1 PROJECT PURPOSE, NEED, AND OBJECTIVES

1.1 Introduction

1.1.1 The High-Speed Rail System

The California Legislature passed the High-Speed Rail Act in 1996, forming the California High-Speed Rail Authority (Authority) as a state governing body with responsibility for planning, designing, constructing, and operating the California High-Speed Rail (HSR) System. In establishing the Authority, the Legislature found that the state's transportation facilities were insufficient to meet the needs of the state's existing population, that the state's population and the travel demands of its citizens would continue to grow, and that the development of an HSR system is a necessary and viable alternative to automobile and air travel in the state. The Authority's mandate under the High-Speed Rail Act is to develop an HSR system that coordinates with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

Rail passenger transportation

Commuter rail passenger transportation serves metropolitan and suburban areas within the same region.

Intercity rail passenger transportation serves travel markets that cross state or regional boundaries.

The Authority proposes to construct, operate, and maintain an electric-powered HSR system in California, connecting the San Francisco Bay Area and the Central Valley to Southern California. When completed, the nearly 800-mile train system would provide new passenger rail service to more than 90 percent of the state's population. More than 200 weekday trains would serve the statewide intercity travel market.[1] The system would use state-of-the-art, electrically powered, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train control systems, with trains capable of operating speeds of up to 220 miles per hour in HSR sections that are fully grade-separated and on a dedicated track alignment.

The HSR system, as illustrated on Figure 1-1, would be implemented in two phases. Phase 1 would connect San Francisco to Los Angeles and Anaheim via the Pacheco Pass and the Central Valley. Phase 2 would extend the HSR system from the Central Valley (starting at the Merced Station) to the state's capital in Sacramento and from Los Angeles to San Diego.

1.1.2 Decision to Develop a Statewide High-Speed Rail System

The Authority has used a tiered environmental review process to support tiered decisions for the HSR system. Tiering of environmental documents means addressing a broad program in a "Tier 1" environmental document, then analyzing the details of individual projects within the larger program in subsequent project-specific or "Tier 2" environmental documents.

[1] "Intercity rail passenger transportation" is defined at United States Code (U.S.C.) Title 49, Section 24102(4), as "rail passenger transportation except commuter rail passenger transportation." "Commuter rail passenger transportation" is defined at 49 U.S.C. 24102(3) as "short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced-fare, multiple-ride, and commuter tickets and morning and evening peak-period operations."

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2016b

Figure 1-1 Statewide High-Speed Rail System—Implementation Phases

The Statewide Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (Authority and FRA 2005) provided a programmatic analysis of implementing the HSR system across the state and compared it to the impacts of a No Project Alternative and a modal alternative that involved expanding airports, freeways, and conventional rail to meet the state's future transportation needs. It also evaluated an HSR alternative, which included consideration of different train technologies and vehicle types, as well as potential corridors and station locations. At the conclusion of that Program EIR/EIS, the Authority and FRA made the following decisions.

2005 Tier 1 Decision	Description
Selection of Transportation Option	Selected the HSR alternative over the modal alternative (expanded airports and freeways) and the No Project Alternative (do nothing) to serve California's growing transportation needs.
Selection of Train Technology	Selected very-high-speed, electrified steel-wheel-on-steel-rail technology over magnetic levitation, lower-speed, electrified steel-wheel-on-steel-rail; and lower-speed diesel (non-electrified) steel-wheel-on-steel-rail.
Selection of Preferred Alignment Corridors	Selected preferred corridors for most of the statewide system to be studied in more detail in Tier 2 EIR/EISs. Deferred selection of preferred corridors for the Bay Area to Central Valley segment to a second Tier 1 EIR/EIS process.
Selection of Preferred Station Locations	Selected station locations along the preferred corridors to be studied in more detail in Tier 2 EIR/EISs.
Adoption of Mitigation Strategies	Adopted broad mitigation strategies to be refined and applied at the second tier as part of project planning and development and environmental review.

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2005b
EIR = environmental impact report HSR = high-speed rail
EIS = environmental impact statement

After completing the Statewide Program EIR/EIS, the Authority and FRA prepared a second Program EIR/EIS to identify a corridor and station locations for the HSR connection between the Bay Area and the Central Valley, examining connections through the Pacheco Pass, the Altamont Pass, or both (Authority and FRA 2008a). In 2008, the Authority and FRA selected a Pacheco Pass connection with corridors and station locations for further examination in Tier 2 environmental reviews. As a result of litigation, the Authority prepared additional programmatic environmental review for the Bay Area to Central Valley section and again selected the Pacheco Pass connection (Authority 2012a).

2008/2012 Tier 1 Decision	Description
Selection of Preferred Alignment Corridors	Selected preferred corridors for connecting the Bay Area to the Central Valley north of Fresno to be studied in more detail in Tier 2 EIR/EIS documents.
Selection of Preferred Station Locations	Selected station locations along the preferred corridors to be studied in more detail in Tier 2 EIR/EISs.
Adoption of Mitigation Strategies	Adopted broad mitigation strategies to be refined and applied at the second tier as part of project planning and development and environmental review.

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2008
EIR = environmental impact report EIS = environmental impact statement

These Tier 1 decisions established the broad framework for the HSR system that serves as the foundation for the Tier 2 environmental review of individual projects. Between Bakersfield and Palmdale, the corridor advanced for Tier 2 study was the State Route (SR) 58/Soledad Canyon (Antelope Valley) corridor. The station locations advanced for Tier 2 study included a station in downtown Bakersfield and a station at the Palmdale Transportation Center.

The Authority and FRA prepared these Tier 1 documents in coordination with the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE).

The USEPA and the USACE concurred that the corridors selected by the Authority and FRA in Tier 1 were most likely to yield the least environmentally damaging practicable alternative under Section 404 of the Clean Water Act.

Electronic copies of the Tier 1 documents are available on request by calling the Authority office at (916) 324-1541. The Tier 1 documents may also be reviewed at the Authority's offices during business hours at: 770 L Street, Suite 620, Sacramento, CA 95814 and 355 S. Grand Avenue, Suite 2050, Los Angeles, CA 90071.

1.1.3 Implementation of the Statewide High-Speed Rail System

Since completion of the Tier 1 documents, the State of California has taken a series of steps to advance the implementation of a statewide HSR system. These efforts have resulted in securing dedicated funding for construction of the initial part of the system in the Central Valley and have further defined the state's vision for completing the system. The HSR system has also become a key component of the state's strategy for reducing greenhouse gas (GHG) emissions.

1.1.3.1 California State Legislation and Funding

In August 2008, the California Legislature adopted Assembly Bill (AB) 3034, finding "it imperative that the state proceed quickly to construct a ... high-speed passenger train system to serve the major metropolitan areas," and submitting The Safe, Reliable, High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1A) to the voters. In November 2008, California voters approved Proposition 1A, making $9.95 billion in bond funds available to the Authority for initiating construction of the HSR system from San Francisco to the Los Angeles basin and linking the state's major population centers. Proposition 1A includes provisions for continuing legislative oversight and requires the Authority to follow certain procedures to access bond funds. In 2012, the Legislature passed Senate Bill (SB) 1029, which appropriated $7.9 billion in federal funds (refer to Section 1.1.3.4 below) and Proposition 1A bond funds to begin construction of the HSR system.

The HSR system is identified as an integral GHG-reduction measure in the Climate Change Scoping Plan prepared by the California Air Resources Board (CARB) pursuant to AB 32, the California Global Warming Solutions Act of 2006, which required a reduction in GHG emissions to 1990 levels by 2020 (CARB 2008, 2014). In 2014, the Legislature passed SB 862, which continuously appropriated 25 percent of specified cap-and-trade auction proceeds to Phase 1 (San Francisco to Anaheim) of the HSR system.[2] The Legislature found that the HSR system, once completed and operational, "will contribute significantly toward the goal of reducing emissions of greenhouse gases and other air pollutants" and provides "the foundation for a large-scale transformation of California's transportation infrastructure" by reducing millions of vehicle miles traveled by automobile and reducing the demand for air travel. In 2017, the Legislature extended the cap-and-trade program from 2020 to 2031.

1.1.3.2 Business Plans for the Statewide High-Speed Rail System

The High-Speed Rail Act requires the Authority to prepare, adopt, and submit a business plan to the State Legislature every 2 years describing its implementation approach for the statewide HSR system. Since 2008, the Authority has adopted business plans in accordance with this requirement. Most recently, the Authority adopted its 2018 Business Plan on May 15, 2018, and submitted it to the Legislature on June 1, 2018 (Authority 2018b).

The 2018 Business Plan identifies major anticipated milestones for upcoming years, focusing on construction and program delivery. The key objectives and principles from prior business plans remain the same:

- Initiate HSR passenger service as soon as possible.

[2] "Cap-and-trade" refers to the market-based mechanism established by CARB for achieving the GHG-reduction requirements in AB 32.

- Make strategic, concurrent investments throughout the system that will be linked together over time.
- Position the Authority to construct additional increments of the HSR system as funding becomes available.

Like the previous business plans, the 2018 Business Plan describes the phased implementation of the California HSR System. As shown on Figure 1-1, Phase 1 would connect the state's major metropolitan areas, extending from San Francisco and Merced to Los Angeles and Anaheim (the San Francisco Bay Area and Los Angeles Basin regions are considered the "bookends" of the HSR system). Phase 2 would complete extensions to Sacramento and San Diego. Phased implementation of the HSR system is compatible with the provisions of Proposition 1A. The 2018 Business Plan also continues to incorporate the concept of "blended" service in certain shared corridors in Northern and Southern California, including between San Francisco and San Jose and between Burbank and Anaheim.

With regard to the timing of implementation of Phase 1, the 2018 Business Plan continues the overall approach presented in 2016, which prioritizes connecting the Silicon Valley to the Central Valley. To achieve that objective, the 2018 Business Plan calls for completing two lines initially—one in the Central Valley, from an interim station in Madera to Bakersfield, and one in the Bay Area/Silicon Valley, from San Francisco and San Jose to Gilroy—and then completing the connection from the Silicon Valley to the Central Valley via the Pacheco Pass tunnels. Completion of this "valley-to-valley" connection would provide continuous HSR service from San Francisco to Bakersfield. After that portion of the system is constructed, it is anticipated that the system would be extended to complete all of Phase 1 and, ultimately, Phase 2.

The 2018 Business Plan supports concurrent investments to deliver early benefits to Southern California in the Burbank-Los Angeles-Anaheim corridor and to Northern California in the San Francisco-San Jose corridor, as well as completion of the environmental review for all Phase 1 project sections statewide from Merced/San Francisco to Los Angeles/Anaheim by 2022.

The Authority released a Draft 2020 Business Plan in February 2020 for public review and comment. The plan's final adoption is expected at the April 2020 Board meeting for submittal to the Legislature by May 1, 2020 (Authority 2020).

1.1.3.3 California State Rail Plan

The federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA) required states to develop state rail plans no less frequently than every 5 years as a condition of eligibility for federal funding for HSR and intercity rail passenger programs. In accordance with PRIIA, the State of California adopted the *California State Rail Plan* (CSRP) in 2013 (California Department of Transportation [Caltrans] 2013a).[3] The 2013 CSRP stated that it "establishes a statewide vision and objectives, sets priorities, and develops implementation strategies to enhance passenger and freight rail service in the public interest" (Caltrans 2013a). The CSRP called for implementation of a statewide HSR system that is integrated into the existing intercity and commuter passenger rail network.

Caltrans released the final draft 2018 CSRP in September 2018, which continues to emphasize HSR as a foundational component of a statewide, integrated rail transportation network (Caltrans 2018).

1.1.3.4 Federal Railroad Administration Grant Agreement

In 2009, the FRA announced a competitive grant program to fund HSR projects under the American Recovery and Reinvestment Act of 2009 through its High-Speed Intercity Passenger Rail Program. The State of California, acting through the Authority, successfully competed for these grant funds and received awards totaling roughly $3.5 billion. In 2010, the Authority entered cooperative agreements with the FRA under which the FRA committed to provide the grant funds

[3] The State Rail Plan is available at: https://dot.ca.gov/programs/rail-and-mass-transportation/california-state-rail-plan.

to support initial construction of the first phase of the HSR system in the Central Valley, as well as related efforts for continued planning, engineering, and right-of-way preservation for the rest of the Phase 1 system between San Francisco and Anaheim.[4]

1.1.3.5 Project-Level Environmental Reviews

In accordance with the tiered approach to environmental review described above, the Authority is preparing Tier 2 (project-level) EIR/EISs for individual sections of the statewide HSR system. Each Tier 2 EIR/EIS evaluates a section of the HSR system that serves a useful transportation purpose on its own and could function independently even if the adjacent sections were not completed. In the event that adjacent project sections are not built, additional facilities, including a heavy maintenance facility (HMF), would be needed. Each Tier 2 EIR/EIS evaluates proposed alignments and stations in site-specific detail to provide a complete assessment of the direct, indirect, and cumulative impacts of the proposed action; considers public and agency participation in the screening process; and is developed in consultation with resource and regulatory agencies, including the USEPA and USACE. The Authority intends each Tier 2 EIR/EIS to be sufficient to support the USACE's permit decisions where applicable. The Tier 2 project sections are shown on Figure 1-2.

To date, the FRA and the Authority have completed Tier 2 EIR/EISs for the following sections:

- Merced to Fresno
- Fresno to Bakersfield

Tier 2 EIR/EISs for the other Phase 1 project sections, listed below, are all in progress:

- San Francisco to San Jose
- San Jose to Merced
- Bakersfield to Palmdale
- Palmdale to Burbank
- Burbank to Los Angeles
- Los Angeles to Anaheim

In addition, the Authority is preparing a Supplemental EIR/EIS for Merced to Fresno: Central Valley Wye, and has completed the Fresno to Bakersfield Section Final Supplemental EIR and the Fresno to Bakersfield Section: Locally Generated Alternative Final Supplemental EIS.

Compatible with the Tier 1 decisions, the Bakersfield to Palmdale Project Section is approximately 80 miles in length and traverses valley, mountain, and high desert terrain, as well as urban, rural, and agricultural lands. From the north, this project section begins at the Bakersfield Station and travels south and southeast through the Tehachapi Mountains, then descends into the Antelope Valley where it terminates at the Palmdale Station in the south. The Bakersfield to Palmdale Project Section is shown on Figure 1-3.

