

### 3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

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

- Text was added to Section 3.1.3.4 to reference the Bakersfield to Palmdale Project Section (B-P) Footprint Mapbook. The Footprint Mapbook posted on the California High-Speed Rail Authority's (Authority) website for the Draft EIR/EIS public review period was updated and added as Appendix 3.1-C.
- Text was added to Section 3.1.3.6 addressing various engineering and design refinements made to the proposed project design after release of the Draft EIR/EIS. An evaluation of the various engineering refinements was added as Appendix 3.1-B.
- A footnote was added to Section 3.1, Introduction, regarding the Council on Environmental Quality regulations issued after release of the Draft EIR/EIS.

#### 3.1 Introduction

This chapter addresses existing environmental conditions and the project's potential impacts on environmental resources, examining each resource in a separate subsection. The Authority has prepared a Final EIS for the Bakersfield to Palmdale Project Section of the California High-Speed Rail (HSR) Project under the National Environmental Policy Act (NEPA) and a Draft EIR under the California Environmental Quality Act (CEQA). The Authority has prepared this EIR/EIS as a joint NEPA/CEQA document. The Authority has used its best judgment in preparing this combined EIR/EIS to satisfy both NEPA and CEQA requirements.

NEPA requires federal agencies to consider the context and intensity of potential environmental impacts (both adverse and beneficial) in the evaluation of any proposed federal agency action. NEPA also obligates federal agencies to consider the environmental consequences and costs in their projects and programs as part of the planning process. The Authority carries out its obligations under NEPA through compliance with the Council on Environmental Quality regulations (Code of Federal Regulations [C.F.R.] Title 40, Parts 1500–1508) implementing NEPA and FRA's Procedures for Considering Environmental Impacts (*Federal Register* Volume 64, Page 28545).<sup>1, 2</sup>

CEQA (California Public Resources Code 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.) require state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts when feasible. California Public Resources Code Section 21100(b)(3) provides that an EIR shall include a statement setting forth the mitigation measures proposed to minimize the significant effects on the environment.

The requirements of NEPA and CEQA are not necessarily the same; similar requirements found in both statutes may have different performance criteria, and some requirements that appear in one statute may not appear in the other. In addition to NEPA and CEQA, the proposed project is subject to additional federal and state environmental statutes and regulations, which also require analyses that must be incorporated into the EIR/EIS. In circumstances where more than one regulation or statute might apply, this joint EIR/EIS has been prepared in compliance with the

<sup>1</sup> While this EIR/EIS was being prepared, FRA adopted new NEPA compliance regulations (23 C.F.R. 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 C.F.R. 771.109(a)(4). Because this EIR/EIS was initiated prior to that date, it remains subject to FRA's Environmental Procedures rather than the Part 771 regulations.

<sup>2</sup> The Council on Environmental Quality issued new regulations, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. 1500. However, this project initiated NEPA before the effective date and is not subject to the new regulations, relying on the 1978 regulations as they existed prior to September 14, 2020. All subsequent citations to Council on Environmental Quality regulations in this environmental document refer to the 1978 regulations, pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 Fed. Reg. 43340.

more stringent or inclusive set of requirements, whether federal or state, to ensure that all regulatory objectives are fully satisfied.

The Authority has focused on avoiding and minimizing potential impacts through rigorous planning and thoughtful design, informed by the decisions they made at the conclusion of the first-tier EIR/EIS process, including the adopted mitigation strategies. The alternatives described in Chapter 2 and analyzed in Chapter 3 incorporate as part of their description means to avoid and minimize impacts through design, compliance with applicable laws and regulations, and compliance with established industry standards, including best management practices, as reflected in Appendix 2-D. The project-level environmental analysis conducted for this EIR/EIS and described in this chapter includes consideration of means to avoid, minimize, and mitigate potential adverse environmental impacts. In balance with other considerations, the Authority has defined alignments along existing transportation corridors and rights-of-way to the extent feasible, while accommodating the appropriate features and design standards for the Bakersfield to Palmdale Project Section to minimize overall impact potential. When necessary, this chapter identifies site-specific mitigation strategies for the HSR project, including those specific to each alternative alignment, proposed stations, and the other facilities, such as the power conveyance and maintenance facilities.

The impacts presented in Chapter 3 reflect the assessment of program and project features from all alternatives integrated through project design and implementation. Mitigation measures identified are those needed to reduce the level of significance of impacts that would remain after all avoidance or minimization features are implemented through project construction and operation. Mitigation measures may be carried forward from, or be based upon refinement of, program-level mitigation measures or newly devised project-level measures.

### 3.1.1 Chapter 3 Purpose

For each resource topic, this chapter consists of five primary categories of environmental information:

- **Regional and Local Policy Analysis**—Discussion of HSR project consistency with adopted regional and local plans, polices, and laws
- **Affected Environment**—Existing environmental conditions in the areas that would be affected by the proposed Bakersfield to Palmdale Project Section
- **Methods for Evaluating Impacts**—Methods used to analyze potential environmental impacts that would be caused by the B-P Build Alternatives and to determine the significance of those impacts
- **Environmental Consequences**—Potential environmental impacts associated with constructing and operating the B-P Build Alternatives
- **Mitigation Measures**—Site-specific mitigation measures where impacts cannot be otherwise avoided or reduced through design, best management practices during construction, or HSR operation

The Chapter 3 analyses address the impacts of the B-P Build Alternatives, including the track, stations, and other related HSR facilities as described in Chapter 2, Alternatives. The analyses also evaluate impacts associated with related infrastructure changes required to accommodate the B-P Build Alternatives, such as roadway and interchange modifications, utility relocations, and addition of power substations. The chapter also analyzes mitigation, impacts resulting from mitigation, and feasibility of mitigation.

