013). Population growth also increases the threat of water contamination from additional urban runoff.

Santa Clara River Watershed

The Santa Clara River Watershed encompasses 786 square miles within Los Angeles County, 243 square miles within Ventura County, and 1 square mile within Kern County. Approximately 43 percent of lands within the Santa Clara River Watershed are developed. The watershed contains an estimated population of approximately 252,000 (Los Angeles County 2017). This watershed contains the Santa Clara River, the largest natural river remaining in Southern California. The river originates in the northern slopes of the San Gabriel Mountains inside the western part of the ANF near the community of Acton. The river and its tributaries flow in a westerly direction for approximately 84 miles through Tie Canyon, Aliso Canyon, Soledad Canyon, the Santa Clarita Valley, the Santa Clara River Valley, and the Oxnard Plain before discharging to the Pacific Ocean in Ventura County. The headwaters take drainage from the northern slopes of the San Gabriel Mountains inside the western part of the ANF.

Los Angeles River Watershed

The Los Angeles River Watershed spans from the Santa Monica Mountains to the Simi Hills in the east and from the Santa Susana Mountains to the San Gabriel Mountains in the west. Big Tujunga Wash is a tributary to the Los Angeles River. Big Tujunga Wash maintains a more natural meandering channel as it flows westerly toward Hansen Dam. Hansen Dam was built in 1940 to provide flood control after catastrophic flooding in the 1930s. Particularly in the San Fernando Valley and southward, the Los Angeles River watershed consists of many paved and channelized waterbodies. From the 1930s through the 1960s, the USACE lined the Los Angeles River with concrete along almost its entire length to provide flood control for the increasingly developed region. Pollutants from dense clusters of residential, industrial, and other urban development have impaired water quality in the middle and lower portions of the watershed.

Groundwater

The RSA for groundwater includes the Antelope Valley Groundwater Basin, the Santa Clara River Valley Groundwater Basin East Subbasin, the Acton Valley Groundwater Basin, and the San Fernando Valley Groundwater Basin. These four groundwater basins (described below) encompass all groundwater aquifers waters beneath the Build Alternatives' footprint.

Antelope Valley Groundwater Basin

Much of the water used within the Antelope Valley Watershed is extracted from groundwater aquifers within the Antelope Valley Groundwater Basin, which has a moderate to high ability for water well production (DWR 2003). Since the 1900s, groundwater levels have declined significantly throughout the Antelope Valley Watershed due to over-extraction. The historical declines in groundwater levels within the Antelope Valley Watershed have caused permanent damage to aquifers in some areas through land subsidence.

Santa Clara River Valley Groundwater Basin East Subbasin

Groundwater in the Santa Clara River Valley East Subbasin occurs in two aquifer systems: the alluvium associated with the Santa Clara River and its tributaries, and the Saugus Formation. The alluvium has historically been and remains the predominant source of groundwater for agricultural and municipal water supply. While groundwater levels in the Santa Clara River Valley East Subbasin have fluctuated historically, the long-term trend is one of relative groundwater level stability (CLWA 2003). Infiltration of runoff waters in the Santa Clara River and its tributaries recharges this groundwater basin.

Acton Valley Groundwater Basin

The water-bearing formations within the Acton Valley Groundwater Basin include alluvium and terrace deposits found within the channel of the Santa Clara River and its tributaries. Water samples collected from wells within the basin have exceeded drinking water standards for total dissolved solids and nitrates. The Acton Valley Groundwater Basin has been rated for municipal, industrial, industrial process supply, and agricultural beneficial uses by the Los Angeles Regional Water Quality Control Board.

San Fernando Valley Groundwater Basin

The San Fernando Valley Groundwater Basin has also had stable groundwater levels. Los Angeles County Public Works maintains spreading grounds to percolate water into groundwater basins for later pumping. These spreading grounds are located adjacent to watercourse channels and nonconcrete channels where underlying soils are permeable and hydraulically connected to the underlying aquifer. The Hansen, Lopez, Tujunga, and Headworks Spreading Grounds all provide recharge for the San Fernando Valley Groundwater Basin.

Hydrogeology

Hydrogeology refers to the distribution and movement of groundwater as it interacts with subsurface geologic formations. This system is governed largely by lithology, geologic structures (e.g., faults), weathering conditions, and in-situ stress. Hydrogeologic conditions are associated with seeps, wells, springs, and other surface waters in the project area. The Build Alternatives would involve the construction of tunnels beneath the ANF including SGMNM; these tunnels would reach maximum depths between 2,060 and 2,700 feet below the ground surface and would encounter subsurface geologic systems associated with hydrogeologic conditions within the tunnel construction RSA.³ Tunnels in low-lying areas south of the California Aqueduct, near seasonal springs, or where perched groundwater exists could also encounter subsurface geologic systems associated with hydrologic conditions.

Floodplains

Floodplains are areas susceptible to inundation by floodwaters and are important environmental resources that can cause major damage if not well managed. Past and present development within floodplains can limit the natural conveyance of floodwaters or modify the water surface elevation. The RSA crosses multiple Federal Emergency Management Agency-identified floodplains.

3.19.4.9 Geology, Soils, Seismicity, and Paleontological Resources

The RSA for geology, soils, seismicity, and paleontological resources includes the Antelope Valley (within the Mojave Desert geomorphic province), the Transverse Ranges geomorphic province, and the San Fernando Valley. The RSA for paleontology includes all geologic units that are partially overlain by the Build Alternatives footprint in the Antelope Valley, the Transverse Ranges geomorphic province, and the San Fernando Valley.

Geomorphic Province

A geomorphic province is a region of unique topography and geology that is readily distinguished from other regions based on its landforms and diastrophic history.

The Antelope Valley is a broad, relatively flat, closed basin at the western edge of the Mojave Desert geomorphic province. The Mojave Desert geomorphic province comprises broad inland expanses of high desert plains separated by isolated mountain ranges. Rivers and streams within this province do not reach the ocean, instead draining to internal lakes and playas located within closed basins. The Antelope Valley is bounded by the Garlock and San Andreas Faults to the northwest and southwest, respectively. The Tehachapi Mountains to the northwest and San

³ The tunnel construction RSA is defined as the area within 1 mile of the centerline of each of the six Build Alternatives in the ANF. This RSA was delineated to analyze potential hydrologic effects in the ANF including the SGMNM and associated with changes in hydrogeologic conditions caused by tunnel construction.

Gabriel Mountains to the southwest align with these major fault zones, enclosing much of the valley. These mountains reach elevations over 10,000 feet above mean sea level, and they are the source of modern sedimentary deposits within the valley.

The main structural feature in the region is the northwest-trending San Andreas Fault System, which separates the Pacific and North American tectonic plates and includes regional faults associated with the main trace of the fault system. The San Andreas Fault separates the flat floor of the Mojave Desert from the rugged terrain of the San Gabriel Mountains. Its proximity to the San Andreas Fault and other active faults, makes the area highly seismically active. Geologic units underlying the Mojave Desert geomorphic province consist of Pliocene- and Holocene-era deposits. Please see Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources for detailed information on these resources, definitions of key terms, and similar information.

The RSA also includes the Transverse Ranges geomorphic province. This province features a series of steep mountain ranges, including the San Gabriel Mountains, with a unique east-west orientation (perpendicular to most mountain ranges in California, which are oriented north-south) as a result of movement along the San Andreas Fault system. Active uplift and erosion in the San Gabriel Mountains have produced steep canyons, rugged topography, landslide deposits, and extensive alluvial sedimentation. A range of geologic units underlies the Transverse Ranges geomorphic province, from Precambrian to Late Holocene.

The RSA's geologic character changes upon entering the San Fernando Valley southwest of the San Gabriel Mountains. The San Fernando Valley has distinct geomorphology as an alluviated lowland plain. This area is underlain by a structural depression that was once the site of extensive accumulation of fluvial, alluvial, floodplain, shallow marine, and deep shelf deposits.

As described below, projects planned within the RSA could encounter a variety of geologic, soil, and seismic hazards.

Geologic Hazards

Within the RSA, the three primary geologic hazards of concern are landslides, ground subsidence, and karst terrain. Landslide risks are highest in the rugged, steep slopes of the San Gabriel and Sierra Pelona Mountains and their associated foothills. The RSA has several areas anticipated to have medium-to-high potential for ground subsidence (or sinking). Karst terrain is a hazard because it can lead to sinkholes on the surface. Such terrain is present within the Soledad Canyon area, particularly north of the Santa Clara River.

Soil Hazards

Extreme faulting and geologic processes have created a multitude of soil conditions throughout the cumulative RSA, including site-specific hazards such as, erosion, expansive soils, corrosive soils, collapsible soils, and areas of difficult excavation (defined in Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources).

Seismic Hazards

Los Angeles County experiences regular seismic activity from multiple hazardous fault complexes in the region, including the San Andreas Fault, which runs in a northwest-southeast direction south of the city of Palmdale. Seismic activity along one of these faults/fault zones could result in seismic hazards throughout the cumulative RSA. Seismic hazards in the RSA include fault rupture; groundshaking; liquefaction, lateral spreading, and ground lurching; seismically induced landslides; and seismically induced dam failure at Lake Palmdale Dam, Pacoima Dam, and Hansen Dam.

Mineral Resources

Los Angeles County has yielded many different types of mineral resources, including construction aggregate (such as sand, gravel, and crushed stone), gold, and precious gems. The cumulative RSA includes active and historic mining facilities, including mineral resource zones (MRZ) as identified by the California State Geologist.

Mineral land classification studies in Los Angeles County also define production-consumption (P-C) regions, which cover aggregate production districts (a group of producing aggregate mines) and the market area they serve. The two aggregate P-C regions within the RSA (Palmdale P-C and San Fernando Valley/Saugus-Newhall P-C) collectively contain 229 million tons of remaining permitted aggregate reserves (CGS 2012).

Paleontology

The RSA for the paleontological resources includes all geologic units that are partially overlain by the Build Alternatives footprint in the Antelope Valley, the Transverse Ranges geomorphic province, and the San Fernando Valley. These geologic regions, like others throughout Los Angeles County, historically yielded a large varieties of paleontologically significant fossils. Many geologic units throughout the cumulative RSA exhibit paleontological sensitivity, indicating that they might contain new and unanticipated paleontological resources.

3.19.4.10 Hazardous Materials and Wastes

Because most hazardous material impacts are localized, the hazardous materials and wastes RSA is the Palmdale to Burbank Project Section footprint. The northern portion of the hazardous materials and wastes RSA include the southern portion of the Antelope Valley. Installation of major rail and road corridors beginning in the late 19th century urbanized the Antelope Valley. Small manufacturing, warehousing, and industrial uses arose adjacent to the railroad, in turn encouraging the development of commercial and residential uses. Agriculture dominated the economy until the early 1950s, with the introduction of aerospace to the Antelope Valley (City of Lancaster 2009). Historical hazardous material releases in the area are primarily associated with automotive fluid spills and petrochemical leaks from storage tanks at gasoline stations and industrial aviation activities, with contributions from commercial and other industrial uses as well as from agriculture.

The relatively rural region between the Antelope Valley and the San Fernando Valley contains a variety of current and historical sources of hazardous materials, including military facilities, landfills, mines, industrial operations, aerospace manufacturing, and automotive businesses. South of the California Aqueduct, the RSA encompasses suburban and rural communities, rail and roadway transportation corridors, and active and historical agricultural production sites throughout the San Gabriel Mountains. This region also contains many oil production operations, mineral resource extraction zones, and military installations.

The southern portion of the RSA encompasses the relatively flat, heavily populated San Fernando Valley. South of the San Gabriel Mountain foothills, historical and ongoing industrial and manufacturing operations have resulted in a variety of contaminant releases in numerous locations in the cities of Los Angeles and Burbank. Most notably, this area encompasses a portion of the San Fernando Valley Superfund Site where substantial volatile organic compounds contamination has been detected in groundwater. Some contaminants can be traced to industries operating in the area as long ago as the 1940s. Many facilities associated with these uses could pose hazardous materials or hazardous waste risks.

The lack of regulation regarding hazardous material transport, use, and disposal prior to the federal Resource Conservation and Recovery Act resulted in areas of environmental contamination. Documentation of these hazardous waste sites, regulatory oversight, and cleanup efforts began in the early 1980s under the Comprehensive Environmental Response, Compensation, and Liability Act. Enterprises that use, store, transport, or dispose of reportable quantities of hazardous materials or petroleum products are now required to comply with federal, state, and local regulations designed to minimize the risk of exposure or release of hazardous materials.

3.19.4.11 Safety and Security

The RSA for the cumulative analysis of safety and security includes the transportation system and fire protection, law enforcement, and other emergency response service areas within the entirety of Los Angeles County—including the 88 incorporated cities and the 140 unincorporated areas regulated by Los Angeles County. This RSA encompasses past, present, and reasonably

foreseeable future projects under the cumulative condition that would affect emergency response and evacuation routes because of impacts on roadway connectivity and emergency service providers. A combination of local and countywide agencies provides fire, police, and emergency services throughout this cumulative RSA. The incorporated cities of Lancaster and Palmdale in particular receive fire and police services from providers that serve the entirety of Los Angeles County. Response times are generally shortest, approximately 2 minutes, in the urbanized portions (Lancaster, Palmdale, Los Angeles, and Burbank) and somewhat longer in the rural communities (approximately 5 minutes). Within the ANF including SGMNM, additional fire and ranger services are provided by a combination of federal and state personnel.

Due to Southern California's hot, arid climate, wildfires have historically posed a threat to communities in this region. Over the past decade, portions of the RSA have experienced major wildfires, including the 2009 Station Fire, 2016 Sand Fire, and 2017 Placerita Fire. In 2017, the Creek Fire threatened multiple communities within the RSA, including Santa Clarita, Lake View Terrace, Sunland-Tujunga, Shadow Hills, Sylmar, and Pacoima (CAL FIRE 2017). Urban communities and rural areas throughout the Palmdale to Burbank region include many areas designated by the California Department of Forestry and Fire Protection as fire hazard severity zones.

3.19.4.12 Socioeconomics and Communities

The RSA for the socioeconomics and communities cumulative impact analysis includes all of Los Angeles County—including the 88 incorporated cities and the 140 unincorporated areas regulated by the County.

Population and Community

Many of the communities and cities in the RSA have grown in connection with the growth of transportation, initially railroads and freeways, but also the jobs-producing industrial areas around air facilities in both Palmdale and Burbank. The RSA includes low-density populated areas such as the Antelope Valley and the San Gabriel Mountains, and highly urbanized areas such as Palmdale to the north and the cities of Los Angeles and Burbank to the south.

Growth trends for Los Angeles County are noted previously in Section 3.19.4.1 as well as in Section 3.12, Socioeconomics and Communities. As of 2015, the population of Los Angeles County—inclusive of its 88 cities and approximately 140 unincorporated areas—is well over 10 million, making it by far the most populous county in the United States. Between 2015 and 2040, the county's population is projected to increase by about 1.3 million people.

Population density within the RSA varies by area. The northern portion of Los Angeles County is much less densely populated than the southern portion; the city of Palmdale has a population density of about 1,500 people per square mile. In contrast, the much more densely populated San Fernando Valley has population densities up to 5 times greater or more.

Contributors to community cohesion vary within different areas of the RSA. The incorporated cities of Palmdale, Los Angeles, and Burbank (as well as some neighboring cities) feature extensive public facilities such as schools, parks, and recreation centers, as well as numerous religious and several private facilities that are considered elements of a cohesive community. In the unincorporated communities of Agua Dulce and Acton, indicators of community cohesion are fewer in number and the population is more widely distributed in rural areas; however, schools, religious facilities, and commercial areas help contribute to individual community identities. In the San Fernando Valley, community cohesion indicators are much more numerous and reflected in the distinct neighborhoods of the northeast San Fernando Valley.

Economy

As of 2016, the unemployment rate in Los Angeles County was 5.53 percent, slightly lower than the rate for the state of California as a whole (5.74 percent). For the cities within the RSA (Los Angeles County), unemployment rates were highest in the high desert communities of Palmdale (7.41 percent) and lowest in Los Angeles (5.74 percent) and Burbank (4.36 percent).

Employment growth in 2016 within the County was led by education and healthcare (+26,300 jobs), information (+23,400 jobs), and leisure and hospitality (+21,400 jobs). The largest decline occurred in manufacturing (-6,400 jobs). In previous years, northern Los Angeles County (the Santa Clarita and Antelope Valleys) was the fastest growing area of the county. Due to large buildable land, this area was able to support the construction of a substantial number of housing units, generating space for new residents. This trend is anticipated to continue, and the northern region of Los Angeles County will have the most growth within the County. However, construction is also occurring in downtown Los Angeles, primarily in the form of high-rise apartment and condominium structures. Over the next 10 years, more than 15,000 new housing units could be constructed in Downtown Los Angeles.

Historically, the economic bases of the cities of Lancaster and Palmdale were tied to the aerospace industry, with many workers employed by Edwards Air Force Base or U.S. Air Force Plant 42 (City of Lancaster 2009). Fluctuations in the world political landscape, economy, and federal program funding have affected the aerospace industry and led to workers seeking jobs in other sectors. While both cities have a goal of continuing to diversify their economic bases, many Lancaster and Palmdale workers travel outside of these cities to seek employment.

The city of Burbank is a major employment center in the Los Angeles region, with over two jobs per housing unit (City of Burbank 2013). The city's large and diverse economy is supported by a core of motion picture and media-related industries, including the Walt Disney Company and Warner Brothers Entertainment. Other major employers in Burbank include Providence/ St. Joseph Hospital, the Burbank Unified School District, the Hollywood Burbank Airport, and the City of Burbank.

3.19.4.13 Station Planning, Land Use, and Development

The RSA for the cumulative impact analysis of station planning, land use, and development is all of Los Angeles County—including its 88 incorporated cities and the 140 unincorporated areas regulated by the County. The RSA includes the entirety of the county due to the regional nature of land use planning.

The growth and development of communities is discussed in Section 3.19.4.1. The RSA traverses diverse ranges of land use within urbanized and rural areas, with agricultural and forest lands in between. The Antelope Valley is located in the northern portion of Los Angeles County and is predominantly rural and either undeveloped or occupied by government uses (such as National Forests). The highly populated denser area within Los Angeles County is in the center of the county and encompasses Downtown Los Angeles, industrial areas, and many of the city of Los Angeles' most densely populated neighborhoods. Lower-density, single-family residential communities characterize the San Fernando Valley portion of the county. The Santa Clarita Valley includes the city of Santa Clarita, the residential communities at the city's periphery, and mountainous areas surrounding the valley.

3.19.4.14 Agricultural Farmland and Forest Land

The cumulative RSA for agricultural farmland and forest land is the entirety of Los Angeles County. Land use decisions regarding the conversion of agricultural land to nonagricultural uses are generally made at the County level.

As defined in Section 3.14, Agricultural Farmland and Forest Land, the majority of what was once agricultural land in Los Angeles County has been developed with nonagricultural uses over the years. Between 1984 and 2016, Important Farmland in Los Angeles County decreased by nearly half (from 60,877 acres in 1984 to 27,390 acres in 2016), while Urban and Built-Up Land increased by nearly 50 percent (from 122,481 acres in 1984 to 182,442 acres in 2016) (see Table 3.19-5). However, during the same period, there was a slight increase in acreage devoted to grazing uses. Notably, grazing land classifications (unlike farmland classifications) are

determined only by use and do not typically depend on the quality of underlying soils or the presence/absence of irrigation.