1.1.4 Lead Agencies, Cooperating Agencies, and Responsible Agencies

Pursuant to U.S. Code (U.S.C.) Title 23 Section 327, under the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (MOU) between the FRA and the State of California, effective July 23, 2019, the Authority is the federal lead agency for environmental reviews and approvals for all Authority Phase 1 and Phase 2 California HSR System projects. In this role, the Authority is the project sponsor and the lead federal agency for compliance with NEPA and other federal laws for the California HSR System, including the Bakersfield to Palmdale Project Section. The FRA administers the High-Speed Intercity Passenger Rail Program and has awarded California $3.48 billion in grant funding for HSR system construction in the Central Valley. The FRA has primary responsibility for developing and enforcing rail line safety regulations in accordance with U.S.C. Title 49, Subtitle V, Part A (49 U.S.C. § 20101 et seq.) and for performing Clean Air Act Conformity determinations and other federal approvals retained by the FRA.

[4] The grant agreements are available at: www.hsr.ca.gov/About/Funding_Finance/funding_agreements.html.

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2016c

Figure 1-2 Statewide High-Speed Rail System, Phase 1 and Phase 2—Project Sections

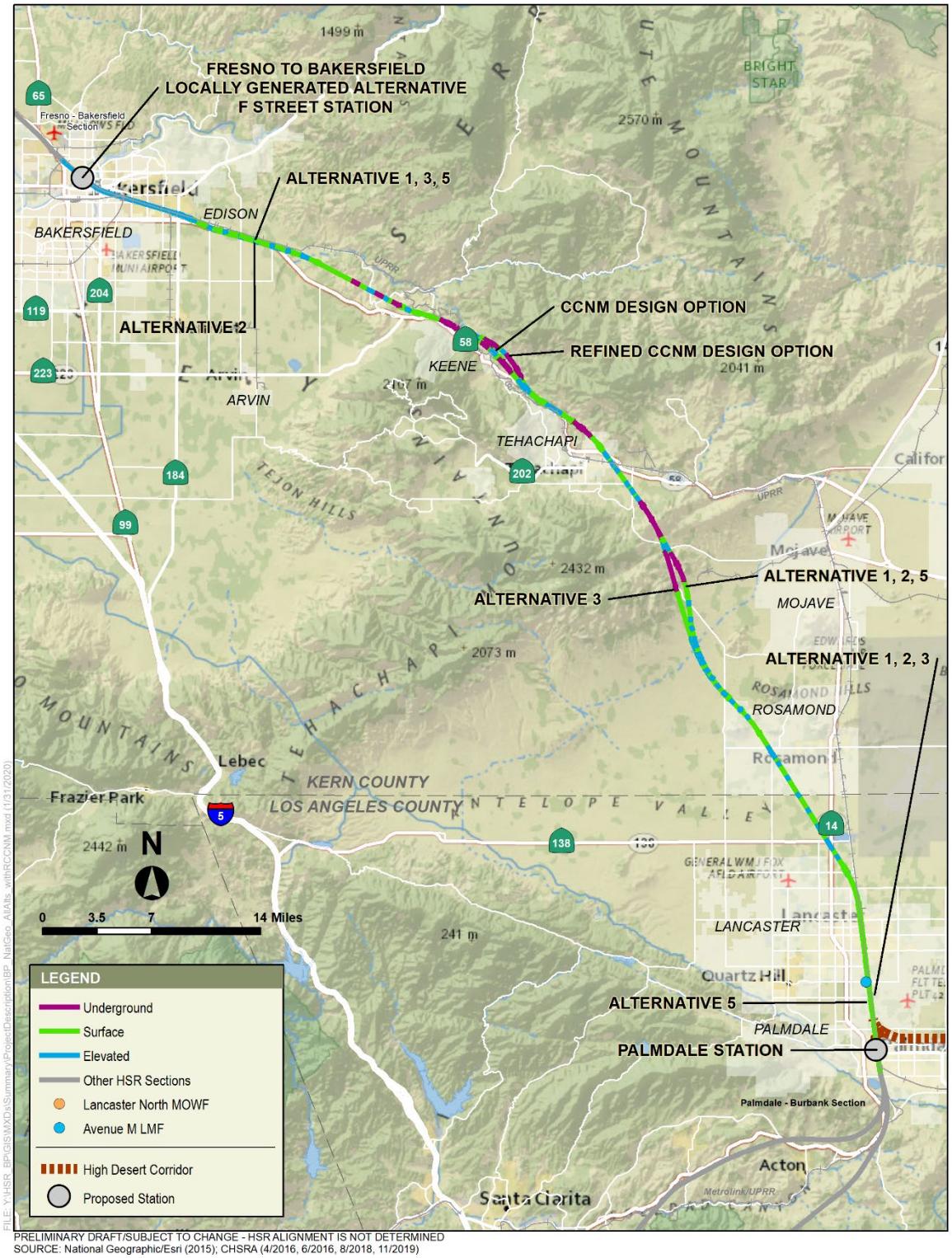


Figure 1-3 Bakersfield to Palmdale Project Section

The following cooperating agencies are included in this NEPA review process for this project section:

- USACE
- Bureau of Land Management
- Surface Transportation Board (STB)[5]

The USACE agreed by letter, dated December 30, 2009, to be a cooperating agency under NEPA. The Bureau of Land Management agreed by letter, dated September 25, 2013, to be a cooperating agency under NEPA. The Authority sent a letter dated April 8, 2013, to the Department of Defense, representing the U.S. Air Force, to confirm its status as a cooperating agency. A response letter from the Department of Defense was not received. The Authority has continued its outreach efforts with the Air Force. The STB, by letter dated May 2, 2013, is also a cooperating agency under NEPA.

Multiple other federal agencies have been involved and contributed to the NEPA process, including the USEPA, the U.S. Fish and Wildlife Service, the National Park Service, the National Forest Service, and the Advisory Council on Historic Preservation.

Several California agencies (state and regional) would have to issue permits or approvals for the Bakersfield to Palmdale Project Section and therefore would be CEQA responsible agencies. These agencies include:

- California Department of Fish and Wildlife
- Caltrans
- California Public Utilities Commission
- California State Lands Commission
- State Water Resources Control Board
- Central Valley Regional Water Quality Control Board
- Lahontan Regional Water Quality Control Board
- San Joaquin Valley Air Pollution Control District
- Antelope Valley Air Quality Management District

These agencies can use the Final EIR/EIS either through the provisions of CEQA Guidelines Section 15220 et seq. or CEQA Guidelines Section 15096 to approve or permit aspects of the HSR project.

1.1.5 Compatibility with Federal Transportation Policy

In 2008, the U.S. Congress enacted a major reauthorization of intercity rail passenger legislation, creating a new priority for rail passenger services in the nation's transportation system. The Passenger Rail Investment and Improvement Act of 2008 (Division B of Public Law 110-432) authorized the appropriation of federal funds to support high-speed and intercity rail passenger services implementation, including authority for the Secretary of Transportation to establish and implement an HSR corridor development program. In the American Recovery and Reinvestment Act of 2009 (Public Law 111-5), Congress appropriated $8 billion in capital assistance for HSR corridors and intercity rail passenger service. Congress provided an additional $2.5 billion for this program in the Department of Transportation Appropriations Act of 2010 (Title I, Division A, of the Consolidated Appropriations Act of 2010). The Full-Year Continuing Appropriations Act of 2011 (Public Law 112-110) reduced available funding by $400 million. In addition, the FRA issued a Strategic Plan, *A Vision for High-Speed Rail in America* (FRA 2009), which described the agency's plan for intercity rail passenger development and subsequent program guidance to implement the High-Speed Intercity Passenger Rail Program with funding provided by Congress through the appropriations acts.

[5] The STB is an independent federal agency with jurisdiction over the construction and operation of new interstate rail lines (49 U.S.C. §§ 10502, 10901). In 2013, the STB determined it has jurisdiction over all sections of the proposed statewide California HSR System, including the Bakersfield to Palmdale Project Section, because of the HSR system's connection to the existing interstate rail network (STB, Docket No. FD 35724, April 18, 2013).

In addition to the intercity rail passenger legislation discussed above, the HSR system is also compatible with recent expressions of federal multimodal transportation legislation, most notably the Fixing America's Surface Transportation (FAST) Act (Public Law 114-94, December 4, 2015); the Moving Ahead for Progress in the 21st Century Act (Public Law 112-141, July 6, 2012); the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users; the Transportation Equity Act for the 21st Century (Public Law 109-59, August 10, 2005); and the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240, December 18, 1991). These laws encourage public transportation investment that increases national productivity and domestic and international competition while improving safety, as well as social and environmental conditions. These laws encourage investments that offer benefits such as the following:

- Link all major forms of transportation
- Improve public transportation systems and services
- Provide better access to seaports and airports
- Enhance efficient operation of transportation facilities and service

As the most current expression of federal multimodal transportation policy, the FAST Act seeks to improve surface transportation infrastructure, including roads, bridges, transit systems, and the passenger rail network. It provides long-term funding certainty for surface transportation, meaning states and local governments can move forward with critical transportation projects, such as new highways and transit lines, with the confidence that they will have a federal partner over the long term. Overall, the FAST Act maintains current program structures and shares funding between highways and transit. The law also makes changes and reforms to many federal transportation programs, including streamlining the approval processes for new transportation projects and financing, providing new safety tools, and establishing new programs to advance critical freight projects.

1.2 Purpose of and Need for the High-Speed Rail System and the Bakersfield to Palmdale Project Section

1.2.1 Purpose of the High-Speed Rail System

The Statewide Program EIR/EIS established the purpose of the statewide HSR system and identified and evaluated alternative HSR corridor alignments and station locations as part of a statewide HSR system.

> *The purpose of the system is to provide a reliable high-speed electrified train system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. Two objectives of the HSR system include provision of an interface with commercial airports, mass transit, and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources* (Authority and FRA 2005a).

1.2.2 Purpose of the Bakersfield to Palmdale Project Section

The purpose of this project is to implement the Bakersfield to Palmdale Section of the California HSR system: to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers consistent with Proposition 1A, and connectivity to airports, mass transit, and the highway network connecting the San Joaquin Valley to the Antelope Valley; and to connect the Northern and Southern portions of the statewide HST system.

The purpose and need for the Bakersfield to Palmdale Project Section was developed through a process established by the Authority, FRA, USACE, and USEPA pursuant to a November 2010 MOU that was intended to facilitate the integration of NEPA, Section 404 of the Clean Water Act,

and Section 14 of the Rivers and Harbor Act. The parties reached agreement on the purpose and need in July 2012.

For Clean Water Act Section 404(b)(1) compliance, the USACE must take into consideration the applicant's needs in the context of the geographic area of the proposed action and the type of project being proposed. The USACE has determined that the overall project purpose (as stated above) allows for a reasonable range of practicable alternatives to be analyzed, and is acceptable as the basis for a USACE 404(b)(1) alternatives analysis.

1.2.3 CEQA Project Objectives of the High-Speed Rail System in California and in the Bakersfield to Palmdale Project Section Vicinity

The Authority's statutory mandate is to plan, build, and operate an HSR system coordinated with California's existing transportation network, particularly intercity rail and bus lines, commuter rail lines, urban rail lines, highways, and airports. In accordance with Section 15124 of the CEQA Guidelines, the Authority has responded to this mandate by adopting the following objectives and policies for the proposed HSR system:

- Provide intercity travel capacity to supplement critically overused interstate highways and commercial airports
- Meet future intercity travel demand that will be unmet by current transportation systems and increase capacity for intercity mobility
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel
- Provide a sustainable reduction in travel time between major urban centers
- Increase the efficiency of the intercity transportation system
- Maximize the use of existing transportation corridors and rights-of-way to the extent feasible
- Develop a practical and economically viable transportation system that can be implemented in phases and generate revenues in excess of operations and maintenance costs
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled (VMT)[6] for intercity trips

While these CEQA project objectives are not directly incorporated into the purpose and need under NEPA, an alternative's ability to achieve these CEQA project objectives will be considered in evaluating the reasonableness of an alternative under NEPA.

[6] VMT is the total miles traveled by all vehicles in a specified area during a specified time.

1.2.4 Statewide and Regional Need for the High-Speed Rail System in the Bakersfield to Palmdale Project Section Vicinity

The approximately 80-mile-long Bakersfield to Palmdale Project Section is an essential component of the statewide HSR system. The Bakersfield to Palmdale Project Section would provide the Cities of Bakersfield, Lancaster, and Palmdale, as well as other communities in the vicinity of the proposed HSR stations, with access to a new a transportation mode; contribute to increased mobility throughout California; and provide for constructing a light maintenance facility and a maintenance-of-way facility, where the HSR trains would be inspected and light maintenance/repair activities would occur. Figure 1-2 depicts the Bakersfield to Palmdale Project Section within the statewide HSR system.

By connecting the northern and southern portions of the statewide HSR system, the Bakersfield to Palmdale Project Section would close the existing passenger "rail gap" between Southern California and the rest of the state. This gap exists between the Los Angeles area and the southern San Joaquin Valley, where passengers are required to board Amtrak connecting buses from Los Angeles and Palmdale to the station in Bakersfield, where they can board a train once again. This gap exists due to topographic challenges with the Tehachapi and San Gabriel mountains, which have made constructing a passenger rail line at a suitable grade difficult.

The need for an HSR system exists statewide, with regional demand contributing to this need. As discussed below in Section 1.2.4.1, Travel Demand and Capacity Constraints, the Bakersfield to Palmdale Project Section would contribute considerably to filling the statewide need for a new intercity transportation service that would connect it with the major population and economic centers and to other regions of the state.