Analysts used many sources to prepare this document. Chapter 12, References/Sources Used in Document Preparation, lists these sources.

### 3.1.2 Chapter 3 Organization

Chapter 3 presents each environmental resource topic in its own section, as follows:

- Section 3.2, Transportation\*
- Section 3.3, Air Quality and Global Climate Change\*
- Section 3.4, Noise and Vibration\*
- Section 3.5, Electromagnetic Interference and Electromagnetic Fields
- Section 3.6, Public Utilities and Energy
- Section 3.7, Biological and Aquatic Resources \*
- Section 3.8, Hydrology and Water Resources\*
- Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources\*
- Section 3.10, Hazardous Materials and Wastes\*
- Section 3.11, Safety and Security
- Section 3.12, Socioeconomics and Communities\*
- Section 3.13, Station Planning, Land Use, and Development
- Section 3.14, Agricultural Farmland and Forest Land
- Section 3.15, Parks, Recreation, and Open Space
- Section 3.16, Aesthetics and Visual Quality\*
- Section 3.17, Cultural Resources\*
- Section 3.18, Regional Growth
- Section 3.19, Cumulative Impacts

The sections marked with an asterisk (\*) are supported by a technical report containing additional detailed analysis. For information on how to access and review technical reports, please refer to the Authority's website at [www.hsr.ca.gov](http://www.hsr.ca.gov).

### 3.1.3 Chapter 3 Content

The project description contained in Chapter 2 is organized from north to south and divided into seven geographic areas: Bakersfield, Edison, Keene (including the César E. Chávez National Monument Design Option (CCNM Design Option)<sup>3</sup> and the Refined CCNM Design Option<sup>4</sup>), Tehachapi, Mojave, Lancaster, and Palmdale. In Chapter 3, information flows in the following geographic and project order: north to south for alignment alternatives and their corresponding station alternatives, followed by the Light Maintenance Facility/Maintenance-of-Way Facility (LMF/MOWF) alternatives. The project section would include one MOWF and two MOWF siding facilities. An LMF site in the Antelope Valley is being evaluated and would allow independent utility of the Bakersfield to Palmdale Project Section. The alternative alignments considered for the Bakersfield to Palmdale Project Section include four alternative alignments (Alternatives 1, 2, 3, and 5<sup>5</sup>).

The project vicinities used for description and illustration of the affected environment and impacts center around the cities of Bakersfield, Tehachapi, Lancaster, and Palmdale. Analysts used smaller geographic areas, such as around the proposed LMF/MOWF sites or the communities of Edison, Keene, and Rosamond, to evaluate the design options within the Bakersfield to Palmdale corridor at a more detailed scale. The Bakersfield Station analyses have been incorporated by reference into this EIR/EIS, with summaries provided based on complete analyses prepared for the *Fresno to Bakersfield Section Final Supplemental EIR (F Street Station)* (Authority 2018a) and the *Fresno to Bakersfield Section: Locally Generated Alternative Final Supplemental EIS* (Authority 2019). The impacts analyses for the alignment from the F Street Station to Oswell Street are also incorporated by reference, with summaries of the analysis for this area included in applicable sections and chapters of this EIR/EIS. The Palmdale Station is included in the

<sup>3</sup> The CCNM Design Option is a 7-mile optional alignment in the Keene area that was developed during the consultation process with FRA, the National Park Service, and the National Chavez Center.

<sup>4</sup> The Refined CCNM Design Option is a 15-mile optional alignment in the Keene area that was developed during the consultation process with FRA, the National Park Service, and the National Chavez Center.

<sup>5</sup> Alternatives 4, 6, 7, and 8 were considered during the alternatives analysis process but were not brought forward due to issues such as constructability and cost.

Bakersfield to Palmdale Project Section footprint, and the station-area analyses have been incorporated into this Bakersfield to Palmdale Project Section EIR/EIS. Each resource topic addressed in Chapter 3 includes the following sections.

### 3.1.3.1 Introduction

The introduction presents the reader with an overview to the topic and the critical issues and concerns considered in the analysis.

### 3.1.3.2 Laws, Regulations, and Orders

The laws, regulations, and orders discussion identifies the relevant regulatory framework, including topical CEQA and NEPA guidance, as well as other regulatory agency guidelines relevant to project approvals or decisions for the resource topic.

### 3.1.3.3 Regional and Local Policy Analysis

This section describes inconsistencies or conflicts between the HSR project and adopted regional or local plans or laws pertaining to the resource topic. The extent of reconciliation and reason for proceeding without full reconciliation are also discussed. Appendix 2-H, Detailed Plan Consistency Analysis, contains detailed tables in support of the plan consistency analyses described in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures.