Table 3.19-5 Land Use Change in Los Angeles County (1984–2016)

Land Use Category	Acreage		Net Acreage (percentage) Change	Average Annual Acreage (percentage) Change
	1984	2016		
Prime Farmland	40,059	22,613	-17,446 (-43%)	- 545 (-1.3%)
Farmland of Statewide Importance	1,017	770	-247 (-24%)	-8 (-.75%)
Unique Farmland	426	962	536 (125%)	17 (3.9%)
Farmland of Local Importance	19,375	3,045	-16,330 (-84%)	-510 (2.6%)
<i>Important Farmland Subtotal</i>	<i>60,877</i>	<i>27,390</i>	<i>-33,487 (-55%)</i>	<i>-1,046 (-1.7%)</i>
Grazing Land	229,763	239,037	9,274 (4%)	289 (.12%)
<i>Agricultural Land Subtotal</i>	<i>290,640</i>	<i>266,427</i>	<i>- 24,213 (-8%)</i>	<i>-756 (-.25%)</i>
Urban and Built-Up Land	122,481	182,442	59,961 (48%)	1,873 (1.5%)
Total Area Inventoried ¹	1,077,506	448,869	35,748	-686

Source: California Department of Conservation 2017

¹ Percentage of Los Angeles County land inventoried = 43%.

Important Farmland and Grazing Land is scarce in the San Fernando Valley and points south; much of Los Angeles County's remaining agricultural lands are located in the Antelope Valley area around the outskirts of the city of Palmdale, with some also located west of the city of Santa Clarita. There are no executed Williamson Act contracts in Los Angeles County (DOC 2015). Trends in decreasing agricultural lands and increasing urbanization are expected to continue.

The RSA does not contain lands designated as timberland or timberland production zones. Portions of the ANF, including SGMNM, may qualify as forest land per California Public Resources Code, 12220(g), but do not contain large-scale timber or operations (USFS 2005b).

3.19.4.15 Parks, Recreation, and Open Space

The RSA for direct impacts on parks, recreation, and open space resources encompasses the Build Alternative footprint for each of the Build Alternatives (as described in Chapter 2, Alternatives)— including stations, road construction, temporary laydown areas, and other land temporarily or permanently acquired to implement the Build Alternative. As a means to address indirect impacts (i.e., noise, visual, and air quality), the RSA also includes resources within 1,000 feet from the edge of the Build Alternative footprints. This analysis also considers parks and recreation facilities that are more than 1,000 feet from the project that may be exceptionally sensitive to noise or visual impacts (e.g., known open space wildlife refuges).

Effects on parks, recreation, and open space resources related to future development in areas surrounding the project limits are site-specific and relate to the type and location of construction proposed. Resources beyond the RSA established for the Build Alternatives would not be affected by the Build Alternatives. Although other projects may affect parks, recreation, and open space resources beyond this distance, the project would not contribute to those impacts. Because there would be no additive effect to resources beyond the project-level RSA with other approved or reasonably foreseeable development and the project, the cumulative setting for parks, recreation, and open spaces resources is the same affected environment described in Section 3.15, Parks, Recreation, and Open Space.

Section 3.15 lists parks, recreation areas, and open spaces within the RSA. Many such resources are well-maintained facilities located within urbanized communities, where they serve important community benefits and contribute to community character and cohesion. Many of the resources are existing or planned trails. Park resources range from relatively formal locations, such as Poncitlan Square in Palmdale, to more rugged natural features like the Hansen Dam Recreation Center in Big Tujunga Wash and the ANF, including SGMNM.

Notably, the RSA includes the entire ANF, an approximately 700,000-acre National Forest that includes the 342,000 acres designated as the SGMNM. The ANF including SGMNM covers a vast swath of Los Angeles County, from the Santa Clara River Valley and SR14 on the west side, extending easterly across the San Bernardino County line, encompassing major peaks of the San Gabriel Mountains, including Mt. San Antonio (“Mt. Baldy”). Various areas of the ANF, including SGMNM, offer a wide variety of recreational resources, including those associated with developed features such as campgrounds and picnic facilities, along with hiking trails and equestrian facilities. According to the ANF Land and Resources Management Plan, 5 million visitors use the ANF annually for recreation.

In addition to recreational uses, many of the land uses within the ANF permit a wide range of nonrecreational activities, including mineral extraction, communication, soil and gas exploration, and major transportation and utility corridors. Mining activities are prohibited in the SGMNM due to this area’s protected status as a National Monument. In contrast, mining is allowed within the ANF.

3.19.4.16 Aesthetics and Visual Quality

The RSA for aesthetics and visual quality is the project’s viewshed. The visual character of the RSA ranges from flat valley floors of the southern Antelope Valley to mountainous terrain of the ANF including SGMNM, and urbanized San Fernando Valley. In certain areas without extensive topography or human development, the project would be visible from long-distance views. Within urban areas, like the city of Palmdale and the San Fernando Valley, intervening development and/or terrain would generally obstruct long-distance views of the project corridor. Therefore, accounting for the existing terrain, predominant land uses, and proposed elevated components of the HSR, the viewshed is within 0.25 mile of the alignment centerline in urbanized areas. In open landscape areas, the viewshed is within 0.5 mile of the alignment centerline.

Viewshed

A viewshed is the area with potential views of the project features and the area potentially viewed from the project.

Visual resources in the Antelope Valley consist of broad views of undeveloped, sparsely vegetated desert landscape. Long-range views of the rugged San Gabriel Mountains to the south, the Sierra Pelonas to the southwest and west, and the Tehachapi Mountains to the northwest, are available from the city of Palmdale and surrounding areas. The most well-known desert plant in the Antelope Valley is the Joshua tree, which provides a unique desert “scene” in the Antelope Valley. Other desert flora provides a significant visual resource during various times of the year; in particular, the California poppy exhibits brilliant displays of orange, yellow, and purple wildflowers in the spring. There are no State-designated scenic routes highways. Historically, Palmdale has had a rural, agricultural desert character, although this has become increasingly urbanized over the past half century. However, the region’s history of farming and ranching remain evident in its visual character, as the area remains characterized by swaths of developed/urbanized areas interspersed with broad open/ undeveloped areas.

Between Palmdale and the San Fernando Valley, views of the San Gabriel Mountains, Sierra Pelona, and Santa Susana Mountains are prominent visual resources. Dramatic topography creates public view corridors of ridgelines and mountains and scenic visual backdrops created by mountains and hillsides. Scenic natural resources in this area include Vasquez Rocks Natural Area Park (Vasquez Rocks), the Pacific Crest National Scenic Trail, the ANF including SGMNM, the Magic Mountain Wilderness, the Santa Clara River SEA, the Robinson Ranch Golf Course, Soledad Canyon Road, and various nature trails. Many of the aforementioned scenic resources

are primarily undeveloped and protected. Development is relatively limited throughout this area, and characterized by low-density residential development, transportation infrastructure, and mining activities. Overall, the visual character is that of a rugged, untouched atmosphere.

The natural environment in the Burbank area is composed of scenic views of the Verdugo Mountains to the northeast, the Santa Susana Mountains to the northwest, and the Santa Monica Mountains to the south. Scenic resources within Burbank include public parks and open space, such as Robert Gross Park and McCambridge Recreation Center. The cultural environment is highly urbanized and composed of buildings and infrastructure. A mix of commercial, light industrial, airport, railroad, and residential land uses add a strong geometric quality to individual views. Most residential neighborhoods contain a variety of architectural styles, indicating periods of infill development and renovation. Industrial areas have low-rise businesses abutting the sidewalks, with limited landscaping and parking. Large business signs and overhead power lines are dominant visual features.

3.19.4.17 Cultural Resources

The RSA for the cumulative impact analysis for cultural resources includes the area of potential effects (APE) for both archaeological and architectural resources, where other development, infrastructure, and transportation projects are proposed as part of the cumulative condition. The APE is the area for potential ground disturbance beyond the immediate footprint and includes all preconstruction, construction, and operations activities that may involve ground disturbance along the proposed alignment for all six of the Build Alternatives.

The APE runs through three distinct areas of California: the western Mojave Desert, the San Gabriel Mountains portion of the Transverse Range, and the Los Angeles Plain. Prehistoric sites (from 12,000 Before Present to Contact) are abundant in the western Mojave Desert and coastal regions of Southern California. During this time, several cultural complexes were present in the APE. At the time of European contact, the APE was an area of cultural territory overlap and a split between three ethnographic groups: the Tatavium, the Gabrieleño/Tongva, and the Serrano/Kitanemuk. Based on existing inventories and the cultural history of the area, numerous cultural resources, including both archaeological and built resources, are present in the RSA.

The built environment in Los Angeles County includes many historical landmarks and points of historical interest, including the remnants of vast ranchos, routes of early explorers, historic railroad lines, and the homes of prominent people who shaped local history (Los Angeles County 2014). Section 3.17, Cultural Resources, contains a detailed description of prehistoric- and historic-period archaeological sites and historic built environment resources documented within the APE.

3.19.5 Environmental Consequences

3.19.5.1 Overview

The cumulative impacts discussion for each resource area considers the resource-specific RSA, the existing condition of the resource, concurrent construction activities, significant cumulative effects, and an assessment of the project's contribution to such significant cumulative effects.

The cumulative impact analyses are based on the cumulative projects list (Appendix 3.19-A), the Bakersfield to Palmdale and the Burbank to Los Angeles Project Sections of the California HSR System, growth projections (Section 3.18, Regional Growth), or a combination of cumulative projects and growth projections.

Anticipated growth in the region is summarized in Section 3.19.4.1, and is presented in further detail in Section 3.18, Regional Growth. Each of the cities in the RSA, as well as the unincorporated county communities, is expected to grow by at least 12 percent between 2015 and 2040, with the highest growth rates anticipated for the cities of Lancaster and Palmdale. Over the same period, employment is projected to increase by approximately 11.8 percent (551,200 jobs) in Los Angeles County. These population and employment increases would result in new housing and commercial development to accommodate projected growth.

Many pertinent local and regional growth management and land use plans encourage infill and higher-density development in urban areas and concentration of development around transit corridors (i.e., transit-oriented development). In fact, plans in Palmdale and Burbank include the Build Alternatives as a critical element in meeting these land use goals, as it would further enhance the opportunity to encourage transit-oriented development in cities that would be served by the proposed Build Alternative. The Build Alternatives would provide opportunities for focusing future growth on land that is already urbanized, approved for development but not built on, underused, or planned for urban uses. Notwithstanding, new development/growth would be expected to continue throughout the Build Alternatives' region. Therefore, under the cumulative condition, automobile traffic levels would be expected to increase, along with ambient noise levels, demands for water and energy, the total impervious surface area, the amount of stormwater runoff, and demand for public facilities/parks and recreation.

For each resource topic analyzed below, the cumulative condition includes buildout of the general plans, including the cumulative development listed in Appendix 3.19-A.

For impacts to which the Build Alternatives would have a cumulatively considerable contribution, the notable differences in the Build Alternatives' contributions are described. Additional feasible mitigation measures are proposed where appropriate to mitigate the incremental significant contribution to a cumulative impact.

3.19.5.2 **Transportation**

Construction

Major development and transportation projects within the construction-period cumulative transportation RSA are listed in Appendix 3.19-A and are summarized below:

Land Use Development—Major land use development documents, including the *Los Angeles County General Plan* (Los Angeles County 2014b), *Antelope Valley Area Plan* (Los Angeles County 2015), *Palmdale 2045 General Plan* (City of Palmdale 2022), *Santa Clarita Valley Area Plan* (Los Angeles County 2012), *Santa Clarita General Plan* (City of Santa Clarita 2011), and *Burbank 2035 General Plan* (City of Burbank 2013), provide the policy framework for long-range community growth and development throughout the RSA. These planning efforts would increase the amount and intensity of residential, commercial, industrial, and other urban/suburban development that could increase trips and demand for all transportation modes, including automobile, transit, bicycle, and pedestrian.

Transportation Improvement and Expansion Projects—Major regional transportation projects include the Northwest SR 138 Corridor Improvement Project, High Desert Corridor, I-5 High-Occupancy Vehicle (HOV)/Truck Lanes, Sepulveda Pass Transit Corridor, East San Fernando Valley Transit Corridor, Link Union Station, Antelope Valley Line Capacity and Service Improvements Program, Vista Canyon Road Bridge Project, East San Fernando Valley Light Rail Transit Project, and Hollywood Burbank Airport Terminal Replacement Project, as well as the adjacent Bakersfield to Palmdale Project Section and the Burbank to Los Angeles Project Section of the California HSR System. Other transportation projects in the RSA include local improvements to provide more efficient auto, transit bicycle, and pedestrian circulation. Implementation of these projects throughout the RSA could alleviate traffic congestion, improve circulation, and provide new regional access routes.

Construction of each of the six Build Alternatives, in combination with other past, present, and reasonably foreseeable future projects, would result in significant cumulative transportation impacts if cumulative projects are located near the project and have construction schedules that overlap that of the project. Temporary impacts, such as road closures and construction-related trips, would impact automotive and nonvehicular circulation and access. As discussed in Section 3.2, Transportation, the Authority will prepare and implement a Construction Transportation Plan as a standardized impact avoidance and minimization feature (IAMF) to minimize temporary construction impacts. This plan includes requirements for the contractor to implement activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities include the routing and scheduling of materials deliveries,

materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures. The contractor will prepare and implement specific construction management plans to ensure safe transit, pedestrian, and bicycle access during the construction period (refer to TR-IAMF#4, TR-IAMF#5, TR-IAMF#11, and TR-IAMF#12). Implementation of these IAMFs would reduce the project's contribution to circulation interruptions during construction.

Earthwork and tunneling activities during the construction of the Build Alternative would generate substantial spoils material, which would be trucked to disposal sites in the project region. Spoils hauling and potential recycled water trucking would increase truck traffic at roadway segments and intersections that, when added to existing traffic conditions within the RSA, would create significant impacts on the circulation network. Most roadway segments and intersections impacted by spoils hauling trips would be located in rural areas that would be relatively unaffected by past, present, and reasonably foreseeable future projects. However, several roadways and intersections that would be impacted by HSR spoils hauling trips are located near the cities of Santa Clarita and Burbank. The Build Alternatives would implement a Construction Management Plan to reduce impacts associated with haul route traffic; however, there is no guarantee that traffic calming measures would adequately reduce impacts on roadway segments and intersections along the HSR spoils haul routes.

Construction of reasonably foreseeable future transportation and land use projects could contribute construction trips at roadway segments and intersections along the HSR spoils haul routes. Examples include projects within the city of Santa Clarita, the Avion Project, the Airport Terminal 14-Gate Replacement Project, and the Burbank Airport North Station. A significant cumulative transportation impact could occur if the development schedule of these cumulative projects overlaps with HSR spoils hauling. Furthermore, operation of reasonably foreseeable future land use projects could increase trips on the roadway network, and reasonably foreseeable future transportation projects could alter existing circulation patterns. If these improvements become operative during the HSR spoils hauling period, increased traffic or modified circulation patterns could exacerbate transportation impacts resulting from HSR spoils hauling.

CEQA Conclusion

Vehicle trips associated with HSR construction, in combination with vehicle trips generated by past, present, and reasonably foreseeable future projects (including the adjacent Build Alternatives sections, which may overlap in timing of construction), would cause automobile delay at roadway segments and intersections within the transportation RSA. All six Build Alternatives would add substantial spoils hauling trips to these roadway segments and intersections throughout the construction period. However, automobile delay is no longer considered a significant environmental impact under CEQA.

Operations

The operations transportation analysis in Section 3.2, Transportation, considers cumulative traffic conditions for past, present, and reasonably foreseeable future development (including the Build Alternatives) in 2029 and 2040. The future year transportation analyses presented in Section 3.2, Transportation, determines that traffic associated with the Build Alternatives would negatively impact intersections and roadway segments throughout the RSA; however, these impacts could be reduced through implementation and fair-share contribution to infrastructure expansion and improvement projects. For example, modifications to signal timing and phasing, installation of new traffic signals, and intersection restriping could improve operations at intersections and roadways to accommodate changes to traffic circulation resulting from the Build Alternatives. Other improvements such as intersection widening and reconfiguration could increase intersection capacity, thereby improving traffic operations.

Operation of any of the six Build Alternative in combination with other cumulative transportation projects would improve long-term circulation in the RSA and accessibility of the RSA from other parts of the state. The Build Alternatives would provide a new regional surface transportation system that complements and connects with existing transportation modes. At a regional level,

HSR service would reduce vehicle miles traveled (VMT) by providing motorists an alternative to relying on existing interregional and intercity freeways and highways. This reduction in total VMT would reduce traffic and congestion on existing roadways and improve circulation. The Build Alternatives would be grade-separated from freeways, highways, and roads, allowing vehicular traffic to pass unimpeded under or over the rail corridor.⁴

Operation of past, present, and reasonably foreseeable future projects would add transit riders, pedestrians, and bicyclists within the RSA. However, many of the past, present, and reasonably foreseeable future transportation projects propose improvements to transit services or nonmodal networks to increase capacity and safety. For example, the group projects for bicycle and pedestrian facilities (Tierra Subida Widening from Avenue S to Rayburn Road, Burbank Channel Bikeway Project, and Los Angeles River Bridge Project) explicitly reference improvements to bicycle circulation. Other projects, including the Avenue R Safety Improvement Project, Reconfigure San Fernando Road from Fletcher Drive to I-5, and Rancho Vista Boulevard Widening Gap Closure Project, would close sidewalk gaps, provide pedestrian crossings, and otherwise improve safety for pedestrians. Furthermore, the Build Alternatives would not significantly impact transit, pedestrian, or bicycle networks.

Operation of the past, present, and reasonably foreseeable projects would modify local parking arrangements in the cumulative RSA. Certain types of new land use development could increase demand for parking but would be required to provide adequate parking facilities per the applicable jurisdictional regulations.⁵ Transportation projects would not inherently increase parking demand but could reduce or rearrange localized available on- or off-street parking. However, the Build Alternatives would include sufficient parking to meet ridership demands and thus not contribute to a cumulative loss of parking within the RSA.

As discussed in Section 3.2, Transportation, operation of the Build Alternatives in combination with other cumulative transportation projects would result in a net reduction of VMT in the RSA by diverting intercity trips from road trips to HSR and other modes of transportation. This would benefit regional transportation and traffic operations by helping to maintain or potentially improve the operating conditions of regional roadways.

CEQA Conclusion

As cumulative projects would increase pedestrian, transit, and bicycle network capacity, and the Build Alternatives would not impact these networks, no cumulative impacts would occur on these networks. Vehicle trips associated with all six Build Alternatives, in combination with vehicle trips generated by past, present, and reasonably foreseeable future projects (including the adjacent Build Alternatives' sections), would cause automobile delay at roadway segments and intersections within the transportation RSA. The Authority would provide fair-share contributions to infrastructure improvement projects designed to minimize vehicle delay. However, automobile delay is not a significant environmental impact under CEQA.

As of December 28, 2018, the CEQA Guidelines were amended to include VMT thresholds, effective July 1, 2020. Under the revised CEQA Guidelines, transportation projects that reduce VMT are presumed to have a less than significant impact on transportation. The impact under CEQA would be less than significant because the HSR Build Alternatives would not result in a net increase of VMT over the baseline condition. The Build Alternatives would result in an overall decrease in VMT throughout the region and the state, resulting in a beneficial impact on VMT.

3.19.5.3 Air Quality and Global Climate Change

Overall, air quality throughout the RSA has improved and is anticipated to continue to improve as federal and state regulatory agencies adopt increasingly stringent standards for criteria pollutants,

⁴ As discussed in Chapter 2, Alternatives, the Build Alternatives would implement grade separations at multiple roadway and railroad crossings throughout the project area.

⁵ For example, Chapter 17.87.030 of the Palmdale Municipal Code outlines parking requirements for land uses in the city of Palmdale (City of Palmdale 2018), and Division 2, Section 10-1-1408 of the Burbank Municipal Code outlines parking requirements for land uses in the city of Burbank (City of Burbank 2018).

toxic air contaminants, and GHGs, with the goal of reducing the amount of pollutant emissions in the atmosphere. However, population growth and proposed developments, with associated increases in traffic congestion, would continue to incrementally affect air quality and GHG emissions.