The capacity of California's intercity transportation system, including within the Bakersfield to Palmdale Project Section vicinity, is insufficient to meet existing and future travel demand. The current and projected future system congestion will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population, economic activity, and tourism in the state, including that in the project vicinity. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between the Bakersfield to Palmdale Project Section vicinity, the Bay Area, Sacramento, and Southern California, relates to the following issues:

- Future growth in demand for intercity travel, including the growth in demand within the Bakersfield and Palmdale areas
- Capacity constraints that will result in increasing congestion and travel delays, including those along the SR 58, SR 14, and Sierra Highway corridors (Figure 1-3)
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including within the project vicinity
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state, including within the project vicinity
- Poor and deteriorating air quality and increasing pressure on natural resources and agricultural lands due to expansion of highways and airports, as well as continued urban development, including in the Bakersfield and Palmdale areas

- Legislative mandates to moderate the effects of transportation upon climate change, including required reductions in GHG emissions caused by vehicles powered by the combustion of carbon-based fuels

1.2.4.1 Travel Demand and Capacity Constraints

Growing population, tourism, and economic growth generate demand for intercity travel in California, including in the Bakersfield and Palmdale areas. Caltrans expects that the projected growth and travel demand in the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley will not be matched by increases in roadway capacity.

Population and Economic Growth

According to the California Department of Finance (2016), California's population should increase by 6.8 million residents between 2015 and 2040. This means an increase from approximately 38.9 million to 45.7 million people (more than 17 percent growth). Figure 1-4 illustrates this growth. The project section extends from Kern County in the north to Los Angeles County in the south. From 2015 to 2040, Kern County is projected to grow at a higher rate (60.4 percent) than California as a whole (17.6 percent), while Los Angeles County is expected to grow at a somewhat slower rate than the state (13.4 percent).

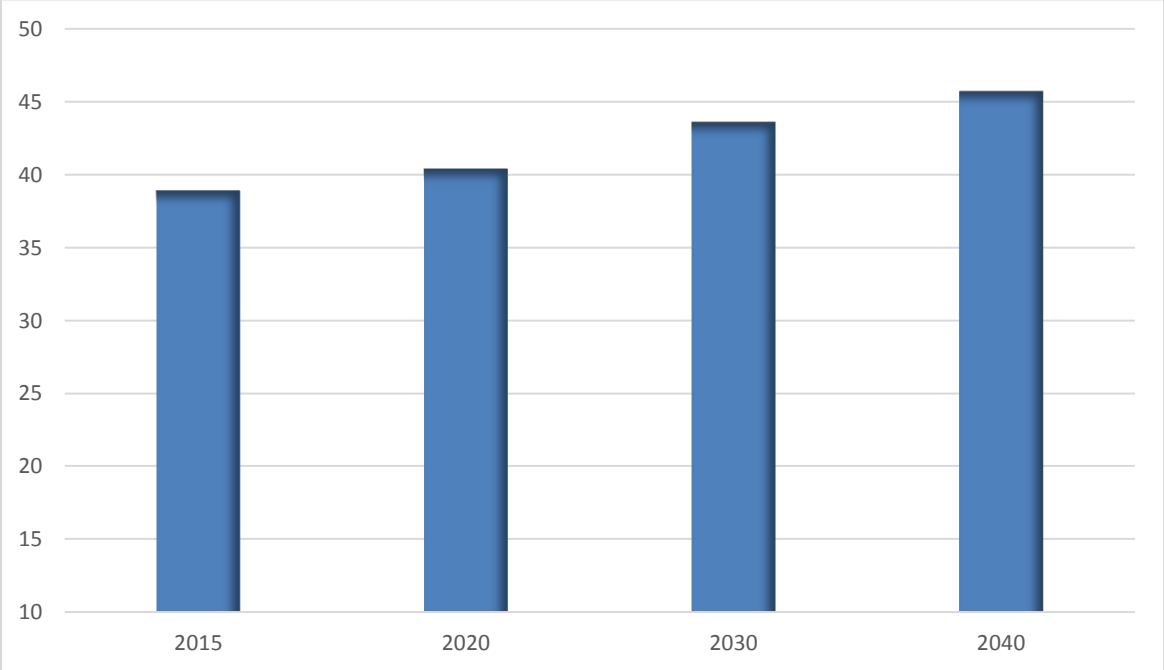


Figure 1-4 Current and Future California Population (in millions)

Much of this population growth will be accommodated in the metropolitan coastal areas or in Southern California's Inland Empire. However, growth and development in these regions are increasingly challenged because of environmental and quality-of-life issues, including high housing prices. In these areas, it is increasingly difficult to accommodate new development, and despite economic pressure to grow, the combination of rising costs and local opposition is likely to push a substantial number of people to seek homes and employment elsewhere. The project vicinity consists of the southern portion of the San Joaquin Valley, the Tehachapi Mountains, and the Antelope Valley, with the San Joaquin Valley providing a likely outlet for this population pressure. However, the San Joaquin Valley is also a major source of regional growth because of its youthful local population (Tietz et al. 2005). During the past quarter-century, population growth rates in the San Joaquin Valley were substantially higher than those for California or the entire nation, and the valley's projected growth rate over the next 25 years is also significantly higher

(Cowan 2005). This population increase is projected to stem from (1) overflow from urban coastal areas, where people are seeking affordable housing within commuting range of major metropolitan areas; (2) immigration; and (3) local population growth (Cowan 2005).

As shown on Figure 1-4, the population of California is expected to reach approximately 45.7 million by 2040. Although Los Angeles County in general is anticipated to experience a much lower population growth rate than the state overall (Table 1-1), the Cities of Lancaster and Palmdale within the Antelope Valley are anticipated to grow at an average rate of 33 percent and 27 percent, respectively, between 2015 and 2040 (Southern California Association of Governments [SCAG] 2016). This rapid population growth in the Antelope Valley, similar to the San Joaquin Valley, is attributable to lower property tax rates and costs of doing business and lower housing prices compared to other California markets (Greater Antelope Valley Economic Alliance 2011).

Table 1-1 Population Growth in California, the Bakersfield to Palmdale Project Section Vicinity, and Kern and Los Angeles Counties

Area	Population		
	2015	2040	Percent Growth 2015–2040
Bakersfield to Palmdale Project Section[1]	11,031,281	12,927,000	17.2%
Kern County	880,664	1,413,000	60.4%
Los Angeles County	10,150,617	11,514,000	13.4%
City of Bakersfield	373,938	719,500	92.4%
City of Tehachapi	12,856	20,100	56.3%
City of Lancaster	157,658	209,900	33.1%
City of Palmdale	158,591	201,500	27.1%
California	38,915,880	45,747,645	17.6%

Sources: California Department of Finance, 2016; Kern COG, 2014, 2015; SCAG, 2016; California Department of Transportation, 2013c
The Kern COG does not provide population projections for the communities of Keene and Rosamond.
[1] The Bakersfield to Palmdale Project Section includes Kern and Los Angeles Counties.
Kern COG = Kern Council of Governments
RSA = resource study area
SCAG = Southern California Association of Governments

The Bakersfield to Palmdale Project Section vicinity includes two distinct employment regions: the southern San Joaquin Valley and the Antelope Valley. The predominant economic sectors in the southern San Joaquin Valley and Antelope Valley are the agricultural and aerospace industries, respectively.

Levels of employment and income in the southern San Joaquin Valley have historically lagged behind those in other parts of the state. Kern County is part of one of the most agriculturally productive areas in the world, and the farming industry has supported the regional economy. Although this area has led the state in agricultural revenues, in recent decades, the economy has been diversifying as the service industry becomes a more predominant sector. Additional shifts in employment sectors came as a result of the real estate boom that peaked in 2007, which generated many jobs in construction, fueled retail sales, and generated increased property sales and tax revenues (Cowan 2005).

Although the agricultural industry provides the southern San Joaquin Valley with a great deal of employment, the region continues to be one of the most economically depressed areas in the nation because many of these jobs are seasonal and low-paying (Cowan 2005). The region was largely untouched by the bursting of the “dot-com” bubble and the loss of tourism following the 9/11 tragedy. However, the real estate boom and the related new construction jobs, along with increased retail sales and tax revenues, only made the effects of the market’s subsequent crash

worse, exacerbating the economic situation and leaving the region as one of the hardest-hit areas in the nation. The implications of the industry's 2007 collapse and associated nationwide recession include substantial increases in unemployment, residential foreclosure rates, and poverty, as well as sharp declines in housing prices (Bertaut and Pounder 2009). Unemployment rates increased sharply in Kern County after the 2007 economic crash, nearly doubling between 2006 and 2009 (California Department of Finance 2016). As shown in Table 1-2, production of agricultural goods has continued to increase, while the percentage of the labor force employed in agriculture and resource extraction has remained somewhat constant since 2000; this sector currently employs the second-largest percentage of the labor force.

Table 1-2 Agriculture in Kern County

Metric	2000	2005	2010	2014
Agricultural Production (harvested acres)	868,628	873,005	803,769	880,457
Percent Labor Force Employed in Agriculture and Resource Extraction	12.3%	13.7%	14.0%	16.4%

Sources: County of Kern Agriculture and Measurement Standards, 2000, 2005, 2010, and 2014; U.S. Census, 2000, and 2001–2005, 2006–2010, and 2010–2014 American Community Surveys

Like the southern San Joaquin Valley, the Antelope Valley is an area built around a single major industry—in this case, the aeronautical industry. The military and the private aeronautical industry invest billions of dollars in the area, and thousands of military and civilian workers are employed in the Antelope Valley (Greater Antelope Valley Economic Alliance 2011). Levels of employment can swing drastically because much of the industry's funding is tied to government spending. Unlike the southern San Joaquin Valley, the Antelope Valley is connected to Los Angeles by a public transportation system (i.e., Metrolink). This makes it possible for approximately 71,000 residents of the Antelope Valley to work in the Los Angeles area (Greater Antelope Valley Economic Alliance 2011). The Antelope Valley is connected to the southern San Joaquin Valley via Amtrak Thruway bus service. The Antelope Valley is also a leader in renewable energy production, with wind farms and solar facilities. Many residents of Lancaster and Palmdale have long commutes to work (Table 1-3). The percentage of commuters with a 60-minute or longer commute is higher for Lancaster and Palmdale than for Los Angeles County or the state overall. The Lancaster General Plan Housing Element (2014–2021) cites the jobs/housing balance as a critical issue facing the growth of Lancaster. Similarly, the Palmdale General Plan (1993) discusses how Palmdale's current jobs/housing imbalance places a strain on freeways and regional arterials, due to the large numbers of commuters using these facilities, and it identifies continued improvement in the jobs/housing ratio to mitigate commuter impacts on regional roadways and freeways.

Table 1-3 Travel Time to Work in the Cities of Lancaster and Palmdale

Jurisdiction	Less than 5 minutes	5–9 minutes	10–14 minutes	15–19 minutes	20–24 minutes	25–29 minutes	30–34 minutes	35–39 minutes	40–44 minutes	45–49 minutes	60–89 minutes	90 or more minutes
California	2.1%	8.4%	13.4%	15.4%	14.7%	5.8%	15.0%	2.5%	4.1%	8.1%	7.2%	3.2%
Los Angeles County	1.3%	6.5%	11.3%	13.8%	14.3%	5.4%	17.7%	2.7%	4.9%	9.9%	8.9%	3.1%
Lancaster	1.7%	10.4%	18.2%	21.6%	10.3%	2.4%	5.1%	0.9%	2.3%	7.9%	12.0%	7.2%
Palmdale	0.7%	5.9%	14.4%	13.1%	11.0%	3.4%	5.7%	0.9%	1.6%	11.7%	19.4%	12.0%

Sources: U.S. Census 2010, and 2010–2014 American Community Survey

As shown in Table 1-4, both Kern County and Los Angeles County have a higher unemployment rate than the state as a whole. Both counties have a lower per-capita income than the state overall.

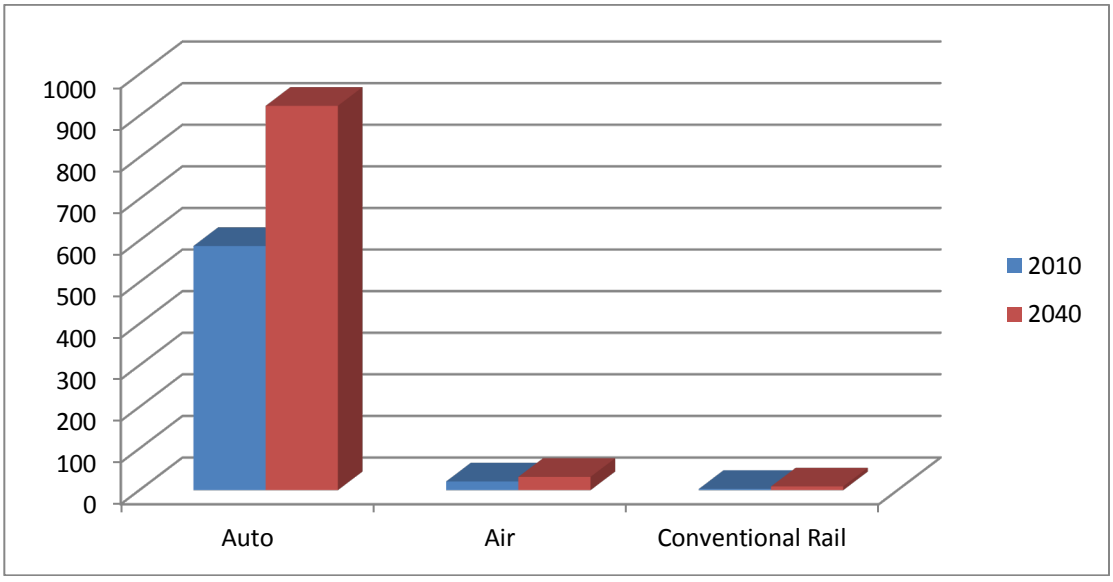
Table 1-4 Unemployment and Income in California and in Kern and Los Angeles Counties

Area	Unemployment Rate (2014)	Per-Capita Income (2014)
California	7.5%	$49,985
Kern County	10.4%	$49,400
Los Angeles County	8.3%	$36,165

Sources: California Employment Development Department, 2014; U.S. Department of Commerce, 2015

Travel Demand

Population growth and the increasing interconnectedness of the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley are creating a surge in travel along the region's highways, including SR 14 and SR 58. Overall, intercity travel in California is forecast to increase by more than 58 percent between 2010 and 2040, from 610 million trips to approximately 965 million trips, as illustrated on Figure 1-5. Californians were estimated to make 610 million trips between the state's metropolitan regions in Northern and Southern California and those in between in 2010 (Cambridge Systematics 2007). Approximately 209 million of these trips were journeys of at least 100 miles; by 2040, this number is expected to increase to more than 271 million trips per year (Cambridge Systematics 2007). As shown on Figure 1-5, the automobile will continue to predominate in intercity travel and, by 2040, is expected to account for more than 95 percent of all intercity travel and close to 90 percent of longer intercity trips (Cambridge Systematics 2007). Figure 1-6 illustrates the major routes and airports used for intercity travel between the markets potentially served by the HSR system.