### 3.1.3.4 Methods for Evaluating Impacts

This section describes the methods used to collect data and evaluate potential impacts. This includes the following:

#### Definition of Resource Study Area

Resource study areas (RSA) are the geographic boundaries in which the environmental investigations specific to each resource topic were conducted. RSAs therefore vary in context by resource topic. A resource topic may have more than one RSA depending on the impacts being analyzed. Each RSA covers a geography that includes:

- Area necessary to define the characteristics and context of the resource
- Facilities or features within the project footprint and associated activities that could affect the resources
- Area necessary to determine the direct and indirect impacts of the project alternatives.
- Areas needed to implement, operate, or maintain mitigation measures
- Off-site mitigation measures and mitigation sites (including relocations)
- Areas to identify and analyze potential secondary impacts of implementing mitigation

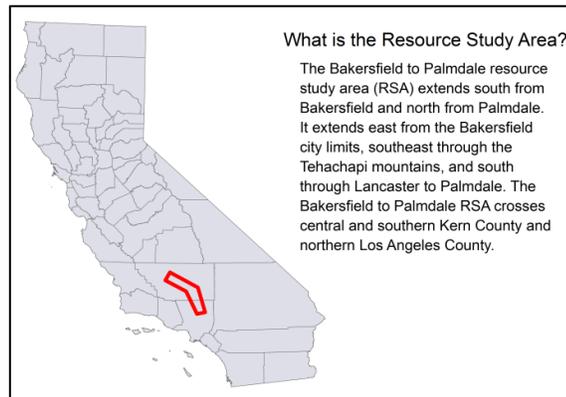
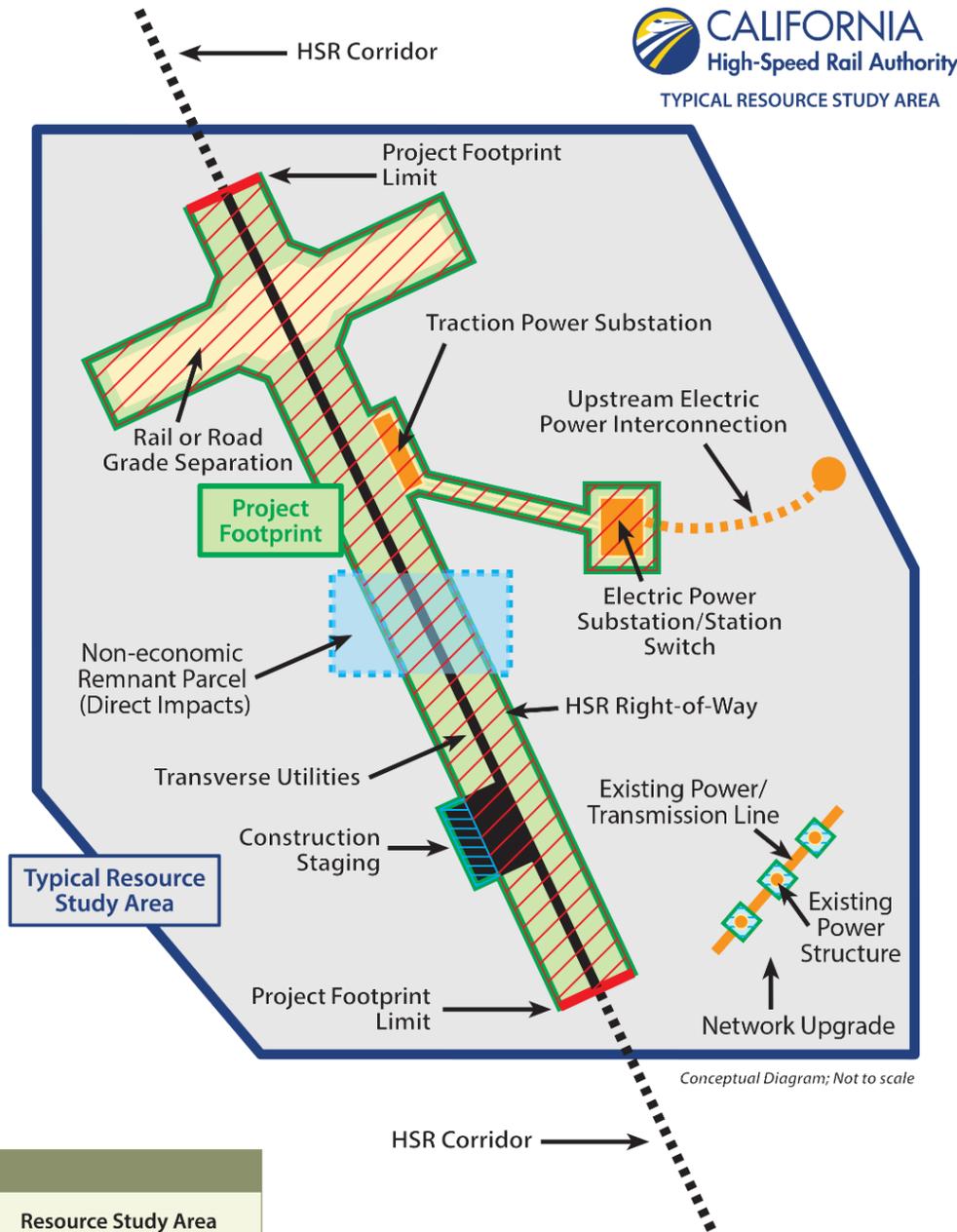


Figure 3.1-1 illustrates the components of the RSA. The project footprint is a more focused area that includes all project components and right-of-way needed to construct and operate the HSR project. The project footprint components include the proposed HSR right-of-way and associated facilities, such as train signaling and communication facilities, intrusion protection barriers, wildlife crossing structures, traction power substations, and switching and paralleling stations. The project footprint also includes the shifts in roadway right-of-way associated with those facilities—including overcrossings and interchanges—that would be modified or shifted to accommodate the HSR project, as described in Chapter 2, Alternatives. The project footprint areas of permanent effect (e.g., areas occupied by HSR project infrastructure), as well as areas of temporary impacts (e.g., construction staging areas), include the following:



LEGEND	
	Resource Study Area
	Project Footprint
	Permanent Impact Area
	Temporary Impact Area

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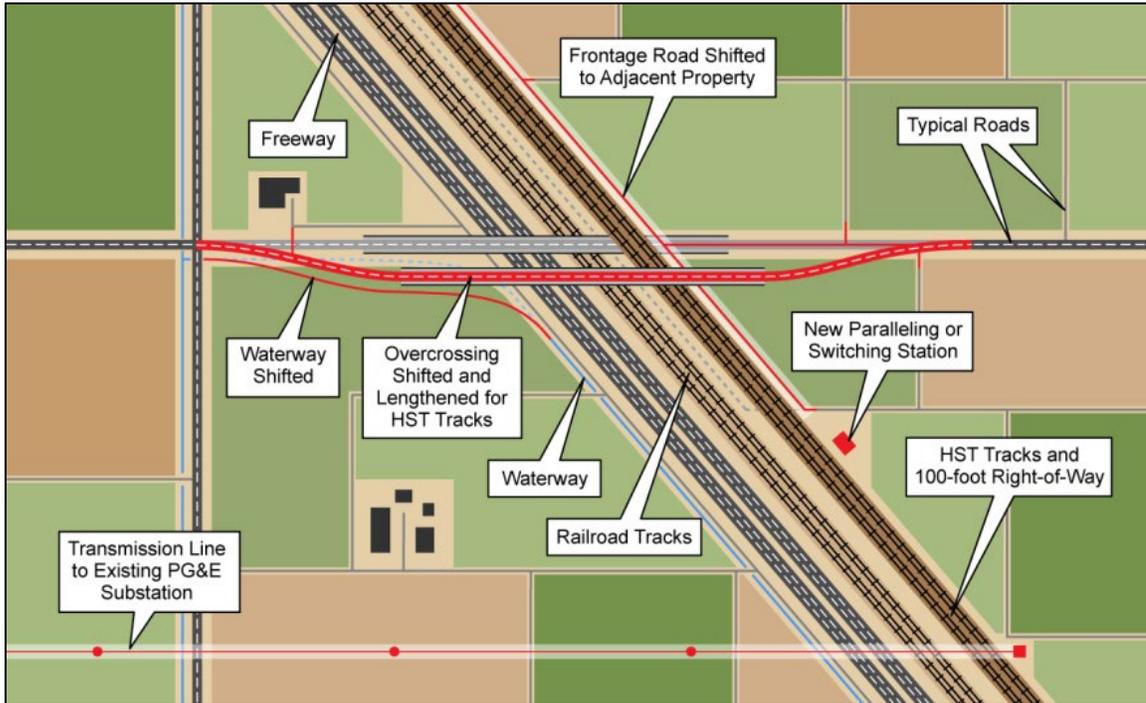
Note: The resource study area for analysis of proposed off-site mitigation impacts may occur outside the project footprint.  
 "Non-economic Remnant Parcel" refers to parcels that have been severed by the project footprint and become uneconomic to farm as a result.

**Figure 3.1-1 Typical Resource Study Area**

- **HSR Right-of-Way**—The typical minimum right-of-way for HSR implementation would be 130 feet. This dimension may be expanded in rural areas to accommodate wildlife crossings and in mountainous areas to accommodate the topography, or it may be reduced to 80 feet in constrained urban areas.
- **HSR Guideway**—The HSR system would travel on different track types with varying profiles. Low, near-the-ground tracks are at-grade; higher tracks are elevated or on retained fill (earth); and below-grade tracks are in a retained cut or tunnel. Types of bridges that might be built include full channel spans, large box culverts, or, for some wider river crossings, limited piers within the ordinary high water channel.
- **Grade Separations**—A safely operating HSR system consists of a fully grade-separated and access-controlled guideway. Grade separations may occur in several scenarios, including roadway overcrossings or undercrossings, and elevated HSR road crossings.
- **Traction Power Substations**—Three substations would be located within Kern County for this project section. Each would require a 32,000-square-foot (or 200-foot by 160-foot) site adjacent to the HSR alignment.
- **Switching and Paralleling Stations**—Nine paralleling stations and three switching stations would be located within Kern County for this project section. Two paralleling stations and one switching station would also be located within Los Angeles County. Each switching station would need a site of approximately 14,400 square feet (generally 160 by 90 feet), and each paralleling station would need a site of approximately 9,600 square feet (generally 120 by 80 feet) adjacent to the proposed HSR alignment.
- **Communications Facilities**—Most communications equipment and 100-foot-tall radio towers would be co-located with traction power, tunnel portal, and train control facilities. Standalone communications facilities would be placed where spacing between the co-location sites exceeds 3 miles.
- **Utility Connections**—The right-of-way required for new power transmission lines to provide a utility connection between electrical power substations and station switching facilities is included in the project footprint.
- **Utility Relocations**—The construction of the HSR project may require the relocation of existing utility lines. The additional right-of-way required to accommodate these relocations is included in the project footprint.
- **HSR Stations**—The Bakersfield Station at F Street was evaluated in the Fresno to Bakersfield project section and is incorporated here by reference. The Palmdale Station is evaluated here in the Bakersfield and Palmdale Project Section. The station and its associated structures, including parking, are analyzed as city blocks.
- **Maintenance Facilities**—The HSR system includes four types of maintenance facilities: MOWFs, maintenance of infrastructure siding facilities, heavy maintenance facilities, and LMFs. The HSR system would require one heavy maintenance facility. The design and spacing of maintenance facilities along the HSR alignment would require the Bakersfield to Palmdale Project Section to include two maintenance of infrastructure siding facilities: an LMF and a MOWF. The Authority is evaluating the feasibility of locating the HSR LMF and an MOWF in the Bakersfield to Palmdale Project Section. Potential sites for each facility, as well as a co-located LMF/MOWF, are situated in the Antelope Valley. The Authority's decision on the optimum location of an LMF and an MOWF is expected to be based on the following factors:
  - Consistency with local plans and policies
  - Minimization of environmental and socioeconomic impacts
  - Operational considerations and costs