Construction

General Conformity

The Authority has confirmed with the SCAB that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section would suffice in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS. However, consultation with SCAB is still ongoing. Construction of any of the six Build Alternatives, in combination with cumulative projects, would result in emissions of air pollutants for which the SCAB and MDAB have General Conformity *de minimis* applicability levels. Exceedance of these thresholds would be cumulatively considerable and contribute to a cumulative air quality impact. Construction activities that would occur within the SJVAB would not exceed General Conformity *de minimis* levels in the SJVAB.

AQ-MM#1 and AQ-MM#2 requires the Authority to purchase emission offsets from the SCAB/SCAQMD and MBAB/AVAQMD, respectively, until General Conformity and CEQA thresholds are met. Additionally, the Authority has confirmed with the SCAB that the air quality modeling conducted as part of the localized construction effects analysis for the project section would suffice in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS. With offsets procured through implementation of AQ-MM#1 and AQ-MM#2, construction-related emissions of NO_x and PM₁₀ would not exceed the regional emissions budget specified in the SCAB and MDAB SIP. Under AQ-MM#3, the Authority will have a goal to use zero emission (ZE) or near-zero emissions (NZE) technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road construction equipment. All remaining emissions above the applicable threshold after implementation of this AQ-MM#3 may be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2, if such offsets are available. However, until the contractual agreements between the Authority and the SCAQMD and the AVAQMD are in place, respectively, and the purchase of emission offsets is secured, the Build Alternatives would contribute to a net increase of regional criteria pollutant emissions.

As discussed in Impact AQ#2, construction activities associated with the Build Alternatives would result in criteria pollutant emissions in exceedance of the *de minimis* General Conformity levels.⁶ The project will incorporate the following IAMFs and mitigation measures during construction to reduce construction-period pollutant emissions:

- AQ-IAMF#1—The contractor will employ measures to minimize and control fugitive dust emissions. The measures will be included in a fugitive dust control plan that will be prepared for approval by each air district prior to construction.
- AQ-IAMF#2—The contractor will use super-compliant or Clean Air paints that have a lower volatile organic compounds content than that required by the air districts.
- AQ-IAMF#3—The contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks.
- AQ-IAMF#4—The Authority will incorporate the construction equipment low-exhaust emissions requirements into the contract specifications.
- AQ-IAMF#5—The Authority will incorporate the material-hauling truck fleet mix requirements into the contract specifications so that all on-road trucks used during construction will have

⁶ See Section 3.3, Air Quality and Global Climate Change, for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants.

emission rates consistent with the calendar year set forth in the most current California Air Resources Board EMFAC database.

- AQ-IAMF#6—Prior to construction of any concrete batch plant, the contractor will provide the Authority with a technical memorandum documenting consistency with the Authority’s concrete batch plant siting criteria and utilization of typical control measures to reduce fugitive dust and emissions.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 would reduce emissions, exceedance of air district *de minimis* levels would still occur within the SCAB and MDAB. The calculated yearly construction emissions for the Build Alternatives, including the IAMFs, are presented in Section 3.3, Air Quality and Global Climate Change (see Impact AQ#2).

A General Conformity Determination will be required for the Build Alternatives—for nitrogen oxides (NO_x) and carbon monoxide (CO) in the SCAB and for NO_x in the MDAB—for the years during construction when emissions would exceed the applicable *de minimis* levels. The General Conformity Determination can be achieved for CO and NO_x using one of the following methods:

- Demonstrating that the direct and indirect emissions are specifically identified in the relevant implementation plan
- Obtaining a written statement from the entity responsible for the implementation plan that the total indirect and direct emissions from the action, along with other emissions in the area, would not exceed the total implementation plan emission budget
- Fully offsetting the total direct and indirect emissions to net zero by reducing emissions of the same pollutant in the same nonattainment or maintenance area

Section 93.158(a)(4) of the General Conformity Rule stipulates that emission offsets cannot be used to mitigate CO emissions impacts. Instead, the SCAB must determine whether the construction-period CO emissions for the Build Alternatives would result in a level of CO emissions that, together with all other emissions in the nonattainment (or maintenance) area, would exceed the regional emissions budget specified in their planning documents. Pursuant to the General Conformity Rule, the SCAB and MDAB may determine that additional air quality modeling is required to demonstrate that the allocation of construction-period emissions for the Build Alternatives is within its emissions budget.

Compliance with the General Conformity Rule will occur prior to completion of the NEPA process for the project. Demonstrating compliance with the General Conformity Rule will not change the results of the construction emissions analysis.

On behalf of FRA, the Authority will issue the final General Conformity Determination for the SR14A Build Alternative.⁷ The final General Conformity Determination will demonstrate that construction emissions of CO and NO_x caused by the implementation of the SR14A Build Alternative would not exceed the regional emissions budget specified in the applicable State Implementation Plan with the implementation of Mitigation Measures AQ-MM#1, AQ-MM#2, and AQ-MM#3, which is further evaluated in Section 3.3, Air Quality and Global Climate Change.

As previously discussed, emissions offsets procured through Mitigation Measures AQ-MM#1 and AQ-MM#2 cannot be used to mitigate CO impacts for General Conformity. However, as shown in localized CO modeling, the localized CO concentrations generated during construction would not result in an exceedance of the NAAQS. The Authority has confirmed with the SCAB that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section would suffice in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS.

⁷ The FRA has assigned its responsibilities for compliance with NEPA and several related laws to the Authority under U.S.C. Title 23, Section 327; however, as required by Section 327, FRA has retained responsibility for making air quality conformity determinations. Therefore, FRA will be responsible for making the General Conformity Determination for this project.

Air Quality CEQA Thresholds

The SCAQMD, AVAQMD, and SJVAPCD have adopted CEQA thresholds of significance to determine a project's cumulative impact on air quality. A project would have a cumulatively significant impact when project-related emissions exceed these regional emissions thresholds. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce most construction emissions (discussed above), exceedance of air districts' CEQA thresholds would still occur during the construction of any of the Build Alternatives (see Impact AQ#2). Construction of any of the Build Alternatives would result in NO_x and CO emissions above the SCAQMD CEQA thresholds for all six Build Alternatives, and NO_x emissions above the AVAQMD annual CEQA thresholds for the E2A Build Alternative. Construction activities that would occur within the SJVAPCD would not exceed CEQA thresholds. Construction emissions of NO_x and CO could be mitigated through the purchase of offsets (Mitigation Measure AQ-MM#1 and AQ-MM#2) under CEQA (if such offsets are available). Zero emission or near-zero emission technology will be utilized for construction vehicles (AQ-MM#3); all remaining emissions after implementation of AQ-MM#3 may be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2, if such offsets are available. However, until the contractual agreements between the Authority and the SCAQMD and AVAQMD are in place, respectively, and the purchase of emission offsets is secured, the project's contribution to the cumulative impact would be considerable.

Health Risk Assessment

Construction activities associated with the Build Alternatives would increase TAC concentrations at certain receptor locations due to the operation of diesel--fueled off-road construction equipment and heavy-duty trucks. While construction activities associated with the Build Alternatives would increase TAC concentrations at certain receptor locations along each of the Build Alternative alignments, impacts related to health risks would be avoided. AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6 implement the lowest-emitting construction equipment technology and adopt best management practices to minimize construction-period emissions. Therefore, project construction would not exceed applicable thresholds for cancer risk and for chronic and acute noncancer health impacts (see Impact AQ#4 in Section 3.3, Air Quality and Global Climate Change).

Localized Construction Effects

Emissions from construction of the six Build Alternatives would cause localized elevated criteria pollutant concentrations (see Impact AQ#5 in Section 3.3, Air Quality and Global Climate Change). Localized CO, NO₂, sulfur dioxide, PM₁₀, and PM_{2.5} modeling shows exceedance of applicable NAAQS and CAAQS thresholds for localized construction-period emissions of NO₂ and PM₁₀. While incorporation of AQ-IAMF#3 through AQ-IAMF#6 will reduce diesel emissions by addressing equipment and vehicle exhaust emissions and requiring the use of renewable diesel, NO₂ and PM₁₀ emissions would exceed applicable thresholds. AQ-MM#3 also addresses impacts related to construction activities near sensitive receptors, however, until contractual agreements between the Authority and the SCAQMD and the AVAQMD are in place, respectively, all six Build Alternatives would expose sensitive receptors to substantial pollutant concentrations that would exceed the applicable NAAQS and CAAQS within certain construction areas. Exceedance of these thresholds would be cumulatively considerable and contribute to a cumulative air quality impact.

CEQA Conclusion

Air pollutant emissions generated during construction of any of the Build Alternatives, in combination with emissions from the construction of other planned development, would exceed SCAQMD and AVAQMD air pollutant thresholds. These exceedances represent significant cumulative impacts. Incorporation of AQ-IAMF#1 through AQ-IAMF#6 and Mitigation Measures AQ-MM#1, AQ-MM#2, and AQ-MM#3 will reduce project-related construction-period emissions. However, until contractual agreements between the Authority and the SCAQMD and the AVAQMD are in place, respectively, it is determined that the six Build Alternatives would expose sensitive receptors to substantial NO₂ and PM₁₀ concentrations that would exceed localized

construction emission thresholds. Therefore, all six Build Alternatives would considerably contribute to these significant impacts. As discussed in Section 3.19.6, there are no feasible mitigation measures to reduce the Build Alternatives' contribution to these significant cumulative impacts, which would remain significant and unavoidable for the Build Alternatives.

Operations

Over time, total emissions for certain air pollutants (CO, and NO_x) would decrease due to anticipated efficiencies and improvements in vehicle emission technology in future years, despite increases in aircraft and power plants emissions resulting from increased population and economic growth. In contrast, emissions of sulfur dioxide, PM₁₀, and PM_{2.5} in 2040 would increase because emissions of these pollutants are dependent on factors other than vehicle emission technology. Improvements in vehicle emission technology would not reduce PM₁₀ and PM_{2.5} emissions from processes unrelated to combustion, such as through brake wear or other sources of on-road dust. Emissions of sulfur dioxide, which are most commonly generated from power plants and other industrial facilities, are expected to increase as demand for energy and industrial products rises along with population and economic growth. These increases in emissions would lead to a degradation of regional air quality in air basins throughout the state. However, as discussed in Section 3.3, Air Quality and Global Climate Change, operation of the Build Alternatives would reduce statewide emissions of all pollutants, including GHG emissions.

CEQA Conclusion

Pollutant and GHG emissions increases associated with cumulative development represents a significant cumulative impact. However, operation of the Build Alternatives would reduce statewide air pollutant emissions and would not considerably contribute to this cumulative impact. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.4 Noise and Vibration

Many planned development and transportation projects throughout the area would result in increased population in the RSA. Under the cumulative condition, increased population could incrementally increase ambient volumes. Cumulative projects in the RSA would have the potential to result in a cumulative noise impact if they would create excessive community noise levels.

Construction

Noise

Construction of the Build Alternatives, in conjunction with other past, present, and reasonably foreseeable projects, would result in noise effects that would last for the duration of construction activities, but would not be permanent. It is possible that multiple projects in urban areas near the Build Alternatives—such as projects implemented pursuant to local general and specific plans as well as transportation projects (e.g., the High Desert Corridor Project and the SR 138 Widening Project)—would be under construction at the same time as the Build Alternatives. Together with the Build Alternatives, construction of these projects could result in exceedance of significance thresholds for noise at sensitive receivers, as defined in Section 3.4, Noise and Vibration. In areas of predominantly vacant, rural agricultural, or protected land (i.e., the ANF, including SGMNM), construction of the Build Alternatives would not result in noise impacts because there are few existing and reasonably anticipated sensitive receivers.

In areas of predominantly urban and suburban development, particularly Palmdale and Burbank, construction of the Build Alternatives would result in noise impacts on residential sensitive receivers. Cumulative projects planned within the RSA include the following (discussed in detail in Appendix 3.19-A):

- High Desert Corridor Project
- Site Plan Review (SPR) 15-04/SPR 15-05
- Avenue L Gap Closure from 60th Street West to 30th West

- SPR 15-008
- Conditional Use Permit (CUP)14-030
- Railroad Grade Separation of Rancho Vista Boulevard, Phase 2
- SR 138 (5th Street East to 10th Street East) Improvements Project
- Avenue R Safety Improvement Project
- Avenue N Widening/Street-028
- Rancho Vista Boulevard Widening/Street-080
- 5th Street East/Street-007
- 10th Street East/Street-008
- 10th Street East/Street-009
- Sierra Highway Widening/Street-083
- Technology Drive Widening/Street-087
- SR 138/Street-101
- Lighting, and Safety Improvements on Road Leading to Hansen Dam Recreation Area (Project ID: LAE0346)
- Brighton to Roxford Double Track Project
- Proposed Airport Hotels
- Avion Project (3001 North Hollywood Way)
- Hollywood Burbank Airport Terminal Replacement Project

Several of these projects are in close proximity to each other and the Build Alternatives, as shown in Appendix 3.18-A. With the exception of the SR 138 (5th Street East to 10th Street East) Improvements Project, the projects listed above could be constructed concurrent with the Build Alternatives. However, mitigation would reduce construction noise associated with the Build Alternatives; N&V-IAMF#1 requires preparation of a technical memorandum documenting guidelines for minimizing construction noise for work conducted within 1,000 feet of sensitive receivers, and Mitigation Measure N&V-MM#1 requires preparation of a noise-monitoring program to describe how the contractor will apply noise control measures and monitoring to achieve compliance with applicable noise limits. Refer to Section 3.4, Noise and Vibration, for additional discussion of these measures. Spoils hauling along local streets and roadways during construction of the Build Alternatives would generate temporary traffic noise. If spoils hauling from the Build Alternatives is concurrent with construction truck trips from nearby cumulative projects, the combined temporary traffic noise increases could result in excessive traffic noise. The following local roadway segments have been identified for HSR spoils hauling and are in proximity to other planned projects listed in Appendix 3.19-A: Big Springs Road south of Escondido Canyon Road; Paxton Street east of Foothill Boulevard; Osborne Street north of Garrick Avenue and south of Laurel Canyon Road; Branford Street north of San Fernando Road Minor; Laurel Canyon Road east of Osborne Street; San Fernando Road west of Tuxford Street; Soledad Canyon Road south of Sierra Highway; Arrastre Canyon Road south of Crown Valley Road; Crown Valley Road east of Soledad Canyon Road; and Sand Canyon Road south of Placerita Canyon Road. As described above, the Build Alternatives include mitigation aimed at reducing noise impacts during construction (discussed in Section 3.4, Noise and Vibration).

CEQA Conclusion

The Build Alternatives, in combination with cumulative projects, could exceed noise significance thresholds during construction. These exceedances represent significant cumulative impacts.

N&V-IAMF#1 and Mitigation Measure N&V-MM#2, discussed in Section 3.4, Noise and Vibration, would reduce these effects, but noise volumes would still exceed construction noise thresholds. Therefore, all six Build Alternatives would considerably contribute to this cumulative impact. As discussed in Section 3.19.7, there are no feasible mitigation measures to reduce the Build Alternatives' contribution to these significant cumulative impacts, which would remain significant and unavoidable for all six Build Alternatives.

Vibration

Construction of the Build Alternatives, in combination with other cumulative projects, would generate vibration at adjacent sensitive receivers. It is possible that other projects in urban areas would also require activities (such as pile driving) that introduce vibration sources during the HSR construction period and in close proximity to sensitive receivers near the Build Alternatives. Vibration-inducing activities associated with the Build Alternatives and other projects in the cumulative scenario that occur could exceed cumulative significance thresholds for vibration. However, to reduce vibration impacts during construction, N&V-IAMF#1 and Mitigation Measure N&V-MM#2, require preparation of technical memoranda and implementation of their recommendations to address and minimize vibration impacts for construction activities within 1,000 feet of sensitive receivers and within 50 feet of buildings. Refer to Section 3.4, Noise and Vibration, for additional discussion of these measures.

CEQA Conclusion

The Build Alternatives, in combination with cumulative projects, could exceed vibration significance thresholds during construction. These exceedances represent significant cumulative impacts. N&V-IAMF#1 and Mitigation Measure N&V-MM#2, discussed in Section 3.4, Noise and Vibration, would reduce these effects such that the contribution of vibration during construction of any of the Build Alternatives would not considerably contribute to this cumulative impact.

Operations

Noise

The operations noise analysis conducted for the Build Alternatives in Section 3.4, Noise and Vibration, inherently represents a cumulative analysis because it assumed that known, programmed, and funded improvements to the intercity transportation system (highway, rail, and transit) and reasonably foreseeable local development projects (with funding sources already identified) would be developed as planned by 2040. Therefore, cumulative project impacts are accounted for in the direct analysis of operational noise impacts.

Under the cumulative condition, the number of sensitive receivers for which significance thresholds for noise may be exceeded would vary depending on which of the Build Alternatives is selected. All six Build Alternatives would result in moderate noise and severe noise effects on residential sensitive receivers throughout the alignment corridor but focused in the urban areas of Palmdale and Burbank.

Traffic is considered one of the primary noise sources affecting noise-sensitive receivers located in the RSA. Traffic volumes typically increase by 2 percent annually due to the natural increase in population. Under the cumulative condition, traffic noise would increase up to 8 dBA in Palmdale, primarily around the Palmdale Station area (refer to Section 3.4, Noise and Vibration). Train operation would exceed noise thresholds for residential receivers within the Central Subsection. The operation of other major transportation projects and improvements in the vicinity of the Build Alternatives would contribute to noise effects on sensitive receivers. In particular, operation of the High Desert Corridor Project would increase the existing noise environment, and other nearby roadway and highway widening projects would additionally contribute to the future noise environment. These projects, in combination with operation of the Build Alternatives, could exceed cumulative significance thresholds for noise. Mitigation will reduce operations noise associated with the Build Alternatives; Mitigation Measures N&V-MM#4 and N&V-MM#5 provide train and trackway design guidelines to minimize noise generated by passing trains, and Mitigation Measures N&V-MM#3 and N&V-MM#7 require the use of barriers to reduce noise at

sensitive receivers that would be impacted by HSR operations noise but may not lower noise volumes below applicable thresholds.

The Build Alternatives would include aerial structures traversing areas that provide wildlife habitat and equestrian trails or facilities. Wildlife and domestic animals near the HSR trackway at viaduct crossing locations could periodically experience noise levels that exceed applicable thresholds for noise exposure. Domestic horses near these viaduct locations could experience startle effects from the noise. As discussed in Section 3.4, Noise and Vibration, Mitigation Measure N&V-MM#8 will require warning signs to be posted along public recreation areas that cross HSR aerial structures, which would reduce this effect on domestic animals. While there are no feasible mitigation measures to reduce startle or noise effects on wildlife at these locations, unconfined wildlife would have the ability to avoid ground-borne noise levels by moving away from the track as trains approach, and noise from pass-bys would be short. These HSR viaduct locations are typically located in rural regions with limited potential from other planned land use and transportation projects. Noise impact on wildlife is discussed in further details in Section 3.7, Biological and Aquatic Resources.

CEQA Conclusion

The Build Alternatives, in combination with cumulative projects, could cause exceedance of noise thresholds during operation. This represents a significant cumulative impact. However, Mitigation Measures N&V-MM#4 and N&V-MM#5, discussed in Section 3.4, Noise and Vibration, would reduce operations noise, but noise volumes would still exceed noise thresholds. Therefore, all six Build Alternatives would contribute to this cumulative impact. As discussed in Section 3.19.7, while the mitigation measures will reduce train noise they may not eliminate noise levels generated by the Build Alternatives and thus there would be a contribution to these significant cumulative impacts, which would remain significant and unavoidable for all six Build Alternatives.