Source: California High-Speed Rail Authority, 2016b

Figure 1-5 Intercity Trips in California (in millions)

Figure 1-6 Major Intercity Travel Routes and Airports

Freeway Congestion and Travel Delays

Travel within the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley in general, as well as the project vicinity in particular, largely depends on SR 14 and SR 58 for intercity trips. As shown on Figure 1-6, SR 14 and SR 58 are two of the principal connections between the major cities in the San Joaquin Valley and the Antelope Valley areas. According to the Transportation Concept Report (TCR) for SR 14 (Caltrans 2014a), in 2008, SR 14 carried between 34,000 to 83,000 in annual average daily traffic volumes within the Bakersfield to Palmdale Project Section. In 2035, SR 14 is projected to carry between 49,100 and 110,000 in annual average daily traffic volumes within the Bakersfield to Palmdale Project Section. According to the Corridor System Management Plan (CSMP) for SR 58, this highway carried annual average daily traffic volumes ranging from 1,700 to 63,000 through the Bakersfield to Palmdale Project Section in 2009 (Caltrans 2011). The CSMP projects that SR 58 will carry annual average daily traffic volumes ranging from 34,500 to 95,300 within the Bakersfield to Palmdale Project Section in 2035.

Most of SR 58 and SR 14 were built in the late 1960s to early 1970s to accommodate a smaller population and transportation infrastructure demands than exist today. Not only is the population increasing rapidly in the southern San Joaquin Valley and Antelope Valley, but growth is also taking place in land use patterns that rely on automobiles for most trips.

Currently, and over the next 10 to 25 years, depending on available funding, Caltrans will continue to implement elements of the SR 58 Congestion Management Plan and the SR 14 TCR, which may be used to implement improvements such as road widenings, new interchanges, high-occupancy vehicle lanes, and grade separations.

Table 1-5 provides the VMT totals for Los Angeles and Kern Counties. VMT is expected to increase by approximately 11.3 percent by 2040, with most of the VMT increase occurring in Kern County.

Table 1-5 Current and Projected Vehicle Miles Traveled in the Bakersfield to Palmdale Project Section Vicinity

County	Vehicle Miles Traveled (millions)			
	Existing Conditions[1]	Annual Growth Rate (%)	Year 2040 Projection	Percent Increase
Kern County	22,379,000	1.54%	38,197,000	70.7%
Los Angeles County	224,000,000	0.18%	236,000,000	5.4%
Total	**246,379,000**	**N/A**	**274,197,000**	**11.3%**

Sources: Kern Council of Governments, 2014; Southern California Association of Governments, 2012
[1] Existing conditions are 2005 conditions for Kern County and 2011 conditions for Los Angeles County.
N/A = not applicable

Caltrans' goal for state highway facilities is level-of-service (LOS) B through D on a scale of A to F, where A is unencumbered travel and F is stop-and-go traffic flow. In the 2011 SR 58 CSMP, Caltrans stated that SR 58 was operating at LOS F for the westernmost portion of the roadway within the project vicinity in the City of Bakersfield and at LOS B for the remainder of SR 58 within the project vicinity through the Tehachapi Mountains and the Upper Antelope Valley, with the exception of one segment in Edison that operated at LOS C in 2009. In 2035, even with planned improvements, SR 58 LOS are anticipated to deteriorate to LOS C through F throughout the entire stretch of SR 58 within the project vicinity.

Similarly, SR 14 currently operates at LOS B in the northern vicinity of the HSR project section near Mojave and at LOS D at the southern end of the project vicinity in Palmdale. By 2035, most of SR 14 within the project vicinity will degrade to a lower LOS (C through F), with the exception of the northernmost portion of the roadway, which will continue to operate at LOS B.

LOS will deteriorate on both SR 14 and SR 58 because of increased interregional and statewide travel, with operations reaching unacceptable levels of congestion (LOS E or F) in some areas by 2035, even with system improvements. The capacity improvements planned for SR 14 and SR 58 would often need property acquisition, reconstruction of roadways, and other infrastructure improvements requiring substantial capital expenditures.

The project vicinity exemplifies the statewide growth patterns and trends in California, where much of the intercity travel consists of trips of intermediate distance. Table 1-6 shows the statewide forecasting model results for expected growth in traffic volumes on major highways by 2040. These trips include more than 26,000 average daily trips between Bakersfield and Mojave and 56,000 trips between Lancaster and Los Angeles.

Table 1-6 Travel Growth for Intercity Highways

Major Highways	Average Daily Volume, 2010	Average Daily Volume, 2040	% Change
I-5 between San Diego and Los Angeles (Orange County/ Los Angeles County line)	229,000	284,000	24%
I-5 between Los Angeles and Bakersfield (at Santa Clarita)[1]	182,000	271,000	49%
SR 99 between Bakersfield and Modesto	110,000	174,000	58%
US-101 between San Jose and Madera	78,000	114,000	46%
SR 152 between San Jose and Madera	27,000	48,000	78%
SR 99 between Bakersfield and Merced	24,000	43,000	79%
I-5 between Bakersfield and Modesto	41,000	60,000	46%
I-280 between San Jose and San Francisco	87,000	133,000	53%
I-5 between Modesto and Sacramento	47,000	79,000	68%
SR 99 between Modesto and Sacramento	57,000	81,000	42%
SR 14 between Lancaster and Los Angeles	44,000	56,000	27%
I-5 between Lancaster and Los Angeles	324,000	384,000	19%
I-5 between Santa Clarita and the Orange County line	294,000	309,000	5%
US-101 from the Ventura County line to Pasadena	296,000	319,000	8%
SR 134 from the Ventura County line to Pasadena	254,000	283,000	11%
SR 170	151,000	180,000	19%
I-210 between Sylmar and Pasadena	88,000	112,000	27%
SR 2 between Glendale and Echo Park	189,000	205,000	8%
SR 110 between Pasadena and San Pedro	161,000	168,000	4%
I-110 between Pasadena and San Pedro	142,000	160,000	13%
I-10 between Santa Monica and Ontario (at Santa Monica)	140,000	150,000	7%
I-10 between Santa Monica and Ontario (at Ontario)	218,000	245,000	12%
SR 60 between Los Angeles and Pomona	177,000	201,000	14%
SR 134 between Studio City and Pasadena	231,000	249,000	8%
SR 118 between Pacoima and Mission Hills	170,000	197,000	16%
SR 58 between Bakersfield and Mojave	12,000	26,000	117%

Source: California Department of Transportation, 2014b
Average daily volume represents the average weekday traffic over a 24-hour period.
[1] Just north of the Y-junction where I-5 splits into SR 14
I = Interstate
SR = State Route
US = U.S. Route

Freight Movement Growth

The high volumes of freight movement along SR 58 and SR 14 limit the availability of transportation capacity for passenger vehicle travel into, out of, and within the region. Freight deliveries by truck are an important component of the regional economy, particularly for transporting agricultural goods from farm to market. Goods traveling between the San Joaquin Valley and Southern California or the Bay Area are shipped almost entirely by truck. Regional goods movement is characterized by shipments to and from the Kern County region of the Central Valley to out-of-state destinations. There is currently no intrastate rail travel from the San Joaquin Valley. Goods currently traveling between the San Joaquin Valley and Southern California or the Bay Area are shipped almost entirely by truck because the national rail companies are unwilling to ship cargo less than 700 miles (Caltrans 2011). This is especially true of containerized freight. Rail shipment volumes in the San Joaquin Valley and greater Tehachapi Area will continue to increase (Caltrans 2011, 2014c).

Daily truck volumes ranged from approximately 1,250 to 1,750 trips on SR 14 in 2008 and from 7,524 to 13,860 trips on SR 58 in 2009, representing 40 percent to 56.8 percent of total traffic between Bakersfield and Palmdale on these routes. The region's growth, especially along urban segments of SR 14 and SR 58, threatens the ability of the highway to serve future needs. Even with significant improvements, such as those planned by Caltrans (discussed previously under Travel Demand), heavily congested segments will remain along SR 14 and SR 58 (Caltrans 2011, 2012a).

SR 14 is identified as a Major International Trade Highway in the Caltrans 2007 *Goods Movement Action Plan* and 2012 *Interregional Transportation Strategic Plan*, and as a part of the National Freight Network in the Caltrans 2014 *California Freight Mobility Plan*, in conjunction with other routes (Interstate [I] 10, I-105, I-110, I-405, I-605, and I-710), seaports, and airports. These routes are shown on Figure 1-7, highlighted as "selected freeways," along with existing freight and passenger rail lines. SR 14 serves as part of the Intermodal Corridors of Economic Significance. Current high levels of congestion limit economic vitality, and much more congestion is projected. SR 14 is within Caltrans District 7, which has 5 of the 10 worst truck bottlenecks in the U.S. Truck VMT for Caltrans District 7 is expected to double by 2030 (Caltrans 2014c).

Rail accounted for only 25 percent of the total tonnage of freight movement through the region in 2011; trucking provided the predominant means of freight movement throughout the region. Growing industries and population mean that freight demand will also grow. In fact, freight volumes moving in the San Joaquin Valley are projected to increase from 500 million tons in 2007 to almost 800 million tons by 2040. Movements will continue to rely heavily on truck—by 2040, roughly 93 percent of all commodity movements will be carried by truck (Caltrans 2013a).

Two major rail companies, Union Pacific Railway (UPRR) and BNSF Railway (BNSF), serve Kern County. The San Joaquin Valley lines for both BNSF and the UPRR are important segments of their national rail systems. Freight rail movements in the area are primarily interstate because the railroads generally focus on shipments of 700 miles or more. Shortline railroads[7] that have interchanges with the BNSF at Fresno and Bakersfield, and with the UPRR at Fresno and Bakersfield, also serve Kern County. The growth in roadway congestion in the project vicinity may increase reliance on rail in the future.

[7] A shortline railroad is typically a local rail line serving a small number of towns and industries or hauling cars for one or more other railroads. Many shortlines were once branch lines of larger railroads or abandoned portions of mainlines.

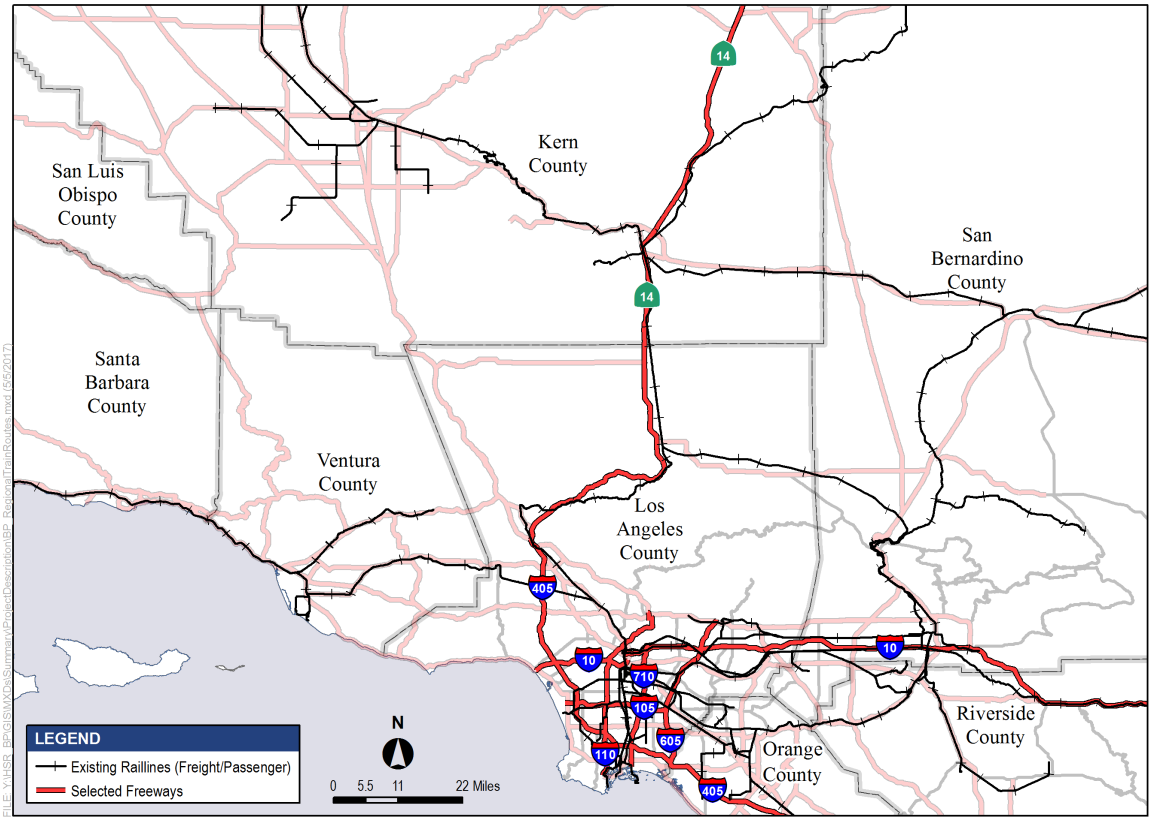


Figure 1-7 Regional Freight/Passenger Network

According to the *San Joaquin Valley Interregional Goods Movement Plan* (Cambridge Systematics 2013), UPRR operates an average of 19 trains per day through the San Joaquin Valley, carrying food products, general freight, grain, and lumber. The San Joaquin Valley Railroad operates regional freight service between Tulare, Fresno, and Kern Counties on leased UPRR branch lines,[8] providing a connection to mainline carriers, which are larger interregional carriers, for agricultural products (Caltrans 2013b). BNSF operates an average of 20 to 24 daily train trips within the study area, 12 of which are Amtrak trains traveling on the San Joaquin passenger rail route. An increase in freight operations along the BNSF route may constrain plans to increase Amtrak's San Joaquin service unless more of the corridor becomes double-tracked. BNSF will gain capacity from planned improvements included in the expansion of Amtrak San Joaquin service, as defined in the State Rail Plan adopted May 2013. Farther south, the Tehachapi Trade Corridor connects Northern California with the major transcontinental UPRR and BNSF routes in Southern California. The Tehachapi Trade Corridor is a 68-mile stretch between Bakersfield and Mojave. This route has a high volume of traffic, with approximately 40 trains per day passing through the corridor (Caltrans 2011).