Once the optimum maintenance facility location(s) are determined during the final stages of design, the site(s) would be incorporated into the project-level environmental document of the affected project section for further evaluation. Additional discussion of maintenance facilities can be found in Chapter 2, Alternatives, of this EIR/EIS.

- **Project Roadway Modifications**—These changes would have varying right-of-way and distance from the HSR right-of-way (Figure 3.1-2) and would include access roads, realignment of existing crossings, and new roadway overcrossings and undercrossings over and under the HSR right-of-way.
- **Temporary Construction Areas**—The project footprint includes the identification of areas needed for construction staging, as well as the location of areas that may be necessary for temporary relocation of facilities during the construction process.



**Figure 3.1-2 Typical Shifts of Roadways and Other Infrastructure**

The project footprint is shown in the Bakersfield to Palmdale Project Section Footprint Mapbook, which was made available on the Authority’s website as part of circulation of the Draft EIR/EIS. This mapbook has been updated and included in the Final EIR/EIS as Appendix 3.1-C for ease of reference.

The HSR project would require acquisition of property necessary for project operation. When the remnant portion of an acquired parcel beyond the right-of-way is too small to sustain current use without other modifications, it would also be acquired. These remnant parcels would not be used for construction and would be considered for sale after project construction if the Authority determines it has no long-term need for them. They would not be part of the finished project, nor would they be within the HSR right-of-way limits. The LMF sites and other identified sites along the alignment would be considered for construction staging. However, the Authority may conduct various management and maintenance activities (e.g., vegetation management, site security) on such parcels. Property management activities would be designed to avoid impacts; if, once the actual site conditions are known and there would be potential for an impact, a separate environmental evaluation would be triggered.

The Authority will not acquire temporary construction staging areas through the right-of-way acquisition process. It will be the responsibility of the Design-Build Contractor to negotiate with property owners to secure access and temporary use of their properties for staging or laydown areas. To provide the Design-Build Contractor with sufficient potential staging areas, this EIR/EIS identifies temporary construction staging areas on vacant parcels located adjacent to or near

parts of the project that would require construction staging and laydown areas (e.g., bridges, elevated structures). This EIR/EIS then evaluates the impacts from all the potential construction staging areas. The resulting analysis is conservative because it assumes all staging areas will be used, and it identifies impacts by parcel boundaries rather than the actual number of acres that may be necessary for staging or storage of materials, which may be less than the parcel size.

### **Impact Avoidance and Minimization Features**

The B-P Build Alternatives incorporate standardized HSR features to avoid and minimize impacts. These features are referred to as IAMFs. IAMFs may involve the development of a plan or program (such as a dust control plan to minimize impacts on air quality) or may require or restrict an action (such as limiting construction material delivery hours to minimize impacts on traffic during peak travel times) to incorporate project design features that are unique to the project section.

IAMFs are incorporated into the B-P Build Alternatives. The IAMFs would be implemented by the Authority as an integral part of the B-P Build Alternatives if the project is approved. The Authority must implement IAMFs during project design and construction. As such, the analysis of impacts of the B-P Build Alternatives in each resource section factors in all applicable IAMFs. The IAMFs that would be applied to the B-P Build Alternatives are abbreviated “IAMF” and numbered in the order identified in the section. For example, the first IAMF for air quality impacts is AQ-IAMF#1, and for aesthetics and visual quality impacts is AVQ-IAMF#1. Appendix 2-E, California High-Speed Rail: Impact Avoidance and Minimization Features, provides a detailed description of the IAMFs included as part of the B-P Build Alternatives’ design.

As discussed below, mitigation measures also are being considered as potential additional methods to further reduce, compensate for, or offset impacts of the B-P Build Alternatives. If adopted at the conclusion of the environmental review process, mitigation measures also would be implemented as part of the B-P Build Alternatives (Section 3.1.3.7, Mitigation Measures).

### **Method for Determining Impacts under NEPA**

Each resource section describes the methods and data sources analysts used for identifying impacts on that resource. The methods for analysis vary by resource and rely on both quantitative and qualitative techniques. For many resource topics, fieldwork was conducted to collect data to support the impacts analysis.

While the terms *context* and *intensity* (including duration) themselves are not used in this analysis, these concepts are employed to fully illustrate the impacts and facilitate comparison between alternatives. *Context* refers to the environment in which a proposed project occurs and may include affected interests of resources, the specific locality, the region, or society as a whole, depending on the resource. *Intensity* refers to the severity of the impact; its analysis encompasses the type, quality, and sensitivity of the resource involved; the location and extent of the impact; the duration of the impact; whether the action threatens a violation of federal or state law or requirements imposed for the protection of the environment; and other intensity considerations (40 C.F.R. 1508.27). Under NEPA, once a decision to prepare an EIS is made, the analysis focuses on the magnitude of the impact; no explicit determination of significance is made for individual impacts.