HSR aerial structures that cross wildlife habitat could result in noise startle effects, which represent a significant cumulative impact. These effects would typically occur in rural and relatively undeveloped areas with a low likelihood for increased development from other planned land use and transportation projects. However, these effects would be limited by the short duration of train passes and the ability for wildlife to move away from the track. Therefore, while disturbance to wildlife habitat from operations could combine with other regional projects' impacts on wildlife habitat, the Build Alternatives' contributions to these cumulative impacts would not be cumulatively considerable.

Vibration

Operation of the Build Alternatives, in combination with other cumulative projects, could generate vibration at adjacent sensitive receivers. For example, planned development and transportation projects could require the use of heavy trucks and machinery that introduce vibration sources in close proximity to sensitive receivers near the Build Alternatives. Vibration-inducing activities associated with the Build Alternatives and other projects in the cumulative scenario could exceed cumulative significance thresholds for vibration. However, Mitigation Measure N&V-MM#8 includes several strategies to avoid and minimize operational vibration impacts, including train and trackway design guidelines, building modification recommendations, and acquisition of vibration buffer zones. Refer to Section 3.4, Noise and Vibration, for additional discussion of this mitigation measure.

CEQA Conclusion

The Build Alternatives, in combination with cumulative projects, could exceed vibration significance thresholds during operation. This represents a significant cumulative impact. However, Mitigation Measure N&V-MM#8, discussed in Section 3.4, Noise and Vibration, would reduce vibration such that the contribution of vibration during project operation of any of the Build Alternatives would not be considerable. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.5 Electromagnetic Interference and Electromagnetic Fields

The cumulative RSA includes existing sources of local EMF sources (such as cell phone signals), regional EMF sources (such as television and radio signals), and facilities that could be sensitive to new sources of EMI. Project construction and operation would introduce new sources of EMFs into the cumulative RSA.

Construction

Construction of each of the six Build Alternatives would require the use of heavy equipment, trucks, and light vehicles, which, like all motor vehicles, generate low levels of EMFs and EMI. EMFs generated by motor vehicles, however, consist of highly localized fields and would attenuate within a few feet of each vehicle. While such changes can interfere with some equipment, construction vehicles must be both very large and operate very close to the equipment in question to cause interference. Similarly, many types of construction equipment contain generators or electric motors that also generate EMFs. However, these sources of EMFs would not generate substantial EMI beyond the construction footprint. Where construction equipment would operate close to (50 feet) of sensitive facilities listed above, the selected Preferred Alternative would implement EMI/EMF-IAMF#2 (Controlling EMI/EMF) to avoid interference with neighboring land uses in accordance with federal and state laws requiring avoidance of EMI). Additionally, Mitigation Measure EMI/EMF-MM#1 will require the Authority to coordinate with nearby sensitive receptors to mitigate impacts on sensitive equipment through shielding, relocation, or other means.

Construction of each of the six Build Alternatives would also require the use of communications equipment capable of resulting in EMI. However, construction activities would be unlikely to impact nearby land uses as communication equipment used would be limited to off-the-shelf products that comply with applicable regulations regarding EMI/EMF.

As with construction of the Build Alternatives, construction equipment used to construct other cumulative projects may generate low levels of EMI and EMF. These would be concentrated primarily within the construction footprints of the other cumulative projects. Construction of current and reasonably foreseeable future projects would not coincide spatially with the Build Alternatives, so localized EMFs generated by construction equipment would not combine to result in cumulatively additive EMF impacts.

CEQA Conclusion

Construction equipment required by cumulative projects and the Build Alternatives would generate low levels of EMI and EMF capable of interfering with EMI/EMF-sensitive facilities. However, these impacts would be concentrated primarily within each of the six Build Alternatives' respective construction footprints. Additionally, with the implementation of EMI/EMF-IAMF#2 and Mitigation Measure EMI/EMF-MM#1, interference with neighboring land uses resulting from the Build Alternatives would be avoided through providing for the protection of sensitive equipment and compliance with federal and state laws. The Build Alternatives, in combination with cumulative projects, would not result in cumulative EMI/EMF impacts during construction. Therefore, CEQA does not require any cumulative mitigation.

Operations

Operation of the Build Alternatives would generate EMFs on adjacent to trains and airports, including in passenger station areas, as discussed in Section 3.5, Electromagnetic Interference and Electromagnetic Fields. Mitigation Measure EMI/EMF-MM#1 will require the Authority to coordinate with nearby sensitive receptors to mitigate impacts on sensitive equipment through shielding, relocation, or other means. Most present and reasonably foreseeable future projects in the RSA include land use development and roadway widening or improvement projects that would not result in the types of activities that would generate substantial EMFs. Notable exceptions include the following:

- The High Desert Corridor Project, which would construct a new roadway between SR 18 in San Bernardino County and SR14 in Los Angeles County. The High Desert Corridor project also proposes space to construct and operate an HSR passenger line that would facilitate a connection between the Palmdale Transit Center and the current proposed terminus of the XpressWest Build Alternatives near Victorville, California.
- The East San Fernando Valley Transit Corridor, which would implement a bus rapid transit or light rail transit corridor that would be, at its closest, about 0.8 mile from the Refined SR14, SR14A, E1, and E1A Build Alternatives.
- The Hollywood Burbank Airport Terminal Replacement Project, which would reconfigure Hollywood Burbank Airport facilities immediately adjacent to the Refined SR14 and SR14A Build Alternatives as it enters the proposed Burbank Airport Station.
- Some industrial or commercial development, which could introduce new local or regional sources of EMFs.

However, these projects would not operate in close enough proximity to the HSR alignment to increase the magnitude of EMI/EMF impacts on nearby areas.⁸

CEQA Conclusion

The Build Alternatives and cumulative projects would generate EMFs capable of impacting nearby sensitive facilities. Mitigation Measure EMI/EMF-MM#1 will require the Authority provide for the protection of sensitive equipment present at sensitive facilities. Additionally, projects that would generate EMFs would not operate in close enough proximity to the HSR alignment to result in cumulatively additive EMF impacts. Thus, the Build Alternatives, in combination with cumulative projects, would not result in cumulative EMI/EMF impacts during operation. Therefore, CEQA does not require any cumulative impacts mitigation.

3.19.5.6 Public Utilities and Energy

With the projected 2040 population and employment growth in Los Angeles County, there would be an increased demand for public utilities and energy throughout the expanded utility RSA. Under the cumulative condition, an estimated 463,495 housing units would be added to Los Angeles County by 2040, which represents a 13.2 percent increase in the number of housing units relative to 2015. Assuming an annual consumption of 10,972 kilowatt-hours per household (EIA, DOE 2020), More than 5 million megawatt-hours of new power would be required in the RSA. Peak- and base-period electricity demand in the region would increase and would require additional energy generation and transmission capacity.

The addition of new housing units would require approximately 40.8 billion gallons of water each year, assuming 88,000 gallons for each household annually (Water Research Foundation 2016). Commercial and industrial development would also generate water demand, which would be projected by water providers and approved through a permitting process. Proportionate increases in wastewater treatment would also be required. As with many communities throughout California, more conservation measures are expected to be required to reduce water demand during multiple years of drought. In particular, the Water Conservation Act of 2009 (Senate Bill X7-7) requires urban water purveyors to reduce customer water demand by 20 percent by 2020 through increases in water efficiency.

California is expected to continue its solid waste diversion policies to further reduce the per capita need for landfill capacity in the future. In particular, Assembly Bill 341 establishes a goal of reaching a statewide diversion rate of 75 percent by 2020. California's Green Building Standards

⁸ As discussed in Section 3.5, Electromagnetic Interference and Electromagnetic Fields, EMFs modeled at 16 feet from the HSR train would generate 720 milligauss, below the 9,040-milligauss public exposure threshold established by the Institute of Electrical and Electronics Engineers. EMFs modeled at 16 feet from the overhead catenary system would generate 0.810 kilovolts per meter, below the 5-kilovolt Institute of Electrical and Electronics Engineers public exposure threshold. EMFs would degrade rapidly as distance from the Build Alternative footprint increases, resulting in milligauss and kilovolts per meter generation less than 1 at 500 feet from the HSR centerline.

(24 California Code of Regulations Part 11, Section 4.408 [residential construction] and Section 5.408 [commercial construction]) include provisions for recycling and/or salvaging for reuse of a minimum of 50 percent of the nonhazardous construction and demolition debris from construction projects.

Construction

Utility Conflicts during Construction

Construction of the Build Alternatives, together with cumulative projects, would require the temporary shutdown of utility lines to safely relocate, extend, or connect to these lines. Utility relocation, extension, and connection is common for new development throughout California. The Build Alternatives, along with other cumulative projects, would adhere to standard practices for the provision and relocation of utilities. These include location and marking of utilities prior to construction; design and relocation of utilities, where necessary, under the supervision of the utility provider prior to the initiation of project construction; and planning and notification of short-duration utility interruptions prior to connecting project facilities to existing utilities or tying in relocated utility infrastructure to the existing utility system.

With adherence to standard practices for the provision and relocation of utilities, direct utility conflicts from the construction of the Build Alternatives, in combination with other reasonably foreseeable development in the region, would not represent a significant cumulative impact. Therefore, CEQA does not require any cumulative mitigation.

Water Demand during Construction

As described in Section 3.6, Public Utilities and Energy (see Impact PUE#3), without the construction of the Build Alternatives, applicable water providers predict sufficient water supplies would be available to meet demands from the planned regional growth in 2020, assuming normal water year conditions. However, in the event of single or multiple dry year conditions, water demand would exceed supply in the Central Subsection (supplied by the Antelope Valley-East Kern Water Agency) in 2020. Additional water supplies would be needed to meet demands under such conditions, with or without the construction of the project.

While sufficient water would likely be available, water supply in California has been subject to substantial fluctuations based on drought conditions that can change year to year, in addition to reductions in overall supply based on climate change. Potable water suppliers are unable to plan for their water supplies to the point where construction water can be guaranteed for a project this large so far in advance of actual construction, and temporary uses such as construction are in general the first kind of use to be curtailed during a drought or during times of low water availability. Additionally, there are uncertainties inherent to the project about place of use, where additional approvals may be necessary to use water outside of existing service or permit areas. Although adequate water supplies have been identified based on the conservative estimates for construction water needs, the Authority cannot currently define the exact water needs for tunneling (the most water intensive use) over the construction period (anticipated to last 7.08 to 8.25 years of the 8.33 to 9.25 years of construction).

Construction of the Build Alternatives would use water for the following activities: dust control, tunneling (increasing the water content of soil optimizes tunnel boring), preparing concrete, and reseeded/ replanting temporary use areas. As such, water demand from construction of the Build Alternatives would require the allocation of additional water entitlements. Mitigation Measure PUE-MM#1, described in Section 3.6, Public Utilities and Energy, will require the Authority to prepare an updated water supply analysis that identifies detailed water supply needs for construction and operation of the selected Build Alternative. Based on the results of the water supply analysis, the Authority will coordinate with the water suppliers to identify the specific suppliers for construction water based on conditions at that time. As explained in Section 3.6, Public Utilities and Energy, sufficient water supplies have been identified to serve the project and other reasonably foreseeable development in all water year types. In addition, the Authority will be required to utilize nonpotable water during construction and operation, to the extent feasible. For example, water coming from the tunnels will be treated to reduce turbidity, and then recycled.

This water will be used several times during construction for lubrication and cooling purposes, reducing demand from municipal water sources.

Wastewater Generation during Construction

Water would be required to construct the tunnels associated with the Build Alternatives. This water would mix with soil as it is extracted from the tunneled alignment. Some of this wastewater would also be collected in water retention ponds or treated in the same capacity as the tunnel spoils would be hauled off site. The management and discharge of construction wastewater (dewatering operations) are governed by federal and state law, as implemented through California regulations. Adherence to federal and state regulations would prevent dewatering discharges from contributing to exceedance of water quality standards. None of the wastewater from the tunneling activities would be directly piped back into local wastewater treatment facilities (collection systems or treatment plants).

Solid Waste Generation during Construction

Construction of the Build Alternatives, together with cumulative projects, would require solid waste and debris disposal at regional landfills (Class I/II Hazardous/Designated Wastes, Class III Non-Hazardous, Contaminated Wastes, and Class III Non-Hazardous, Uncontaminated Wastes). Typical construction activities that generate solid waste (i.e., construction debris) includes clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures.

In accordance with Senate Bill 1374, construction and demolition waste is required to meet solid waste diversion goals to the extent practicable by reusing or recycling materials. In addition, the 2010 Green Building Standards Code requires cities and counties in California to develop a waste management plan and to divert at least 50 percent of the generated construction materials (CBSC 2012). In accordance with the Authority's 2013 sustainability policy, 100 percent of steel and concrete would be recycled, and a minimum 75 percent of construction waste would be diverted from landfills (Authority 2016b).

Construction debris and tunneling spoils that would be generated by the construction of the Refined SR14 and SR14A Build Alternatives represent approximately 13.1 and 17.9 percent, respectively, of the total remaining capacity of the landfills that would be used, inclusive of Class I/Class II Hazardous/Designated Waste facilities, Class III Non-Hazardous, Contaminated Waste facilities, and Class III Non-Hazardous, Uncontaminated Waste facilities. Construction debris that would be generated by the construction of E1 and E1A Build Alternatives represent approximately 11.9 percent and 12.0 percent, respectively, and the construction debris that would be generated by the construction of the E2 and E2A Build Alternatives represent approximately 12.4 percent and 12.6 percent of the remaining landfill capacity, respectively. However, as discussed in Section 3.6, Public Utilities and Energy, landfills within the applicable regions of the Build Alternatives have sufficient capacity to accommodate solid waste from project construction, even if waste is not recycled to the extent recommended under the Authority's policy.

The solid waste generated for project construction, together with cumulative projects, would be related to the capacity of regional and local landfills. As the overall capacity at regional and local landfills have capacity to accept construction waste, additional capacity would not be required. Therefore, no cumulative impact would occur, and CEQA does not require any cumulative mitigation.

Energy Consumption during Construction

Construction of the Build Alternatives, together with cumulative projects, would result in temporary increases in energy demand. During construction activities, energy would be consumed in the production and transportation of construction materials and the operation and maintenance of construction equipment (indirect energy consumption). Energy used for construction is a one-time, nonrecoverable energy cost. Impact PUE#6 (see Section 3.6, Public Utilities and Energy) shows estimates of construction-related indirect energy consumption for the Build Alternatives. Given the indirect nature of construction-related energy consumption, the

cumulative energy needs would not require significant additional capacity nor significantly increase peak- or base-period demands for electricity from the electrical grid system.

As the Authority enters into contracts for the construction and implementation of the Build Alternatives, system-specific goals and strategies would be further refined in each contract's general and special provisions, sustainability strategies and procedures, and other documents as the system matures. This policy and contract implementation would help ensure that construction-period energy savings, to the extent feasible, are integrated into the Build Alternatives (PUE-IAMF#1).

CEQA Conclusion

With adherence to standard practices for the provision and relocation of utilities, direct utility conflicts from the construction of the Build Alternatives, in combination with other reasonably foreseeable development in the region, would avoid significant cumulative impacts during construction. As significant capacity exists at landfills in the region, construction of the Build Alternatives, in combination with other development, would not result in significant cumulative impacts from solid waste generation. Although construction of the Build Alternatives would generate wastewater, none of the wastewater would be directly piped back into local wastewater treatment systems. Therefore, construction would not exceed available capacity for wastewater treatment providers in the expanded utility RSA.

Water demands associated with construction of the Build Alternatives, together with cumulative water demands throughout the RSA, could result in a significant cumulative impact and may require the construction or expansion of water facilities. However, the Build Alternatives would not utilize local wastewater infrastructure and there are sufficient water supplies to serve the project and other reasonably foreseeable development in all water year types. Additionally, Mitigation Measure PUE-MM#1 would require the Authority to utilize non-potable water from regional water utility service providers for construction activities where feasible, as well as recycle/reuse water used for tunnel construction, further minimizing demand for water supplies, and allowing the Authority to identify the specific other sources of water that will meet water supply needs if needed as part of the construction planning and water procurement process occurring closer to the time of construction, when more detail is known.

If any of the Build Alternatives require expansion of water and wastewater facilities, impacts from these facilities would be of the type that are common to most infrastructure projects. These impacts are typically reduced to less than significant levels through adherence to applicable regulations, incorporating best management practices, and applying standard mitigation measures. Construction of the Build Alternatives would not considerably contribute to cumulative impacts from water demand and wastewater generation.

The energy used for project construction, together with cumulative projects, would be related to the production and transportation of construction materials and the operation and maintenance of construction equipment (indirect energy consumption). As such, this cumulative temporary energy consumption would not require significant additional capacity; significantly increase peak- or base-period demands for electricity from the electrical grid system; or result in wasteful, inefficient, or unnecessary consumption of energy resources. No cumulative impact would occur. Therefore, CEQA does not require any cumulative mitigation.

Operations

Water Demand during Operation

As previously discussed, water providers within the RSA predict that sufficient water supplies would be available to meet water demand in 2020, assuming normal rainfall conditions. However, in the event of single or multiple dry year conditions, water demand would exceed supply in 2020. Additional water supplies would be needed to meet demands under such conditions, with or without the Build Alternatives.

Project-related operations water use would occur at the Burbank Airport Station (see Impact PUE#8). As such, water demand from construction of the Build Alternatives would require the

allocation of additional water entitlements. However, the average annual water use for the Burbank Airport Station would be 164.8 acre-feet, representing an approximately 15 percent decrease in water use when compared to existing land use. Because there is a projected decrease in water use during operations of the Build Alternatives, no cumulative impact would occur. Therefore, CEQA does not require any cumulative mitigation.

Wastewater Generation during Operation

Operational wastewater associated with the project would only be generated by the Burbank Airport Station (see Impact PUE#9). To comply with federal regulations for wastewater plan operations and collection systems, publicly owned treatment works receive Statewide General Waste Discharge Requirements to ensure that wastewater facilities operate in compliance with water quality regulations set forth by the State. Waste Discharge Requirements establish effluent limits on the kinds and quantities of pollutants that publicly owned treatment works may discharge. These permits also contain pollutant monitoring, recordkeeping, and reporting requirements. Each publicly owned treatment work that intends to discharge into the nation's waters must obtain a Waste Discharge Requirement prior to initiating its discharge.

The Build Alternatives would result in a connection to the existing sewer system that would be ultimately routed to the wastewater treatment plant serving the Burbank Airport Station. Since wastewater generated by the Build Alternatives would be treated by publicly owned treatment works, discharge flows would be required to comply with the Waste Discharge Requirements for the facility. Compliance with condition or permit requirements established by the City of Burbank and Waste Discharge Requirements at the publicly owned treatment works would ensure that discharges into the wastewater treatment facility system from Build Alternatives operations would not exceed applicable Los Angeles Regional Water Quality Control Board wastewater treatment requirements.

The impact on operations wastewater usage would be less than significant because, based on the estimates for water usage presented in Impact PUE#9, the regional wastewater treatment facilities have the capacity to treat wastewater demand for the Burbank Airport Station.

Solid Waste Generation during Operation

Operation of the Build Alternatives, together with cumulative projects, would result in the generation of solid waste and debris. Project-related operations activities that would generate solid waste include passenger/employee refuse disposal at stations and materials used for HSR maintenance (see Impact PUE#10).

Under the Resource Conservation and Recovery Act and the California Integrated Waste Management Act of 1989 (Assembly Bill 939), county or municipal solid waste disposal facilities are required to plan for nonhazardous solid waste facility expansions as well as meet recycling diversion goals; therefore, existing laws and regulations would ensure that there is adequate landfill capacity to serve the reasonably foreseeable development. As shown in Section 3.6, Public Utilities and Energy, there is sufficient capacity at the respective landfills that would serve the Build Alternatives. By law, county or municipal solid waste disposal facilities are required to plan for nonhazardous solid waste facility expansions as well as meet recycling diversion goals, including for the Build Alternatives.