Historically, both the BNSF and UPRR have added capacity when needed to meet market demand. Future improvements are expected to continue to provide sufficient capacity for interstate rail needs. The 2014 Kern Regional Transportation Plan (RTP) notes two major freight rail investments in progress as of 2014: double-tracking the BNSF sections from Bakersfield to Mojave and developing the Shafter Intermodal Rail Facility (Kern Council of Governments [COG] 2014).

[8] Leased branch lines are smaller, regional rail lines leased by regional rail carriers from the larger, interregional carrier companies that own the lines.

Conventional Passenger Rail

In the study area, conventional passenger rail and freight rail share track. Figure 1-7 shows passenger rail lines, including Metrolink service that runs to Lancaster and Amtrak service that picks up in Bakersfield. Presently, there is no passenger rail line connecting the Antelope and San Joaquin Valleys, although freight lines do connect these areas. Amtrak operates intercity rail passenger service in the study area on the San Joaquin route, which currently runs a total of six trains from Northern California (Oakland and Sacramento) to downtown Bakersfield. A seventh train from Oakland to Bakersfield was added in 2016 (Amtrak 2016). The Caltrans Division of Rail administered the San Joaquin service from the 1970s until July 2015, but on July 1, 2015, a new San Joaquin Joint Powers Authority composed of major San Joaquin Valley metropolitan planning organizations and transit operators assumed administrative services responsibilities. One elected official from each agency makes up the San Joaquin Joint Powers Authority Board.

As an integral part of the San Joaquin service, Amtrak operates connecting Thruway bus service from the Bakersfield Amtrak Station to Los Angeles Union Station, as well as other points in Southern California. Many of these buses run parallel to the Bakersfield to Palmdale Project Section Build Alternatives and connect passengers to Amtrak trains in Bakersfield and Los Angeles.

As shown on Figure 1-8, eight Amtrak Thruway bus routes connect to San Joaquin trains:

- Amtrak Thruway Bus Route 10 (Bakersfield–Oxnard–Santa Barbara)
- Amtrak Thruway Bus Route 12 (Bakersfield–Victorville)
- Amtrak Thruway Bus Route 19a (Bakersfield–Hemet)
- Amtrak Thruway Bus Route 19b (Bakersfield–Indio)
- Amtrak Thruway Bus Route 1a (Bakersfield–San Diego)
- Amtrak Thruway Bus Route 1b (Bakersfield–Los Angeles–San Pedro)
- Amtrak Thruway Bus Route 1c (Bakersfield–Van Nuys–Torrance)
- Amtrak Thruway Bus Route 9 (Bakersfield–Las Vegas)

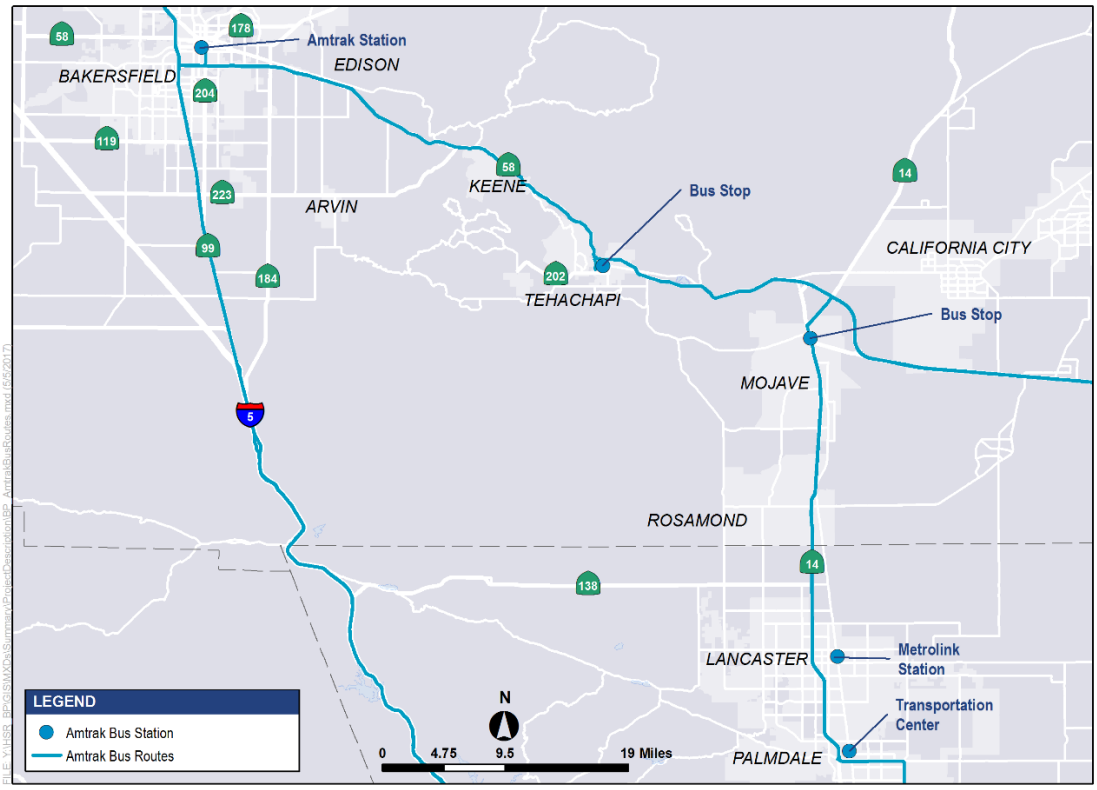


Figure 1-8 Project Vicinity Amtrak Thruway Bus Routes

Each thruway bus serves several locations on its route between Bakersfield and its terminus. As many as six buses meet each scheduled train in each direction of travel every day. Only passengers connecting to or from a train may ride Amtrak Thruway buses.

Metrolink offers a Thruway Connecting Service (Antelope Valley Line) between Los Angeles Union Station and Lancaster that connects to the Amtrak Pacific Surfliner route and the San Joaquin route. The Antelope Valley Line offers 19 daily trips in each direction on weekdays and 12 daily trips on weekends. The travel time on Metrolink's Antelope Valley Line between Lancaster and Palmdale is 9 minutes; between Lancaster and Los Angeles Union Station it is 1 hour, 55 minutes; and between Palmdale and Los Angeles Union Station it is 1 hour, 46 minutes. In 2015, Metrolink implemented a 25 percent permanent student and youth discount and a 25 percent temporary discount on all trips on the Antelope Valley Line between Lancaster and downtown Los Angeles. The agency began the pilot discount program in July and saw ridership gains of 10 percent on the Antelope Valley Line and 13 percent among students and youth.

Freight train operations can adversely affect passenger train service under certain circumstances (e.g., freight lines utilizing limited rail capacity and thereby minimizing the availability of railroads for passenger train service), resulting in longer travel times and less predictable schedules for train passengers. To increase ridership on the Antelope Valley Line, the *California State Rail Plan 2007–2008 to 2017–2018* (Caltrans 2008a) seeks to improve the frequency of travel and on-time performance by implementing capital and operational improvements.

Air Travel Growth and Capacity Constraints at Airports

The Federal Aviation Administration (FAA) projects that U.S. and foreign air travel will increase by 4 percent per year between 2015 and 2035 (FAA 2016). Air travel demand has been growing steadily in California since 2009 and is projected to continue to grow at a rate of approximately 2 percent per year between 2015 and 2025 (California Energy Commission 2015). By 2005, Los Angeles to San Francisco was the busiest air travel route in the U.S., with 8.6 million trips annually, representing approximately 43 percent of the intercity trips between Los Angeles and the San Francisco Bay Area for all transportation modes (Cambridge Systematics 2007). During calendar year 2015, San Francisco International Airport enplaned and deplaned 38,823,001 domestic passengers (FAA 2016a). Based on San Francisco International Airport's July 2015 schedule, Los Angeles International Airport (LAX) was the top domestic destination, with 14.2 percent of total domestic seats. During the same time period, there were 623 weekly flights between San Francisco International Airport and LAX. In addition, far fewer commercial air trips were made to and from project vicinity airports that do not fall within the top 100 flight corridors in the U.S. Without the HSR system, more than 3 percent of all intercity travel statewide and approximately 10 percent of longer intercity trips (those more than 100 miles) are forecast to be air travel (Cambridge Systematics 2007).

Fresno-Yosemite International Airport (FAT) and Bakersfield Meadows Field Airport (BFL) offer several commercial flights daily. Neither FAT nor BFL provides substantial intercity commercial airline service to the population in the southern San Joaquin Valley, greater Tehachapi Area, or Antelope Valley, as shown by a comparison between the populations of Kern County and northern Los Angeles County and the amount of air travel activity at FAT and BFL. The 2010 U.S. Census data indicate that the populations of Kern County and Los Angeles County are 840,000 and 9,818,605 people, respectively. As shown in Table 1-7, the number of enplanements from these two airports compared to these populations is very small in comparison.

Hollywood Burbank Airport (BUR) offers a fraction of the flights offered at LAX. LAX and BUR are both constrained with regard to airfield capacity at 7.3 million annual passengers (MAP) and 82.9 to 96.6 MAP according to the 2016–2040 SCAG RTP/Sustainable Communities Strategy (SCS) (SCAG 2016). The 2016/2040 SCAG RTP/SCS provides a range of forecasts describing how the 136.2 MAP will be distributed throughout the region based on airport constraints and levels of regionalization of the region's airports to accommodate passenger demand.

Table 1-7 Commercial Air Traffic and Airports Serving the Bakersfield to Palmdale Project Section

Airport	Total 2014 Annual Passengers[1]	Estimated 2040 Annual Passengers[2]	Number of Carriers Providing In-State Service[3]	In-State Airports Served
Fresno-Yosemite International Airport (FAT)	710,353	1,189,776	3	SFO, LAX, SAN
Meadows Field—Bakersfield (BFL)	140,007	148,343	1	SFO
Los Angeles International Airport (LAX)	34,314,197	82,900,000–96,600,000	7	MMH, MRY, OAK, SAN, SFO, SJC, SMF, STS
Hollywood Burbank Airport (BUR)	1,928,491	7,300,000	2	OAK, SFO, SJC, SMF

Sources: Federal Aviation Administration, 2016b; FlyFresno.com, 2016; MeadowsField.com, 2016; lawa.org, 2016; bobhopeairport.com, 2016; 2016–2040 Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy
Assumes the adopted constrained scenario for 2040 growth in million annual passengers across the region's airports.
[1] Calendar Year 2014 Air Carrier Activity Information System, Calendar Year 2014 Passenger Boardings at Commercial Service Airports.
[2] Source of 2040 estimates for FAT and BFL: FAA Terminal Area Forecast, https://taf.faa.gov//.
[3] FlyFresno.com, meadowsfield.com, bobhopeairport.com, lawa.org.
MMH = Mammoth Airport
MRY = Monterey Regional Airport
OAK = Oakland International Airport
SAN = San Diego International Airport
SFO = San Francisco International Airport
SJC = Mineta San José International Airport
SMF = Sacramento International Airport
STS = Charles M. Schulz–Sonoma County Airport

BFL currently offers the only commercial passenger service in the Bakersfield to Palmdale Project Section study area. The study area is the area defined for study and analysis for the Bakersfield to Palmdale Project Section. This study area varies slightly for each topic but generally covers the southern San Joaquin Valley and the Antelope Valley regions. Located east of SR 99 and north of the City of Bakersfield, BFL is the second busiest passenger airport in the San Joaquin Valley, after FAT, which is located outside of the Bakersfield to Palmdale Project Section study area. Kern County owns and operates BFL, which has three carriers providing 24 daily flights (12 departures and 12 arrivals), with service to Denver, Houston, Las Vegas, Los Angeles, Phoenix, and San Francisco. Five of the daily departures travel to destinations within California. In 2014, the airport had 140,007 passenger enplanements, with approximately half of those passengers traveling within California. The in-state weekly capacity is approximately 1,136 seats. Expansion of the number of gates in response to increased demand is possible. Two gates can be added to the current concourse without construction, while concourse expansion could accommodate a total of 12 gates. If warranted, construction of an additional 12-gate terminal would provide for a total of 24 gates at the facility (Kern COG 2014).

Palmdale Regional Airport is to the immediate northeast of Palmdale and to the southeast of Lancaster. The two main runways, built for military jets, are each over 2 miles long. From 1970 to 1983, the Los Angeles Department of Airports, now called Los Angeles World Airports, acquired about 17,750 acres of land east and south of U.S. Air Force Plant 42 in unincorporated Los Angeles County to be developed into a future "Palmdale Intercontinental Airport," which would be an alternative to LAX. However, Los Angeles World Airports did not develop Palmdale Regional Airport beyond a 9,000-square-foot airport terminal. The airport attracted intermittent commercial service from the late 1970s until 2008. The City of Palmdale took over the airport at the end of 2013 and now manages it through the Palmdale Airport Authority. The city continues to seek the return of commercial service and expanded use of the airport.

Table 1-7 provides a summary of the usage of airports in the study area in terms of enplanements. Palmdale Airport is not included in Table 1-7 because it did not serve any commercial passenger flights during the time period present and does not currently provide commercial passenger flights.

As shown in Table 1-7, FAT and BFL accounted for approximately 3 percent of enplanements compared to LAX. Air travel to and from FAT and BFL does not competitively serve south San Joaquin Valley residents when compared with automobile travel. More direct flights are available from larger airports in Sacramento, San Francisco, Oakland, San Jose, or Southern California compared to smaller airports such as BFL. Enplanements from BFL declined by approximately 9 percent between 2005 and 2013 (California Airports Council 2015), while the population in Bakersfield grew by approximately 43 percent during the same time period (U.S. Census 2010). As shown in Table 1-7, annual enplanements at LAX were approximately 34.3 MAP in 2014. By 2040, passenger demand at LAX is projected to reach 82.9 to 96.6 MAP (SCAG 2016). In the unconstrained scenario, where travel demand increases at the highest projected rate and alternative modes of travel are not factored, LAX will exceed its capacity in 2040 at 100.7 MAP. The SCAG 2016–2040 RTP/SCS discusses the need to shift air traffic from existing constrained airports like LAX to the outlying suburban or exurban airports that have the capacity to accommodate forecasted growth (e.g., BFL) to provide a more regionalized aviation network.