### **Method for Determining Significance under CEQA**

In contrast to NEPA, CEQA requires the identification of each “significant effect on the environment” resulting from the project and uses a thresholds-based approach to determine significance (State CEQA Guidelines §§15064(a) and 15126.4). All significant impacts on the environment must be disclosed and mitigated, if feasible. For each resource topic, analysts use impact thresholds (e.g., above the impact threshold) to determine whether proposed mitigation measures would be capable of reducing the magnitude and severity of adverse impacts to a less than significant level (e.g., below the impact threshold). These impact thresholds, also called significance criteria, generally describe whether impacts would be considered significant because there would be a substantial, or potentially substantial, adverse change in any of the physical conditions within the

area affected by the project. Where possible, significance criteria use state or federal standards. For example, air quality significance criteria follow the state and federal ambient air quality standards; noise significance criteria use thresholds defined by FRA. In other cases (for example, the visual resources analysis), the significance criteria rely on guidelines and policies, assessment methodologies such as those used by FRA, and standards of professional practice.

Because of the difference in the approach to the determinations of significance under NEPA and CEQA, impacts determined to be significant under CEQA will not have a similar label under NEPA.

### **3.1.3.5 Affected Environment**

The description of the affected environment summarizes the existing conditions of resources that are sensitive or protected, or that could be impacted by the HSR project, and associated physical changes. The information focuses on environmental commitments, data, and issues for analyzing potential effects. Information in the affected environment discussion is presented for the entire Bakersfield to Palmdale Project Section, including a discussion of the regional context.

The affected environment discussions describe the existing conditions provided in the most recent, publicly available data or collected during fieldwork conducted from 2014 to 2016.

### **3.1.3.6 Environmental Consequences**

The environmental consequences discussion describes the potential environmental impacts of the No Project Alternative and the B-P Build Alternatives by 2040, and the planning horizon for this analysis. Some topic areas (transportation, air quality, and energy) include additional discussion of the impacts of the B-P Build Alternatives in the opening year, or “date of implementation” of HSR operations, as described more specifically in the individual chapters.<sup>7</sup> The discussion of the potential impacts of each alternative is organized by geographic segment and presented in the occurrence timeframe of construction or operations. For the purposes of the environmental analysis in this EIR/EIS, construction years are assumed based on the latest information available at the time the environmental analysis was performed. The construction years identified at the time of the environmental analysis are March 2018 to June 2025, with peak construction activity occurring in 2021. Actual construction years may occur later than those assumed in the environmental analysis. Evaluations of direct and indirect project impacts reflect the integration of project features to avoid or minimize impacts (IAMF), as well as mitigation commitments derived from the 2005 *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* (Authority and FRA 2005), the 2008 *Bay Area to Central Valley High-Speed Train Final Program Environmental Impact Report/Environmental Impact Study (EIR/EIS)* (Authority and FRA 2008), and the 2012 *Bay Area to Central Valley High-Speed Train Partially Revised Final Program Environmental Impact Report (EIR)* (Authority 2012) (as appropriate to the geographic location of the project section). This evaluation of direct and indirect project impacts will occur with consideration of IAMFs, but before implementation of project mitigation measures. The explanations of the impacts include the context, intensity, duration of the impact, other impact characteristics as appropriate (e.g., no effect, impact, or beneficial effect), and the consideration of mitigation measures as required by NEPA. Operational impacts that would occur during the incremental stages of HSR project implementation and that would change with build out of the project are considered interim. Intermittent impacts are those that are not continuous but recur throughout the life of the system on an episodic or occasional basis. Permanent impacts are those that are continuous throughout the life of the Bakersfield to Palmdale Project Section. As described above, the analysis of environmental consequences includes determination of significance under CEQA using the approach mandated by the act.

<sup>7</sup> For purposes of the analysis in this Final EIR/EIS, assumptions from the 2016 Business Plan were used, including an existing conditions baseline of 2015, an opening year of HSR operations of 2029, and a horizon year for HSR operations of 2040.

## Construction Impacts

The Environmental Consequences discussion addresses construction impacts for each of the sections identified in the Affected Environment chapter. Both temporary (short-term) and permanent (long-term) impacts are associated with the construction of the HSR Build Alternative. Construction impacts that occur for a limited time only are considered temporary (e.g., short-term ground disturbance, construction staging and activities, construction associated with implementing mitigation measures). Construction impacts that continue long term are permanent (e.g., land conversion, removal of habitat, elimination of at-grade crossings, construction of permanent structures). For each alignment alternative, these impacts are discussed in comparison to the other B-P Build Alternatives, as well as the existing condition or No Project Alternative.

## Operations Impacts

The Environmental Consequences discussion addresses operational impacts for each of the sections identified in the Affected Environment chapter. Operational impacts are permanent impacts related to operation and maintenance of the HSR alignment. HSR system operations and related improvements, such as maintenance facilities and roadway modifications, are included in the operational impacts discussion. For each alignment alternative, these impacts are discussed in comparison to the other B-P Build Alternatives, as well as the existing condition or No Project Alternative.

To fully understand a proposed project's environmental implications, CEQA and NEPA require that its effects be examined in conjunction with other past, present, and reasonably foreseeable projects. Section 3.19, Cumulative Impacts, discusses cumulative impacts for each resource and the relative importance of the HSR project's contribution to any significant cumulative impact.