Energy Consumption during Operation

The operations energy analysis established in Section 3.6, Public Utilities and Energy, is inherently cumulative because the Build Alternatives' energy impacts are evaluated against existing (2015) conditions and anticipated future (2040) conditions without the Build Alternatives. The Authority calculated operations energy consumption for the Build Alternatives (see Impact

PUE#11) based on the level of ridership as presented in the Authority’s 2016 Business Plan (Authority 2016a).⁹

Transportation accounts for a large portion of California’s energy budget, with approximately 46 percent of the state’s energy consumption resulting from the transport of goods and people. The population of California is projected to increase 28 percent by 2030. Because of trends in travel demand, congestion, and other adverse travel conditions, the market for intercity travel in California is projected to increase by up to 46 percent over the next 30 years. Therefore, operation of past, present, and reasonably foreseeable future projects would increase energy requirements.

The proposed California HSR System would obtain electricity from the statewide grid. None of the proposed Build Alternatives would involve construction of a separate power source, but rather would include the extension of existing power lines to a series of traction power substations positioned along the HSR corridor. However, the Authority has adopted a policy goal of utilizing renewable energy for all traction power. Subsequent planning identified the preferred strategy for realizing this goal (i.e., procuring or producing on site, where feasible, enough renewable energy to feed into the California grid to offset the energy required for traction power) (Authority 2008). An industry survey in April 2013 indicated that there is sufficient renewable energy capacity to meet the system demand (Authority 2014). Under the 2013 Policy Directive POLI-PLAN-03, the Authority has adopted a goal to purchase 100 percent of the California HSR System’s power from renewable energy sources (Authority 2016b).

Operation of the Build Alternatives, in combination with past, present, and reasonably foreseeable future projects, would not outpace the provision of energy resources and would reduce statewide long-distance city-to-city motor vehicle travel, as well as long-distance city-to-city aircraft takeoffs and landings. Under the cumulative condition, operation of any of the Build Alternatives would reduce regional energy consumption from transportation by approximately 3.3 to 3.7 percent, and statewide energy consumption from transportation by approximately 2.7 to 3.8 percent, depending on the ridership scenarios.

CEQA Conclusion

Operation of the Build Alternatives, in combination with reasonably foreseeable future development would not result in cumulative impacts due to generation of solid waste, because solid waste disposal sites in the Build Alternative vicinity contain sufficient capacity for anticipated solid waste volumes.

Operation of the Build Alternatives, in combination with reasonably foreseeable future development would increase water consumption, wastewater generation, and energy consumption. These represent significant cumulative impacts. However, Mitigation Measures PUE-MM#1 and PUE-MM#2 will offset operations wastewater generation and water consumption, to avoid a considerable contribution to this impact. Also, because the Build Alternatives would result in an overall reduction in regional transportation energy consumption, the Build Alternatives would not considerably contribute to this cumulative impact. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.7 Biological and Aquatic Resources

Past, present, and reasonably foreseeable future projects that could affect biological resources in this area generally fall into two categories:

- **Land Use Development**—Local and regional land use development documents, including the *Los Angeles County General Plan* (Los Angeles County 2014b), the *Antelope Valley Area Plan* (Los Angeles County 2014a), the *Palmdale 2045 General Plan* (City of Palmdale 2022), the *Santa Clarita Valley Area Plan* (Los Angeles County 2012), the *Santa Clarita Valley*

⁹ The 2024 Business Plan reduced the ridership estimates as compared to the 2016 Business Plan. As a result, anticipated energy consumption would be less than shown in the Draft EIR/EIS and impacts as analyzed would be conservative compared to using the latest ridership forecasts.

General Plan (City of Santa Clarita 2011), and the *Burbank 2035 General Plan* (City of Burbank 2013) provide the policy framework for long-range development of human communities within the RSA. Community buildout per these planning documents would lead to residential, commercial, industrial, and other urban/suburban development within previously disturbed and/or previously undisturbed areas that currently harbor biotic and aquatic resources.

- **Transportation Improvement and Expansion Projects**—Major regional transportation projects include the Northwest SR 138 Corridor Improvement Project, the High Desert Corridor, the I-5 HOV/Truck Lanes, the Sepulveda Pass Transit Corridor, the East San Fernando Valley Transit Corridor, the Link Union Station, Antelope Valley Line Capacity and Service Improvements Program, East San Fernando Valley Light Rail Transit Project, the Vista Canyon Specific Plan (which includes a bridge crossing over the Santa Clara River), and the adjacent HSR Bakersfield to Palmdale Project Section. Other transportation projects in the RSA include improvements to existing roadway segments and intersections to provide more efficient auto, transit bicycle, and pedestrian circulation. Implementation of these projects could result in right-of-way acquisition, construction disturbance, and installation of new transportation infrastructure within previously disturbed and/or previously undisturbed areas that currently harbor biotic and aquatic resources.

Construction

As discussed in Section 3.7, Biological and Aquatic Resources, HSR construction could impact special-status plants, plant communities, special-status wildlife, critical habitat, SEAs, protected trees, and aquatic resources. Other past, present, and reasonably foreseeable projects in the area have or are expected to disturb and convert habitat areas into urban and suburban infrastructure. Active construction areas associated with land use development and transportation projects would result in similar biotic and aquatic habitat degradation and potential for special-status species mortality, injury, relocation, or disruption. Linear transportation projects, including the Northwest SR 138 Corridor Improvement Project and the High Desert Corridor Project, would contribute to impacts on wildlife movement corridors in the region. Cumulatively, these impacts could substantially degrade biological and aquatic resources throughout the Antelope Valley.

Cumulative development within the city of Santa Clarita could increase the amount of rural residential suburbs and transportation infrastructure along the SR14 corridor and Santa Clara River corridor, and within human communities surrounding the ANF. Notable projects in this area include the Mancara at Robinson Ranch Project, the Vista Canyon Specific Plan, and the Santa Clarita Parkway Extension, which propose infrastructure over or immediately adjacent to the Santa Clara River channel. Transportation projects, such as the I-5 HOV/Truck Lanes Project and Sierra Highway Improvements, would widen major roadway and freeway corridors through developed and undeveloped areas. Together, these impacts could substantially degrade biological and aquatic resources in the area. Within the ANF, however, uses of the of the National Forest are regulated by the USFS, and present and reasonably foreseeable future projects would be unlikely to substantially affect habitat within the ANF, including the SGMNM.

Section 3.7, Biological and Aquatic Resources, identifies HSR design features, IAMFs, and mitigation measures to reduce the magnitude and severity of impacts associated with construction of the Build Alternative. Examples of IAMFs and mitigation measures include the following:

- Conducting pre-construction surveys to determine the presence of special-status plants and wildlife within the construction footprint
- Prescribing construction site monitoring, deterrence, and relocation to protect special-status wildlife within and immediately adjacent to the construction footprint
- Establishing aquatic resource non-disturbance zones, seasonal work restrictions, erosion-control measures, and monitoring protocols during construction
- Restoring temporary impacts on habitat and wildlife movement corridors at the outset of construction

- Implementing a compensatory mitigation program consisting of off-site habitat acquisition, restoration, or enhancement; purchase of mitigation credits; or payment into a land bank fund

In addition, the project would adhere to regulatory standards established by state and federal laws to protect biological and aquatic resources, including the federal Endangered Species Act, the California Endangered Species Act, and Section 404 of the Clean Water Act. Refer to Section 3.7, Biological and Aquatic Resources, for a complete discussion of applicable regulations, HSR design features, IAMFs, and mitigation measures that would reduce the project’s impact on biological and aquatic resources during construction.

CEQA Conclusion

Construction of the Build Alternatives, in combination with past, present, and reasonably foreseeable future development, could result in the further loss of biological and aquatic resources. This represents a significant cumulative impact. However, IAMFs and mitigation measures will be applied to avoid, minimize, and compensate for loss of biological and aquatic resources. The Authority, for instance, would establish non-disturbance zones for sensitive biological resources, restore habitat, and acquire habitat off site for restoration or enhancement, among other measures. With implementation of Build Alternative IAMFs and mitigation measures, the project’s contribution to this significant cumulative impact would not be cumulatively considerable. Therefore, CEQA does not require any cumulative mitigation.

Operations

Operation of the Build Alternative, in combination with other past, present, and reasonably foreseeable projects such as linear transportation projects, including the Northwest SR 138 Corridor Improvement Project and the High Desert Corridor Project, could degrade biological and aquatic resources throughout the cumulative RSA. Other projects, such as those discussed above and other regional development, would convert currently undeveloped habitat to residential, commercial, industrial, and transportation uses, thereby creating barriers to wildlife movement, reducing natural habitat, and impacting special-status plants, special-status wildlife, and aquatic resources in areas surrounding the ANF, including the SGMNM. However, as discussed above, development would be unlikely to substantially affect habitat within the ANF including the SGMNM, given the protected status of these lands.

Impacts during HSR operation would be limited to the following:

- Noise impact from passing trains
- Maintenance activities along the HSR right-of-way that result in removal or modification of protected plants or trees encroaching on the alignment
- Maintenance activities along the HSR right-of-way that result unauthorized contaminant releases into adjacent biologic or aquatic communities.

Thus, operational impacts of the Build Alternatives, in combination with impacts from cumulative projects, could contribute to habitat degradation. Although the Build Alternatives would contribute to these cumulative effects, it has been designed to avoid effects to biological and aquatic resources. For example, the extensive use of tunnels within sensitive biologic areas would reduce the Build Alternatives’ impacts through this relatively undeveloped area. Furthermore, as discussed in Section 3.7, Biological and Aquatic Resources, the Authority will implement IAMFs and mitigation measures to reduce the magnitude and severity of impacts associated with HSR operation. Examples of IAMFs and mitigation measures include the following:

- Operation-and-maintenance-period worker environmental awareness program training
- Vegetation and weed management plans
- Stormwater management plans

Refer to Section 3.7, Biological and Aquatic Resources, for a complete discussion of the HSR IAMFs and mitigation measures that would reduce the project’s impact on biological and aquatic

resources during operation. Section 3.8, Hydrology and Water Resources, provides additional information on the IAMFs, and mitigation measures that would reduce impacts on water resources that support aquatic habitat.

CEQA Conclusion

Operation of the Build Alternatives, in combination with past, present, and reasonably foreseeable future development, could degrade biological and aquatic resources. This represents a significant cumulative impact. However, the Build Alternative's operation contributions to cumulative impacts would be reduced through IAMFs, examples of which are listed above, and would reduce the project's contribution to this significant cumulative impact such that it would not be cumulatively considerable. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.8 Hydrology and Water Resources

The cumulative RSA for hydrology and water resources includes surface waters in the Antelope Valley, Santa Clara River, and Los Angeles River watersheds, and groundwater in the Antelope Valley Groundwater Basin, Santa Clara River Valley Groundwater Basin East Subbasin, Acton Valley Groundwater Basin, and San Fernando Valley Groundwater Basin. Past, present, and reasonably foreseeable future development in these hydrologic regions include land use development and transportation projects, most notably the following:

- **Land Use Development**—Local and regional land use development documents, including the *Los Angeles County General Plan* (Los Angeles County 2014b), the *Antelope Valley Area Plan* (Los Angeles County 2014a), the *Palmdale 2045 General Plan* (City of Palmdale 2022), the *Santa Clarita Valley Area Plan* (Los Angeles County 2012), the *Santa Clarita General Plan* (City of Santa Clarita 2011), and the *Burbank 2035 General Plan* (City of Burbank 2013) provide the policy framework for long-range development of human communities within the RSA. Construction and operation of these planned communities would encounter surface water, groundwater, and floodplains.
- **Transportation Improvement and Expansion Projects**—Major regional transportation projects include the Northwest SR 138 Corridor Improvement Project, the High Desert Corridor, the I-5 HOV/Truck Lanes, the Sepulveda Pass Transit Corridor, the East San Fernando Valley Transit Corridor, the Link Union Station, the Vista Canyon Specific Plan (which includes a bridge crossing over the Santa Clara River), and the adjacent HSR Bakersfield to Palmdale Project Section of the California HSR System. Other transportation projects in the RSA include improvements to existing roadway segments and intersections to provide more efficient auto, transit bicycle, and pedestrian circulation. Implementation of these projects would encounter surface water, groundwater, and floodplains.

Construction

Construction and operation of the Build Alternatives, in combination with past, present, and reasonably foreseeable future cumulative development, may affect surface and groundwater resources within the regional watersheds and groundwater basins. With the exception of impacts on hydrological conditions resulting from tunnel construction, hydrology and water quality effects associated with construction and operation of past, present, and reasonably foreseeable future projects would be of similar nature as the effects identified for the Build Alternatives, described in Section 3.8, Hydrology and Water Resources. Construction projects could alter surface-water drainage patterns, modify watercourse capacity and water flow height, increase erosion and sedimentation, degrade surface-water or groundwater quality, and increase flood risks by altering flood hazard areas.

Long-term effects associated with the Build Alternatives may involve increases in stormwater runoff speed and rates, permanent alteration of watercourse hydraulic capacity, degradation of surface-water or groundwater quality, increases in flood heights, and decreases in groundwater recharge. However, development throughout the cumulative RSA would be subject to federal, state, and local regulations designed to control stormwater runoff, require construction-period pollution controls, prevent floodplain development, ensure adequate groundwater recharge, and

otherwise protect hydrologic resources and water quality. Table 3.19-6 provides examples of relevant federal, state, and local regulations.

Construction of the tunnels located in low-lying areas south of the California Aqueduct, beneath the ANF including SGMNM, near seasonal seeps and springs, or where perched groundwater exists, could cause impacts on hydrologic conditions. During construction, groundwater could drain from the rock mass into the tunnels. Seepage of groundwater through faults and fractures into the tunnels could occur during and under certain conditions. Impacts associated with changes in groundwater and surface water conditions include both the potential for a localized reduction in spring, seep, and stream flows, resulting in partial or complete aquatic habitat degradation, and for aggregated downstream changes to habitats. Other reasonably foreseeable future projects listed in Appendix 3.19-A would not entail the construction of tunnel systems that may potentially cause similar type changes to hydrogeological conditions.

CEQA Conclusion

As numerous regulatory requirements place strong protections on surface waters, the Build Alternatives' and other development's contributions to cumulative impacts associated with surface-water hydrology or water quality would be greatly reduced, and no significant cumulative impacts would occur. All six Build Alternatives would involve tunneling beneath the ANF including SGMNM, which could result in changes to hydrogeological resources, affecting groundwater and surface-water resources (i.e., streams, seeps, and springs). As discussed in Section 3.8.7, with implementation of HWR-MM#4, impacts on groundwater during tunnel construction would mitigate or offset impacts to affected water resources. According to the planned and potential projects listed in Appendix 3.19-A, there are no recent, present, or foreseeable future land development or transportation projects and plans in the ANF. Construction of the Build Alternatives would not contribute to a cumulatively considerable hydrological impact with implementation of regulatory requirements. Therefore, CEQA does not require any cumulative mitigation. Refer to Section 3.8, Hydrology and Water Resources, for a discussion of project-level impacts on hydrogeological resources.

Operations

Operation of the Build Alternatives could result in the generation of erosion, and small quantities of pollutants generated from station operation and regular maintenance across the Build Alternative footprint, resulting in the project contributing to impacts on water quality. However, HYD-IAMF#1, HMW-IAMF#9, and HMW-IAMF#10 will require treatment of runoff and plans for the correct handling and storage of materials capable of contributing to polluted runoff. Also, the Build Alternatives and other development in the project vicinity will be required to conform to regulations protecting water quality.

CEQA Conclusion

As polluted runoff from the Build Alternatives operations would be minimized through regulatory compliance and application of IAMFs, the Build Alternatives would be unlikely to contribute to cumulative impacts. Other cumulative projects would also be subject to the same regulatory requirements regarding water quality. Construction and operation of the Build Alternatives, in combination with other past, present, and foreseeable future projects, would not result in cumulative hydrological and water resources impacts. Therefore, CEQA does not require any cumulative mitigation.

Table 3.19-6 Federal, State, and Local Hydrology and Water Quality Regulations

Regulation Name
Federal Regulations
<ul style="list-style-type: none"> ▪ Sections 303(d), 201, 402, and 404 of the Clean Water Act
<ul style="list-style-type: none"> ▪ Sections 9, 10, and 14 of the Rivers and Harbors Act of 1899
<ul style="list-style-type: none"> ▪ United States Presidential Executive Order 11988 and 11990
<ul style="list-style-type: none"> ▪ United States Department of Transportation Order 5650.2
<ul style="list-style-type: none"> ▪ National Flood Insurance Act Safe Drinking Water Act
State Regulations
<ul style="list-style-type: none"> ▪ Porter-Cologne Water Quality Act
<ul style="list-style-type: none"> ▪ National Pollutant Discharge Elimination System
<ul style="list-style-type: none"> ▪ Cobey-Alquist Floodplain Management Act
<ul style="list-style-type: none"> ▪ Sections 1601 to 1603 of the California Fish and Game Code
Local Regulations
City of Palmdale
<ul style="list-style-type: none"> ▪ City of Palmdale Stormwater Management Plan
<ul style="list-style-type: none"> ▪ Palmdale 2045 General Plan (goals, policies, and objectives from the Environmental Resources, Public Services, and Safety elements)
<ul style="list-style-type: none"> ▪ City of Palmdale Municipal Code Chapters 15.28 (Floodplain Management) and Section 8.04.265 Chapter 70 (Excavating and Grading)
Los Angeles County
<ul style="list-style-type: none"> ▪ Los Angeles County Flood Control Act
<ul style="list-style-type: none"> ▪ Los Angeles Regional Water Quality Control Plan
<ul style="list-style-type: none"> ▪ Water Quality Control Plan for the Lahontan Region
<ul style="list-style-type: none"> ▪ Los Angeles County Standard Urban Stormwater Mitigation Plan
<ul style="list-style-type: none"> ▪ Los Angeles County General Plan (goals and policies from the Mobility, Conservation and Natural Resources, and Safety elements)
<ul style="list-style-type: none"> ▪ Los Angeles County Department of Regional Planning Antelope Valley Area Plan (goals and policies from the Land Use, Conservation and Open Space, and Public Safety, Services, and Facilities elements)
<ul style="list-style-type: none"> ▪ Los Angeles County Department of Regional Planning Santa Clarita Valley Area Plan
<ul style="list-style-type: none"> ▪ Los Angeles County Code of Ordinances: Title 12, Chapter 12.80 Stormwater and Runoff Pollution Control; Title 20, Chapter 21 Stormwater and Runoff Pollution Control; Title 22, Chapter 22.44.113 Agua Dulce Community Standards District; Title 22, Chapter 22.44.126 Acton Community Standards District; Title 22 Planning and Zoning, Chapter 22.52 Part 5 Flood Control; and Title 26, Appendix J
City of Santa Clarita
<ul style="list-style-type: none"> ▪ City of Santa Clarita General Plan
<ul style="list-style-type: none"> ▪ City of Santa Clarita Enhanced Watershed Management Program
<ul style="list-style-type: none"> ▪ City of Santa Clarita Municipal Code

Regulation Name
City of Burbank
<ul style="list-style-type: none"> ▪ Burbank 2035 General Plan (goals, policies, and programs from the Open Space and Conservation and Safety elements)
<ul style="list-style-type: none"> ▪ Burbank Municipal Code Title 7 Public Ways and Properties, Chapter 1 Excavations; and Title 9 Building Regulations, Chapter 3 Environmental Protection, Article 4 Standard Urban Storm Water and Urban Runoff Management Programs

Sources: Authority 2019c; City of Burbank 2013; City of Palmdale 1993; City of Santa Clarita 2014; Los Angeles County 2006, 2012, 2016, 2014; RWQCB 1993, 1994
 Authority = California High-Speed Rail Authority; RWQCB = Regional Water Quality Control Board

3.19.5.9 Geology, Soils, Seismicity, and Paleontological Resources

The cumulative RSA for geology, soils, seismicity, and paleontological resources includes the Antelope Valley (within the Mojave Desert geomorphic province), the Transverse Ranges geomorphic province, and the San Fernando Valley.