The future level of travel demand is noteworthy because LAX is among the most capacity-constrained airports in the nation. An FAA study that examined future demand and operational capacity identified the Los Angeles area as needing additional capacity by 2015 and LAX as needing additional capacity by 2025, even with the planned improvements (FAA 2007). Other smaller airports in Los Angeles travel markets (e.g., BUR) were also identified as needing capacity improvements. Because of existing constraints to the expansion of airports, the study concludes that other solutions, including regional sharing of air travel among local airports, market mechanisms such as incentives for alternative modes of transportation, and consideration of high-speed ground travel modes such as HSR, will be needed to alleviate the demand and capacity constraints. The HSR system, including the Bakersfield to Palmdale Project Section, would help to alleviate these capacity constraints at LAX and BUR by providing a new intercity transportation mode and improving the transportation accessibility of the project vicinity.

Travel Time

With growing demand for intercity travel and capacity constraints, the total automobile travel time will increase statewide. Air and rail travel time will remain basically the same, while HSR travel would be faster than conventional rail and would be competitive with air travel when taking into account the time needed for airport access, waiting, and egress. Table 1-8 shows the approximate total travel time in 2010 and the projected total travel time in 2040 for automobile, air, and rail travel between various city pairs. These data come from the ridership analysis completed for the HSR forecasting model, with information from regional transportation planning agencies, Caltrans, and current air and conventional rail schedules.

While air travel time will not change, the number of desired flights to a given destination may be limited by runway capacity, which reduces flexibility in travel dates available. Projected increases in automobile travel time will be caused largely by growing travel demand and resulting congestion on highways used for intercity travel. Some rail capacity improvement projects have been funded for Southern California, but these are equipment enhancements intended to improve reliability rather than travel time (CSRP 2013).

These improvements will provide some benefit to rail passengers but will not substantially increase passenger rail capacity to the San Joaquin Valley, greater Tehachapi Area, or Antelope Valley.

Continuing population growth in California place severe demands on the already congested transportation system serving the state's major metropolitan areas. As described in the RTPs for areas to be served by the proposed HSR system, the highways serving key cities are operating at capacity, and plans for expansion will not keep pace with projected growth over the next 20 to 40 years (Kern COG 2011; SCAG 2012).

Table 1-8 Estimated Total Travel Times (Door-to-Door in Hours and Minutes) between City Pairs by Auto, Air, and Rail (Peak Conditions)

City Pair	Auto[1]		Air[2,3]		Conventional Rail[3]	
	2010	2040	2010	2040	2010[4]	2040[5]
Los Angeles downtown to San Francisco downtown	6:27	6:53	4:37	4:32	11:40	11:29
Fresno downtown to Los Angeles downtown	3:37	3:51	4:03	4:23	5:49	5:55
Los Angeles downtown to San Diego downtown	2:24	2:28	4:11	3:55	3:02	3:24
Burbank (Airport) to San Jose downtown	5:22	5:43	3:43	3:43	10:31	10:40
Sacramento downtown to San Jose downtown	2:22	2:18	4:12	4:25	4:04	3:32

Source: California High-Speed Rail Authority, 2016b

[1] Travel times come from California Statewide Travel Demand Model.

[2] Main mode level-of-service assumptions are the same for 2010 and 2040 and are based on 2009 level-of-service conditions from U.S. Department of Transportation 10% O&D Survey airline data from the Bureau of Transportation Statistics. Total travel time differences are based on changes in access/egress over time.

[3] Air and conventional rail times include access to main mode via transit, egress to main mode via transit, and terminal and wait time at stations/airports. When transit data are unavailable, auto data are used for access/egress.

[4] Developed from the online published San Joaquin schedule.

[5] The Year 2040 San Joaquin operation plan was developed from the 2013 State Rail Plan.

1.2.4.2 Safety and Reliability

Projected growth in California's people and goods movement by automobile, air, and rail over the next 2 decades underscores the need for improved travel safety. With more vehicles on intercity highways, the potential for accidents increases.

In addition to insufficient roadway capacity, weather-related events can also disrupt and delay travel and can affect transportation reliability and safety. Weather conditions, such as rain and wind, can make roads dangerously slick, further increasing the likelihood of accidents. Fog, haze, and glare can distract drivers or cause them to slow. As delays on freeways increase, the overall reliability of the system tends to decrease (Cambridge Systematics 2007), which adversely affects travel times.

Travel demand will continue to outpace future highway capacity, resulting in increased travel delays. Roadway congestion, limited airport capacity, passenger train delays from freight train traffic, and a growing intercity travel market adversely affect the travel time reliability of air, conventional passenger rail, and automobile travel. As noted under Travel Demand in Section 1.2.4.1, Caltrans expects that the projected growth and travel demand in the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley will not be matched by increases in roadway capacity.

The California Highway Patrol publishes an annual summary of accident data for state highways. According to those statistics, in 2013, 156,909 nonfatal injuries and 3,104 fatalities occurred on California highways, which corresponds to a fatality rate of 0.94 per 100 million VMT. Kern County experienced 122 fatal collisions, and Los Angeles County experienced 585 fatal collisions. These correspond to a fatality rate of 1.52 per 100 million VMT and 0.75 per 100 million VMT, respectively (California Highway Patrol 2013). The nationwide fatality rate per 100 million VMT was 1.88 in rural areas and 0.73 in urban areas in 2013 This indicates that Kern County is above the statewide average, likely due to it being largely rural, and Los Angeles County is below the statewide average, likely due to it being largely urban. Rural areas generally have a higher than average fatality rate than urban areas because of factors including rate of

speed, seat belt use, age and safety systems in vehicles, and poor road conditions (National Highway Transportation Safety Administration 2015).

The San Joaquin Valley is subject to dense fog (often called tule fog) many days during the winter months. Visibility in tule fog is less than one-eighth of a mile (approximately 600 feet) and is sometimes less than 10 feet, which creates a substantial safety hazard for motorists. Visibility in tule fog can also change rapidly; within a short distance, visibility can diminish to near zero. Low and changing visibility related to tule fog causes many chain-reaction vehicle accidents on roads and hills in the San Joaquin Valley. In February 2002, two people were killed in an 80-car pile-up on SR 99 in Fresno County. Visibility at the time of the accident was less than 10 feet. In November 2007, fog caused a pile-up that involved 1,098 passenger vehicles on northbound SR 99 south of Fresno. Tule fog can extend as far south as Bakersfield, although these occurrences are rare. Many motorists avoid travel between cities in the San Joaquin Valley, or to and from the valley, during the winter because of tule fog. Fog also affects other forms of transportation that require visibility for safety (e.g., pedestrians, bicyclists). Tule fog is limited to the San Joaquin Valley and does not extend into the Tehachapi Mountains or the Antelope Valley to the south.

Much of the project vicinity is subject to high winds that can overturn vehicles. In December 2015, three big rigs and a delivery truck flipped over near SR 58 and SR 14 as a result of sustained winds of up to 70 miles per hour, with gusts of up to 85 miles per hour (Victor Valley News Group 2015). High winds can also result in blowing dust that can decrease visibility and cause accidents.

The greater Tehachapi area is subject to mudslides, and the periodic drought in California has worsened the conditions that lead to mudslide hazards. Vegetation typically compacts and holds soil in place. However, wildfires and areas of dead vegetation have resulted in less stable soils. In October 2015, approximately 192 vehicles were blocked on a 10-mile stretch of SR 58 for days because roadways were buried by 5 to 6 feet of mud. Many motorists abandoned their cars on SR 58 to find shelter, and school districts were forced to close (Bankert 2015).

In the Antelope Valley, periodic snowfall during the winter months can present a hazard for motorists traveling along SR 14 and Sierra Highway. Because snowfall is rare in the Antelope Valley, when it does occur, motorists are often not prepared to drive under such conditions.

Airport delays are a function of capacity, weather conditions, and safety conditions. When demand at an airport exceeds the capacity on the airfield at that time, flights are delayed until they can be safely accommodated. Delayed flights sometimes compound problems for other flights and can result in cancelled flights.

Please refer to the *Bakersfield to Palmdale Project Section Transportation Technical Report* (Authority 2018) for a more detailed discussion of the safety and reliability of the existing transportation system in the project vicinity. For information on how to access and review technical reports, please refer to the Authority's website at www.hsr.ca.gov.

1.2.4.3 Modal Connections

As discussed in Section 1.2.4.1, Travel Demand and Capacity Constraints, the project vicinity currently is underserved by transportation facilities for vehicle, air, and rail travel, and there are capacity constraints for all three of these modes of travel. Freight movement utilizes much of the railroad capacity in the project vicinity, limiting the number of trips possible for passenger rail. LOS on intercity highways in the project vicinity will continue to deteriorate by the year 2040, and airports will not be able to accommodate additional enplanements due to the constraints discussed in Section 1.2.4.1. Air, rail, and vehicle travel modes connect the San Joaquin Valley communities to the greater Los Angeles area, connecting the residents of the Central Valley to some of California's major commercial and cultural hubs. Between San Francisco and Los Angeles, the project vicinity's major transportation facilities for passenger travel include SR 14, SR 58, I-5, Amtrak, Metrolink, and the FAT, BFL, and LAX airports. Convenience and speed similar to vehicular travel are essential to the viability of a transportation system. Multiple mode changes (e.g., from car to shuttle to plane to train) to reach a destination are less convenient for travelers and may reduce the likelihood of travelers choosing to use a transportation system.

As shown on Figure 1-3, Bakersfield and Palmdale are connected by SR 14 for north-south travel and by SR 58 for east-west travel. Because I-5 is located approximately 15 and 30 miles west of Bakersfield and Palmdale, respectively, it does not provide a convenient transportation route between the cities. In addition, Amtrak California™ does not provide a direct connection between Bakersfield and Palmdale, and requires an interconnecting stop at the Newhall Metrolink Station in Santa Clarita and a transfer to the Santa Clarita-Newhall connecting bus service. The frequency and travel times between these cities are not adequate to meet many travel needs, as discussed above under Conventional Rail.

As discussed above, commercial airports in the southern San Joaquin Valley area (BFL and FAT) are underutilized because it often costs less for San Joaquin Valley residents to drive than to fly between locations within California. As shown in Table 1-9, travel time and costs are much higher for air travel compared to vehicular travel between Bakersfield and Burbank.

Table 1-9 Bakersfield to Burbank Travel Time Comparison

Travel Method	Time[1]	Cost[2]
Air Travel (BFL to BUR)	3 hours, 26 minutes, to 31 hours, 58 minutes	$248 to $1,101
Vehicle	1 hour, 30 minutes, to 2 hours, 10 minutes	$57

Sources: Google Maps, 2016; Google Flights, 2016
[1] Travel times for vehicular travel vary based on peak-hour traffic delays. Travel times for flights between BFL and BUR vary based on the number of connecting stops. There are no direct flights between BFL and BUR.
[2] Vehicular travel cost is based on the 2016 Federal Mileage Reimbursement rate of $0.54 for business use. Flight costs vary depending on the date of travel, airline carrier, and available flights. This represents a range based on booking a flight on the same day to booking a flight one month in advance as of May 19, 2016.
BFL = Bakersfield Meadows Field Airport
BUR = Hollywood Burbank Airport

Larger airports that are within driving distance of the southern San Joaquin Valley provide more variety of direct airline service for trips outside California, often at much lower prices. Driving to one of these larger airports may be a more attractive option for southern San Joaquin Valley residents than flying from one of the regional airports. As stated above, the number of enplanements from BFL declined between 2005 and 2013. Correspondingly, commercial airlines have not increased service from these airports, which reduces connectivity options for the Bakersfield to Palmdale area.

The options for connecting from the San Joaquin Valley or Antelope Valley to California's largest metropolitan areas include driving the full distance, driving to a regional or larger airport and then flying, or using an intercity rail and transit bus to the final destination. The limited options of direct, fast, and safe connections to the major metropolitan areas isolate the San Joaquin Valley and Antelope Valley economically, limit the areas from which local businesses draw customers and employees, and reduce the accessibility of job markets for residents. HSR service to/from Bakersfield and Palmdale would provide links to a number of bus, light rail, and airport services for intercity travelers to other areas of the state and would integrate the Bakersfield to Palmdale Project Section into the statewide and national transportation and economic systems.

1.2.4.4 Air Quality and Reduce Greenhouse Gas Emissions

Metropolitan areas will continue to be challenged to reduce emissions from a growing number of vehicles to acceptable levels and to maintain air quality standards by encouraging more efficient use of land resources, improving mobility, and providing alternative transportation facilities and services. Policies aimed at reducing the demand for trips in single-occupant vehicles are integral to all transportation plans and programs to help areas currently in nonattainment status to conform to federal air quality standards.

The USEPA implements the Clean Air Act (42 U.S.C. § 7401), as amended. Under the authority of the Clean Air Act, the USEPA established nationwide air quality standards to protect public health and welfare with an adequate margin of safety. The federal standards (National Ambient Air Quality Standards) represent the maximum allowable atmospheric concentrations for criteria

pollutants: ozone, particulate matter (particulate matter less than or equal to 10 microns in diameter [PM_{10}] and particulate matter less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. The Clean Air Act requires that a state implementation plan be prepared for each nonattainment area and a maintenance plan be prepared for each former nonattainment area that subsequently demonstrates compliance with the standards. A state implementation plan is a compilation of a state's air quality control plans and rules that the USEPA has approved. California has multiple air basins designated as nonattainment areas (Section 3.3, Air Quality and Global Climate Change) ranging from severe to serious status. These include the Sacramento Valley Air Basin, the San Joaquin Valley Air Basin, the South Coast Air Basin, and the Southeast Desert Air Basin (Coachella Valley).

Metropolitan areas will continue to be challenged to reduce emissions to acceptable levels from a growing number of vehicles and to maintain air quality standards by encouraging more efficient use of land resources, improving mobility, and providing alternative transportation facilities and services. Policies aimed at reducing the demand for trips in single-occupant vehicles are integral to all transportation plans and programs to help areas currently in nonattainment status to conform to federal air quality standards.