## Ridership Forecasts and Impacts Analysis

The ridership forecasts used in this environmental analysis correspond to forecasts in the 2016 Business Plan and are based on probability of occurrence. The "medium" forecast (42.8 million) is lower than the "high" forecast but has a higher likelihood of occurrence. For impacts analyses that are related to the level of ridership on the HSR system, the medium and high ridership forecasts provide conservative estimates that have been applied as follows.

The high ridership forecast (56.8 million) provides for a conservative assessment of adverse impacts in these areas:

- **Section 3.2: Transportation**—Analysis of transportation effects from increased traffic around station areas
- **Section 3.3: Air Quality and Global Climate Change**—Analysis of localized air quality effects from increased traffic around station areas
- **Section 3.4: Noise and Vibration**—Analysis of noise effects from increased traffic around station areas

The use of the high ridership forecast for these analyses ensures a conservative disclosure of a higher level of adverse environmental effects that could occur if ridership reaches the 2040 forecast of 56.8 million passengers. If HSR ridership proves to be lower than the 56.8 million forecast, adverse environmental impacts will also be lower. However, while a lower level of ridership would reduce adverse environmental impacts, it would also reduce the environmental benefits of the HSR system (e.g., transportation, air quality, and energy).

The medium ridership forecast (42.8 million) provides for a conservative assessment of environmental benefits in these areas:

- **Section 3.2: Transportation**—Analysis of traffic effects on the regional highway network from reducing automobile vehicles miles traveled
- **Section 3.3: Air Quality and Global Climate Change**—Analysis of effects on air quality and greenhouse gases from reducing vehicles miles traveled, air travel, and energy use

- Section 3.6: Public Utilities and Energy**—Analysis of energy effects from reducing fossil fuel consumption for automobile, air, and conventional rail travel

The use of the medium ridership forecast for these analyses ensures a conservative disclosure of a lower level of environmental benefit that could occur if ridership reaches the 2040 forecast of 42.8 million passengers rather than the higher forecast of 56.8 million riders. If HSR ridership proves to be higher than the 42.8 million forecast, environmental benefits will also be higher, but will also bring a higher level of impact as described above.

Since the 2016 Business Plan forecasts were developed, the Authority has adopted its 2018 Business Plan, which was accompanied by updated forecasts (the *2016 Business Plan: Ridership and Revenue Forecasting Technical Supporting Document* [Authority 2016a] and the *2018 Business Plan: Technical Supporting Document: Ridership & Revenue Forecasting* [Authority 2018b]). The 2016 and 2018 Business Plan ridership forecasts were developed using the same travel forecasting model; the forecasts differ due to changes in the model's inputs, including the HSR service plan, demographic forecasts, estimates of automobile operating costs and travel times, and airfares. The medium ridership forecast for 2040 decreased by 6.5 percent, from 42.8 to 40 million, and the high ridership forecast decreased by 10.1 percent, from 56.8 to 51.6 million. In addition, the 2018 Business Plan assumes an opening year of 2033 rather than 2029 for the full Phase 1 system (Authority 2016b, 2018b).

The Authority released a Draft 2020 Business Plan in February 2020 for public review and comment. The plan's final adoption was expected at the December 2020 Board meeting for submittal to the Legislature by December 15, 2020. However, in coordination with the Legislature, the deadline for adoption of a Final 2020 Business Plan was extended. A Revised Draft 2020 Business Plan was released for public review on February 9, 2021. The 2020 Business Plan was adopted by the Authority Board of Directors on March 25, 2021, and submitted to the state legislature on April 12, 2021. The 2020 Business Plan forecasts were developed using the same travel forecasting model as the 2016 and 2018 Business Plans, updated for population and employment forecasts. As a result, the ridership forecasts did not change. The Phase 1 medium ridership forecast for 2040 is 38.6 million, and the high ridership forecast is 50.0 million (Authority 2021).

To the extent that the lower ridership levels projected in the 2018 Business Plan or the 2020 Business Plan result in fewer trains operating in 2040, the impacts associated with the train operations in 2040 would be somewhat less than the impacts presented in this EIR/EIS, and the benefits accruing to the project (e.g., reduced vehicles miles traveled, reduced greenhouse gas emissions, and reduced energy consumption) also would be somewhat less than the benefits presented in this EIR/EIS. As with the impacts, the benefits would continue to build and accrue over time and would eventually reach the levels discussed in this EIR/EIS for the Phase 1 system.

### **Modifications to the Proposed Project after Draft EIR/EIS**

Chapter 2, Alternatives, of this Final EIR/EIS describes modifications the Authority has made to the project design since publication of the Draft EIR/EIS. Some design modifications have been made in response to comments on the Draft EIR/EIS or requests from public agencies and other stakeholders within the Bakersfield to Palmdale Project Section. Other design modifications have been made to improve the design, reduce impacts of the project, or to reduce project construction costs. These design modifications have been incorporated into the design of each alternative. Refer to Appendix 3.1-B, Evaluation of Various Engineering Refinements Since the Publication of the Draft EIR/EIS, for additional analysis of these refinements.

This Final EIR/EIS discusses where these design modifications have resulted in changes to the environmental impacts described in the Draft EIR/EIS, in both narrative and in changes to impact tables. For example, the Introduction section of Section 3.2, Transportation, first provides a bullet list summarizing the substantive changes that have been made since publication of the Draft EIR/EIS. Section 3.2.6, Environmental Consequences, then discusses any substantive changes to project impacts that resulted from the design modifications. The tables in Section 3.2.6 have been updated to indicate levels-of-service at each road crossing after these refinements have been

incorporated for each alternative and design option (for example, see Table 3.2-22, Roadway Levels-of-Service, Future Year [2040] No Project and Future Year [2040] Plus Project Conditions).