Construction

Geologic Hazards

Geologic hazards within the cumulative RSA include karst terrain, landslides, and ground subsidence. Local geologic conditions, soil composition, slope, and drainage govern the presence and magnitude of karst terrain and landslides. Due to these site-specific factors, development within karst terrain and landslide hazards areas would not create new or more severe karst terrain or landslide hazards beyond the specific conditions encountered by each individual project. Thus, these hazards are not cumulatively additive.

Projects constructed in areas with subsidence risks could encounter ground instability or a gradual drop in ground surface elevation. Although drops in ground elevation occur on a regional basis, the site-specific hazards associated with subsidence are not additive across multiple projects. Furthermore, because the primary cause of subsidence is excessive withdrawal of subsurface fluids (water or petroleum), new loads (i.e., mass and weight associated with new structures) associated with past, present, and reasonably foreseeable future development on subsidence-prone soils would not trigger additional subsidence risks.

New water demands associated with cumulative development could increase aquifer withdrawal and accelerate subsidence. However, many regulatory requirements manage water supply and protect groundwater resources, including the following:

- The Sustainable Groundwater Management Act requires the California Department of Water Resources to identify groundwater basins subject to critical conditions of overdraft. Such basins require a Groundwater Sustainability Plan or Groundwater Management Plan, prepared by local groundwater pumpers.
- California Senate Bill 1262 requires water purveyors to prepare water supply assessments for large projects to assess impacts on water supply.
- The Urban Water Management Planning Act requires major urban water suppliers to demonstrate how local water needs can be feasibly met through an Urban Water Management Plan.

Cumulative development must manage water demands to comply with this legal framework that minimizes aquifer overdraft, which is the principal cause of subsidence. Thus, water demand associated with past, present, and reasonably foreseeable future projects in the cumulative RSA would not increase subsidence hazards.

Soil Hazards

Soil hazards within the cumulative RSA include erosion, expansive soils, corrosive soils, collapsible soils, and areas of difficult excavation. Site-specific geologic and hydrologic factors, including soil composition, slope, and drainage, govern the presence and magnitude of soil hazards. Development within hazardous soil conditions would not create new or more severe soil hazards beyond the specific conditions encountered by each individual project. Thus, soil hazards are not cumulatively additive.

Seismic Hazards

Seismic hazards within the project vicinity include fault rupture; groundshaking; liquefaction, lateral spreading, and ground lurching; seismically induced landslides; and seismically induced dam failure at Lake Palmdale Dam, Pacoima Dam, or Hansen Dam.

Fault rupture and groundshaking result from earthquake activity at regional fault complexes. Although these seismic hazards pose a risk to past, present, and reasonably foreseeable future projects, tectonic displacement is the principal factor that dictates earthquake occurrence and severity. Development in earthquake-prone regions would not increase earthquake hazards or create new or more severe fault rupture or groundshaking events beyond the specific conditions encountered by each individual project.

Similar to the soil hazards described above, site-specific geology and hydrology govern the presence and magnitude of liquefaction, lateral spreading, ground lurching, and seismically induced landslides. Development within areas that could experience liquefaction, lateral spreading, ground lurching, and seismically induced landslides would not create new or more severe hazards beyond the specific conditions encountered by each individual project. Thus, these hazards are not cumulatively additive.

Catastrophic dam failure during an earthquake could inundate past, present, and reasonably foreseeable future development within dam flood hazard zones. Seismically induced dam failure within the RSA would be unlikely because the seismic event would need to be large enough to cause extreme damage to the dam structure. As discussed above, development projects would not affect the likelihood or severity of earthquake events or increase the risk of catastrophic dam failure. However, the Build Alternatives, in addition to past, present, and reasonably foreseeable future development, would place structures within the Lake Palmdale Dam, Pacoima Dam, and Hansen Dam inundation zones. Over time, the introduction of structures within these inundation zones could impede or redirect flood flows during a catastrophic dam failure, potentially expanding the overall flood zone. However, catastrophic dam failure and large-scale inundation is an unlikely hazard; such an event would simultaneously require a large-magnitude earthquake at structurally defective or vulnerable dam facilities at maximum water-storage capacity. Furthermore, the Department of Water Resources' Division of Safety of Dams and the California Governor's Office of Emergency Services monitor and regulate dam hazards. Given the unlikelihood of a catastrophic dam failure and the regulatory oversight regarding dam failure hazards, it is unlikely that development within areas would create new or more severe hazards beyond specific conditions encountered by each individual project.

Mineral Resources

Construction Aggregate Resources

Construction of past, present, and reasonably foreseeable future projects involve the use of construction aggregate. Local aggregate materials are a resource of great importance to the economy of a given area. Because aggregate is a low unit-value, high bulk weight commodity, it must originate from nearby sources to minimize economic and environmental costs associated with transportation. If nearby sources do not exist, transportation costs can quickly exceed the value of aggregate. Transporting aggregate from distant sources results in increased construction costs, fuel consumption, GHG emissions, air pollution, traffic congestion, and road maintenance (CGS 2012).

The building and paving industries consume large quantities of aggregate, and future demand for this commodity is expected to increase throughout California. Implementation of past, present, and reasonably foreseeable future projects within the RSA collectively reduce the availability of known mineral resources in Los Angeles County. According to the California Geological Survey's *Aggregate Sustainability in California* study (CGS 2012), the two aggregate P-C regions within the RSA (the Palmdale P-C and the San Fernando Valley/Saugus-Newhall P-C) collectively contain 229 million tons of remaining permitted aggregate reserves. This report also compared forecasted aggregate demand against remaining permitted aggregate reserves for local P-C regions. This analysis determined the following:¹⁰

- Demand for aggregate resources within the Palmdale P-C region would exhaust permitted sources by 2032.
- Demand for aggregate resources within the San Fernando Valley/Saugus-Newhall P-C region would exhaust permitted sources by 2022.

Construction of the Build Alternatives, in addition to past, present, and reasonably foreseeable future projects, would consume substantial amounts of permitted construction aggregate within the cumulative RSA.¹¹ The Build Alternatives would require between approximately 8.1 and 9.3 million tons of construction aggregate. However, according to the 2012 aggregate study, the Palmdale P-C region and the San Fernando Valley/Saugus-Newhall P-C regions contain 229 million tons of remaining permitted aggregate reserves. Based on this estimate, there would be sufficient aggregate available to provide material for the project without harmfully depleting available sources (CGS 2012). Therefore, the project's contribution to the cumulative impact would not be considerable.

Mineral Resource Zones

New land use development or transportation projects could reduce the availability of fossil fuel resources, MRZs, and active mineral resource extraction facilities within the RSA. Mineral resources located within urbanized or developed areas would be minimally threatened by cumulative development, because existing land uses already preclude the viability of mineral resource recovery. However, the RSA contains MRZs and mining operations within relatively rural or undeveloped areas. Past, present, and future development could permanently fragment and/or prevent mineral recovery in these areas, limiting the continuity of existing and future recovery operations that become converted to urban/suburban development or transportation uses.

As discussed in Section 3.9, Geology, Soil, Seismicity, and Paleontological Resources, construction of the Build Alternatives could affect active oil/gas recovery sites and active mineral recovery sites. Given the abundance of active oil/gas and active mineral recovery facilities (excluding MRZs) throughout Los Angeles County, implementation of the Build Alternatives, along with other cumulative projects, would not considerably contribute to a cumulative impact on these resource extraction facilities in the region.

Each of the six Build Alternatives would encounter two large MRZ areas between Palmdale and Burbank: one in a relatively undeveloped portion of the San Gabriel Mountains, and another that encompasses the southwestern portion of the San Gabriel Mountains and the urbanized San

¹⁰ According to the 2012 aggregate study (CGS 2012): "These numbers are estimates and the actual lifespan of existing permitted reserves in a study area can be influenced by many factors. In periods of high economic growth, demand may increase, shortening the life of permitted reserves. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area."

¹¹ According to the 2012 aggregate study (CGS 2012): "Non-permitted aggregate resources are deposits that may meet specifications for construction aggregate, are recoverable with existing technology, have no land use overlying them that is inconsistent with mining, and currently are not permitted for mining. It is unlikely that these resources will ever be mined because of social, environmental, or economic factors. The location of aggregate resources too close to urban or environmentally sensitive areas can limit or prevent their development. Resources may also be located too far from a potential market to be economic. In spite of such possible constraints, non-permitted aggregate resources are the most likely future sources of construction aggregate potentially available to meet California's continuing demand."

Fernando Valley. Each of the six Build Alternatives would reduce availability of mineral resources through the conversion of MRZs to a transportation use. Each of the six Build Alternatives would not affect MRZs within the San Fernando Valley because these areas already contain extensive urban land uses that prohibit mineral resource recovery. Each of the six Build Alternatives would convert MRZs to transportation use within the relatively undeveloped San Gabriel Mountains; however, mining activities are prohibited in the SGMNM due to this area's protected status as a National Monument. Mining is allowed within the ANF.

Los Angeles County has a total MRZ-2 inventory of 119,268 acres of MRZ-2 areas (California Department of Conservation 2020), although much of the area within the MRZ sites in Los Angeles County was developed with structures prior to the MRZ classification, and therefore is unavailable for extraction (LACFCD 2015). Other incorporated areas within Los Angeles County, as well as in the cities of Palmdale, Burbank, and Santa Clarita, also encompass MRZs. Several cumulative projects are proposed within relatively undeveloped MRZ areas, including the following:

- High Desert Corridor
- SR 138 Widening Project
- Santa Clarita Extension
- Mancara at Robinson Ranch Project
- Vista Canyon Specific Plan
- I-5 HOV/Truck Lanes Project

Given that the Build Alternatives would permanently interfere with less than 1 percent of the MRZ areas within Los Angeles area, and that many of the MRZ acres with the six Build Alternative footprints are already developed with urban land uses, the Build Alternatives' contribution to access to MRZ's would be minimal.

Paleontological Resources

Cumulative impacts on paleontological resources involve destruction or alteration of fossils during ground-disturbing projects throughout Los Angeles County. Although surface activities (such as vegetation removal and construction staging) generally would not encounter fossil-bearing geologic units, excavation, grading, and other ground-disturbing construction activities could affect paleontologically sensitive geologic units within the RSA. The implementation of standard construction practices to identify, protect, and recover paleontological resources during surface-disturbing projects has resulted in the salvage and permanent preservation of scientifically significant paleontological resources. However, tunnel boring machine (TBM) construction would likely destroy paleontological resources encountered beneath the ground surface, because typical paleontological resource protection techniques (such as visual surveying and monitoring) are not feasible during tunneling operations. Thus, past, present, and reasonably foreseeable future projects within the RSA that require TBM excavation would likely destroy paleontological resources encountered beneath the ground surface, resulting in a cumulative impact. Most cumulative development within the RSA would not require TBM construction that could endanger paleontological resources. Thus, TBM construction required for the Build Alternatives represents the primary contributor to this cumulative impact; the project's contribution would thus be considerable.

CEQA Conclusion

There would be no cumulative impacts associated with geologic hazards, soil hazards, or seismic hazards, given their localized nature. Each of the six Build Alternatives' contribution to mineral resource impacts from conversion of MRZ zones to a transportation use would be minimal and not result in a significant contribution to a cumulative impact. Additionally, construction of the Build Alternatives, in combination with past, present, and reasonably foreseeable future development in the RSA, would not result in significant cumulative impacts on aggregate reserves. However, construction of the Build Alternatives, in combination with past, present, and reasonably foreseeable future development in the RSA would result in significant cumulative impacts on paleontological resources. The Build Alternatives would considerably contribute to these cumulative impacts. There are no feasible mitigation measures to reduce the Build

Alternatives' contribution to these significant cumulative impacts, which would remain significant and unavoidable for the Build Alternatives.

Operations

The Build Alternatives would operate across hazardous and potentially hazardous faults that would be susceptible to rupture during a seismic event. As impacts from fault rupture result from a given project's location in relation to faults, operational impacts from fault rupture would be specific to the project and would not be cumulatively additive.

CEQA Conclusion

As fault rupture impacts are constrained to individual projects' footprints, they are not cumulatively additive. The Build Alternatives in combination with other past, present, and foreseeable future projects, would not result in cumulative operational geology, soils, seismicity, and paleontological resources impacts. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.10 Hazardous Materials and Wastes

Construction

Construction of the Build Alternatives, along with past, present, and reasonably foreseeable future projects, would temporarily increase the regional generation, use, storage, transport, and disposal of hazardous materials and petroleum products commonly used at construction sites, such as diesel fuel, welding materials, lubricants, paints and solvents, and cement products containing strong acidic or basic chemicals. This increase would contribute incrementally to the regional transportation, use, storage, and disposal of hazardous materials. While hazardous materials handling may increase during construction, compliance with federal, state, and local regulations related to the transport, handling, and disposal of hazardous waste would reduce the potential for significant cumulative effects.

Demolition, ground-disturbing, and construction activities could disturb hazardous media—such as contaminated soil, soil vapor, or groundwater—that would require removal and off-site disposal. Facilities and construction sites that use, store, generate, or dispose of hazardous materials or wastes and transporters of hazardous material/waste are required to comply with various federal and state regulations to minimize the risk of a spill or accidental release of hazardous materials as described in Section 3.10, Hazardous Materials and Wastes.

While hazardous materials handling may increase during construction, compliance with regulations would prevent potential cumulative effects. In the context of the short-term and intermittent use of hazardous materials and generation of hazardous waste from construction, Hazardous/Designated Wastes would be generated during tunneling.

Tunnel spoils would be transported to a Class I/Class II Hazardous/Designated Wastes landfill site near the City of Buttonwillow, California, approximately 127 miles away from the Refined SR14 and SR14A Build Alternatives. The Refined SR14 and SR14A Build Alternatives represent the largest potential for tunneling spoils, which is estimated to generate 6.8 million cubic yards of spoils.

The Refined SR14 and SR14A Build Alternatives would require 25 percent of the total remaining capacity at the Clean Harbors Buttonwillow Class I/Class II Hazardous/Designated Waste landfill. As the Refined SR14 and SR14A represent the highest quantity of both hazardous and nonhazardous materials generated for the Palmdale to Burbank Project Section, the E1, E1A, E2, and E2A Build Alternatives would require less capacity at the various landfills for both Class I/Class II Hazardous/Designated Waste landfills, and Class III Non-Hazardous, Contaminated Waste landfills.

Therefore, project contribution to potential release of hazardous materials to the environment would be minimal and thus not be cumulatively considerable under CEQA. Refer to Section 3.19.5.6 for discussion of landfill capacity in regards to Hazardous/Designated Wastes.

CEQA Conclusion

Regulatory compliance would require the Build Alternatives and other development to comply with standards for the storage, use, and handling of hazardous materials during construction to avoid spill or release of such materials. With regulatory compliance, construction of the Build Alternatives in combination with other past, present, and foreseeable future projects, would not result in cumulative hazardous materials and wastes impacts. Therefore, CEQA does not require any cumulative mitigation.

Operations

Under cumulative conditions, the increased population in the RSA would contribute incrementally to the transportation, storage, use, and disposal of hazardous substances. The Build Alternatives would incrementally increase use of hazardous materials because the facilities would use, store, and dispose of small quantities of hazardous materials and petroleum products on a regular basis.¹² Additionally, HSR trains would release hazardous materials in the form of brake dust. Operations of the selected Preferred Alternative would comply with federal, state, and local regulatory requirements to minimize the risk of exposure to or release of hazardous materials. Because the Build Alternatives and other cumulative projects would be subject to legally required controls and/or mitigation measures, the hazardous waste impacts of these projects would not be cumulatively considerable under CEQA. Additionally, the development of future projects and the Build Alternatives could result in incidental improvement in environmental quality because of the discovery and/or required remediation of existing soil and groundwater contamination.

CEQA Conclusion

Regulatory compliance would require the Build Alternatives and other development to comply with standards for the storage, use, and handling of hazardous materials during operation to avoid spill or release of such materials. Operation of the Build Alternatives, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative hazardous material and waste impacts. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.11 Safety and Security

The safety and security cumulative impact analysis considers effects of the Build Alternatives combined with past, present, and reasonably foreseeable future projects identified in Appendix 3.19-A. The cumulative RSA includes the transportation system and fire protection, law enforcement, and other emergency response service areas in the entirety of Los Angeles County—including the 88 incorporated cities and the 140 unincorporated areas regulated by the County.

Construction

Construction of the Build Alternatives, along with other cumulative projects, would expand existing public transportation options and construction of new roadways. These projects would require several thousand construction workers per year, which could increase the demand for fire protection, law enforcement, and other emergency response services in the project region for the short-term. Both the Build Alternatives and the cumulative projects identified in Appendix 3.19-A would be required to follow strict Occupational Safety and Health Administration and other safety practices. This includes implementation of standard construction safety plans, construction transportation plans, and traffic control plans, as necessary, to reduce the need for and interference with emergency services. As most of the development would occur over several years, local agencies would have the time to plan for increased demand during construction activities and to reduce the effect of those activities.

The following discussion reflects the potential for impacts from the Burbank to Los Angeles Project Section of the California HSR System on the Burbank Airport Station. A portion of the

¹² High-speed trains would be propelled by electricity, and thus would not carry or require storage of fuels. Moreover, trains would carry only passengers, not potentially hazardous cargo.

Burbank to Los Angeles Project Section alignment would cross under Runway 8-26, Taxiway D, the proposed extension of Taxiway C, and critical airport safety zones at Hollywood Burbank Airport. This section of the HSR alignment would be constructed by using the sequential excavation method, working under the runway and taxiway systems to avoid any airfield operation impacts. The runway and taxiway systems would remain fully operational during construction because the sequential excavation method minimizes surface disruption, which would be limited to the tunnel entry and exit points, outside of the critical airport safety zones. However, a potential effect caused by tunnel construction could be surface settlement on runways and taxiways immediately above a tunnel excavation. Based on the case histories described in Appendix 3.11-C of the Burbank to Los Angeles Project Section Final EIR/EIS as well as industry experiences from similar construction, the surface settlements will be controlled to a limit acceptable to the Federal Aviation Administration (FAA) and Burbank-Glendale-Pasadena Airport Authority consistent with FAA Advisory Circular 150/5300-13A Airport Design, paragraph 313 Surface Gradient, Draft FAA Advisory Circular 150/5300-13B Airport Design, paragraph 3.15 Surface Gradient, and Part 139 Certification of Airports (for FAA Airport Inspection) – 139.305 Paved Areas.

On March 5, 2020, the FAA provided a determination to the Authority that the FAA does not object to the construction of the portion of the tunnel associated with the Burbank to Los Angeles Project Section under Runway 8-26, Taxiway D, the proposed extended Taxiway C, and critical airport safety zones with respect to the safe and efficient use of navigable airspace and the safety of persons and property on the ground, conditioned on certain requirements outlined in this determination. This determination expired on September 5, 2021, unless extended, revised, or terminated. FAA recommended refiling a notice for this construction closer to the start of construction.

Although development is typically discouraged in designed fire severity zones, new land use and transportation infrastructure located in these areas could increase the likelihood of human-induced fire events and subsequent hazards to human health and safety. Although construction and permanent presence of HSR infrastructure could exacerbate wildfire hazards, aboveground HSR facilities would be collocated with existing infrastructure of a similar nature and would be located in disturbed areas to reduce wildfire risks. Furthermore, the Authority will develop and incorporate fire- and life-safety programs into the design and construction of the Build Alternative. The Build Alternatives would therefore neither exacerbate fire risk nor result in temporary or ongoing wildfire impacts on the environment.