One statewide strategy adopted in the California State Implementation Plan is the development of multiuse transportation corridors, including designated high-occupancy vehicle lanes, the addition of more transit, and the inclusion of rail modal options. Meeting federal and state air quality standards over the next 20 to 40 years will also require reductions in VMT, integration of land use and transportation planning and development, development of transportation demand strategies, implementation of operational improvements, and use of new technologies that improve transportation efficiencies and increase transportation alternatives to the single-occupant automobile. Automobile trips are expected to account for more than 95 percent of all intercity travel and close to 90 percent of longer intercity trips in California by 2035.

In 2005, California set statewide targets for reducing GHG emissions. Executive Order S-3-05 requires that state agencies reduce their GHG emissions to 2000 levels by the year 2010, to 1990 levels by the year 2020, and to 80 percent below 1990 levels by the year 2050. Shortly after the issuance of Executive Order S-3-05, the California State Legislature adopted AB 32, the Global Warming Solutions Act of 2006. AB 32 recognizes that California is the source of substantial amounts of GHG emissions. Legislative findings in the law state the following:

> *The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to the marine ecosystems and that natural environment, and an increase in the incidences of infectious diseases, asthma, and other health-related problems* (California Health and Safety Code Section 38500–38599 [2006]).

To avoid these consequences, AB 32 requires CARB, the state agency charged with regulating air quality, to create a plan and implement rules to achieve real, quantifiable, and cost-effective reductions of GHGs in California. AB 32 requires CARB to design and implement emissions limits, regulations, and other measures to reduce statewide GHG emissions to 1990 levels by 2020. CARB developed this plan in 2008 as the Climate Change Scoping Plan (CARB 2008), the state's road map to reaching the GHG reduction goals required by AB 32. The plan supports the implementation of an HSR system to provide more mobility choice and reduce GHG emissions. CARB adopted the approved scoping plan at its December 11, 2008, meeting. The *First Update to the Scoping Plan* was approved by CARB on May 22, 2014.

In 2015, Executive Order B-30-15 set an interim GHG emissions reduction goal for California to reduce GHG emissions to 40 percent below 1990 levels by 2030. Executive Order B-30-15 was written to help make it possible for California to reach its ultimate goal of reducing GHG emissions to 80 percent below 1990 levels by 2050, as set forth under Executive Order S-3-05.

SB 32, which became law in September 2016, codifies Executive Order B-30-15 and extends the GHG emissions reduction goals of the California Global Warming Solutions Act of 2006. SB 32 requires CARB to ensure statewide GHG emissions reductions of at least 40 percent below 1990 levels by 2030. CARB prepared the *2017 Climate Change Scoping Plan Update* (CARB 2017a), adopted in December 2017 by Resolution 17-46 (CARB 2017b), which includes plans to achieve goals set forth by SB 32.

SB 375, which became law in September 2008, provides a new planning process to coordinate the community development and land use planning process with RTPs. SB 375 sets priorities to help California meet its GHG reduction goals and requires the RTPs prepared by metropolitan planning organizations (including the Councils of Governments for Kern and Los Angeles Counties) to include a "sustainable communities strategy" or, if infeasible, an "alternative planning strategy" that would support the GHG emission reduction targets for automobiles and light trucks set by CARB. The current provisional GHG reduction targets for the San Joaquin Valley Council of Governments are 5 percent below 2005 levels by 2020 and 10 percent below 2005 levels by 2035. SCAG has set GHG reduction targets of 8 percent below 2005 levels by 2020 and 13 percent below 2005 levels by 2035.

The transportation sector is responsible for about 41 percent of California's GHG emissions (CARB 2018). Emissions of criteria pollutants and GHG emissions from motor vehicles are directly proportional to the amount of fuel burned. Table 1-10 shows the monitored air quality levels in the project vicinity.

The projected growth (Section 3.18, Regional Growth) in Kern and Los Angeles Counties will result in an approximately 18.5 percent increase in VMT by 2040 (Section 3.3, Air Quality and Global Climate Change). Particulate matter levels are a direct function of the amount of driving, with road dust caused by moving vehicles accounting for 60 to 80 percent of particulate emissions from mobile sources. The continued increase in traffic will exacerbate the existing air quality problem and impede the region's ability to attain state and federal ambient air quality standards. Therefore, offering effective transportation choices (such as the HSR system) that can reduce VMT is critical for reducing these emissions.

As the HSR project expands to the full Phase 1 system, it would contribute substantially to reducing GHG emissions. The average annual savings of the Phase 1 system through 2040 is projected to be just over 1 million metric tons of carbon dioxide equivalent and, through 2075, is projected to be 1.35 million metric tons of carbon dioxide equivalent. This is equivalent to taking 285,000 passenger vehicles off the road every year (Authority 2016a).

Table 1-10 Monitored Air Quality in the Bakersfield to Palmdale Project Section Vicinity

Project Section Air Districts	CO State	CO Federal	O_3 8-Hour State	O_3 8-Hour Federal	O_3 1-Hour State	O_3 1-Hour Federal	PM_{10} State	PM_{10} National	$PM_{2.5}$ National	SO_2
San Joaquin Valley Air Pollution Control District	Standard not exceeded 2012–2014	Standard not exceeded 2012–2014	Standard exceeded in 2012 and 2014	Standard exceeded in 2012 and 2014	Standard exceeded 2012–2014	Standard exceeded 2012–2014	Standard exceeded 2012–2014	Standard not exceeded 2012–2014	Standard exceeded 2012–2014 except at Bakersfield Station	Not monitored
Eastern Kern Air Pollution Control District	Standard not exceeded 2012–2014	Standard not exceeded 2012–2014	Standard exceeded in 2012 and 2014	Standard exceeded in 2012 and 2014	Standard exceeded 2012–2014	Standard exceeded 2012–2014	Standard exceeded 2012–2014	Standard not exceeded 2012–2014	Standard exceeded 2012–2014	Not monitored
Antelope Valley Air Quality Management District	Standard not exceeded 2012–2014	Standard not exceeded 2012–2014	Standard exceeded in 2012 and 2014	Standard exceeded in 2012 and 2014	Standard exceeded 2012–2014, except at Mojave Station (only 2013)	Standard exceeded 2012–2014	Standard exceeded 2012–2014, except at Lancaster Station (only 2012)	Standard not exceeded except at Lancaster and Mojave Stations in 2012	Standard exceeded 2012–2014 except at Mojave Station	Not monitored

Source: California High-Speed Rail Authority, 2016b

CO = carbon monoxide
O_3 = ozone
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide

1.2.4.5 Protect and Preserve Natural Resources and Agricultural Lands

California's natural resources, including claypan resources, Joshua tree woodland, agricultural resources, and wildlife migration corridors, have been subject to direct and indirect impacts as the state's population has increased and growth has occurred in the less developed areas of the state. The rapid population growth and the draw of relatively affordable housing in Kern County and northern Los Angeles County, as compared with other urbanized areas of California, have threatened California's most valued agricultural lands and habitats that support biodiversity.

Claypan Resources

Claypan resources are an unusual aquatic feature in the Antelope Valley and have been threatened as a result of new development in the area. Claypans are typically shallow depressions in a relatively flat landscape, with a dense, hardpan layer of clay soil usually within 12 to 18 inches of the surface. These features support a variety of plants and animals, including migrating birds, fairy shrimp, insects, and opportunistic desert animals. While the water that collects in these depressions is not always drinkable, the insects that gather at claypans are a valuable food source for many desert mammals, birds, and reptiles. Desert claypans are scattered throughout the historic Lake Thompson area of the Antelope Valley, primarily between Lancaster and Rosamond. The USACE considers claypans to be aquatic resources. Please refer to the *Bakersfield to Palmdale Project Section Biological and Aquatic Resources Technical Report* (Authority 2018d) for further discussion of claypans.

Joshua Tree Woodland

Joshua tree woodland is also an unusual feature of the Antelope Valley and parts of Kern County that has been threatened as a result of rapid development patterns in the area. Aside from the Joshua tree woodland in Joshua Tree National Park and other parts of the Mojave Desert, Joshua trees are not protected and may be removed in advance of continued development and infrastructure projects.

Conservation Plans/Planning Areas

There are habitat conservation plans/planning areas throughout the project vicinity, including the Tejon Ranch Conservation Lands. These areas have been established to protect lands and to regulate development of lands that may result in conversion of critical habitat for species of concern or state- and federally listed threatened or endangered species. These species include the desert tortoise (*Gopherus agassizii*), the San Joaquin kit fox (*Vulpes macrotis mutica*), and the American badger (*Taxidea taxus*).

Agricultural Lands

Of California's approximately 49 million acres of privately owned lands mapped by the Farmland Mapping and Monitoring Program, approximately 12 million acres are considered to be Prime, Unique, or Statewide Important Farmlands, and approximately 10 percent of these lands are located in Kern and Los Angeles Counties. Since 1984, when the Farmland Mapping and Monitoring Program began, 1.4 million acres have been converted from agricultural land to nonagricultural purposes. The agricultural lands of the Central Valley, with their high-quality soils, support production of a wide array of food and fiber goods that are exported throughout the U.S. and internationally (refer to Section 3.14, Agricultural Farmland and Forest Land, for detail on crops in the project vicinity and their value). These lands, which form the underpinning of the state's agricultural industries, have been subject to a long-term trend of conversion to urbanized uses (Thompson 2007).

Wildlife Movement

The three distinct ecoregions in the Bakersfield to Palmdale Project Section vicinity—the Central Valley, the Tehachapi Foothills and Mountains, and the Antelope Valley—provide areas for wildlife movement and migration corridors that have been threatened by development and the associated increase in transportation infrastructure. For example, I-5 and SR 58 already impede

the Tehachapi Connection, which is a wildlife connection of statewide importance (South Coast Wildlands n.d.).

Conversion of Open Space for Urban Development

In California, new development has consumed 1 acre of land for every 7.2 people statewide, but this rate is 1 acre for every 8.1 persons in the San Joaquin Valley area and for every 8.0 persons in the Southern California area (not including the City of Los Angeles) (Thompson 2009). Conversion of open lands has also led to inefficient urban development patterns that have increased the cost of providing public services to the newly developed areas. Population growth in the project vicinity in the coming decades is expected to continue, resulting in ongoing pressure to use agricultural and vacant desert lands to accommodate growth. The HSR system would ease the pressure on the state's agricultural and natural resources, including those discussed above (i.e., conservation plans/planning areas, wildlife linkages, claypan resources, and Joshua tree woodlands), by reducing the need for expanding airports and freeways. Offering a new transportation option would provide an opportunity to create transit centers in the central business districts, which are best suited to mixed land uses (residential, commercial, and business uses) and urban densities. High volumes of people can induce economic investments within walkable distances of these centers. If the communities take advantage of this increase in land values, the growth can be directed to limit low-density development, which has been consuming large amounts of land area. HSR provides an opportunity to encourage walkable, more concentrated development patterns to meet new growth demands and reduce the rate and occurrence of low-density development, which degrades valuable land resources.

1.3 Relationship to Other Agency Plans, Policies, and Programs

The objectives of the California HSR System include providing an interface between the HSR system and major commercial airports, mass transit, and the highway network. Plans and programs that have been considered in the development of the Bakersfield to Palmdale Project Section alignment and station location options, or that already include recommendations for an HSR project, are discussed below.

In addition to the RTPs, general plans for cities and counties in the area were reviewed for information about growth and transportation policies in the communities covered. Key general plans consulted include those for Kern County, Los Angeles County, and the Cities of Bakersfield, Tehachapi, Lancaster, and Palmdale. While the newest of these plans (i.e., Tehachapi's 2012 General Plan, the Draft 2009 Metropolitan Bakersfield General Plan Update, and the 2014 Draft Los Angeles County General Plan) support HSR, older general plans in the area for the most part do not mention HSR. One exception is the City of Palmdale's General Plan; although adopted in 1993, it contains an Objective (C.4.2) to "Encourage extension of passenger rail service to the City of Palmdale" and a Policy (C4.2.1) supporting connecting Palmdale Regional Airport with LAX via HSR. Please refer to Appendix 2-H for a list of the relevant agency plans, policies, and programs in the project vicinity.

1.3.1 San Joaquin Corridor Strategic Plan and Corridor Service Development Plan

The San Joaquin Corridor Strategic Plan formalizes the vision for passenger rail service through the Central Valley. The purpose of the plan is to develop a program of improvements that will increase rail ridership, revenue, capacity, reliability, and safety within the San Joaquin corridor. The plan recognizes that current passenger trains have the opportunity to interface with the HSR system to serve as a collector/distributor through joint stations at major cities such as Fresno, Bakersfield, Sacramento, and Merced. Other opportunities would arise for the Amtrak San Joaquins rail line to "bridge" the HSR service while it is under construction in different regions, such as between the Bay Area and Merced, and between Los Angeles and Palmdale. The San Joaquins could act as a Central Valley corridor "bridge" connecting the HSR corridors in the north and south during construction of the HSR system (Caltrans 2008b).

In 2013, Caltrans published the *San Joaquin Corridor Service Development Plan* (Caltrans 2013b). The plan reflects the proposed implementation of the Initial Operating Segment of the HSR system between Madera and just north of Bakersfield, which is scheduled for completion in 2029. The Service Development Plan examines how the San Joaquin service would be restructured to operate some trains over the first construction section of the Initial Operating Segment as part of the blended-system approach described in the *California High-Speed Rail 2016 Business Plan* (Authority 2016b).

1.3.2 San Joaquin Valley Blueprint

As part of a smart growth principle, the *San Joaquin Valley Blueprint* (San Joaquin Valley Regional Planning Agencies' Policy Council 2010) envisions HSR service in the San Joaquin Valley, with stations in Fresno, the Kings/Tulare region, and Bakersfield. The blueprint is expected to be implemented through collaborative local and regional programs and planning processes, as well as through projects built by private-sector developers (San Joaquin Valley Regional Planning Agencies' Policy Council 2010).

1.3.3 Kern Council of Governments Regional Transportation Plan

This plan is a long-term general plan for the region's transportation network that encompasses projects for all types of travel, including aviation and freight movement. The document discusses intermodal and multimodal transportation activities, and it specifies how approximately $11.6 billion in anticipated federal, state, and local transportation funds will be spent in Kern County during the next 25 years. This plan includes approximately $4.3 billion in transit-oriented projects, including the HSR system.