### 3.1.3.7 Mitigation Measures

NEPA requires federal agencies to identify potentially adverse effects and discuss potential measures to mitigate those impacts. This is accomplished through application of the IAMFs that are part of the project design and the mitigation measures proposed in this EIR/EIS. CEQA requires that each significant impact of a project be identified and that feasible mitigation measures be stated and implemented. Mitigation measures are identified for both significant construction-period and operational impacts. A list of the standardized mitigation measures can be found in Appendix 3.1-A.

The Mitigation Measures section identifies possible measures to avoid, minimize, rectify, reduce, eliminate, or compensate for significant adverse effects. If no mitigation measures are required, this section is not included. The mitigation measures are based on the mitigation strategies presented in the Final Statewide Program EIR/EIS (Authority and FRA 2005), the Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008; Revised Final EIR/EIS 2010), and the Partially Revised Final Statewide Program EIR/EIS (Authority and FRA 2012) as they may apply to the Bakersfield to Palmdale Project Section. The programmatic mitigation strategies in the Program EIR/EISs provided a foundation for crafting mitigation measures, and additional mitigation measures specific to the Bakersfield to Palmdale Project Section were identified where appropriate. The mitigation measures proposed for the HSR project are abbreviated “MM” and numbered in the order identified in the section. For example, the first mitigation measure for air quality impacts is AQ-MM#1, and the first mitigation measure for aesthetics and visual resources is AVR-MM#1. Mitigation measures may skip particular numbers if a statewide mitigation measure does not apply to the Bakersfield to Palmdale Project Section.

The impacts analysis for the portion of the alignment from the F Street Station to Oswell Street, including applicable mitigation measures, has been incorporated by reference into this EIR/EIS from the *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018a) and *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* (Authority 2019). The following provides a general guide as to how the mitigation measures from these two documents have been incorporated into the applicable sections and chapters of this EIR/EIS.

- Some mitigation measures identified in the *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* are also listed in this Final EIR/EIS where necessary to mitigate project impacts occurring in the portion of the alignment from the F Street Station to Oswell Street.
- Additional mitigation measures are identified to mitigate impacts occurring in the portion of the alignment from Oswell Street to the Palmdale Station.
- In some instances, the mitigation measures for the F Street Station to Oswell Street portion of the alignment may be duplicative of mitigation measures for the Oswell Street to Palmdale Station portion of the alignment. Although the language of the measures may differ slightly, the differences do not represent any material difference in the substance and scope of the measures. (See, for example, Section 3.4 discussing noise and vibration.) For clarity, both are presented.
- In other instances, the substantive requirements in the listed mitigation measures from the *Fresno to Bakersfield Section Final Supplemental EIR* and *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* have been incorporated into IAMFs per the Authority’s most recent publication of IAMFs (Appendix 2-E), and thus are described as IAMFs for the portion of the alignment from Oswell Street to the Palmdale Station. (See, for example, Section 3.7 discussing biological resources and wetlands.) For clarity, both are presented.

### **3.1.3.8 NEPA Impact Summary**

This section summarizes the environmental consequences specific to NEPA requirements for each resource. Based on the discussion of the context, intensity, and duration of the potential impacts, this section reports impacts under NEPA and applicable mitigation measures for each B-P Build Alternative.

### **3.1.3.9 CEQA Significance Conclusions**

This section lists the significant impacts identified in the Environmental Consequences section for each resource, reports the level of significance prior to mitigation, and indicates mitigation measures that are available to reduce the level of significance for each impact. If implementing one or more measures would reduce the potential impact below the applicable significance threshold, the impact would be considered less than significant after mitigation. If, however, implementing a mitigation measure cannot reduce the level of impact below the significance threshold, the impact would be considered significant and unavoidable. This section identifies the CEQA level of significance before and after mitigation.

### **3.1.4 Outreach to Local Agencies**

Meetings and other outreach activities were conducted with the staff of local public agencies within the Bakersfield to Palmdale Project Section throughout preparation of the EIR/EIS. These meetings and other outreach activities have helped the Authority understand the on-the-ground conditions and local environmental issues, understand the concerns of local agencies and the public, facilitate reconciliation of substantive concerns, and design effective and feasible mitigation measures. Chapter 9, Public and Agency Involvement, is an inventory of outreach activities undertaken during preparation of the EIR/EIS. Specific resource-related issues also are discussed in the respective resource sections of the document.

### **3.1.5 Legal Authority to Implement Off-Site Mitigation**

Chapter 3 analyzes the HSR project's potential physical environmental effects on various resource areas. If a potential significant effect is found, mitigation measures are proposed. Most mitigation measures identified are within the Authority's jurisdiction and control. Some of the proposed mitigation measures, however, would need to occur on property the Authority would not own as part of its right-of-way acquisitions. These are sometimes referred to as "off-site" mitigation measures. Mitigation that would occur on property not owned by the Authority would require working with the property owners involved or with the jurisdiction that regulates the property in order to accomplish that mitigation. If specific off-site mitigation locations were known at the time these analyses were conducted, they were included in the evaluation as effects of mitigation in this EIR/EIS.

The Authority has not identified any off-site mitigation measures that they believe are infeasible or unlikely to occur. The off-site mitigation measures recommended in this EIR/EIS are physically feasible. The Authority will continue its current practice of developing memoranda of understanding and funding agreements with local governments to facilitate agreement on implementation of off-site mitigation measures on property owned at the local level.

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