CEQA Conclusion

Construction of cumulative development throughout the RSA would increase the likelihood of human-induced fire events and subsequent hazards to human health and safety. This represents a significant cumulative impact. However, the Build Alternatives would incorporate fire- and life-safety programs into their design and construction. Additionally, aboveground HSR facilities would be collocated with existing structures and disturbed areas. Construction of the Build Alternatives would not contribute to a cumulative safety and security impact. Therefore, CEQA does not require any cumulative mitigation.

Operations

The planned highway projects that would occur under the cumulative condition would improve roadway network connectivity and capacity. These projects would expand existing public transportation options and widen existing roadways, including I-5. These improvements are intended to reduce congestion. Assuming the new transportation capacity and connectivity is not fully utilized by increased traffic under the cumulative conditions, these improvements would cumulatively benefit from access to fire protection, law enforcement, and other emergency service vehicles, positively impacting response times. The Build Alternative would provide a transportation option that is safe during inclement weather, and the project would help improve other transportation projects and reduce emergency response times by constructing new grade separations for BNSF Railway and Union Pacific Railroad tracks. The project would not result in the need for out-of-direction travel or new routes for emergency services. The cumulative setting

would also likely reduce traffic volumes on I-5 and SR14 as some long-distance travelers would use the Build Alternative instead of driving.

The Build Alternatives would not generate population growth substantially beyond what is already planned for in Los Angeles County, and would therefore not result in an increased demand on emergency services. Further, the Build Alternatives would construct new grade separations for existing rail corridors, which would be beneficial for emergency service response times in those areas. If other cumulative projects have the potential to impact demand for emergency services, they would be required to contribute fair-share costs as a condition of approval.

Neither the Build Alternatives nor other cumulative projects would encroach on areas covered by airport land use compatibility plans. It is unlikely that future development projects would affect municipal airports because land management plans limit developments near those airports.

Under cumulative conditions, increased population and human presence in fire hazard severity zones would contribute incrementally to wildfire risks throughout the RSA. Similarly, maintenance of HSR facilities could marginally exacerbate wildfire risks by increasing human activity in relatively rural or undeveloped areas. Ancillary HSR facilities would be collocated with existing infrastructure of a similar nature and located in disturbed areas (where possible) to reduce wildfire risks. Collocation would ensure that both human use and occupancy of undeveloped, fire-prone areas would not substantially increase because of the Build Alternatives. Furthermore, HSR trains would be fully electric and would not carry large quantities of flammable or combustible freight.

CEQA Conclusion

Operation of the Build Alternatives would provide a safe transportation option and would not generate population growth in combination with other projects beyond what is planned for Los Angeles County. Thus, project operation would not result in significant contributions to safety and security regarding transportation accidents and population growth. However, operation of cumulative development throughout the RSA would contribute incrementally to the likelihood of human-induced fire events and subsequent hazards to human health and safety. This represents a significant cumulative impact. Nonetheless, maintenance and operation of the Build Alternatives would not introduce substantial fire risks in wildfire-prone areas. Operation of the Build Alternatives would not contribute to a cumulative safety and security impact. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.12 Socioeconomics and Communities

Implementation of the projects listed in Appendix 3.19-A could result in localized community impacts as well as regional and local economic impacts during construction and operation.

Construction

The construction activities associated with the projects listed in Appendix 3.19-A would temporarily disrupt communities by introducing annoyances such as noise, dust, traffic, light, and glare. Construction of such projects, if constructed simultaneously with the Build Alternatives, could cause temporary increases in traffic, changes in traffic patterns and access to community facilities, and construction-related noise and dust.

Construction of the Build Alternatives, in conjunction with construction of cumulative projects, would also affect community character via increased development and growth. Construction activities associated with these projects could hinder access and interaction among neighborhoods because of increased congestion, detours, and lane or road closures. Such disruptions are temporary and can be minimized by implementation of IAMFs, such as a construction management plan. Such a plan will include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on local communities.

Transportation projects listed in Appendix 3.19-A could permanently displace businesses, residents, and community facilities, and divide established communities. Specifically, the High Desert Corridor project would require property acquisitions from residential, commercial,

industrial, agricultural, and nonprofit properties within the cumulative RSA. Construction of the proposed improvements within the Palmdale to Burbank Project Section, in combination with cumulative projects, could contribute to cumulative effects associated with the displacement and relocation of residents and businesses. Sufficient replacement housing and commercial space are available in nearby communities to accommodate the residential and business relocations necessitated by the proposed improvements within the Palmdale to Burbank Project Section. However, these resources could be strained if relocations associated with cumulative projects were to occur concurrently with those related to the project. The proposed improvements within the Palmdale to Burbank Project Section and cumulative projects that result in property acquisitions would be required to comply with the Uniform Relocation Assistance and Real Property Acquisition Act, legislation that ensures fair treatment of those displaced by federal activities. The proposed improvements within the Palmdale to Burbank Project Section include mitigation measures aimed at reducing impacts associated with the divisions of communities and residential neighborhoods through relocation programs for displaced residents; community workshops for affected residents; and outreach to homeowners, residents, business owners, and community organizations to maintain community cohesion and avoid physical deterioration.

Construction and associated construction spending would result in beneficial impacts on employment and sales tax revenues in the region. Although community facilities, residences, and businesses could be displaced and relocated, the implementation of the Build Alternatives and other planned projects, such as the High Desert Corridor Project, would result in long-term benefits of increased sales taxes that would offset property and sales tax losses with displacement and relocation.

CEQA Conclusion

The Build Alternatives, along with other planned projects within the cumulative RSA, could permanently divide established communities and could permanently displace residences or businesses, necessitating construction of replacement housing or facilities. This represents a significant cumulative impact. Implementation of a detailed construction management plan and construction-related traffic plan would minimize a project's contribution to temporary disruptions to localized communities. However, the Build Alternatives would still displace residential communities on a project-level basis, resulting in an incremental contribution to this cumulative impact. As discussed in Section 3.19.7, there are no feasible mitigation measures to reduce the Build Alternatives' contribution to this significant cumulative impact, which would remain significant and unavoidable for each of the six Build Alternatives.

The cumulative economic impact from construction of the proposed improvements within the Palmdale to Burbank Project Section, in combination with cumulative projects, is not considered an environmental impact under CEQA because it would not cause a physical change in the environment. Nevertheless, impacts on the local tax base would be offset by additional revenues resulting from indirect local economic activity associated with construction spending.

Operations

The Build Alternatives would result in long-term losses in property taxes resulting from decreased property taxes due to noise from operating trains. Other transportation projects could result in similar impacts on property taxes. However, these impacts would likely be minimal. The Build Alternatives would not result in property tax losses greater than 0.1 percent for affected jurisdictions.

CEQA Conclusion

Although operation of the Build Alternatives and other transportation projects would result in long-term impacts on property tax revenues, these impacts would be minimal and would not result in significant environmental impacts. Operation of the Build Alternatives, in combination with cumulative projects, would not result in a significant cumulative impact. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.13 Station Planning, Land Use, and Development

Construction

Construction of the Build Alternatives, along with other planned and approved projects listed in Appendix 13.9-A, would result in temporary and permanent land use effects. Temporary effects include use of land for construction staging, laydown, and fabrication. Because lands used for temporary construction would be restored to their previous condition at the end of the construction period, long-term land uses would not change, adjacent land uses would not change, and there would not be a substantial change in the long-term pattern or intensity of land use inconsistent with adjacent land uses within the RSA. Future development to accommodate projected population growth in Los Angeles County would result in land use changes, particularly to increasingly urbanized uses. Additionally, transportation projects throughout the cumulative RSA would affect land uses directly, through permanent conversion of land from existing uses to transportation uses, and indirectly, by providing new or improved access to areas. However, future development would generally be implemented in compliance with local zoning and land use plans.

CEQA Conclusion

Construction of the Build Alternatives in combination with other planned and approved projects within the RSA would result in temporary and permanent conversion of land uses. However, development will likely be completed in compliance with local zoning and land use plans, and thus not result in cumulative impacts on land use. Planned and approved projects within the RSA, in combination with the Build Alternatives, would not result in cumulative land use impacts. Therefore, CEQA does not require any cumulative mitigation.

Operation

Operation of the Build Alternatives and other transportation projects could result in effects on adjacent land uses, such as induced wind, noise and visual changes. However, these changes would not result in land use conflicts that would change land use patterns. As described above, future development would generally be implemented in compliance with local zoning and land use plans.

CEQA Conclusion

Construction of Build Alternatives in combination with other planned and approved projects within the RSA would result in effects on adjacent land use. However, these impacts would likely be minimal. Also, development would likely be completed in compliance with local zoning and land use plans, and thus not result in cumulative impacts on land use. Planned and approved projects within the RSA, in combination with the Build Alternatives, would not result in cumulative land use impacts. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.14 Agricultural Farmland and Forest Land

Construction

The conversion of agricultural farmland to nonagricultural uses is typically considered a significant and unavoidable impact because agricultural lands once converted are considered irretrievable. The conversion of forest lands to non-forest use is considered a significant impact if the land is not returned to forest uses.

Past, present, and reasonably foreseeable future projects in Los Angeles County were found to have significant cumulative impacts on agricultural farmland through conversion to other uses. Implementation of projects included or encouraged by the *Los Angeles County General Plan* (Los Angeles County 2014a), the *Antelope Valley Area Plan* (Los Angeles County 2014b), and the *City of Santa Clarita General Plan* (City of Santa Clarita 2010) would result in conversion of agricultural lands to nonagricultural uses, as would transportation projects such as the I-5 HOV/Truck Lanes Project, the High Desert Corridor Project, and the Northwest SR 138 Corridor Improvement Project (Caltrans 2008, 2016a, 2016b, and 2017).

For the Build Alternatives, there is one parcel of Important Farmland in the Refined SR14 and SR14A Build Alternative RSAs. The parcel is a 9-acre vineyard east of the Sierra Highway/SR14 interchange. The Refined SR14 and SR14A Build Alternatives alignments would require crossing this parcel with electrical power lines. The electrical utility corridor would span the parcel of farmland for a length of approximately 250 feet. Electrical towers are generally spaced from 125 to 300 feet apart and can often span over 1,000 feet between towers. Because the electrical utility towers would be placed outside of the boundaries of the 9-acre vineyard, the installation of an electrical utility corridor would not convert agricultural land or cause the cessation of agricultural operations in this area.

The E1, E1A, E2, and E2A Build Alternatives would not result in permanent surface conversions of Important Farmland. The E1, E1A, E2, and E2A Build Alternatives footprints would be constructed near Prime Farmland at Aliso Canyon Road but would not convert agricultural uses or result in indirect effects to the agricultural use of the land. Additionally, the E1, E1A, E2, and E2A Build Alternatives would operate in a subsurface tunnel beneath Prime Farmland just south of Arrastre Canyon Road and would not impact this farmland as the Build Alternatives would be underground. Therefore, none of the Build Alternatives would significantly impact agricultural farmlands.

Although the RSA does not contain lands designated as timberland or timberland production zones, there are portions of the ANF including SGMNM that qualify as forest land per California Public Resources Code 12220(g). Land use restrictions within the ANF including SGMNM would generally preclude cumulative development projects from impacting forest lands in these areas managed by the USFS. However, surface facilities associated with the Build Alternatives would encounter forest lands within the ANF. The Authority would apply for a Special Use Authorization from the USFS, which includes conditions to avoid or minimize impacts on forest land or management of forest resources within the ANF. Adherence to the Special Use Authorization would adequately avoid, minimize, or compensate for the permanent loss of forest land or conversion of forest land to non-forest use that could result from construction of permanent HSR facilities within the ANF.

CEQA Conclusion

The Build Alternatives, in combination with past, present, and reasonably foreseeable future projects, would result in significant cumulative impacts on agricultural farmland. However, the Build Alternatives would not considerably contribute to this cumulative impact because the Build Alternatives would not convert agricultural lands to nonagricultural uses with adherence to AG-MM#1. Although no timberland or timberland production zones are located within the RSA, the ANF including SGMNM contain forest land susceptible to surface impacts. Cumulative impacts on forest resources would not occur due to land use restrictions within the ANF including SGMNM, which generally preclude development projects from impacting forest lands. Moreover, the Authority would apply for a Special Use Authorization from the USFS, which would include conditions to avoid or minimize impacts on forest resources. Cumulative impacts on forestlands within the ANF including SGMNM would be adequately avoided, minimized, or compensated for through adherence to the Special Use Authorization submitted to the USFS. Therefore, CEQA does not require any cumulative mitigation.

Operations

Operation of HSR trains would induce winds and impact Important Farmland. However, HSR trains would be located more than 1,000 feet from Important Farmland areas and would thus result in minimal wind impacts on such lands. This impact would not be cumulatively considerable, as other development would be unlikely to create new sources of wind along the Build Alternative alignment.

CEQA Conclusion

As other development would be unlikely to introduce new wind sources and HSR trains' induced wind impacts on Important Farmland would be minimal, operation of the Build Alternatives, in combination with other past, present, and reasonably foreseeable future projects, would not result

in cumulative impacts on agricultural farmland or forest land. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.15 Parks, Recreation, and Open Space

Construction

The Build Alternatives, in combination with cumulative projects, would not result in the physical alteration of existing parks or other recreation facilities or result in a need to provide new parks or other recreation facilities, the construction of which could cause significant environmental impacts to maintain acceptable service ratios or other performance objectives. Although the project would require construction of facilities within the ANF including SGMNM, and Lang Station Open Space at Bee Canyon, as discussed in Section 3.15, Parks, Recreation, and Open Space, these facilities would not affect recreational resources provided by these lands.

CEQA Conclusion

Individual environmental review required by federal, state, and local regulations would require projects to adequately compensate for impacts on most parks, recreation, and open space resources within the RSA. The Authority will provide compensation or land, or both, for all permanent acquisitions of property for HSR improvements from publicly owned parks, consistent with the requirements of the California Park Preservation Act of 1971 and the federal Uniform Relocation Assistance and Real Property Acquisition Act. Implementation of Mitigation Measures PR-MM#6, PR-MM#7, and PR-MM#9 will ensure that each resource acquired would be accessible during construction and, if construction would result in a permanent loss, the Authority will provide necessary compensation. Therefore, temporary or permanent acquisition as a result of construction activities would not lead to significant impacts. Construction-related access, noise, vibration, air quality, and visual impacts on resources would not occur with the implementation of Mitigation Measures PR-MM#1 through PR-MM#5. Additionally, physical impacts on existing parks or other recreation facilities would be unlikely to occur, and the Build Alternatives' construction of facilities within the ANF including SGMNM, and Lang Station Open Space at Bee Canyon would not affect recreational resources. Construction of the Build Alternatives, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative impacts on parks, recreation, and open space resources. Therefore, CEQA does not require any cumulative mitigation.

Operation

The reasonably foreseeable regional development, with or without the project, would not increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of those facilities would occur or be accelerated. This is because regional population projections due to future development are accounted for in regional and local land use plans. Those plans and related county and city ordinances contain provisions for funding, acquiring, and maintaining public parks and recreation facilities adequate to meet the needs of future planned population growth.

The development of other projects near the ANF could increase visitation and usage of recreational resources within the National Forest. Operation of the Build Alternatives would not affect usage of recreational areas within the ANF including the SGMNM, because there would be no Build Alternative stations located near the ANF boundaries, and the Build Alternatives would not alter or result in increased access to the ANF including SGMNM.

CEQA Conclusion

State and local regulations typically require adequate compensation for impacts on most parks, recreation, and open space resources within the RSA. However, increased population and development near the ANF, including SGMNM, could increase usage beyond the current capacity of this recreational resource. This represents a significant cumulative impact. However, the Build Alternatives would not contribute considerably to this cumulative impact because the Build Alternatives would not affect the character or usage of recreational areas within the ANF, including SGMNM. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.16 Aesthetics and Visual Quality

The aesthetics and visual quality cumulative RSA includes viewsheds in three distinct visual regions: suburban communities and desert landscapes in southern Antelope Valley; rural communities and undeveloped areas throughout the mountainous ANF; and the heavily urbanized San Fernando Valley. Overall, the visual character of the cumulative RSA would continue to change with the development and expansion of urban and suburban development. Transit-oriented development and infill development is a focus of the planning documents throughout the RSA, so cumulative projects would primarily concentrate around transit corridors and intensify existing developed areas. Construction of projects in the region would result in construction activities that would create temporary visual changes from demolition, vegetation removal, establishment of construction staging areas, and construction lighting.

Construction

Southern Antelope Valley

The RSA in the southern Antelope Valley is characterized by flat, open terrain and urban development associated with the cities of Palmdale and Lancaster. Views of the distant mountain ranges encircling the Antelope Valley are common. Future development would expand the urbanized area, but the region would continue to be surrounded by agricultural land or low-density uses, and open stretches of desert landscape, thereby maintaining its semi-rural character. In the RSA, future development would consume/convert existing vacant/open spaces but would not generally be expected to substantially interfere with long-range mountain views.

Introduction of new or widened transportation infrastructure and residential/commercial land uses (Appendix 3.19-A) would change the rural appearance of underdeveloped communities in the region. The overall cumulative visual effects would be increased by urban character and reduction of desert landscape. Specifically, the following cumulative projects identified significant unavoidable aesthetic resource impacts within the southern Antelope Valley:

- The High Desert Corridor Project’s cumulative impact assessment determined that new urban visual features introduced into the open, expansive undeveloped desert, as well as changes to urban areas, would result in cumulative visual impacts.
- The Antelope Valley Landfill Expansion’s cumulative impact assessment determined that new tract residential and commercial uses are out of character with the adjacent semi-rural residential and open space land uses.

Construction of the Build Alternatives would cause substantial visual disturbance in the southern Antelope Valley, including grading and site preparation, rail bed construction, and associated truck hauling and other major material and equipment storage and movement. These activities would be highly visible and could detract from visual quality of existing views. HSR construction would increase the amount of urban infrastructure throughout the southern Antelope Valley. However, the Build Alternatives would primarily be located in commercial and industrial areas associated with existing transportation infrastructure, so the change in visual character introduced by the Build Alternatives would not substantially decrease visual quality of the area. Furthermore, the project’s scale, form, and materials would generally be consistent with the existing environments of commercial, industrial, and residential development in Lancaster and Palmdale.

ANF Region

Large portions of the rural areas between Palmdale and Burbank are protected areas within the ANF, including SGMNM, where future development would be restricted, and visual character would not change. Cumulative projects in this region are concentrated within the city of Santa Clarita (Appendix 3.19-A, Tables 3.19-A-5) and primarily located near existing developed areas. While cumulative projects would be visible within distant scenic vistas offered from the mountains, the projects themselves would not represent a distinct or otherwise appreciable component of such a field of view, given the intervening topography; however, short-range views would be

affected. Specifically, the following cumulative project identified significant unavoidable aesthetic resource impacts within the ANF region:

- The Via Princessa Extension project's cumulative impact assessment determined that reasonably foreseeable development throughout the city of Santa Clarita would transform the character of the area by adding urban uses in currently undeveloped areas, resulting in significant and unavoidable cumulative impacts on the region's visual character and quality.

As described in Section 3.16, Aesthetics and Visual Quality, substantial portions of all six Build Alternatives would pass underground through this region. However, the Build Alternatives would adversely affect visual quality throughout the RSA because of the large scale of overcrossing structures, which would contrast with existing scenic mountain views and obstruct views in some areas. These changes would not affect visual resources within the city of Santa Clarita.

Other than development in the city of Santa Clarita, there are few past, present, and reasonably foreseeable future projects that would affect aesthetics or visual quality in the ANF region. The overall change in visual quality due to past, present, and future projects, in combination with the Build Alternatives, would be small because these cumulative projects occur/would occur within developed areas characterized by urban and transportation infrastructure-dominated settings.