1.3.4 Southern California Association of Governments 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy

The SCAG RTP/SCS provides a vision for transportation investments throughout the region. To implement the goals identified in the RTP/SCS, SCAG is collaborating with various state and regional stakeholders to plan intercity and interregional mobility improvements. This work currently includes partnering with the Los Angeles–San Diego–San Luis Obispo Rail Corridor Agency, Metrolink, and the Authority to plan and coordinate the development of higher-speed passenger rail service in the SCAG region and beyond.

In February 2012, SCAG approved an MOU with the Authority, various Southern California transportation agencies, the San Diego Association of Governments, and Metrolink for a proposed $1 billion investment from Proposition 1A bonds approved by voters in November 2008 (SCAG 2012) for investment in HSR.

1.3.5 State Route 58 Corridor System Management Plan

This plan is a long-range planning document that recommends management strategies within a transportation corridor that encompasses all transportation elements, including highways, major local parallel roads, transit, pedestrians, and HSR. The CSMP provides an overview of the HSR system, including the Bakersfield to Palmdale Project Section, as part of the regional transportation network, and it will be used by local, regional, and statewide agencies to continue to identify and plan transportation projects in the future within the project vicinity. Additionally, the CSMP discusses the potential to locate the heavy maintenance facility in Bakersfield.

1.3.6 District 6 System Management Plan

This plan develops and describes the vision of Caltrans District 6 for how the transportation system will be maintained, managed, and developed over the next 20 years and beyond. The District 6 System Management Plan states that HSR is part of the state's transportation system and should be considered in concert with local and regional nonmotorized transportation, transit, airports, and highways. Additionally, the District 6 System Management Plan indicates that HSR stations are envisioned to be multimodal transportation hubs and that establishing healthy, sound multimodal transportation connections will be critical to the success of the HSR service. The District 6 System Management Plan includes a discussion of the Caltrans Division of

Transportation Planning's High-Speed Rail Transit Connectivity Program, which was created on July 1, 2012, to assist the Caltrans Transit and Intercity Rail Program, the Authority, regional and local agencies, and transit operators in providing connectivity to HSR and feeder services. A discussion of Caltrans' Division of Transportation Planning's High-Speed Rail Transit Connectivity Program can be found in the Plan Consistency appendix (Appendix 2-H) of this EIR/EIS.

1.3.7 State Route 14 Transportation Concept Report

The SR 14 TCR is a long-range planning document that describes the current characteristics of the SR 14 transportation corridor and establishes a 20-year planning concept. A TCR has been prepared for the portions of SR 14 within Caltrans Districts 7 (2014) and 9 (2012). The TCR defines the goals for the development of a corridor in terms of facility type and LOS while broadly identifying the improvements needed to reach those goals. The main purpose of this TCR is to evaluate current and projected conditions along the route and suggest a configuration for SR 14 that will meet projected demand. The SR 14 TCR is an important planning document used by the Authority to identify and address transportation needs in the project vicinity in relation to the demand served by the HSR system.

1.3.8 California Transportation Plan 2040

The California Transportation Plan 2040 (CTP 2040), prepared by Caltrans, provides a long-range policy framework for guiding transportation decisions and investments by all levels of government and the private sector. CTP 2040 defines goals, performance-based policies, and strategies to achieve the collective vision for California's future statewide, integrated, multimodal transportation system, envisioning a sustainable system that improves mobility and enhances quality of life. Federal and state laws require developing and preparing a state transportation plan and an update every 5 years (Caltrans 2016).

CTP 2040 was initiated in early 2010 with the development of the 2012 California Interregional Blueprint in response to SB 391. The California Interregional Blueprint is a state-level transportation blueprint that articulates the state's vision for an integrated multimodal transportation system that complements RTPs and land use visions and provides the foundation for CTP 2040, which will conclude with the plan's approval by the Secretary of the California State Transportation Agency.

CTP 2040 is currently being updated and will focus on meeting new trends and challenges, such as economic and job growth, climate change, freight movement, and public health. The HSR system would support CTP 2040 goals, policies, and strategies by providing an efficient and reliable means of transportation that facilitates economic and job growth; by providing electric-powered transportation that reduces GHG emissions and air pollutants that contribute to climate change; and by providing some relief to California's strained highway and rail systems.

1.3.9 Measure R (Los Angeles County)

Measure R is a 30-year, $40-billion state tax-funded transportation investment plan program. Funds received from the tax will be used for all of the following in Los Angeles County:

- Developing new rail and bus systems
- Enhancing existing rail and bus systems
- Accelerating existing transportation projects
- Improving highways, carpool lanes, goods movement, grade separations, and sound walls
- Suspending scheduled fare increases for 1 year and freezing all Los Angeles Metropolitan Transportation Authority (Metro) student, senior, disabled, and Medicare fares (was effective through 2013)
- Resurfacing, rehabilitating, and reconstructing streets

- Improving or adding left-turn signals, bicycle and pedestrian facilities, streetscapes, and signal synchronization
- Repairing potholes
- Making rail and bus system and yard improvements

In addition to the improvements described above, some specific improvements designated in the Measure R program are listed below (some of which have already been completed):

- Extend light rail with airport connections, including Green Line service to LAX and the South Bay Corridor, the Purple Line from Wilshire/Western to Westwood, Exposition Boulevard Light Rail Transit from Culver City to Santa Monica, and the 24-mile Gold Line Foothill Extension to Claremont, as well as develop a West Santa Ana branch transportation corridor and a rapid transit option through the I-405/Sepulveda Pass
- Accelerate completion of the Canoga Corridor Orange Line to Chatsworth, as well as completion of the San Fernando Valley North-South Rapidways
- Link local rail lines through a regional connector (Long Beach/Pasadena and Culver City/East Los Angeles lines)
- Improve freeway traffic flow (I-5, I-10, SR 14, SR 60, US-101, I-110, SR 138, I-210, I-405, I-605, and I-710)

1.3.10 2016–2040 Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy

The RTP/SCS is a long-range transportation plan that SCAG developed and updates every 4 years. The RTP/SCS identifies strategic goals ranging from maximizing the system's mobility and accessibility to protecting the environment and improving air quality. The RTP/SCS provides a vision for transportation investments throughout the region. Using growth forecasts and economic trends that project over a 20-year period, the RTP/SCS considers the role of transportation in the broader context of economic, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address all mobility needs (SCAG 2016). The 2016 RTP/SCS includes mobility as an important component of a much larger picture that incorporates added emphasis on sustainability and integrated planning. The RTP/SCS integrates land use and transportation strategies that would meet the CARB emissions reduction targets. The vision for the RTP/SCS encompasses three principles as the key to the region's future: mobility, economy, and sustainability. The RTP/SCS focus areas include the following categories:

- Aviation
- Environmental mitigation
- Goods movement
- Growth forecast
- High-speed regional transport
- Highways and arterials
- Land use
- Nonmotorized transportation
- Transit
- Transportation demand management
- Transportation finance
- Transportation safety and security

Major goals of the RTP/SCS include improving regional economic development, maximizing mobility and accessibility for the region, ensuring travel safety and reliability, protecting the environment, maximizing the productivity of the regional transit system, and encouraging land use and growth patterns that facilitate transit and nonmotorized transportation (SCAG 2016). These goals are used to identify key transportation priorities throughout the region that in turn determine the need for specific system improvements in the following categories:

- Highway improvements (mixed-flow lanes and interchanges/ramps, high-occupancy vehicle lanes, toll lanes, and arterials)
- Transit improvements (commuter rail, heavy rail, light rail, bus rapid transit, bus, and other transit)
- High-speed regional transport
- Goods movement strategies (mainline rail capacity improvements, highway-rail grade separations, upgrade to diesel engines with reduced emissions, an alternative technology-based goods movement system, dedicated lanes for clean-technology trucks, and truck climbing lanes)

Ten performance measures have been developed to assess both the ability of proposed improvements to meet the established goals and the plan's overall performance. According to the RTP/SCS, these measures are crucial in evaluating progress over time and identifying the most effective investments for the region.

Funding plays a large role in the implementation of the RTP/SCS's proposed improvements. As such, the plan has been divided into two sections. The first is a financially constrained plan that includes only those improvements with "…committed, available, or reasonably available revenue sources…" that could be accessed at some point in the plan's 24-year time frame. These revenue sources are generated at the federal, state, and local levels, with the largest portion coming from local sales taxes. The second section of the plan, referred to as the Strategic Plan, consists of improvements requiring further study to determine whether funding should be committed.

1.3.11 Los Angeles Metropolitan Transportation Authority Antelope Valley Line Infrastructure Improvement Strategy

In April 2011, Metro initiated a feasibility study to enhance the Antelope Valley Line corridor and to identify infrastructure improvements that would enable Metrolink service to operate more quickly, safely, and reliably between Los Angeles Union Station and the City of Lancaster. A major study objective was to identify necessary infrastructure improvements to reduce travel time by 50 percent in the corridor. Another key objective was to identify safety improvements for pedestrian and vehicular traffic at existing at-grade crossings. The study also included a cost-benefit analysis for capital projects. The initial phase of the study was completed in March 2012 and concluded that some infrastructure and grade crossing safety improvement projects should be pursued. The study recommends continued coordination with the Authority for the portions of the Antelope Valley corridor that may be shared with the HSR system.

1.3.12 Metrolink 5-Year Short-Range Transit Plan

The *Metrolink 5-Year Short-Range Transit Plan* (Southern California Regional Rail Authority [SCRRA] 2015a) assesses the current Metrolink system based on projected growth and proposed improvements between 2015 and 2020. The analysis contained in this plan is based on many elements, including an assessment of the current Metrolink system, including plans for growth and improvements between 2015 and 2020. The Short-Range Transit Plan advances the SCRRA toward achieving its long-term goals identified in its 10-Year Strategic Plan. The Short-Range Transit Plan provides an analysis of financial resources, proposes action plans for commuter rail, and includes other project and program initiatives. It also addresses future funding strategies and includes measures to evaluate the plan's performance (SCRRA 2015a).

1.3.13 Metrolink 10-Year Strategic Plan

In 2015, the SCRRA adopted the SCRRA Strategic Plan, a conceptual planning document aimed at aiding Metrolink in meeting ridership demands through 2025. The Strategic Assessment forecasts that Metrolink will grow from 165 current daily trains to 240 by 2025 (SCRRA 2015b). The plan aims to:

- Strengthen core institutional functions, with a focus on fiscal sustainability, system reliability, and customer communications and responsiveness
- Focus initial investment in the rehabilitation of the system (vehicles and infrastructure) to ensure a state of good repair that can provide a base for supporting the growth scenarios identified in the Strategic Plan
- Evaluate the potential for additional reverse commute trips to address the growth and changing travel patterns in the region
- Initiate discussions with host railroads on the potential for reverse-peak services on corridors that are governed by shared-use agreements
- Establish strategic partnerships to tap new sources of funds, encourage rail-friendly development, and enable Metrolink to better serve markets within its existing network

1.4 Relationship to Other Transportation Projects in the Project Vicinity

One of the objectives of the proposed HSR system is to connect to major commercial airports, mass transit, and the highway network. The sections below describe other key transportation projects within the project vicinity that offer intercity travel benefits and could enhance intermodal connections to the proposed HSR system. The planning and development of the Bakersfield to Palmdale Project Section and station location options considered these projects.

1.4.1 High Desert Corridor

The High Desert Corridor would be a new 63-mile-long, east-west, four- to six-lane multimodal facility between SR 14 and US 395, including a steel-wheel-on-steel-rail train. The project would link the Cities of Palmdale, Lancaster, Adelanto, and Victorville and the Town of Apple Valley, and it would accommodate projected growth in the Western Mojave High Desert area in the future. The EIR/EIS for the High Desert Corridor was completed in June 2016. The High Desert Corridor project would serve as an HSR feeder service between Palmdale and Victorville. Toward this goal, studies have been conducted to identify viable routes to connect to both the Palmdale Transportation Center in Palmdale and the future XpressWest station in Victorville. The recently expanded Palmdale Transportation Center is a multimodal hub that offers connections between Antelope Valley Transit Authority local and commuter bus service, Metrolink commuter rail service, Greyhound bus service, and Amtrak train service. The new multimodal facility would allow riders to transfer from an HSR train to a High Desert Corridor train at the Palmdale Station, make the short trip to Victorville, and transfer to an XpressWest train to Las Vegas without the need to take a bus or car at any point.

1.4.2 XpressWest

XpressWest is a proposed HSR system identified in the SCAG's 2035 RTP that would link Las Vegas to Southern California. The proposed initial Southern California XpressWest station would be located in Victorville, roughly 60 miles to the east of the proposed Palmdale HSR Station. The High Desert Corridor, described in Section 1.4.1, would provide the link between the two stations (SCAG 2012). HSR riders would be able to transfer to the High Desert Corridor train in Palmdale, then transfer to an XpressWest train in Victorville, allowing for a bus- and car-free trip to Las Vegas from Los Angeles or the Bay Area.

1.4.3 Measure M (Los Angeles County)

In November 2016, Los Angeles County voters approved another sales tax ballot initiative titled the Los Angeles County Traffic Improvement Plan, or Measure M. Measure M is a new half-cent sales tax that began in in 2017 and will increase to a 1-cent sales tax in 2039 when the Measure R sales tax is set to expire. The measure is expected to generate $860 million per year for transportation-related improvements throughout Los Angeles County. The measure funds several new projects throughout Los Angeles County and expedites projects previously approved under Measure R.

Specific improvements funded through Measure M over the next 10 years include:

- Airport Metro Connector 96th Street Station/Green Line Extension LAX: Interfaces the station with the LAX-sponsored Automated People Mover; includes consolidated bus interface for Metro and municipal bus lines
- Westside Purple Line Extension—Phase 3: Project acceleration to the Department of Veterans Affairs Health Campus in West Los Angeles
- Metro Gold Line Foothill Extension: An 11-mile extension of the Metro Gold Line from its current terminus in the City of Azusa to the City of Claremont
- West Santa Ana Transit Corridor: An approximately 20-mile light rail line connecting southeast Los Angeles County to downtown Los Angeles
- Los Angeles River Waterway and System Bikepath/Complete Los Angeles River Bike Path: an approximately 24-mile bike path along the Los Angeles River from Los Angeles to Long Beach.

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