San Fernando Valley

The majority of the San Fernando Valley is urbanized, except for undevelopable hillside areas. Introduction of new or improved transportation infrastructure and residential, commercial, and industrial land uses in the cities of Burbank and Los Angeles (Appendix 3.19-A, Tables 3.19-A-6 and 3.19-A-7) would increase urban densification in this region. In addition, the following cumulative projects identified significant unavoidable aesthetic resource impacts within the San Fernando Valley:

- The East San Fernando Valley Transit Corridor would result in adverse visual effects on scenic vistas due to the installation of new vertical features in the landscape.

Future development would intensify the urbanized area, but the region would continue to maintain its visual character as an urban collection of residential, commercial, and industrial neighborhoods set against the backdrop of mountainous, natural, open space areas. Moreover, development in the region would be subject to goals, policies, and regulations that reduce impacts of projects on scenic resources.

As described in Section 3.16, Aesthetics and Visual Quality, the Build Alternatives would result in a neutral change in visual quality in this region. Many proposed Build Alternatives features, including buildings, roadways, transmission poles, rail alignments, and power lines, are already present and visible in existing views. The proposed stations and alignments would be consistent with the existing paved roadways, buildings, streetlights, and transportation infrastructure (i.e., buses, trains, and airports). Given this, the Build Alternatives' scale, form, and materials would generally be consistent with the existing urban environment in the San Fernando Valley.

CEQA Conclusion

Construction of reasonably foreseeable future projects could degrade visual and aesthetic resources, which represents a significant cumulative impact. The Build Alternatives would be highly visible and could detract from visual quality of existing views, although large portions of the Build Alternatives' footprints are underground and surface facilities associated with each of the six Build Alternative are mostly in developed areas characterized by urban and transportation infrastructure-dominated settings. The Build Alternatives would considerably contribute to this significant cumulative impact. There are no feasible mitigation measures to reduce the Build Alternatives' contribution to these significant cumulative impacts, which would remain significant and unavoidable for the Build Alternatives.

Operations

Southern Antelope Valley

Visual changes resulting from operation of the Build Alternatives in the southern Antelope Valley would result from the movement of HSR trains, increased activity, and traffic on local roadways from passengers arriving at and departing from the Palmdale Station, and ongoing maintenance activities. The High Desert Corridor Project would consist of similar activities, as it would connect to the California HSR System at the Palmdale Station. However, the High Desert Corridor Project's cumulative impact assessment did not conclude that operations activities would result in cumulative visual impacts in the southern Antelope Valley. Additionally, similar visual disturbances already occur at the existing Palmdale Transit Center, with trains and maintenance occurring along the Metrolink alignment and transit riders regularly visiting the area.

ANF Region

In the area of the ANF including SGMNM, the Build Alternative's operational visual impacts would be constrained by the California HSR System passing across the alignment aboveground. Most of the alignment would be constructed belowground in this region. As described above, development is greatly restricted in the area of ANF including SGMNM, and no other large transportation projects are proposed in the vicinity of the Build Alternatives within the ANF region.

San Fernando Valley

As described above, this region is currently urbanized with substantial existing transportation infrastructure. HSR trains would operate in close proximity to existing Metrolink trains, which would reduce the uniqueness of seeing trains operating through the area as rail operations are already common. The Burbank Airport Station would be a new focal point in the community and would appear as a highly active transportation hub. However, the Burbank Airport Station would be in close proximity to the Hollywood Burbank Airport, which is an existing active transportation hub. The East San Fernando Valley Transit Corridor would also introduce activity associated with transportation in the project vicinity. However, the cumulative impact analysis for the East San Fernando Valley Transit Corridor did not conclude that it would result in a significant cumulative visual impact. Thus, disruptive visual activities during operation of the Build Alternatives, such as passengers traveling to and from the Burbank Airport Station, regular maintenance, and trains passing across the alignment would be consistent with the existing visual setting.

CEQA Conclusion

The operational visual impacts of development in the project vicinity would be minimal and consistent with the existing visual setting. Operation of the Build Alternatives would also result in minimal visual impacts and would be constructed primarily underground or in close proximity to existing transportation infrastructure. Operation of the Build Alternatives would not contribute to a cumulative visual impact. Therefore, CEQA does not require any cumulative mitigation.

3.19.5.17 Cultural Resources

Impacts on cultural resources tend to be specific to the context of the resource and to the aspects that contribute to a property's eligibility for listing in the National Register of Historic Places or California Register of Historical Resources. Several identified archaeological properties are located in the cumulative RSA. Because their individual significance is unknown until analyzed, impacts on these cultural resources caused by cumulative projects can collectively contribute to an incremental and often nonrenewable loss to the aggregate of cultural resources in the environment. In addition, implementation of multiple projects can result in cumulative effects on individual historic properties, historic districts, or landscapes. Cumulative development within the archaeological and historic built RSA may contribute to the loss of or impacts on known historic properties. In addition, currently unknown archaeological properties or historic properties may be affected by other reasonably foreseeable projects.

Construction

Construction of the Build Alternatives could result in exposure, disruption, or destruction of archaeological resources. Linear projects in the cumulative scenario that require extensive excavation could also affect archaeological resources. Examples of such projects include the Bakersfield to Palmdale and Burbank to Los Angeles Project Sections of the California HSR System, the High Desert Corridor Project, and the Northwest SR 138 Corridor Improvement Project. As discussed in Section 3.17, Cultural Resources, construction of the Build Alternatives would encounter archaeological resources throughout the archaeological RSA. Cultural resources, specifically prehistoric and historic archaeological resources, could be disturbed, damaged, or destroyed during construction activities associated with the Build Alternatives and cumulative projects. Implementation of CUL-IAMF#1, CUL-IAMF#2, and CUL-IAMF#5 would avoid and minimize impacts on known archaeological resources. However, due to limited access, many of these known archaeological resources have not yet been surveyed. Implementation of CUL-IAMF#3 would reduce impacts by ensuring the completion of pre-construction cultural resource surveys in previously inaccessible portions of the archaeological APE. Phased identification would occur as access is granted, the project design is refined, and where adverse effects are likely to occur. Known archaeological resources that have not yet been evaluated will be evaluated if warranted prior to construction activities, when access is granted.

Historic architecture resources could be affected during construction and operation of the Build Alternatives and cumulative projects. Linear projects in the cumulative scenario that require ground disturbance and installation of new facilities in developed communities could encounter historical resources. As discussed in Section 3.17, Cultural Resources, construction of the E1, E1A, E2, and E2A Build Alternatives would result in significant unavoidable visual effects to the Blum Ranch and the Blum Ranch Farmhouse.

CEQA Conclusion

Construction of the Build Alternatives, in combination with other cumulative projects, would not result in a significant cumulative impact on archaeological resources because project-level impacts on archaeological resources would be reduced under the Palmdale to Burbank Project Section through implementation of Mitigation Measures CUL-MM#1, CUL-MM#3, and CUL-MM#4.

Construction of the E1, E1A, E2, and E2A Build Alternatives would result in adverse visual impacts on the Blum Ranch and Blum Ranch Farmhouse. As discussed in Section 3.19.7, implementation of CUL-MM#5 would minimize adverse visual impacts on the Blum Ranch through consultation with the State Historic Preservation Officer. However, visual impacts would remain significant due to construction of the Palmdale to Burbank Project Section. According to the planned and potential projects listed in Appendix 3.19-A, there are no recent, present, or foreseeable future land development or transportation projects and plans in the Acton area, where the Blum Ranch and Blum Ranch Farmhouse are located. While the E1, E1A, E2, and E2A Build Alternatives would result in significant and unavoidable impacts on these resources, they would not contribute to a cumulatively considerable cultural resources impact. Therefore, CEQA does not require any cumulative mitigation.

Operations

Operations impacts resulting from the Build Alternatives and cumulative projects could result in cumulative effects on susceptible historic architectural properties due to noise and vibration from operation of cumulative infrastructure projects. As discussed in Section 3.17, Cultural Resources, operation of the Build Alternatives would increase noise levels at the Blum Ranch, the Blum Ranch Farmhouse, and the Pink Motel and Café. However, a quiet setting is not a character-defining feature of the properties, and operations noise would not affect the integrity of these historic architectural resources. Vibration resulting from the HSR trains would be minimal, and thus unlikely to contribute to a cumulative impact.

CEQA Conclusion

Although the Build Alternative and cumulative projects could result in noise and vibration at cultural resources, a quiet setting is not a character-defining feature of impacted resources. Operation of the Build Alternatives, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative cultural resource impacts. Therefore, CEQA does not require any cumulative mitigation.

3.19.6 Mitigation Measures (for Any Newly Identified Significant Cumulative Impacts)

As described above, the following resources are determined have cumulatively considerable impacts (Air Quality, Geology, Noise, and Cultural Resources). Section 3.19.7 provides mitigation measures identified in Chapter 3, that would be applied to reduce impacts of the Build Alternatives. These mitigation measures would also reduce the Build Alternatives' contribution toward cumulative impacts as described above, where applicable. However, there are no feasible mitigation measures to reduce the Build Alternatives' contribution to significant cumulative impacts. Therefore, these cumulatively considerable impacts would remain.

3.19.1 Impacts Summary

This section discusses cumulative impacts associated with the Build Alternatives. Table 3.19-7 and Table 3.19-8 at the end of this section summarize cumulative impacts for all resource areas for construction and operational impacts, respectively. Resource areas with adverse effects (NEPA) or cumulatively considerable significant impacts (CEQA) are addressed below.

3.19.6.1 Air Quality and Global Climate Change

General Conformity—The Build Alternatives would result in exceedance of air district and *de minimis* thresholds for NO_x and CO, which represents a significant cumulative air quality impact. The draft General Conformity Determination demonstrates that construction emissions of NO_x would not exceed the regional emissions thresholds due to implementation of Mitigation Measure AQ-MM#1 and AQ-MM#2 (Offset Project Construction Emissions through SCAB and MDAB Emissions Offsets Programs) if such offsets are available. These mitigation measures will require the Authority to secure emissions offsets to achieve General Conformity and/or to result in net emissions below the applicable emission thresholds. However, emissions offsets procured through Mitigation Measures AQ-MM#1 and AQ-MM#2 cannot be used to mitigate CO impacts, and there are no other feasible mitigation measures to reduce CO emissions. AQ-MM#3 will require the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles. The Authority will have a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of this AQ-MM#3 may be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2 (if such offsets are available).

Until the contractual agreements between the Authority and the SCAQMD and AVAQMD, respectively, are in place and the purchase of emission offsets is secured, the Build Alternatives' contribution to this significant cumulative impact would remain considerable after mitigation, and this impact would be the same for all six Build Alternatives.

Air Quality CEQA Thresholds—Implementation of AQ-IAMF#1 through AQ-IAMF#6 will reduce most construction emissions, however, exceedance of SCAQMD and AVAQMD CEQA thresholds would still occur during the construction of any of the Build Alternatives (see Impact AQ#2). Construction of any of the Build Alternatives would result in NO_x and CO emissions above the SCAQMD CEQA thresholds for all six Build Alternatives, and NO_x emissions above the AVAQMD annual CEQA thresholds for the E2A Build Alternative. Construction emissions of NO_x and CO could be mitigated through the purchase of offsets (Mitigation Measure AQ-MM#1 and AQ-MM#2) under CEQA (if such offsets are available). Zero emission or near-zero emission technology will be utilized for construction vehicles (AQ-MM#3); all remaining emissions after implementation of AQ-MM#3 may be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2, if

such offsets are available. However, until the contractual agreements between the Authority and the SCAQMD and AVAQMD are in place, respectively, and the purchase of emission offsets is secured, the project's contribution to the cumulative impact would be considerable.

Localized Construction Effects—The Build Alternatives would also result in an exceedance of applicable thresholds for localized emissions of NO₂ for NAAQS and PM₁₀ for CAAQS. While Mitigation Measure AQ-MM#3 addresses impacts related to construction activities near sensitive receptors, the Build Alternatives would expose sensitive receptors to substantial pollutant concentrations that would exceed the applicable NAAQS and CAAQS within certain construction areas. The Build Alternatives' contribution to this significant cumulative impact would remain considerable after mitigation, and this impact would be the same for all six Build Alternatives.

3.19.6.2 Noise and Vibration

The Build Alternatives, along with other planned projects, could increase outdoor levels of noise during construction. Project mitigation measures have been identified for the proposed Build Alternatives, including Mitigation Measure N&V-MM#3 (Implement California High-Speed Rail Project Noise Mitigation Guidelines), Mitigation Measure N&VM-M#4 (Vehicle Noise Specification), Mitigation Measure N&V-MM#5 (Special Track Work at Crossovers and Turnovers), and Mitigation Measure N&V#6 (Additional Noise Analysis Following Final Design). There is no other feasible mitigation to reduce impacts associated with noise, so the Build Alternatives' contribution to this significant cumulative impact would remain considerable after mitigation. This impact would be the same for all six Build Alternatives.

3.19.6.3 Geology, Soils, Seismicity, and Paleontological Resources

The Build Alternatives would implement standard construction practices to identify, protect, and recover paleontological resources during excavation and other ground-disturbing construction activities conducted aboveground. However, TBM construction would likely destroy paleontological resources encountered beneath the ground surface, because typical paleontological resource protection techniques (such as visual surveying and monitoring) are not feasible during tunneling operations. There are no feasible mitigation measures to reduce impacts on subsurface paleontological resources, so the Build Alternatives' contribution to this significant cumulative impact would remain considerable after mitigation. This impact would be the same for all six Build Alternatives.

3.19.6.4 Socioeconomics and Communities

The Build Alternatives, along with other planned projects, could permanently divide established communities and could permanently displace residences and businesses. Project mitigation measures have been identified for the proposed Build Alternatives, including SO-MM#1 (Implement measures to reduce impacts associated with the division of residential neighborhoods) and SO-MM#2 (Implement measures to reduce impacts associated with the division of communities). SO-MM#1 will facilitate the transition of displaced residents into nearby replacement housing, and SO-MM#2 will require outreach activities to homeowners, residents, landowners, business owners, community organizations, and local officials in affected neighborhoods to gather and utilize input to maintain community cohesion and avoid physical deterioration. Despite these measures, however, construction of the Build Alternatives and cumulative projects would permanently disrupt established patterns of interaction among community residents and directly displace residences and businesses. There is no other feasible mitigation to reduce changes to community cohesion, so the Build Alternatives' incremental contribution to this significant cumulative impact would remain considerable after mitigation. This impact would be identical for all six Build Alternatives.

3.19.6.5 Aesthetics and Visual Quality

The Build Alternatives would result in a permanent change to visual quality for KVP 1.2, KVP 1.3, KVP 1.8, KVP 1.10, KVP 1.11, KVP 1.12, KVP 1.14, KVP 1.16, KVP 1.22, and KVP 1.24 in Landscape Unit 1. While Mitigation Measure AVR-MM#3, Mitigation Measure AVR-MM#4, Mitigation Measure AVR-MM#5, and Mitigation Measure AVR-MM#6 addresses changes in visual

quality, the Build Alternatives would permanently impact the visual quality within the Central Subsection. The Build Alternatives' contribution to this significant cumulative impact would remain considerable after mitigation, and this impact would be the same for all six Build Alternatives.

Table 3.19-7 Summary of Cumulative Construction Impacts

Resource	NEPA Determination (Construction)	CEQA Conclusion (Construction)	Comparison of Build Alternatives	Cumulative Mitigation (during Construction)
Transportation				
Transportation	Adverse Effect	N/A	Similar for all Build Alternatives	No mitigation measures are required
Air Quality and Global Climate Change				
General Conformity	Adverse Effect	N/A	Similar for all Build Alternatives	No mitigation measures are required
Air Quality CEQA Thresholds	N/A	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Health Risk Assessment	No Effect	Less than Significant	Similar for all Build Alternatives	No mitigation measures are required
Localized Construction Effects	Adverse Effect	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Noise and Vibration				
Noise	Adverse Effect	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Vibration	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Electromagnetic Interference and Electromagnetic Fields				
Electromagnetic Interference and Electromagnetic Fields	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Public Utilities and Energy				
Utility Conflicts	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Water Demand	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Wastewater Generation	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required

Resource	NEPA Determination (Construction)	CEQA Conclusion (Construction)	Comparison of Build Alternatives	Cumulative Mitigation (during Construction)
Solid Waste Generation	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Energy	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Biological and Aquatic Resources				
Biological and Aquatic Resources	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Hydrology and Water Resources				
Hydrology and Water Resources	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Geology, Soils, Seismicity, and Paleontological Resources				
Geologic Hazards	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Soil Hazards	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Seismic Hazards	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Mineral Resources	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Paleontological Resources	Adverse Effect	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available

Resource	NEPA Determination (Construction)	CEQA Conclusion (Construction)	Comparison of Build Alternatives	Cumulative Mitigation (during Construction)
Hazardous Materials and Wastes				
Hazardous Materials and Wastes	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Safety and Security				
Safety and Security	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Socioeconomics and Communities				
Population and Community Impacts	Adverse Effect	Significant Impact –Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Economic Impacts	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Station Planning, Land Use, and Development				
Station Planning, Land Use, and Development	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Agricultural Farmland and Forest Land				
Agricultural Farmland	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Parks, Recreation, and Open Space				
Parks, Recreation, and Open Space	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Aesthetics and Visual Quality				
Aesthetics and Visual Quality	Adverse Effect	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Cultural Resources				
Cultural Resources	Adverse Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required

CEQA = California Environmental Quality Act; HSR = high-speed rail; N/A = not available; NEPA = National Environmental Policy Act

Table 3.19-8 Summary of Cumulative Operations Impacts

Resource	NEPA Determination (Operations)	CEQA Conclusion (Operations)	Comparison of the Build Alternatives	Cumulative Mitigation (during Operations)
Transportation				
Transportation	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Air Quality and Global Climate Change				
Air Quality and Greenhouse Gas Emissions	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Noise and Vibration				
Noise	Adverse	Significant Impact – Cumulatively Considerable	Similar for all Build Alternatives	No feasible mitigation available
Vibration	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Electromagnetic Interference and Electromagnetic Fields				
Electromagnetic Interference and Electromagnetic Fields	No Effect	No Impact	Similar for all Build Alternatives	No mitigation measures are required
Public Utilities and Energy				
Water Demand	No Effect	Significant Impact – Not Cumulatively Considerable	Similar for all Build Alternatives	No mitigation measures are required
Wastewater Generation	No Effect	Less than Significant	Similar for all Build Alternatives	No mitigation measures are required
Solid Waste Generation	No Effect	Less than Significant	Similar for all Build Alternatives	No mitigation measures are required
Energy	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Biological and Aquatic Resources				
Biological and Aquatic Resources	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required

Resource	NEPA Determination (Operations)	CEQA Conclusion (Operations)	Comparison of the Build Alternatives	Cumulative Mitigation (during Operations)
Hydrology and Water Resources				
Hydrology and Water Resources	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Geology, Soils, Seismicity, and Paleontological Resources				
Seismic Hazards	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Hazardous Materials and Wastes				
Hazardous Materials and Wastes	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Safety and Security				
Safety and Security	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Socioeconomics and Communities				
Population and Community Impacts	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Economic Impacts	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Station Planning, Land Use, and Development				
Station Planning, Land Use, and Development	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Agricultural Farmland and Forest Land				
Agricultural Farmland	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Parks, Recreation, and Open Space				
Parks, Recreation, and Open Space	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required

Resource	NEPA Determination (Operations)	CEQA Conclusion (Operations)	Comparison of the Build Alternatives	Cumulative Mitigation (during Operations)
Aesthetics and Visual Quality				
Aesthetics and Visual Quality	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required
Cultural Resources				
Cultural Resources	No Effect	Less Than Significant	Similar for all Build Alternatives	No mitigation measures are required

CEQA = California Environmental Quality Act; NEPA = National Environmental Policy Act

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